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(54) **MACHINE FOR THE PREPARATION OF BEVERAGES AND METHOD**

(57) The machine for preparing beverages comprises: a support for a cup which is adapted to receive a beverage; at least one piece of equipment for preparing beverages provided with a dispenser adapted to dispense at least one beverage into the cup positioned on the support; a dispenser of a soluble granular substance, adapted to dose the soluble granular substance into the cup positioned on the support; and a stirring device which imparts to the support, and to the cup positioned thereon, a movement adapted to dissolve the soluble granular substance in the beverage dispensed into the cup.

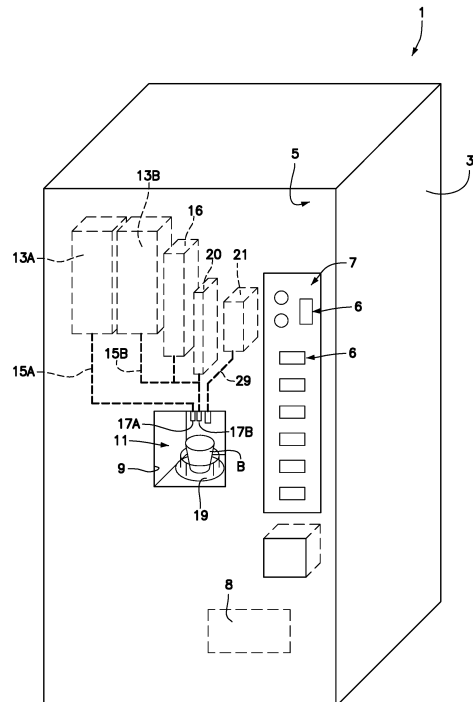


Fig.1

**EP 4 478 310 A1**

**Description**

## TECHNICAL FIELD

**[0001]** The present invention relates to devices and machines for preparing beverages, in particular hot beverages, such as coffee and the like.

## BACKGROUND ART

**[0002]** Vending machines for beverages, for example coffee, tea, and the like, are typically provided with a system for dispensing the beverage into a cup or the like, and with a sugar dispenser, which dispenses a dose of caster sugar into the cup before, during or after dispensing the beverage. Typically, a dispenser of teaspoons or stirrers is also provided, which are used to stir the beverage to dissolve the sugar.

**[0003]** The stirrers often consist of simple sticks, are usually made of plastic or wood and are disposable. They therefore constitute a potentially polluting element if the user does not have the foresight to throw it into a separate waste collection container, or if such a separate waste collection container is not available.

**[0004]** Furthermore, stirrers are a consumable material which increases the cost of each individual dispensing of a beverage.

**[0005]** The stirrer dispensing devices must be systematically refilled, like any other dispensing device of the automatic vending machine. This incurs a maintenance cost. Furthermore, the stirrer dispensers are expensive components which affect the overall cost of the beverage vending machine and are prone to failures resulting in malfunctioning of the automatic vending machine and the need for extraordinary maintenance interventions.

**[0006]** A vending machine for hot beverages, typically coffee, with a stirrer dispenser is disclosed in WO2016174647.

**[0007]** US2019/0117021 discloses a mixer for dissolving soluble substances in beverages. The device disclosed in this publication includes a rotating support, on which the cup with the beverage and the solid substance to be dissolved therein is placed. The support is rotated until the solid substance is completely dissolved. This known device, although also hypothetically proposed for use in automatic vending machines, could eliminate the use of stirrers, but would present notable limitations in such use. In fact, some beverages necessarily require a stirring action by means of stirrers, for example to dissolve ingredients which are difficultly soluble, or dispensed in high quantities such as to reach saturation of the liquid, or even because the beverage already contains a high quantity of substances in solution, which make it difficult to dissolve further solid substances. Consider, for example, the habit of some consumers to beverage very sweet coffee: dissolving large quantities of coffee can become difficult and require a prolonged stirring time. Dissolving sugar in coffee can also be made

particularly difficult when the coffee is espresso, since in this case the aromas extracted from the coffee powder are concentrated in a small amount of water, in which it is difficult to dissolve further substances.

**[0008]** The present invention has the aim of overcoming or alleviating the drawbacks of the known dispensing machines.

## SUMMARY

**[0009]** In order to reduce or avoid the prior art drawbacks described above, according to the invention a machine for preparing beverages is provided comprising: a support for a cup which is adapted to receive a beverage; at least one beverage preparation apparatus provided with a dispenser adapted to dispense at least one beverage into the cup positioned on the support; a dispenser of a soluble granular substance, adapted to dose the soluble granular substance into the cup positioned on the support; a stirrer dispenser; a stirring device which imparts to the support, and to the cup positioned thereon, a movement adapted to dissolve the soluble granular substance in the beverage dispensed into the cup; and a control unit configured to allow the user, by means of a user interface, to select at least a first operating mode, in which a stirrer is dispensed, and a second operating mode, in which a stirrer is not dispensed and the stirring device is activated.

**[0010]** The movement imparted by the stirring device to the cup containing the liquid part of the beverage and the granular substance, for example sugar, causes the granular substance to dissolve without the user needing to stir the beverage with a teaspoon or a stirrer.

**[0011]** Thereby, the consumption of stirrers is avoided, the user is facilitated in preparing the beverage and the machine for preparing beverages is made more economical, as well as simpler to maintain.

**[0012]** Typically but not exclusively, the soluble substance is sugar. For example, the machine can be a machine for preparing coffee by means of capsules or by means of ground coffee, possibly prepared instantly by grinding coffee beans. The possibility of using the stirring device to dissolve or melt other soluble granular substances in a liquid base, preferably hot, for example for preparing herbal teas or the like, is not excluded.

