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- **HOLZINGER, Jochen**
91541 Rothenburg o. d. Tauber (DE)
- **KLEIN, Gerhard**
91541 Rothenburg ob der Tauber (DE)
- **HAUSCHILDT, Heino**
91541 Rothenburg ob der Tauber (DE)
- **BUMANN, Veronika**
91541 Rothenburg ob der Tauber (DE)

(71) Applicant: **Electrolux Appliances Aktiebolag**
105 45 Stockholm (SE)

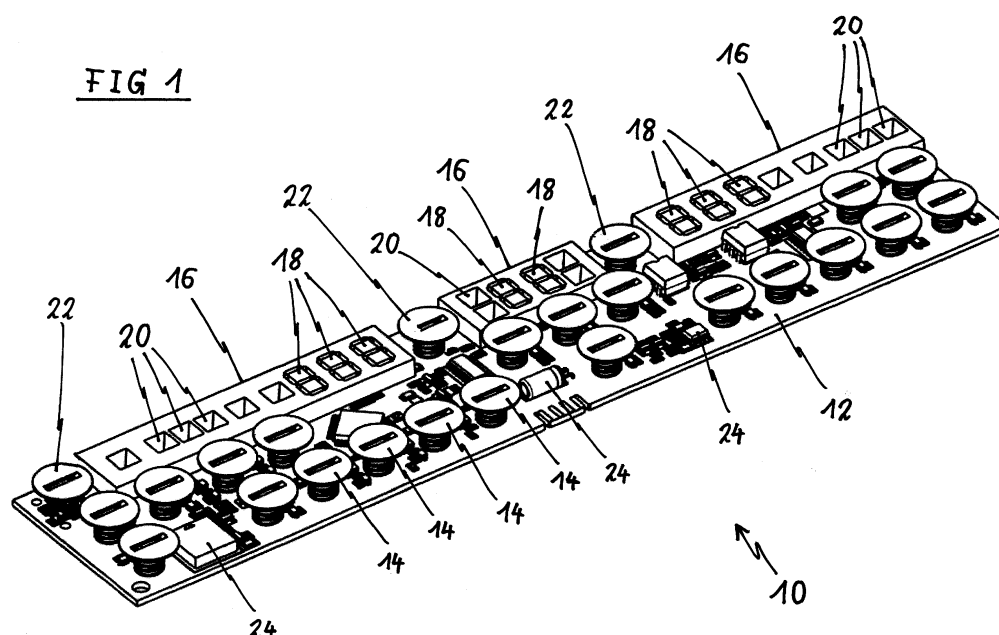
(74) Representative: **Electrolux Group Patents**
AB Electrolux
Group Patents
105 45 Stockholm (SE)

(72) Inventors:
• **DEI TOS, Paolo**
91541 Rothenburg ob der Tauber (DE)

(54) **USER INTERFACE FOR A COOKING HOB**

(57) The present invention relates to a user interface (10) for a cooking hob. At least a part of the user interface (10) is arranged or arrangeable underneath a glass ceramic panel of the cooking hob. The user interface (10) comprises a plurality of control elements (14) provided for adjusting parameters of the cooking hob by a user. The user interface (10) comprises at least one display device (16) provided for indicating at least one operation-

al state of the cooking hob and/or at least one switching status of at least one of the control elements (14). The user interface (10) comprises at least one sensor element (22) provided for detecting the presence of an object, for example a cooking utensil, upon the user interface (10). The at least one sensor element (22) is arranged within the user interface.



Description

[0001] The present invention relates to a user interface for a cooking hob. Further, the present invention relates to an according cooking hob.

[0002] The user interface for a cooking hob comprises a plurality of control elements and indicators. The control elements are operated by a user. The indicators show operational states of the cooking hob and/or a current switching status of the corresponding control element.

[0003] Often, the user interface is arranged underneath a glass ceramic panel of the cooking hob. The control elements and indicators of the user interface are arranged in a horizontal plane within the glass ceramic panel on the same level as the cooking zones.

Thus, the user interface is arranged beside the cooking zones of the cooking hob.

[0004] However, if a hot object, for example a cooking utensil, particularly a cooking vessel, is accidentally placed upon the user interface by the user, then said user interface are parts thereof could be damaged or destroyed. In particular, the electronic devices and the display devices of the user interface are very heat-sensitive.

