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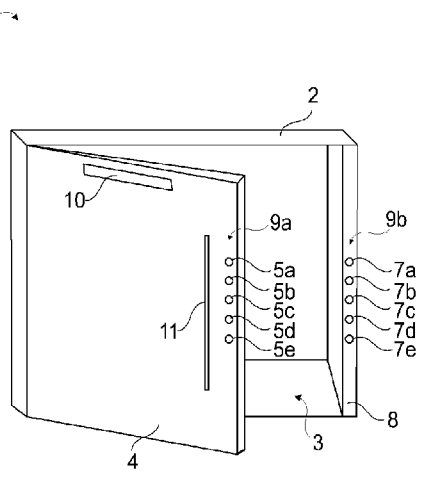
(54) Title: COOKING APPLIANCE WITH IMPROVED MANUFACTURABILITY

Fig. 1



(57) Abstract: The present invention relates to a cooking appliance (1) which comprises: a main body (2) which comprises a cavity (3) for receiving the food to be cooked; a door (4) for opening/closing the cavity (3); a control unit for controlling one or more functions, wherein the control unit is disposed into the door (4); one or more touch sensitive buttons (5a-5e) for respectively selecting the functions of the control unit, wherein each touch sensitive buttons (5a-5e) is disposed onto the door (4); and a sensing unit (6) for separately sensing the activation of each touch sensitive button (5a-5e).

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Description

COOKING APPLIANCE WITH IMPROVED MANUFACTURABILITY

[0001] The present invention relates to a cooking appliance, in particular to an oven.

[0002] Cooking appliances such as ovens are commonly known in the art. An oven generally comprises: a main body which comprises a cavity for receiving the food to be cooked; a door for opening/closing the cavity; a control unit for controlling one or more functions; one or more touch sensitive buttons for respectively selecting the functions of the control unit; and a sensing unit for separately sensing the activation of each touch sensitive button. The control unit, the touch sensitive buttons and the sensing unit are all disposed onto the door. When operating the oven, the user puts the food to be cooked into the oven cavity, and then closes the door. Subsequently, the user selects the desired functions by means of the touch sensitive buttons on the door in order to take the oven into operation.

[0003] CN102012051 (A) discloses a microwave oven with a touchscreen on its door.

[0004] A problem with the prior art oven is that the production of the door is complicated.

[0005] An objective of the present invention is to provide a cooking appliance which solves the aforementioned problem in a cost effective way and which enables a comparatively easier production.

[0006] This objective has been achieved by the cooking appliance as defined in claim 1. Further achievements have been attained by the subject-matters respectively defined in the dependent claims.

[0007] In the cooking appliance of the present invention, the sensing unit is disposed into a section of the main body off the door and adapted to transmit the sensing result to the control unit.

[0008] A major advantageous effect of the present invention is that the manufacturability of the door has been improved. Another major advantageous effect of the present invention is that the control unit be can be cooled more effectively as the number of electrical components inside

the door has been reduced. Another major advantageous effect of the present invention is that the weight of the door can be comparatively reduced. Thereby, the user can handle the door more easily.

[0009] In an embodiment, the cooking appliance has additional touch sensitive buttons which are disposed onto a section of the main body off the door. These additional touch sensitive buttons can also be used by the user for respectively selecting the functions of the control unit. This embodiment is particularly advantageous as the user can use the additional touch sensitive buttons, for instance, when the door has been opened, and the touch sensitive buttons on the door are not accessible. Thereby the usability of the cooking appliance has been improved. In this embodiment, the sensing unit also separately senses the activation of each additional touch sensitive button and transmits the sensing result to the control unit. Thereby, the number of parts can be further reduced, and thus the production costs can be further reduced both in terms of material and labor.

[0010] In another embodiment, the sensing unit also sense the whether the door is open or closed. This embodiment is particularly advantageous as the need for using a separate mechanical switch that detects the opening/closing of the door has been obviated. Thereby, the number of parts can be further reduced, and thus the production costs can be further reduced both in terms of material and labor.

[0011] In another embodiment, the additional touch sensitive buttons and the sensing unit are disposed into the side section of the main body. This embodiment is particularly advantageous as the space utilization efficiency in the height direction of the cooking appliance can be improved.