**[0013]** In some embodiments, the machine can be configured as an automatic beverage vending machine.

**[0014]** In practical embodiments, the stirring device comprises an actuator configured to impose a rotary movement around a rotation axis on the support and the cup positioned thereon. The rotation axis can coincide with the axis of the cup. In other embodiments the rotation axis can preferably be parallel to the axis of the cup located in or on the support, but spaced therefrom, so that the movement imposed on the cup to cause the granular substance to dissolve is a translational movement according to a circular trajectory.

**[0015]** To facilitate the solution of the soluble granular

substance, a cycle of stirring or movement of the cup can be envisaged with steps of rotation clockwise and counter-clockwise around the axis of the cup or around an axis parallel to the axis of the cup but spaced therefrom.

**[0016]** According to a further aspect, the invention concerns a device to assist in preparing beverages, comprising: a support for a cup which is adapted to receive a beverage; and a stirring device which imparts to the support, and to the cup positioned thereon, a movement adapted to dissolve the soluble granular substance in the beverage dispensed into the cup. The device can be separated from a machine for preparing beverages and acts as an external accessory thereto.

**[0017]** Further features and embodiments of the invention are indicated in the attached dependent claims.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0018]** The invention will be better understood by following the description and the attached drawings, which illustrate an exemplary and non-limiting embodiment of the invention. More in particular, the drawings show in:

- Fig. 1 a view of a beverage vending machine;
- Fig.2 a section, according to the plane II-II of Fig.3, of a stirring device;
- Fig.3 a plan view according to the line III-III of Fig.3; and
- Fig.4 and 5 flow charts of an exemplary dispensing cycle.

#### DETAILED DESCRIPTION

**[0019]** Fig. 1 schematically shows in frontal axonometric view a machine for preparing beverages, hereinafter referred to as a "beverage vending machine" indicated overall with 1. The beverage vending machine 1 can comprise a housing 3 with a front panel 5, on which one or more control panels 6 are accessible, forming a user interface 7, for setting the characteristics of the requested beverage and for making the payment. The number 8 indicates a control unit of the beverage vending machine 1, which receives commands by means of the user interface 7 and consequently controls the members inside the vending machine to dispense the beverage requested by the user.

**[0020]** The front panel can be configured as an openable door to allow access to the inside of the beverage vending machine 1.

**[0021]** An opening 11 is provided in the front panel, which allows access to a compartment 13, in which a cup B is positioned.

**[0022]** The beverage vending machine 1 can be made in any manner and contain one or more pieces of equipment for preparing beverages. In Fig. 1, two pieces of equipment 13A, 13B for preparing two distinct types of beverages, for example coffee and tea, are shown very schematically. In other embodiments, only one piece of

equipment 13, or more than two pieces of equipment for preparing beverages, can be provided. Preferably, at least one of the pieces of equipment for preparing beverages is adapted to prepare a hot beverage.

**[0023]** Each piece of equipment 13A, 13B has a conduit 15A, 15B ending in a dispensing nozzle 17A, 17B for dispensing the beverage into the cup B positioned on a support 19, better described below. Inside the housing 3, an apparatus 16 is also arranged, adapted to house a supply of disposable cups, for example made of plastic and preferably biodegradable plastic, and adapted to dispense, i.e., to position individual cups B on the support 19.

**[0024]** The beverage vending machine 1 further comprises a dispenser 21 of a soluble granular substance, which is dispensed into the cup B positioned on the support 19 by means of a conduit 23. Typically, the dispenser 21 is a dispenser of sugar or other sweetening substance. In other embodiments, the dispenser 21 can be a dispenser of coffee beans or other freeze-dried product.

**[0025]** Although Fig.1 shows by way of example a single dispenser 21 of soluble granular substances, the possibility of including more than one dispenser of soluble granular substances is not excluded. For example, the beverage vending machine 1 can comprise one or more dispensers of soluble ingredients for producing beverages using hot water supplied by a piece of equipment for preparing beverages which, in such a case, could be a simple kettle. In general, the beverage vending machine 1 comprises one or more dispensers of soluble granular substances, in which preferably at least one of such dispensers is adapted to dispense sugar.

**[0026]** Soluble granular substance is intended as any substance in the form of grains or powders, which can dissolve in a liquid, preferably water or a beverage, preferably hot.

**[0027]** The number 20 indicates a stirrer dispenser.

**[0028]** To allow the granular substance to dissolve in the hot beverage without the need for a teaspoon or a stirrer, according to the invention the beverage vending machine 1 comprises a stirring device, connected to the support 19. An exemplary and non-limiting embodiment of a stirring device is illustrated in Figs. 2 and 3 and indicated therein overall with the number 31.

**[0029]** In the embodiment illustrated in Figs. 2 and 3, the stirring device 31 comprises a housing 33 in which an actuator 35 is positioned. In some embodiments the actuator 35 is configured to impart a rotary movement to the support 19 for the cup B. In particular, in such a case the actuator 35 can be an electric motor. The rotary movement has proven to be particularly effective for dissolving powdered or granular products, such as sugar in particular, inside the beverage dispensed in the cup B.

**[0030]** In other embodiments, it is not excluded to use a different actuator, possibly adapted to impart another type of motion to the support 19. For example, the actuator can be a vibrodyne.

**[0031]** In the illustrated embodiment, the stirring device

31 includes a mechanical connection between the actuator 35 and a rotating plate 37 forming part of the support 19. A seat 39 is fixed to the rotating plate 37 and is adapted to receive and hold the cup B. The seat 39 is preferably positioned on the rotating plate 37 so that its axis B-B, i.e., the axis of the cup B when the latter is positioned in the seat 39, is parallel to the rotation axis A-A, but spaced therefrom, i.e., eccentric. In Fig.2, the letter E indicates the distance between the two axes A-A and B-B.