[0005] It is an object of the present invention to provide a user interface for a cooking hob, which prevents or avoids the permanent presence of a cooking utensil, particularly a cooking vessel upon the user interface.

[0006] The object of the present invention is achieved by the user interface according to claim 1.

[0007] According to the present invention a user interface for a cooking hob is provided, wherein

- at least a part of the user interface is arranged or arrangeable underneath a glass ceramic panel of the cooking hob,
- the user interface comprises a plurality of control elements,
- the control elements are provided for adjusting parameter of the cooking hob by a user,
- the user interface comprises at least one display device,
- the display device is provided for indicating at least one operational state of the cooking hob and/or at least one switching status of at least one of the control elements,
- the user interface comprises at least one sensor element provided for detecting the presence of an object, particularly a cooking utensil, more particularly a cooking vessel, upon the user interface, and
- the at least one sensor element is arranged within the user interface.

[0008] The main idea of the present invention is the additional sensor element arranged within the user interface and provided for detecting the presence of the object upon the user interface.

[0009] A hot object, particularly cooking utensil, more particularly a cooking vessel, placed upon the user inter-

face could damage or destroy said user interface or parts thereof. In particular, the display device is heat-sensitive. Further, electronic devices of the user interface are heat-sensitive. Usually, the user interface is arranged beside the cooking zones, so that the user may accidentally place the hot object upon the user interface. The at least one sensor element prevents or avoids a destruction of the user interface or parts thereof by the hot object.

[0010] Preferably, at least one sensor element is a touch sensor, a touch switch and/or a proximity sensor. The touch sensor, the touch switch and/or the proximity sensor are already often used as control elements. Thus, the sensor element and the control element may be made of the same components. This contributes to a low-cost production of the user interface.

[0011] Additionally or alternatively, the at least one sensor element comprises a temperature sensor. This advantageously allows to determine a temperature as the input value of the sensor, which relates to the temperature of the object and/or the respective section of the glass ceramic panel above the sensor element. Depending on the specific placement of the sensor element, the input value of the temperature sensor may additionally or alternatively relate to the temperature of a part of the display device.

[0012] A sensor element comprising a capacitive sensor is particularly preferred. This allows for detecting various objects with a wide range of materials. Particularly, the object according to the present invention may particularly be any object detectable by the respective sensor element, i.e. preferably comprising a capacitive sensor, and which object may be accidentally laid on the user interface. However, the present invention particularly considers an object being a cooking utensil, for example a cooking vessel, without the wish to being bound thereto.

[0013] Further, the user interface may comprise at least one signalling device provided for indicating a signal, if the presence of the object upon the user interface has been detected, wherein preferably the at least one signalling device indicates an optical and/or acoustic signal.

[0014] Alternatively to the signalling device, the user interface may comprise at least one turn-off device provided for switching-off the cooking hob or at least one cooking zone beside said user interface, if the presence of the object upon the user interface has been detected.

[0015] Additionally to the signalling device, the user interface may comprise at least one turn-off device provided for switching-off the cooking hob or at least one cooking zone beside said user interface after a predetermined time interval, after the presence of the object upon the user interface has been detected and if the cooking hob or the at least one cooking zone beside said user interface has not yet been switched off by the user.

[0016] Moreover, the user interface may be additionally provided for controlling and/or monitoring a cooking oven.

[0017] In particular, the at least one sensor element is

arranged beside the display device and/or between the display devices.

[0018] For example, the user interface includes at least one operating portion and at least one displaying portion, wherein the operating portion is defined by the arrangement of the control elements, while the displaying portion is defined by the arrangement of the at least one display device, and wherein the at least one sensor element is arranged within said displaying portion.

[0019] Additionally or alternatively, the at least one sensor element may also be provided within the display device, at or adjacent to a rim section or edge section, particularly a long side of the display device, more particularly between the cooking field and the main part of the display device. Such placement may be of advantage, as for example, if a hot object being accidentally placed upon the user interface, particularly at a rim portion thereof, the user interface may be prevented from being damaged or destroyed.

[0020] Preferably, at least one of the control elements is a touch sensor, a touch switch and/or a proximity sensor.

[0021] Alternatively or additionally, at least one of the control elements is a mechanical key, in particular a push-button. A part of the user interface may be arranged beside the glass ceramic panel and/or at least one cut-out for the mechanical key or keys may be formed in said glass ceramic panel.

