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(54) Cooking system and oven used therein

(57) A cooking system comprises a radio frequency identification device associated with an oven for automatically capturing data stored on a remotely accessible data media associated with the food. The user has only to load the food in the oven and the cooking and/or heating process is started and controlled in a fully automated way.

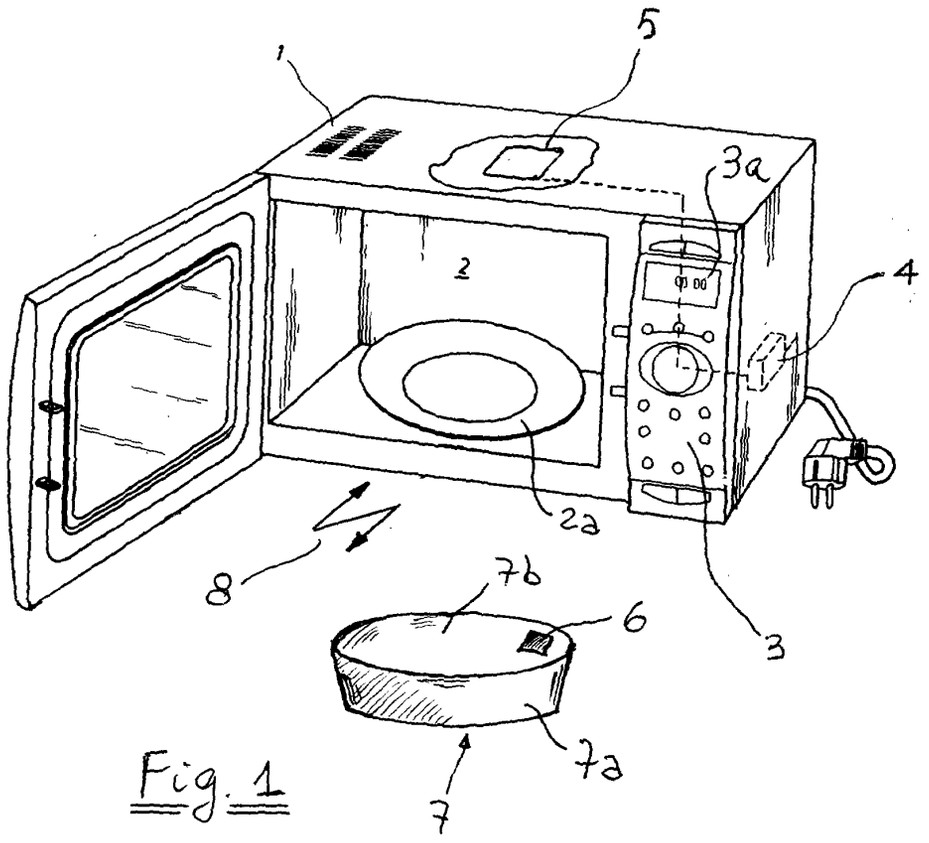

Fig. 1

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Description

[0001] The present invention relates to a cooking system comprising an oven and means for detecting food data and for adjusting cooking process accordingly. With the term "cooking" we mean here either heating of pre-cooked food or cooking of fresh food.

[0002] A system of this kind is known from US-A-5321232 which discloses a microwave oven having a code reader allowing the user to scan the product code of the respective food product to be cooked and/or heated in the oven. The oven will then cook the food according to the recipe stored in the code.

[0003] Today a lot of pre cooked or ready-to-eat meals are available on the market. Data as cooking recipes, expiration data, nutrition facts and other consumer relevant data are printed on the packaging either in coded or un-coded way.

[0004] Even if the known cooking systems with a code reader help the user in avoiding any input of data through a keyboard or similar device, nevertheless it still requires a manual activity by the user.

[0005] It is an object of the present invention to provide a cooking system of the above type which is completely automatic, i.e. does not require any other activity than opening the oven door and placing the food product inside the oven, such system being particularly useful for cooking raw-fresh as well as pre-cooked food.