**[0032]** The vending machine and the stirring device contained therein operate as follows. When the user requests a beverage into which a soluble granular substance is poured, for example sugar, or another granular substance constituting for example an ingredient of the beverage, the liquid (and preferably hot) part of the beverage is dispensed by the respective equipment 13A or 13B in the cup B which has been previously inserted in the seat 3 of the support 31, for example with an automatic cycle performed by the automatic vending machine 1, in which the cup B is dispensed by the apparatus 16. The granular substance dispenser 21, for example sugar, dispenses the granular substance into the cup B. The granular substance can be dispensed before, during and/or after dispensing the liquid part of the beverage.

**[0033]** If the vending machine comprises means for dispensing a beverage obtained from freeze-dried granular substances, for example, the cycle can be similar and include dispensing the granular substance before, during or after the dispensing of hot water.

**[0034]** The interface 7 allows the user not only to select the desired beverage and any characteristics thereof (quantity of sugar or other, for example), but also allows to set the request for a stirrer, or the request to start an automatic cycle for dissolving the solid part in the liquid part of the beverage, avoiding the dispensing of the stirrer. The choice can be dictated by various factors, for example the type of requested beverage, the requested quantity of soluble substance (e.g., quantity of sugar), but also simply by a personal preference or habit of the user.

**[0035]** Thereby, in practice the user can choose an attitude which is more attentive to environmental pollution, selecting a method of dissolving the solid substance in the liquid performed by the stirring device, renouncing the dispensing of a stirrer. Conversely, if the user deems a more classic approach to consuming the requested beverage preferable, he/she can set on the interface 7 the dispensing of a stirrer by means of the device 20.

**[0036]** The control unit 8 can also be programmed to communicate to the user the opportunity for one or the other operating mode, as a function of the type and quantity of ingredients required for preparing the beverage. For example, if an espresso with a high quantity of sugar is requested, the control unit 8 can inform the user the greater suitability of using a stirrer to completely dissolve the sugar in the beverage. On the contrary, if the request is set for a beverage containing a greater quantity of liquid (e.g., a coffee, a tea, an herbal tea), the control unit 8

can suggest to the user the use of the stirring device, to avoid the dispensing of a stirrer.

**[0037]** The control unit 8 can also be programmed to impose a surcharge in the event of dispensing a stirrer.

**[0038]** If the user chooses to activate the stirring device 31, once the liquid part and the solid part, i.e., in powder or granules, have been dispensed into the cup B, the stirring device 31 performs a cycle of solubilizing or dissolving the granular substance in the liquid part of the beverage by stirring the beverage in the cup B.

**[0039]** If the stirring device 31 is rotating, as illustrated, the solubilizing cycle comprises at least one step of rotating the support 19 by means of the actuator 35. In some embodiments the rotation can occur at a variable speed so as to favour solubilizing the granular substance. In some embodiments, the solubilizing cycle can be envisaged to comprise a clockwise rotation step and a counter-clockwise rotation step. That is, the rotation speed can be set to change direction at least once.

**[0040]** The change in rotation direction can induce turbulent motions in the beverage which favour the dissolving, i.e., the solubilizing of the granular substance.

**[0041]** In advantageous embodiments, the seat 39 holding the cup B can have raised sides 39A which effectively hold the cup B during rotation, avoiding accidental movements under the effect of the centrifugal force. This can be particularly useful when the axes A-A and B-B are eccentric, as illustrated in Figs. 2 and 3.

**[0042]** Once the solubilizing cycle of the granular substance is completed, the stirring device stops and the user is informed, by means of the panel 7, that the beverage is ready for withdrawal and consumption.

**[0043]** With the stirring device described herein, the important advantage of reducing the consumption of plastic, i.e., polymeric material, wood, or other material, for the production of stirrers or teaspoons is obtained, thereby reducing the cost of the consumable material and the quantity of waste produced by the consumption of beverages, typically coffee or other hot sweetened beverages. Furthermore, the cost of the automatic vending machine and its maintenance is reduced, and the user is provided with a better service, as the beverage provided by the vending machine is already ready for consumption without the need to stir a stirrer or teaspoon therein to dissolve sugar or another soluble substance, such as a sweetener, powdered milk, or freeze-dried coffee granules.

**[0044]** The possibility of selecting at least two operating modes, i.e., solubilizing by activating the stirring device 31, or dispensing a stirrer, allows the user to choose the preferred, or best, mode based on the type and/or quantity of ingredients forming the beverage. The automatic vending machine 1 is thus particularly easy to use even for the most "traditionalist" users, while at the same time allowing an operation which is more attentive to environmental needs, which can be preferred by users who are more sensitive to these issues.

**[0045]** In some embodiments, it can be envisaged that

the control unit calculates the time necessary for solubilizing the solid substances by means of the stirring device 31. For example, the solubilizing time can be longer for an espresso with more sugar compared to an American coffee with less sugar. The control unit 8 can be programmed to communicate to the user, by means of the interface 7, the calculated solubilizing time. This provides the user with further information to choose the type of operation, i.e., with activation of the stirring device 31, or with dispensing of the stirrer. Based on the user's urgency and/or any crowding of users waiting for their turn, the user can orient his choice towards the most "ecological" mode of use or the "quickest" mode of use. The latter includes dispensing the stirrer into the cup, so that the beverage can be withdrawn immediately, allowing the person who withdrew the beverage to dissolve the solid part therein with the due time and due calm after having freed the vending machine for the benefit of the next user.

