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(54) Title: SYSTEM OF EDIBLE-PRODUCT MAKING MACHINE AND LOAD ELEMENT AND PROCESS FOR CONTROL OF MACHINE

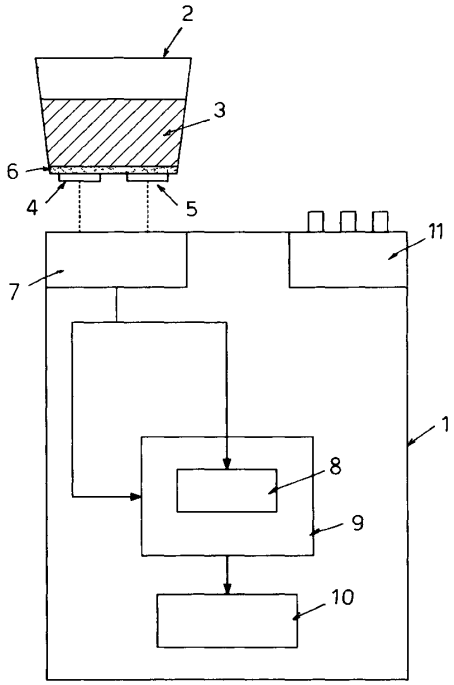

FIG1

(57) Abstract: The process for controlling the operation of an edible-product making machine (1) of the type being fed with a single use load element (2) having a brewable or water soluble aromatic substance (3) for preparation of the edible product, comprises a first step of recognition wherein the edible-product making machine (1) recognises an identifying element (4) on the load element (2) allowing the edible-product making machine (1) to take further steps only if it also recognises on the load element (2) a validation element (5) to be validated, a second step of validation of the validation element (5), and a third step of activation wherein the edible-product making machine (1) automatically activates a cycle of production of the edible product only after having recognised on the load element (2) the identifying element (4) in combination with the validation element (5) as validated.

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SYSTEM OF EDIBLE-PRODUCT MAKING MACHINE AND LOAD ELEMENT AND PROCESS FOR CONTROL OF MACHINE

DESCRIPTION

The present invention relates to a system of an edible-product making machine and a load element, and a process for controlling the operation of the edible-product making machine .

Edible-product making machines of the type being fed with a single use load element having a brewable or water soluble aromatic substance for preparation of said edible product are often used for the preparation of coffee, tea, or other beverages, as well as for soups. The load element generally comprises a capsule containing coffee powder, instant coffee granules, tea leaves, freeze-dried soup granules or other substances designed to be put in contact with water within machine. The load element is usually sealed, and the element is inserted into the machine, without the user being in contact with the substance therein. Inside the machine, the load element is generally pierced to allow water to pass through it, or the contents of the load element are emptied out into a different container for the preparation of the edible product. The contents of the load element are brewed or dissolved in the water in order to make the edible product .

The necessary operating conditions of the machine vary depending on the substance within the load element. Such operating conditions may include the amount of water used for

each product, the temperature and pressure of the water supplied, as well as the time required for operation. For each substance or type of substance, the operating conditions affect the quality of the final edible product. In order to achieve a desired quality, the contents of the load element must be known and the appropriate operating conditions must be set.

In systems of the prior art which are capable of producing a variety of edible products, such as a variety of coffee beverages, the user must select the operating conditions of the machine. This requires time and effort and there is the potential risk of producing an edible product with incorrect qualities if the user is not familiar with the functioning of the machine or the operating conditions appropriate for the contents of the load element and therefore selects the wrong operating conditions.

The production of an edible product of the desired quality is also dependent on the user knowing the contents of the load element. Since load elements are generally sealed, it may not be possible to ascertain the contents thereof by visual inspection. Furthermore, if there is no indication on the load element of its contents, the user cannot be sure of the contents, thus potentially selecting the wrong operating conditions for the desired quality of product, or even producing the wrong product.

Furthermore, edible-product making machines of the prior art, such as coffee machines fed with capsules containing coffee powder, are usually designed so as to operate with a certain design or type of load element. Use of an incorrect load element may cause the machine to malfunction and can prejudice the safety and integrity of the machine and the may harm the user. These types of machines often involve the use of high pressure, high temperature water, which poses a potential health hazard if the machine is not used correctly or malfunctions. Alternatively, use of the wrong operating conditions with the correct load element may also lead to these consequences. For example, use of an insufficient amount of water could lead to the contents of the load element not being fully dissolved and blocking channels within the machine, thereby potentially causing accumulation and overflow of hot water.