[0006] According to the invention, the cooking system is characterised by the features reported in the appended claims.

[0007] The invention integrates a chip in the food packaging that contains all relevant food and logistic data and allows a wireless, non-contact access to this data. With the term logistic data we mean all the data related to the food production, for instance place of production, date of production etc. The cooking system according to the invention may be used in combination with a domestic oven, either electrical traditional oven with heating elements or microwave oven, or with an oven being part of an automated food vending machine.

[0008] In order to enable an automatic cooking process in ovens and microwave ovens, the invention uses a read-/writeable chip, that is preferably attached to the food packaging. On this read-/writeable chip as e.g. an EEPROM all relevant food data such as food identification, production data, cooking recipe, expiration date, nutritional values, water content, cooking losses, dietetic applications, preferred recipe and other information about the food are stored. The read/write procedure will be managed by radio frequency technology with an antenna that transfers the energy to the passive chip device and enables this to send back relevant data to the antenna. From there the data are transferred to the cooking system control unit and are used in various ways.

[0009] The cooking system of the present invention is programmed automatically according to the food identification and the pre-defined recipe data on the chip. At the beginning of the cooking procedure, the data from the chip on the food packaging is automatically read and transferred by means of the radio frequency automated data capture device to the control unit of the cooking system. The cooking system heats or cooks the food according to the recipe stored on the chip by using multiple features of the oven, i.e. by using for instance forced air circulation, rotating plate, grill and crisp function at the right time and for the proper duration according to the recipe data. With the term "crisp function" we mean a special function of a microwave oven which makes use of a well-known metal plate coated with a microwave lossy material and able to increase its temperature when subjected to microwave energy. The data on the chip can be used for several other purposes such as optimisation of logistics, inventory control in vending machines, control of expiration date and information or recommendations for customers (nutrition data, food content etc.). The food packaging is preferably coated, at least in a limited zone, with a layer of a known temperature sensitive substance which changes permanently its colour (for instance from white to black) when the temperature of the package has been maintained higher than a fixed value for a predetermined period. This change of colour alerts the user when the food (either fresh or pre-cooked) has not been properly stored at the right temperature.

[0010] The present invention overcomes the problem of setting up cooking systems with the right parameters in order to have the optimum set-up and control of the cooking process for a defined recipe. Recipe data on the chip will avoid openings of the oven during the cooking process in order to control the cooking result and to adjust the cooking system accordingly. After the cooking process has finished, a message will be displayed to the user. There is no interaction of the user necessary to set-up the cooking system. The integration of a chip in the food packaging, and related wireless communication, allows an automatic read-/write access along the whole supply chain from production down to the point of sale and the set-up of the cooking system such as an oven or a microwave oven for home or professional use. This invention keeps all data on the chip and allows an easy creation of new recipes and other data. The chip can be integrated in several ways on the packaging and it may be disposable or it can be recycled.

[0011] On top of relevant food data such as nutrition facts, expiration date, cooking recipe etc., also the EAN code may be stored in the chip so that this latter may be used for identifying the product in the shop or supermarket and/or in the supply chain of the food product.

[0012] Moreover the oven is preferably provided with a display that shows to the user the relevant data of food items (for example nutrition facts).

[0013] According to another feature of the invention, the system prevents the oven from cooking food with expired expiration data.

[0014] The chip may be integrated in the food packaging directly by the food producer.

[0015] According to a further aspect of the present invention, the system allows a pre order of food that will be brought to.a vending machine and will be reserved by a code for the pickup by the user.

[0016] For domestic use it is also possible to have a chip attached to the recipe in a recipe book. For advanced use it is also possible to program the chip with a handheld computer device or with a special interface with a personal computer. In this way, recipes downloaded from and Internet website can also be stored on the chip.

[0017] If the chip is placed inside the food packaging and it is embedded in a suitable support (for instance a polymeric disc or ball), it can be easily re-used if it is given back to the food producer or vendor.

[0018] The increased storage capacity of the chip allows the chip on the food packaging to contain all necessary data. It will not be necessary to refer to a central database to query for the relevant data.