**[0046]** According to a further embodiment, the vending machine 1 can be configured so as to also allow the user further choices aimed at reducing the environmental impact. Typically, in addition to the stirrers, the cups used to contain the beverage also constitute a consumable material, a source of pollution. Although it is possible to make cups in recyclable or biodegradable material, in any case the consumption of disposable products represents a source of pollution, exactly like the stirrers, even if these are made with biodegradable or recyclable materials. In fact, on the one hand it is necessary to distribute consumables, which in any case entails an environmental impact. On the other hand, the industrial production of disposable items, even if made of recyclable or non-polluting materials, involves anthropic activity with a non-null impact on the environment. The production of cups and their possible recycling are processes which require energy and therefore have a negative impact on the environment.

**[0047]** To further reduce these problems, the vending machine 1, and in particular its control unit 8, can be configured so as to allow the user to choose a beverage dispensing cycle with or without use of the disposable cup B dispensed by the apparatus 16. For example, the user who is more sensitive to environmental problems can choose to use his/her own container, glass or cup, which he/she will insert directly onto the support 19, then requesting a beverage to be dispensed without the vending machine dispensing the cup B.

**[0048]** Also in this case it can be envisaged that the control unit 8 calculates a different cost for the beverage, reducing such a cost if dispensing without a cup, in order to promote ecologically virtuous user behaviour.

**[0049]** Fig.4 illustrates a flow chart of a dispensing cycle with illustration of the choices which the user can make by means of the interface 6. The dispensing cycle is started at the block 101. The next step includes the selection of the beverage (block 102), a selection which can possibly also include sub-commands for selecting some qualities of the beverage, such as the quantity of

sugar or other. The user can subsequently select the dispensing of a stirrer, or choose the mode of preparing the beverage without a stirrer, see block 103. In the next step (block 104A or 104B) the user chooses whether to have the beverage dispensed into a disposable cup B distributed by the vending machine 1, or to use his/her own container or cup. Based on the path chosen (selection blocks 103, 104A, 104B), the vending machine can choose four distinct paths up to the dispensing: the path PA includes positioning the cup B on the support 19 (block 105), releasing the stirrer (block 106) in the cup. The path PB includes only releasing the stirrer, which will fall into the container which the user has prepared on the support 19. In the path PC the vending machine moves directly to dispensing the beverage, without positioning either cup or stirrer; in the path PD the vending machine releases a cup B onto the support 19, block 107. In block 108 the beverage is dispensed, which can finally be withdrawn by the user when the cycle is complete (block 109).

**[0050]** The sequence of the various steps can in some cases be reversed. In particular, it is possible to dispense the stirrer (if requested) after dispensing the beverage.

**[0051]** Fig. 5 illustrates a different operating mode, in which the control of the control unit first verifies whether the dispensing of a cup has been requested and then whether the dispensing of a stirrer has been requested. The flow is described as follows. The dispensing cycle is started at the block 201. The next step includes the selection of the beverage (block 202), a selection which can possibly also include sub-commands for selecting some qualities of the beverage, such as the quantity of sugar or other. The user can subsequently select the dispensing of a cup, or choose the mode of preparing the beverage without dispensing a cup, but rather using a container provided by the user. See block 203. In the next step (block 204A or 204B), the user chooses whether or not to request a stirrer. Based on the path chosen (selection blocks 203, 204A, 204B), the vending machine can choose four distinct paths up to the dispensing: the path PE includes positioning the cup B on the support 19 (block 205), and releasing the stirrer (shown here again by block 205) in the cup. In the path PF only the release of the cup is envisaged. In the path PG the vending machine passes directly to dispensing the beverage, without positioning either cup or stirrer; in the path PH the vending machine releases a stirrer into a container previously positioned by the user on the support 19, block 207. In block 208 the beverage is dispensed, which can finally be withdrawn by the user when the cycle is complete (block 209).

**[0052]** In all cases it can be envisaged that, if the user requests dispensing the beverage without a disposable cup, the user interface requests confirmation from the user, by means of a button, a touch pad or other, that the container has been positioned on the support 19. In some cases, a sensor can also be included which verifies the presence of a container, through a photocell, a load cell, or other sensing element. In such a case, if a sensor of this type is included, the user interface, instead of asking

for confirmation that the container has been positioned, can signal to the user the possible absence of a container, blocking the dispensing until the user remedies this absence.

**[0053]** In the flow chart of Fig.4, for the sake of simplicity, the calculation of the cost of the beverage and the request for payment have not been inserted, steps which can be inserted for example in the paths from PA to PH, after block 104A or 104B, or block 204A, 204B, i.e., after the user has made all the choices (beverage, stirrer yes/no, cup yes/no).

**[0054]** In general terms, the vending machine 1 can actuate a method which can be summarized in the following steps: (a) start of the dispensing cycle; (b) acquisition of beverage choice; (c) acquisition of the stirrer dispensing request or a cycle request without a stirrer; (d) acquisition of the cup dispensing request or a cycle request without a cup; (e) calculation of the beverage cost; (f) awaiting payment; (g) dispensing the beverage with or without a stirrer, with or without a cup.

**[0055]** In simplified embodiments, the machine or vending machine 1 can be configured to actuate a cycle which includes a single option of dispensing or not dispensing the stirrer, but does not include the option of dispensing or not dispensing the cup. In such a case, the method actuated by the vending machine can be summarized in the following steps: (a) start of the dispensing cycle; (b) acquisition of beverage choice; (c) acquisition of the stirrer dispensing request or a cycle request without a stirrer; (e) calculation of the beverage cost; (f) awaiting payment; (g) dispensing the beverage with or without a stirrer.