The technical task proposed by the present invention is therefore that of providing a system of an edible-product making machine and load element and process for controlling the operation of the machine that overcome the noted technical drawbacks of the prior art.

Within the scope of this technical task is therefore that of providing a safe and simple system and process for ensuring that an appropriate load element is used.

A further technical task is that of providing a system and process for ensuring that operating conditions appropriate for the load element are used.

The technical task, as well as these and other objects, are achieved according to the present invention by a process for controlling the operation of an edible-product making machine of the type being fed with a single use load element having a brewable or water soluble aromatic substance for preparation of said edible product, characterised in that it comprises a first step of recognition wherein said edible-product making machine recognises an identifying element on said load element allowing said edible-product making machine to take further steps only if it also recognises on said load element a validation element to be validated, a second step of validation of said validation element, and a third step of activation wherein said edible-product making machine automatically activates a cycle of production of said edible product only after having recognised on said load element said identifying element in combination with said validation element as validated.

The present invention also relates to a system comprising a edible-product making machine and at least one single use load element having a brewable or water soluble aromatic substance to be fed into said edible-product making machine for preparation of said edible product, characterised in that said load element comprises an identifying element for its recognition and a validation element for its validation, and said edible-product making machine comprises means for recognising said identifying element and said validation

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element of said load element, and means for validation of said validation element of said load element.

The use of an identification element and recognition means, as well as the step of recognising the identification element allows the machine to recognise the load element and, hence, its contents. This in turn enables the machine to automatically select the operating conditions appropriate for that specific load element. This prevents the user from having to verify the contents of the load element, and from having to know and select the operating conditions appropriate therefor. It also helps to prevent the safety hazard associated with the use of inappropriate operating conditions .

The use of a validation element and validation means, as well as the step allowing the machine to take further steps only if it also recognises on the load element the validation element help to prevent the use of an already-used single use load element in the machine, thereby avoiding the production of an edible product of inferior quality and ensuring the proper functioning of the machine. In the case of re-use of a load element originally containing a water soluble aromatic substance, the dynamics of the fluid flow through the machine could be different if there is no substance in the load unit for the water to contact, thereby causing incorrect functioning of the machine and the associated health hazard.

The use of an activation step of automatically activating the cycle of edible-product production only when the same identifying element is recognised in combination with the validated validation element ensures that the operating conditions actually used are the correct conditions as selected by the machine in the first recognition step. This helps to prevent the user from making the mistake of inserting into the machine a different load element to the one that was first recognised, for which the operating conditions are set.

Other characteristics of the present invention are moreover defined in the subsequent claims.

The process of the present invention comprises a first step of the edible-product making machine recognising an identifying element on the load element. This can optionally be through an infra red (IR) wave communication channel, a radio frequency (RF) wave communication channel, or an optical wave communication channel. The user may hold the identifying element on the load element up against recognition means located externally on the edible-product making machine .

The identification element preferably contains information about the contents of the load element. This permits the optional further step of self-programming of the edible-product making machine according to the specific load element recognised such that the appropriate operating conditions are automatically set.

The edible-product making machine is only allowed to take further steps if it in the first step also recognises on the load element a validation element to be validated. In practice, this may take the form of unlocking the machine when both the identification element and the unvalidated validation element are recognised. Thus, the production process cannot be activated unless the first step has been completed. The process could also require that the validation element be of a specific kind or be related to or associated to the identification element in a specific way in order for this first step to be completed. The validation element could be identical to the identification element, but is preferably different thereto, and could either be either of the same or of a different type to the identification element. If the identification element and the validation element are of different types, the recognition means for the two must accordingly also be different.

The process comprises a second step of validation of the validation element. This may be performed by the machine, such as by a tool in or on the machine, or independently from the machine, such as by hand or by the user using a tool not associated with the machine. The validation preferably takes the form of mechanical destruction of the validation element, such as ripping, cutting, scratching or piercing the identification element. Validation ensures that the validation element can no longer be recognised as an

unvalidated validation element. Usually, this is evidenced by the communication channel producing a null-signal. It may also be advantageous if said validation is visible to the user, such that it is clear if a load element has been validated and can therefore not be re-used in the process as it would not pass the first step.