[0019] The chip will allow a tracking of each single food package through the whole supply chain after packaging of the food until final shops or vending machines. The vending machine will have one or several antennas in order to enable an online inventory update. If the vending machine is connected to a central computer the logistics of the replenishment will be simplified.

[0020] The cooking recipe to be stored on the chip will be defined in a professional kitchen environment and the best cooking recipe will be set-up. The parameters of the cooking recipes for the cooking system will be defined and handed over to the food producer or food packaging company. During the packaging operation of the food, the relevant data are written on the chip and stored.

[0021] A cooking system in accordance with the invention will now be described, by way of example, with reference to the accompanying drawing in which:

- Figure 1 is a schematic view of the system according to a first embodiment of the invention, and
- Figure 2 is a schematic view of the cooking system according to a second embodiment of the invention.

[0022] With reference to figure 1, a microwave oven 1 has an oven cavity 2 with a rotating plate 2a and a user interface 3 connected to a control unit 4 of the oven. This unit 4 comprises a radio frequency device connected to an antenna 5 able to detect and capture data stored on a chip 6 on food packaging 7. The chip 6 may be of the transponder type so that it does not need any electrical supply. The food packaging 7 may be of any kind, but it preferably comprises a tray 7a and a flexible cover 7b made of a transparent film of polymeric material adapted to be pierced before loading the packaging inside the oven cavity in order to let the water vapour vent from the package during cooking and to limit the loss of food flavours and natural food water content. The chip 6 may be integral with the food packaging, it may be glued to the food packaging or it may be placed inside the packaging 7. A particularly suitable package, which does not need any piercing and therefore reduces further any manual intervention of the user is produced by CNF with the name Dream Steam ® and comprises a tray, a transparent layer covering the tray and a plastic valve which allows the water vapour to vent during the cooking process.

[0023] With 8 is indicated the wireless data transfer from chip 6 to the antenna 5 that happens when the food packaging is placed near or inside the oven, i.e. within a distance of few centimetres from the antenna. Once the antenna 5 detects and captures the data on the chip, the oven is ready to start the cooking process simply by closing the oven door and possibly by pushing a start button. At the same time, a display 3a of the user interface 3 shows the kind of food loaded in the cavity 2, the recipe that the oven will use (power, time, function etc.) and all other relevant data on the food. The user has not to check whether the food is properly cooked since the cooking process (suitable heating power for a suitable period of time, use of different components such grill or crisp plates at the right moment, etc.) is carried out automatically. If the user loads an expired food in the oven, the display 3a will show an alert message which will inform the user that the cooking or heating process cannot be started.

[0024] In figure 2 with the reference 10 a vending machine is indicated having a microwave oven compartment 12, a plurality of stacked food packaging and a radio frequency device (not shown) connected to an antenna 5 placed adjacent the oven 12. The oven compartment 12 may be separate from the vending machine 10, and in this case the user has to load manually the food packaging taken from the vending machine. The food packaging may be substantially of the same type shown in figure 1, the sensibility of the radio frequency device and related antenna 5 being differently tuned in order to capture data of the packaging once they enter or are inside the oven 12. The vending machine 10 may be provided with two antennas having different sensibility, the first one being tuned to detect the data of the good to be cooked in the oven, the second one being capable of detecting the relevant data of all the food products contained in the vending machine. In this case the vending machine is connected to Internet or to a similar network 14 in order to inform the product supplier of the current status of the vending machine (number and kinds of products, possible technical problems etc.).

Claims

1. Cooking system comprising an oven and means for detecting food data and for adjusting food heating and/or cooking process accordingly, **characterised**

in that said means for detecting food data comprise a radio frequency identification device (4,5) associated with the oven (1) and able to capture automatically food data stored on a remotely accessible data media (6) associated with or able to be associated with the food.

2. Cooking system according to claim 1, **characterised in that** said remotely accessible data media comprise a read / writeable chip (6).