[0012] In another embodiment, the additional touch sensitive buttons and the sensing unit are disposed onto the side wall of the main body. This embodiment is particularly advantageous as the space utilization efficiency in the width direction of the cooking appliance can be improved.

[0013] In another embodiment, the sensing unit has sensors which are respectively associated with the touch sensitive buttons on the door and the additional touch sensitive buttons on the main body. This embodiment

is particularly advantageous as one sensor can be used in common for the touch sensitive button and the additional touch sensitive button which are assigned for the selection of the same function. Thereby, the number of parts can be further reduced, and thus the production costs can be further reduced both in terms of material and labor.

[0014] In other alternative embodiments, one or more sensor may perform optical sensing, in particular infrared sensing, capacitive sensing, inductive sensing, or acoustic sensing, in particular ultrasound sensing. These embodiments are particularly advantageous as the type of the sensor to be used can be chosen in accordance with the ambient conditions and the operating conditions. Other sensing techniques which are known to those skilled in the art may be alternatively used.

[0015] In another embodiment, the touch sensitive buttons on the door, the additional touch sensitive buttons on the main body, and the sensors of the sensing unit are respectively arranged in matching arrays. The arrays may be aligned vertically or horizontally. This embodiment is particularly advantageous as the user can easily identify the touch sensitive button on the door and the additional touch sensitive button on the main body with the same function.

[0016] In another embodiment, the cooking appliance has a display on the door for displaying information to the user. This embodiment is particularly advantageous as the user can be informed about the selected functions and other related settings, including the cooking modes, the cooking temperature, the cooking time, the remaining time, the open/closed state of the door and the like.

[0017] In another embodiment, the sensing unit transmits the sensing result to the control unit through a wireless connection means. This embodiment is particularly advantageous as the wiring between the door and the main body can be further reduced. Alternatively, the sensing unit and the control unit can be connected through a wired connection.

[0018] In another embodiment, the cooking appliance can be installation on a worktop. This embodiment is particularly advantageous as the cooking appliance can be easily accessed by the user on the worktop. Alternatively

the cooking appliance may be provided as a free standing type appliance or built-in type appliance.

[0019] Additional features and additional advantageous effects of the cooking appliance of the present invention will become more apparent with the detailed description of the embodiments with reference to the accompanying drawings in which:

[0020] Figure 1 – is a schematic perspective view of a cooking appliance according to an embodiment of the present invention, wherein the door has been opened;

[0021] Figure 2 – is a schematic partial perspective enlarged view of the side wall of the cooking appliance of Fig. 1.

[0022] The reference signs appearing on the drawings relate to the following technical features.

1. Cooking appliance
2. Main body
3. Cavity
4. Door

5a-5e. Touch sensitive button

6. Sensing unit

6a-6e. Sensor

7a-7e Additional touch sensitive button

8. Side wall

9a-9c Array

10. Display
11. Handle

[0023] The cooking appliance **(1)** comprises: a main body **(2)** which comprises a cavity **(3)** for receiving the food to be cooked; a door **(4)** for opening/closing the cavity **(3)**; a control unit (not shown) for controlling one or more functions, wherein the control unit is disposed into the door **(4)**; one or more touch sensitive buttons **(5a-5e)** for respectively selecting the functions of the control unit, wherein each touch sensitive button **(5a-5e)** is disposed onto the door **(4)**; and a sensing unit **(6)** for separately sensing the activation of each touch sensitive button **(5a-5e)** (Fig. 1 and Fig. 2).

[0024] In the cooking appliance **(1)** of the present invention the sensing unit **(6)** is disposed into a section of the main body **(2)** off the door **(4)** and adapted to transmit the sensing result to the control unit (Fig. 2).

[0025] In an embodiment, the cooking appliance **(1)** further comprises one or more additional touch sensitive buttons **(7a-7e)** for respectively selecting the functions of the control unit (Fig. 1). In this embodiment, each additional touch sensitive button **(7a-7e)** is disposed onto a section of the main body **(2)** off the door (Fig. 1). In this embodiment, the sensing unit **(6)** is further adapted to separately sense the activation of each additional touch sensitive buttons **(7a-7e)** and to transmit the sensing result to the control unit (Fig. 2).

[0026] In another embodiment, the additional touch sensitive buttons **(7a-7e)** are disposed into the side section of the main body **(2)** (Fig. 1).