In a third step of the process, the product-making machine automatically activates a cycle of edible-product production. However, this is only after having recognised on the load element the same identifying element as that recognised in the first step, and it must be recognised in combination with the validation element as validated. As with the first and second steps, this step may take place inside or outside the machine. However, for reasons of cost efficiency, it is preferable to use the same recognition means in step three as in step one.

The system of the present invention comprises an edible-product making machine and at least one single use load element having a brewable or water soluble aromatic substance to be fed into the machine for preparation of an edible product. The load element is preferably in the form of a capsule, and is preferably sealed. It may optionally comprise a capsule and a protective packaging thereof. The capsule may have a protective sheet on the outlet base of the capsule, designed to be removed by the user or by the machine prior to activation of the production cycle.

The load element of the system comprises an identifying element for its recognition and a validation element for its validation. These are preferably in the form of barcodes, antennae, or paints having optically measurable properties. The machine comprises means for recognising the load element and the validation element, such as at least one infra red barcode reader, radio frequency wave transmitter and receiver, or optical sensor. These are preferably located externally on a lateral wall of the capsule, externally on the protective packaging of the capsule, or externally on the protective sheet on the outlet base of the capsule .

The machine of the system further comprises means for validating the validation element, this preferably comprising a mechanical destruction tool having a plurality of tips adapted to rip, cut, scratch or pierce said validation element. The machine may perform this validation, or the user may manually engage the validation element with the validation means.

The system further optionally comprises checking means connected to a control unit of the machine. This may be in the form of a computer programme within the control unit . The checking means compares the signal from the recognising means for the identifying element and the validation element with pre-stored data in order to allow the machine to proceed to activation only if it recognises the identifying element and the unvalidated validation element. The checking means may be

connected to unlocking means for unlocking the machine when said recognition takes place.

The system also optionally comprises activation means connected to the recognising means through the control unit. This automatically activates the machine, but only if the identifying element is recognised, and in combination with the validation element as validated. The activation means cannot be triggered unless the checking means have first indicated a positive recognition of the identifying element and the unvalidated validation element.

Further characteristics and advantages of the present invention will become more evident from the description of a preferred, but not exclusive, embodiment of a system of edible-product making machine and a load element according to the finding, illustrated in the attached, non-limiting drawing, wherein:

Figure 1 shows a schematic view of one embodiment of the system of the present invention.

With reference to the above figure, the system comprises an edible-product making machine 1 and a single use load element in the form of a capsule 2. The load element contains a brewable or water soluble aromatic substance 3 for preparation of an edible product. The capsule 2 comprises an identifying element in the form of a barcode 4 and a validation element also in the form of a barcode 5, both located externally on a protective sheet 6 of the outlet base of the capsule.

The machine 1 comprises recognising means in the form of an infrared barcode reader 7. This is connected to checking means 8 stored within a control unit 9 of the machine. The checking means allow the machine activation means 10 to be engaged only if the barcode reader 7 recognises the identification barcode 4 and the validation barcode 5.

The machine 1 further comprises validation means in the form of a mechanical tool 11 having a plurality of tips for destroying the validation barcode 5, for example by ripping, cutting, scratching or piercing, such that the barcode reader 7 cannot recognise it as an unvalidated validation barcode.

If, after the positive signal from the checking means 8 from the first recognition of the identification and validation barcodes 4,5, the barcode reader 7 performs a second recognition of the identification barcode 4 combined with the validated validation barcode 5, the activation means 10, connected to the barcode reader 7 through the control unit 9, automatically activate a cycle of production of the edible product.

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1. Process for controlling the operation of an edible-product making machine of the type being fed with a single use load element having a brewable or water soluble aromatic substance for preparation of said edible product, characterised in that it comprises a first step of recognition wherein said edible-product making machine recognises an identifying element on said load element allowing said edible-product making machine to take further steps only if it also recognises on said load element a validation element to be validated, a second step of validation of said validation element, and a third step of activation wherein said edible-product making machine automatically activates a cycle of production of said edible product only after having recognised on said load element said identifying element in combination with said validation element as validated.