3. Cooking system according to claim 2, **characterised in that** the chip (6) is supported by a food packaging (7b).

4. Cooking system according to claim 2, **characterised in that** the chip (6) is placed inside a food packaging (7) in order to be re-usable.

5. Cooking system according to claim 3 or 4, **characterised in that** the food packaging (7) is airtight and comprises a valve for venting internal pressure.

6. Cooking system according to any of claims 3-5, **characterised in that** the food packaging (7) comprises at least a zone coated with a temperature sensitive layer able to change permanently its colour when the temperature of the packaging is higher than a predetermined value.

7. Cooking system according to claim 1, **characterised in that** the oven (12) is associated with a vending machine (10) which contains a plurality of food items.

8. Cooking system according to claim 7, **characterised in that** the vending machine (10) comprises an auxiliary radio frequency identification device able to detect data of all products contained in the machine and to deliver them to an information network (14).

9. Cooking system according to claim 2, **characterised in that** said chip (6) is placed on a page of a recipe book which can be detached from the book and placed near the oven (1) so that the radio frequency identification device (4,5) can detect the data on the page.

10. Cooking system according to any of the preceding claims, **characterised in that** food data stored on the remotely accessible data media are selected in the group consisting of cooking parameters of the oven, expiration date of the food and nutrition facts.

11. Oven, particularly microwave oven, comprising means for detecting food data and for adjusting food cooking process accordingly, **characterised in that** said means for detecting food data comprise a radio frequency identification device (4,5).

12. Oven according to claim 11, **characterised in that** it comprises a display (3a) which shows food data captured automatically by the radio frequency identification device (4,5).

13. Vending machine able to contain a plurality of food items and comprising an oven (12) for heating and/or cooking food items, **characterised in that** it comprises a radio frequency identification device (4,5) for automatically detecting food data and for adjusting food cooking and/or heating process accordingly, each food item (7) comprising remotely accessible data media (6) in which food data are stored.