[0027] In another embodiment, the additional touch sensitive buttons **(7a-7e)** are disposed onto the side wall **(8)** of the main body **(2)** (Fig.2).

[0028] In another embodiment, the sensing unit **(6)** is disposed into the side section of the main body **(2)** (Fig. 1 and Fig. 2).

[0029] In another embodiment, the sensing unit **(6)** is disposed into the side wall **(8)** of the main body **(2)** (Fig. 2).

[0030] In another embodiment, the sensing unit **(6)** comprises one or more sensors **(6a-6e)** which are respectively associated with the touch sensitive buttons **(5a-5e)** on the door **(4)** and the additional touch sensitive buttons **(7a-7e)** on the main body **(2)** (Fig. 2).

[0031] In another embodiment, one or more sensors **(6a-6e)** are adapted to perform optical sensing.

[0032] In an alternative embodiment, one or more sensors **(6a-6e)** are adapted to perform capacitive sensing.

[0033] In another alternative embodiment, one or more sensors **(6a-6e)** are adapted to perform inductive sensing.

[0034] In another alternative embodiment, one or more sensors **(6a-6e)** are adapted to perform acoustic sensing.

[0035] In another embodiment, the touch sensitive buttons **(5a-5e)** on the door **(4)** , the additional touch sensitive buttons **(7a-7e)** on the main body **(2)**, and

the sensors **(6a-6e)** of the sensing unit **(6)** are respectively arranged in matching arrays **(9a-9c)** (Fig. 1 and Fig. 2).

[0036] In another embodiment, the arrays **(9a-9c)** are arranged in the vertical direction (Fig. 1 and Fig. 2).

[0037] In another embodiment, the sensing unit **(6)** is further adapted to sense the whether the door **(4)** is open or closed.

[0038] In another embodiment, the cooking appliance **(1)** further comprises a display **(10)** for displaying information to the user (Fig. 1).

[0039] In another embodiment, the display **(10)** is disposed onto the door **(4)** (Fig. 1).

[0040] In another embodiment, the cooking appliance **(1)** further comprises a wireless connection means (not shown). In this embodiment, the sensing unit **(6)** is adapted to further transmit the sensing result to the control unit through the wireless connection means.

[0041] In another embodiment, the cooking appliance **(1)** is adapted for installation on a worktop.

[0042] In another embodiment, the door **(4)** is pivotably disposed onto the main body **(2)**.In this embodiment, the door **(2)** has a handle **(11)** (Fig. 1).

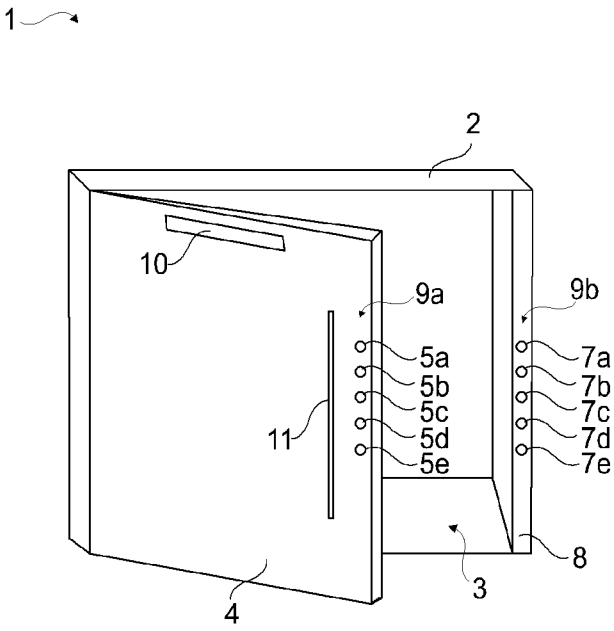
[0043] A major advantageous effect of the present invention is that the manufacturability of the door **(4)** has been improved. Another major advantageous effect of the present invention is that the control unit be can be cooled more effectively as the number of electrical components inside the door **(4)** has been reduced. Another major advantageous effect of the present invention is that the weight of the door **(4)** can be comparatively reduced. Thereby, the user can handle **(4)** the door more easily. Other advantageous effects of the present invention can be taken from the above-described embodiments.