2. Process for controlling the operation of an edible-product making machine as claimed in claim 1, characterised in that said second step is performed by said edible-product making machine .

3. Process for controlling the operation of an edible-product making machine as claimed in any preceding claim, characterised in that said second step is not performed by said edible-product making machine.

4. Process for controlling the operation of an edible-product making machine as claimed in any preceding claim, characterised in that said second step consists of mechanical destruction of said validation element.

5. Process for controlling the operation of an edible-product making machine as claimed in any preceding claim, characterised in that said mechanical destruction comprises ripping, cutting, scratching or piercing of said validation element .

6. Process for controlling the operation of an edible-product making machine as claimed in any preceding claim, characterised in that it comprises a further step of self-programming of said edible-product making machine according to the specific load element recognised in said first step.

7. Process for controlling the operation of an edible-product making machine as claimed in any preceding claim, characterised in that in said first step said recognition occurs through an IR communication channel.

8. Process for controlling the operation of an edible-product making machine as claimed in any preceding claim, characterised in that in said first step said recognition occurs through an RF communication channel.

9. Process for controlling the operation of an edible-product making machine as claimed in any preceding claim, characterised in that in said first step said recognition occurs through an optical communication channel.

10. A system comprising a edible-product making machine and at least one single use load element having a brewable or water soluble aromatic substance to be fed into said edible-product making machine for preparation of said edible product, characterised in that said load element comprises an identifying element for its recognition and a validation element for its validation, and said edible-product making machine comprises means for recognising said identifying element and said validation element of said load element, and means for validation of said validation element of said load element .

11. A system as claimed in claim 10, characterised in that said validation means comprises a mechanical destruction tool having a plurality of tips adapted to rip, cut, scratch or pierce said validation element.

12. A system as claimed in claim 10 or 11, characterised in that it comprises checking means connected to a control unit of said edible-product making machine for allowing said edible-product making machine to proceed to activation only if said recognition means recognises said identifying element and said validation element.

13. A system as claimed in any of claims 10 to 12, characterised in that said checking means comprise a computing programmes stored within said control unit of said apparatus .

14. A system as claimed in any of claims 10 to 13, characterised in that it comprises activation means connected

to said recognising means through said control unit for automatic activation of a cycle of production of said edible product only if said identifying element is recognised in combination with said validation element as validated.

15. A system as claimed in any of claims 10 to 14, characterised in that said validation element and said identification element comprise at least one barcode, and in that said identification means comprise at least one IR barcode reader.

16. A system as claimed in any of claims 10 to 15, characterised in that said validation element and said identification element comprise at least one antenna, and in that said identification means comprise at lease one RF transmitter and receiver.

17. A system as claimed in any of claims 10 to 16, characterised in that said validation element and said identification element comprise at least one paint with measurable optical properties, and in that said identification means comprise at least one optical sensor.

18. A system as claimed in any of claims 10 to 17, characterised in that said load element comprises a capsule.

19. A system as claimed in any of claims 10 to 18, characterised in that said load element comprises a capsule and a protective packaging thereof.

20. A system as claimed in any of claims 10 to 19, characterised in that said identification element and said

validation element are located externally on a lateral wall of said capsule .

21. A system as claimed in any of claims 10 to 20, characterised in that said identification element and said validation element are located externally on said protective packaging of said capsule .

22. A system as claimed in any of claims 10 to 21, characterised in that said identification element and said validation element are located externally on a protective sheet of the outlet base of said capsule.