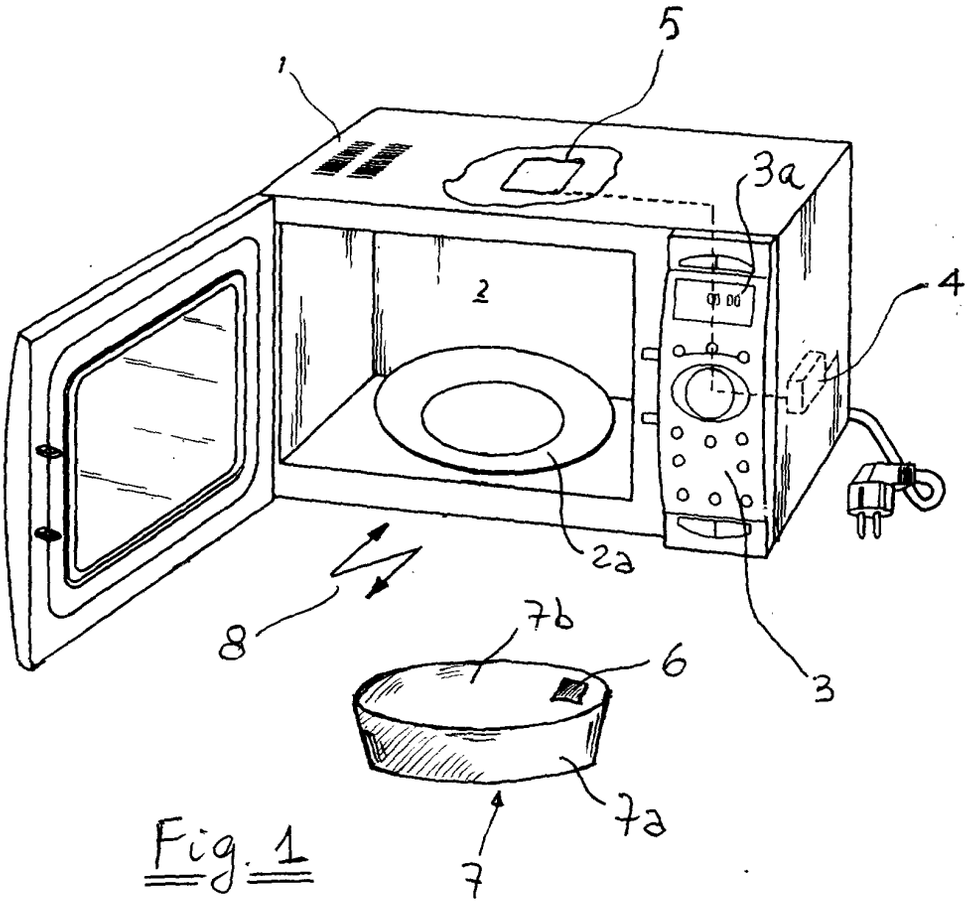

Fig. 1

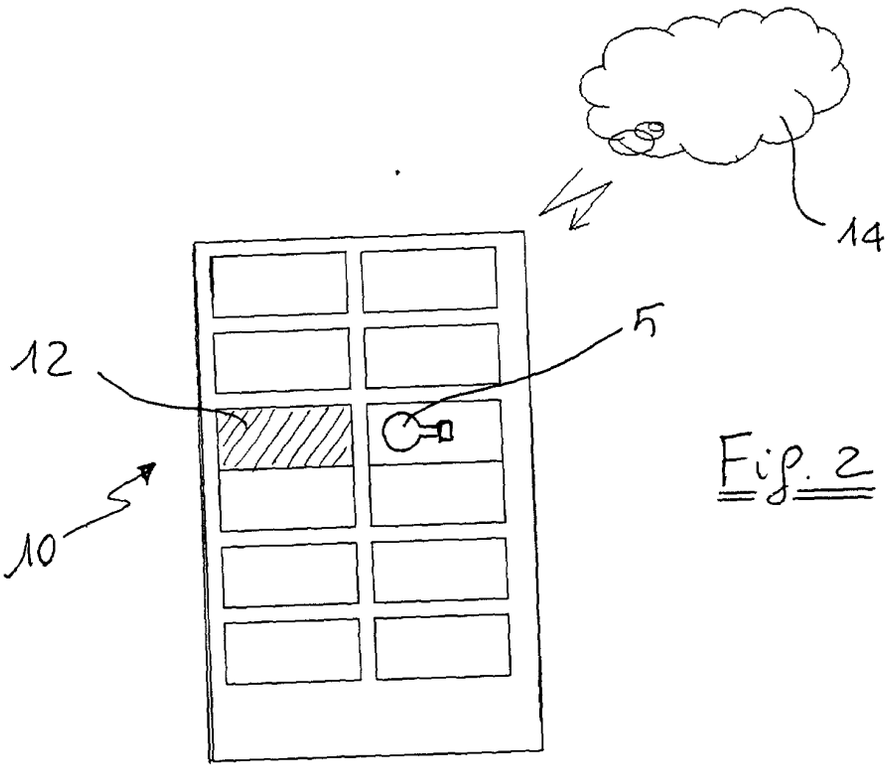

Fig. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 12 1155

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	EP 0 550 312 A (GOLD STAR CO) 7 July 1993 (1993-07-07)	1,11,13	G05D11/13 G05D11/00 H05B6/68 G05D1/04 G06F15/20
A	* column 1, line 5 - column 2, line 5 * * column 3, line 51 - column 7, line 33; claims 1-3; figures 1,2 *	2-10,12	
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A	* column 1, line 5 - column 2, line 10 * * column 3, line 23 - column 8, line 58; claims 1-8; figures 2,4 *	2-10,12	
A	US 4 858 119 A (WAUGH GERALD ET AL) 15 August 1989 (1989-08-15) * column 1, line 10-50 * * column 4, line 4 - column 8, line 40; figures 1,2 *	1-13	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

G05D
H05B
G06F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	26 January 2001	Pierron, P

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 12 1155

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82