**[0056]** In all the cases, the calculation of the cost and awaiting payment can be carried out prior to step (c) and/or (d), if the method of preparing the beverage, with or without a stirrer and with or without a cup, does not affect the cost of the beverage.

**[0057]** Although in the previous description specific reference was made to an automatic vending machine, in which a stirring device according to the invention is particularly advantageous for the reasons set out above, in other embodiments it is possible to provide a machine for preparing beverages which is not configured as a vending machine. For example, it is possible to envisage that the machine is a machine intended for domestic use, or for professional use but not in the form of a vending machine. For example, the stirring device can be integrated into a coffee machine for professional use, such as a machine for bars.

**[0058]** The present invention also concerns a stirring device 31 configured as an accessory to be combined with a coffee machine or other machine for preparing beverages.

**[0059]** In the illustrated embodiment, the stirring device 31 is made in the form of a plate which supports a seat for holding the cup and which is rotated. In other embodiments, different systems for holding and moving the cup can be included. For example, the cup could be engaged

by an upper flange which holds it and moves it in a stirring movement.

## 5 Claims

1. A machine for preparing beverages comprising:

a support for a cup which is adapted to receive a beverage;

at least one piece of equipment for preparing beverages, provided with a dispenser adapted to dispense at least one beverage into the cup positioned on the support;

a dispenser of a soluble granular substance, adapted to dose the soluble granular substance into the cup positioned on the support;

a stirring device which imparts to the support, and to the cup positioned thereon, a movement adapted to dissolve the soluble granular substance in the beverage dispensed into the cup; a stirrer dispenser; and

a control unit programmed to allow a user, by means of a user interface, to select at least a first operating mode, in which a stirrer is dispensed, and a second operating mode, in which a stirrer is not dispensed and the stirring device is activated.

2. The machine of claim 1, wherein the soluble granular substance is sugar or a sweetener.

3. The machine of claim 1 or 2, wherein the stirring device comprises an actuator configured to impose on the support and the cup positioned thereon a rotary movement around a rotation axis preferably parallel to an axis of a seat for receiving the cup, or coincident therewith.

4. The machine of claim 3, wherein the axis of the seat is eccentric with respect to the rotation axis of the support.

5. The machine of claim 3 or 4, wherein the stirring device is configured to impart to the support at least one cycle of two rotation steps in discordant directions.

6. The machine of one or more of the preceding claims, comprising an apparatus for dispensing disposable cups.

7. The machine of claim 6, wherein the control unit is programmed to select at least one operating mode, wherein the cup dispensing apparatus releases a cup for collecting the beverage, and an operating mode wherein the cup dispensing apparatus does not release the disposable cup.

8. The machine of one or more of the preceding claims, configured as an automatic beverage vending machine.
9. The machine of one or more of the preceding claims, wherein the beverage is a hot beverage, in particular coffee. 5
10. The machine of one or more of the preceding claims, wherein the control unit is programmed to provide the user with information adapted to orient the choice towards one or the other of the two operating modes. 10
11. The machine of one or more of the preceding claims, wherein the control unit is programmed to calculate the cost of the beverage based on the user's choice, as a function of at least two of the following parameters: type of beverage, stirrer request, cup request. 15

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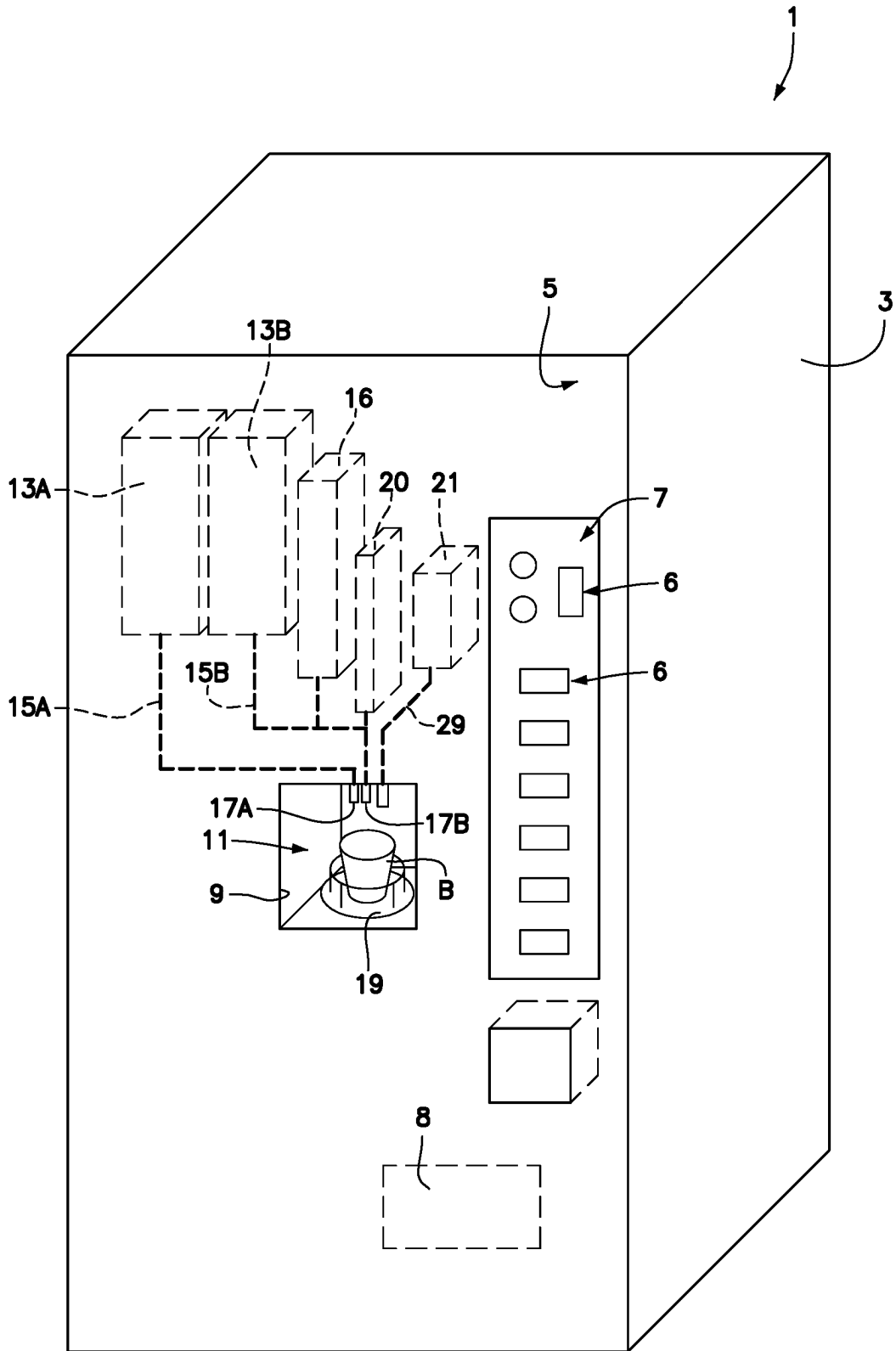