Claims

1. A cooking appliance (1) comprising: a main body (2) which comprises a cavity (3) for receiving the food to be cooked; a door (4) for opening/closing the cavity (3); a control unit for controlling one or more functions, wherein the control unit is disposed into the door (4); one or more touch sensitive buttons (5a-5e) for respectively selecting the functions of the control unit, wherein each touch sensitive button (5a-5e) is disposed onto the door (4); and a sensing unit (6) for separately sensing the activation of each touch sensitive button (5a-5e), characterized in that the sensing unit (6) is disposed into a section of the main body (2) off the door (4) and adapted to transmit the sensing result to the control unit.
2. The cooking appliance (1) according to claim 1, characterized by further comprising one or more additional touch sensitive buttons (7a-7e) for respectively selecting the functions of the control unit, wherein each additional touch sensitive button (7a-7e) is disposed onto a section of the main body (2) off the door, and wherein the sensing unit (6) is further adapted to separately sense the activation of each additional touch sensitive buttons (7a-7e) and to transmit the sensing result to the control unit.
3. The cooking appliance (1) according to claim 2, characterized in that one or more additional touch sensitive buttons (7a-7e) are disposed into the side section of the main body (2).
4. The cooking appliance (1) according to claim 3, characterized in that one or more additional touch sensitive buttons (7a-7e) are disposed onto the side wall (8) of the main body (2).
5. The cooking appliance (1) according to any one of claims 1 to 4, characterized in that the sensing unit (6) is disposed into the side section of the main body (2).
6. The cooking appliance (1) according to claim 5, characterized in that the sensing unit (6) is disposed into the side wall (8) of the main body (2).
7. The cooking appliance (1) according to any one of claims 1 to 6, characterized in that the sensing unit (6) comprises one or more sensors (6a-6e) which are respectively associated with the touch sensitive buttons (5a-5e) on the door (4) and the additional touch sensitive buttons (7a-7e) on the main body (2).

8. The cooking appliance (1) according to claim 7, characterized in that one or more sensors (6a-6e) are adapted to perform optical sensing.
9. The cooking appliance (1) according to claim 7, characterized in that one or more sensors (6a-6e) are adapted to perform capacitive sensing.
10. The cooking appliance (1) according to claim 7, characterized in that one or more sensors (6a-6e) are adapted to perform inductive sensing.
11. The cooking appliance (1) according to claim 7, characterized in that one or more sensors (6a-6e) are adapted to perform acoustic sensing.
12. The cooking appliance (1) according to any one of claims 7 to 11, characterized in that the touch sensitive buttons (5a-5e) on the door (4), the additional touch sensitive buttons (7a-7e) on the main body (2), and the sensors (6a-6e) of the sensing unit (6) are respectively arranged in matching arrays (9a-9c).
13. The cooking appliance (1) according to any one of claims 1 to 12, characterized in that the sensing unit (6) is further adapted to sense the whether the door (4) is open or closed.
14. The cooking appliance (1) according to any one of claims 1 to 13, characterized by further comprising a display (10) for displaying information to the user, wherein the display (10) is disposed onto the door (4).
15. The cooking appliance (1) according to any one of claims 1 to 14, characterized by further comprising a wireless connection means, wherein the sensing unit (6) is further to transmit the sensing result to the control unit through the wireless connection means.

Fig. 1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9b
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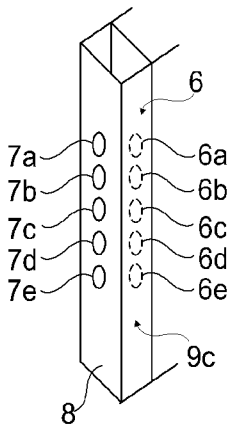
Fig. 2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INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/060163

A. CLASSIFICATION OF SUBJECT MATTER
INV. A21B3/02 F24C15/02 F24C7/08
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A21B F24C

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	GB 2 455 513 A (MYCAFE INTERNAT PLC [GB]) 17 June 2009 (2009-06-17) pages 4-10; figures 1-9	1-11, 13-15 12
X	EP 1 891 499 A1 (ELECTROLUX AB [SE]) 27 February 2008 (2008-02-27) paragraphs [0016] - [0019], [0025]; figures 1,2	1,14
Y	US 2011/087987 A1 (BROWN MICHAEL W [US]) 14 April 2011 (2011-04-14) paragraphs [0020] - [0047]; figure 1	12

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

☒ See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
25 January 2017	02/02/2017

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2016/060163

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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