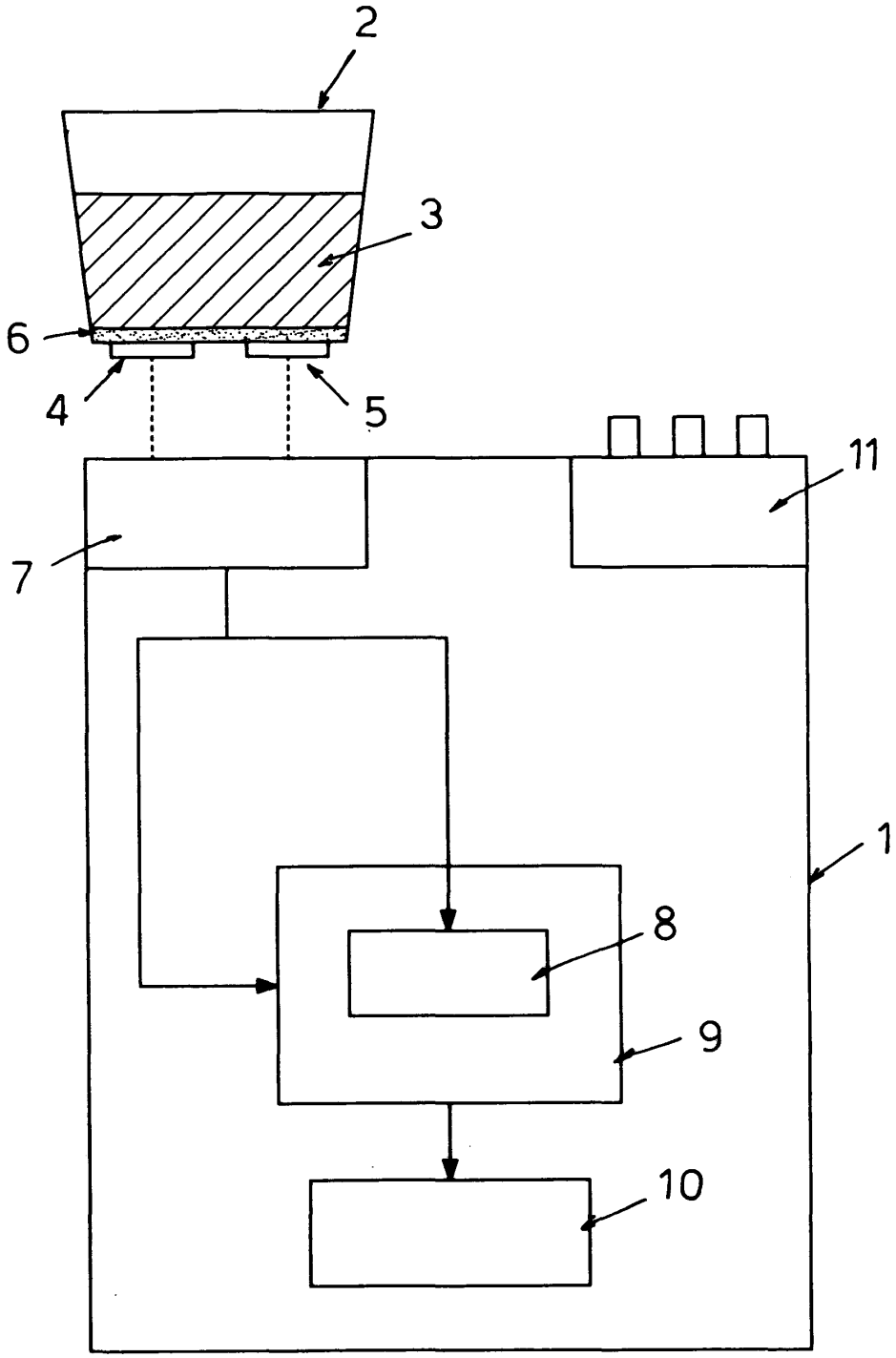

FIG.1

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2009/001617

A. CLASSIFICATION OF SUBJECT MATTER
INV. A47J31/36

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

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

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

EPO-Internal , WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 890 271. A (GRIMAC S R L [IT]) 20 February 2008 (2008-02-20) paragraph [0009] - paragraph [0023]; figures 1,2	1,2, 6-10, 12-22
Y		4,5,11
A		3
Y	GB 964 657 A (UNIVERSAL MATCH CORP) 22 July 1964 (1964-07-22) page 2, line 87 - page 4, line 38; figures 1-9	4,5,11
X	EP 1 764 015 A (GRIMAC S R L [IT]) 21 March 2007 (2007-03-21) paragraph [0013] - paragraph [0028]; figures 1-6	1,2,6, 10,12-14

D Furtherdocume πts are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
11 November 2009	19/11/2009
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
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Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1890271	A	20-02-2008	NONE	
GB 964657	A	22-07-1964	NONE	
EP 1764015	A	21-03-2007	NONE	

Form PCT/ISA/210 (patent family annex) (April 2005)