Fig.1

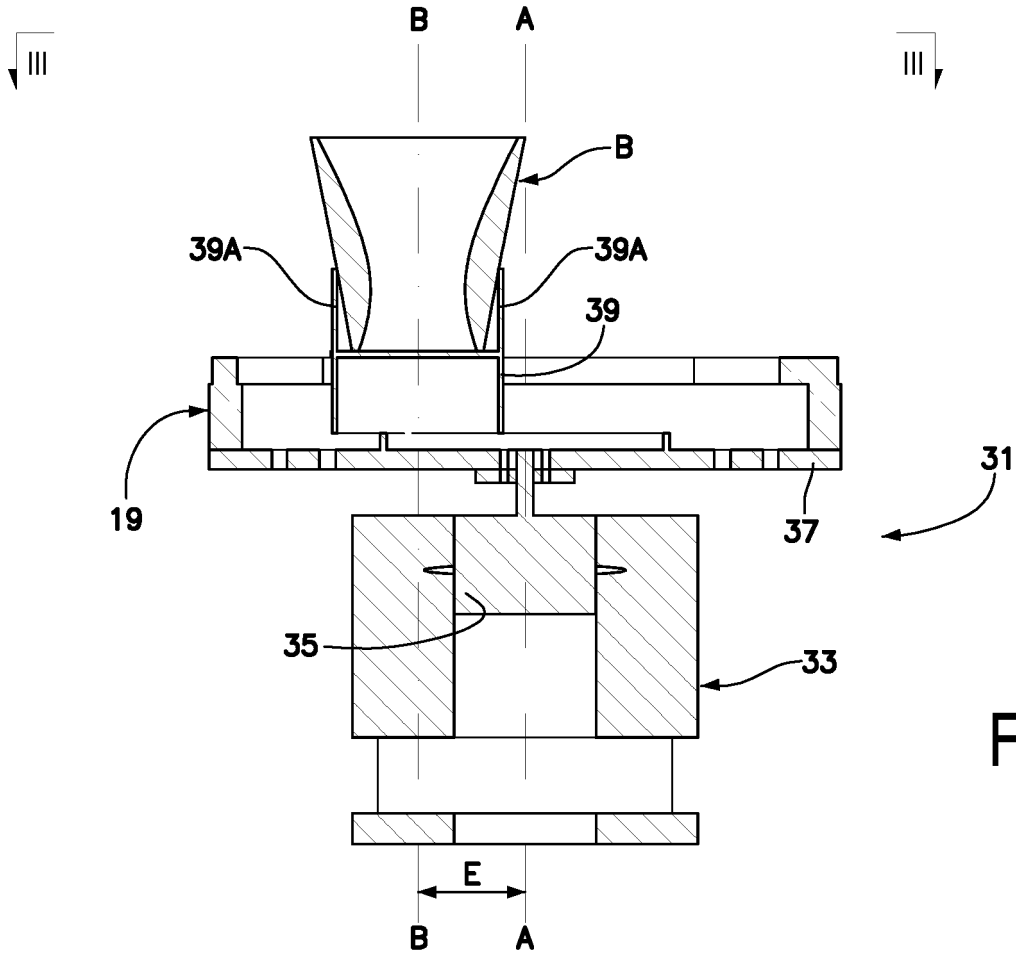


Fig.2

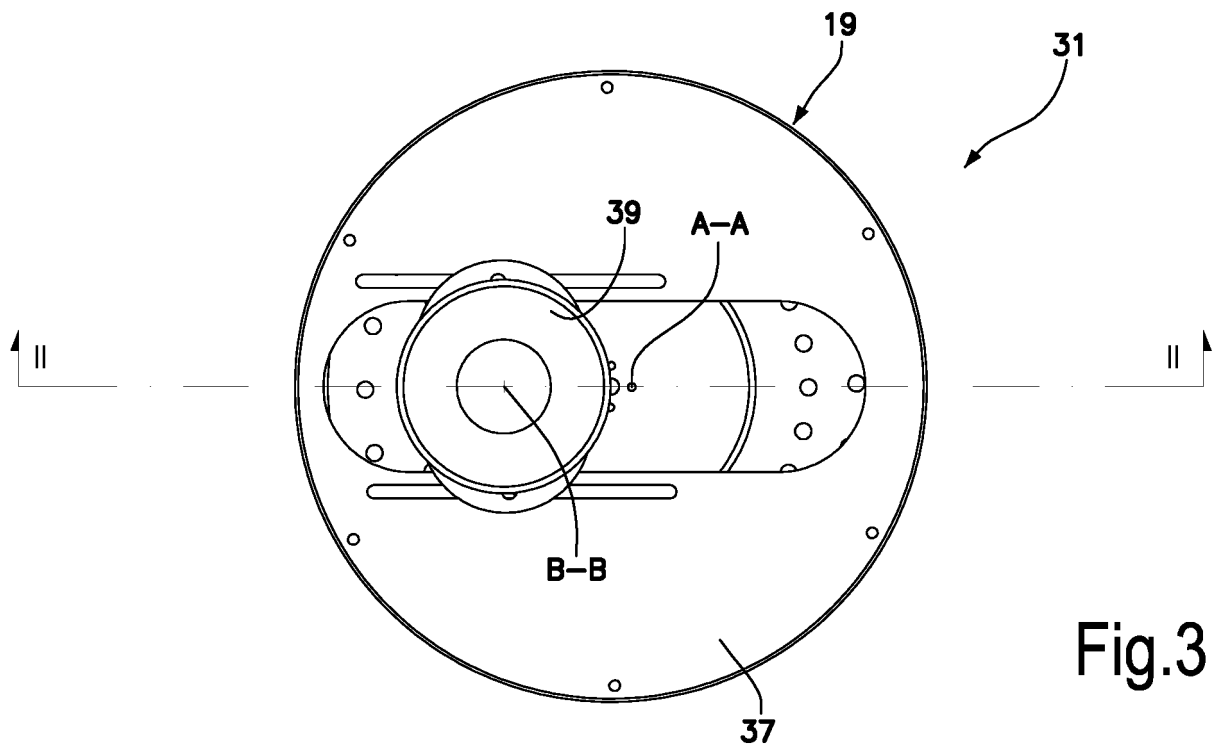


Fig.3

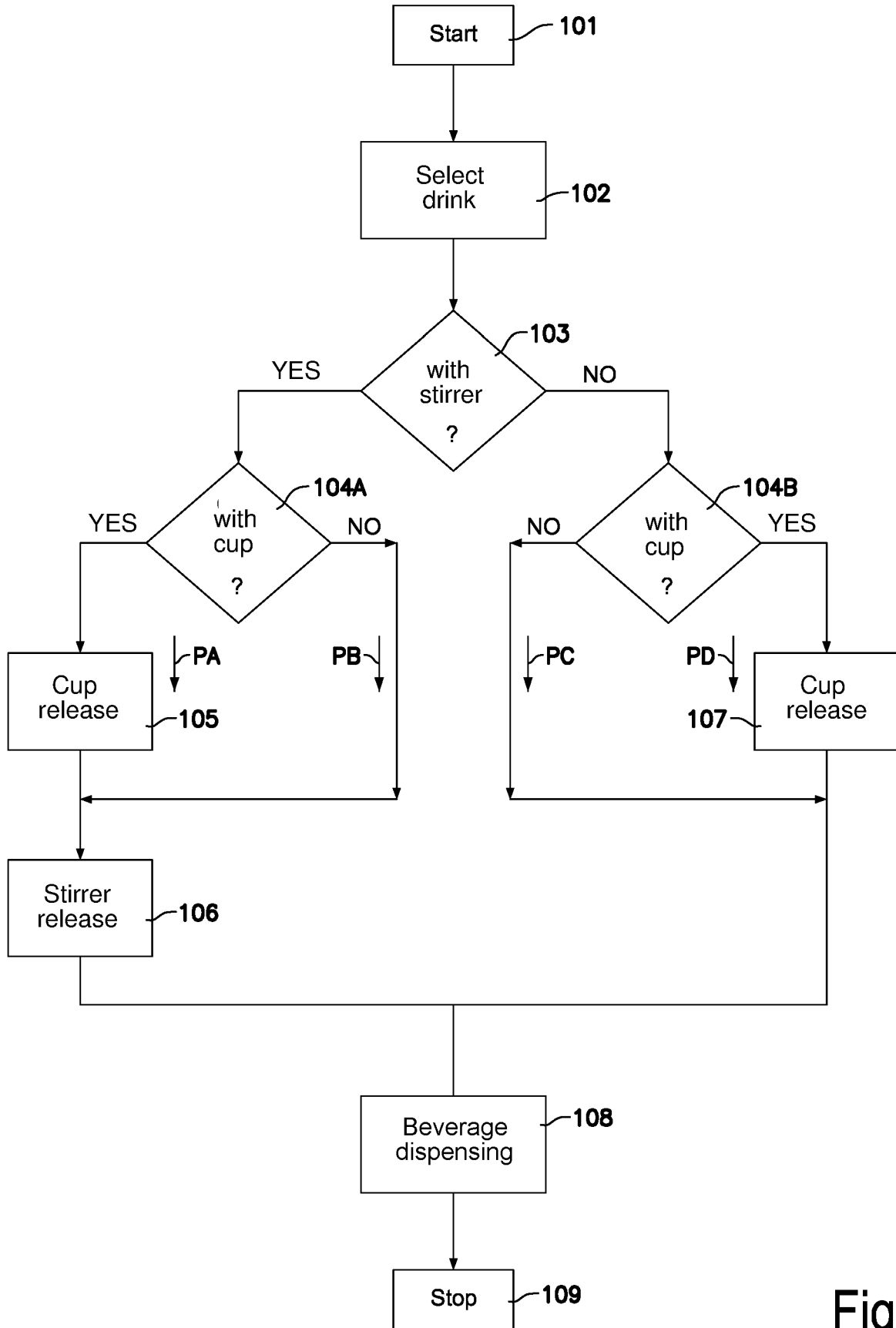


Fig.4

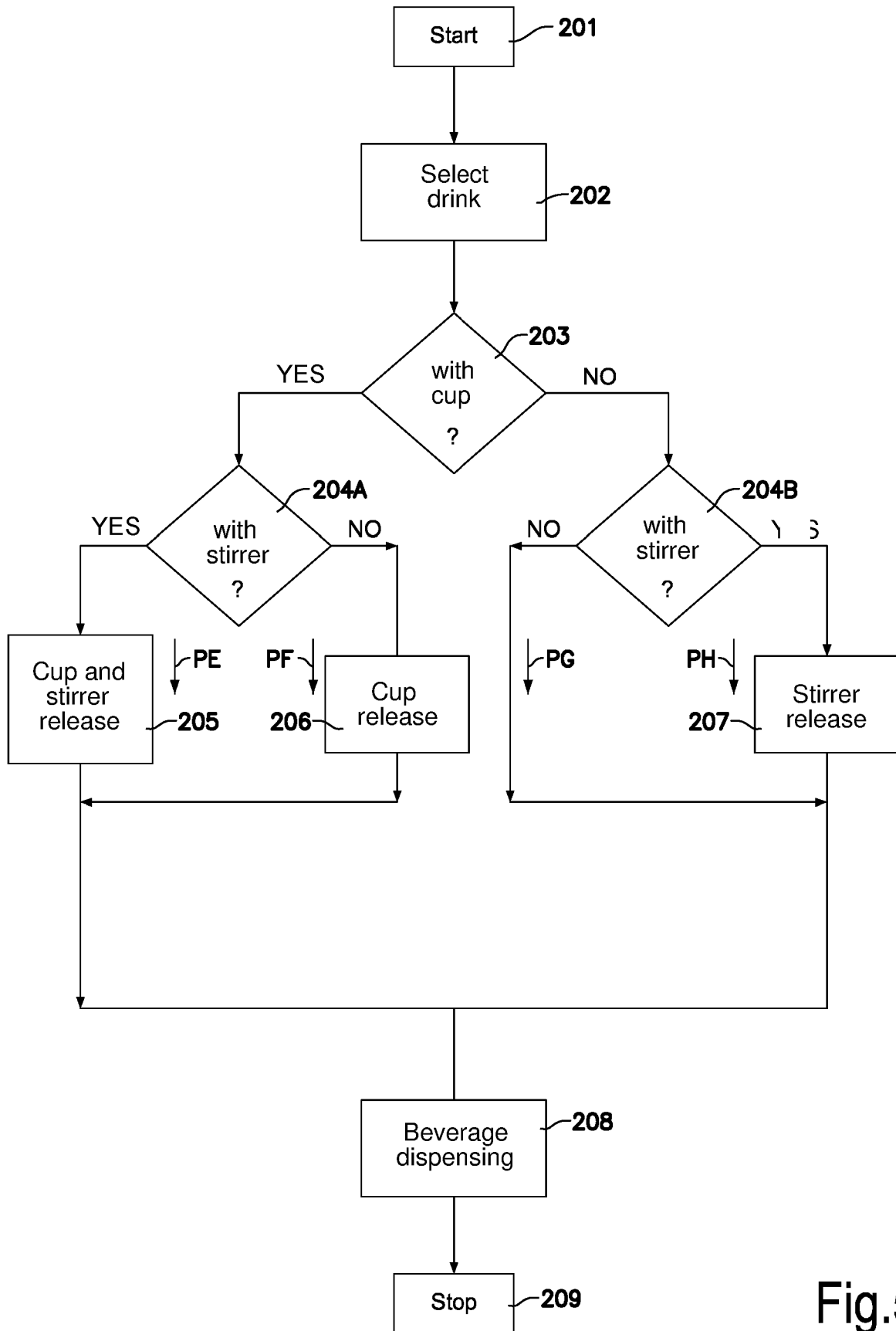


Fig.5



EUROPEAN SEARCH REPORT

Application Number  
EP 24 18 1163

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DOCUMENTS CONSIDERED TO BE RELEVANT

10

15

20

25

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2014/220211 A1 (BRUNNER YANN [CH] ET AL) 7 August 2014 (2014-08-07) * abstract * * paragraph [0007] - paragraph [0018] * * paragraph [0027] - paragraph [0036] * * figures 1-4 *	1-5,8-11	INV. G07F11/72 G07F13/06 G07F13/10
X	GB 1 367 354 A (GKN SANKEY LTD) 18 September 1974 (1974-09-18) * the whole document *	1-3,5,8-11	
X	US 2019/254465 A1 (DI MARIA JOSEPH JOSHUA [AU]) 22 August 2019 (2019-08-22) * the whole document *	1-3,5-11	
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			TECHNICAL FIELDS SEARCHED (IPC)
			G07F

The present search report has been drawn up for all claims

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Place of search <b>The Hague</b>	Date of completion of the search <b>17 September 2024</b>	Examiner <b>Diepstraten, Marc</b>
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EPO FORM 1503 03.82 (F04C01)

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X : particularly relevant if taken alone  
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A : technological background  
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17 - 09 - 2024

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