[0022] Further, at least one of the control elements may be a touch slide element, wherein preferably said touch slide element is formed by a series of control elements.

[0023] For example, the display device includes at least one seven-segment display.

[0024] The seven-segment display may be provided for indicating at least one parameter value of the cooking hob and/or of an oven cavity of the cooking oven.

[0025] Moreover, the display device may include at least one illumination unit.

[0026] For example, at least one illumination unit is provided for indicating at least one operational state of the cooking hob and/or of the oven cavity of the cooking oven.

[0027] Additionally or alternatively, at least one illumination unit is provided for indicating at least one switching status of at least one control element.

[0028] Further, the present invention relates to a cooking hob, wherein the cooking hob comprises at least one user interface mentioned above, and wherein the at least one user interface is provided for controlling and/or monitoring the cooking hob.

[0029] At last, the cooking hob may correspond with a cooking oven, wherein the at least one user interface is provided for controlling and/or monitoring said cooking oven.

[0030] Novel and inventive features of the present invention are set forth in the appended claims.

[0031] The present invention will be described in further detail with reference to the drawing, in which

FIG 1 illustrates a schematic perspective view of a user interface according to a preferred embodiment of the present invention.

[0032] FIG 1 illustrates a schematic perspective view of a user interface 10 according to a preferred embodiment of the present invention. Said user interface 10 is provided for a cooking hob. Additionally, the user interface 10 may be further provided for a cooking oven. Preferably, the user interface 10 is arrangeable or arranged beneath a glass ceramic panel. Said glass ceramic panel may be transparent or semi-transparent.

[0033] The user interface 10 includes a circuit board 12, in particular a printed circuit board. The user interface 10 comprises a plurality of control elements 14 arranged on said circuit board 12. For example, the control elements 14 are touch sensors, touch switches and/or proximity sensors. Further, the user interface 10 comprises a number of display devices 16 arranged on the circuit board 12. In this example, each display device 16 includes seven-segment displays 18 and illumination units 20. Said illumination units 20 include a light funnel for receiving a light source element in each case. Preferably, the light source elements are light emitting diodes (LED). The seven-segment displays 18 indicate numerical parameter values. For example, said numerical parameter value corresponds with the temperature of a cooking zone or oven cavity or with a residual time of a cooking process. The illumination units 20 indicate operational states of the cooking hob and/or cooking oven. Further, the illumination unit 20 may indicate a switching status of a corresponding control element 14. Moreover, the user interface 10 comprises a plurality of electronic devices 24 arranged on the circuit board 12.

[0034] According to the present invention the user interface 10 comprises a number of sensor elements 22. Further, the user interface 10 may comprise at least one signalling device and/or a turn-off device, which are not explicitly shown in FIG 1. The sensor elements 22 are provided for detecting the presence of an object upon the user interface 10. If the object is placed on the user interface 10, then the presence of the object is detected by one or more of the sensor elements 22.

[0035] After the presence of the object has been detected by one or more sensor elements 22, the signalling device outputs an optical and/or acoustic signal. If the object is not removed from the user interface 10 within a predetermined time interval, then the turn-off device switches off the cooking hob or at least the cooking zone or cooking zones beside the user interface 10. Alternatively, the cooking hob or the cooking zone(s) beside the user interface 10, respectively, are switched off by the turn-off device, as soon as the presence of the object has been detected by the sensor element(s) 22. In the latter case, the signalling device is optional and outputs the optical and/or acoustic signal, if the presence of the object has been detected by the sensor element(s) 22.

[0036] A hot object placed on the user interface 10

could damage or destroy said user interface 10. In particular, the electronic devices 24 and the display devices 16 are heat-sensitive. Thus, the sensor elements 22 and the at least one signalling device and/or the turn-off device prevent or avoid a destruction of the user interface 10 or parts of said user interface 10.

[0037] In this example, the user interface 10 includes an operating portion and a displaying portion. The operating portion is defined by the control elements 14, while the displaying portion is formed by the display devices 16. In this example, the sensor elements 22 are arranged within the displaying portion. Preferably, the sensor elements 22 are arranged between and/or beside the display devices 16. Usually, the displaying portion is arranged beside the cooking zones. Thus, the user may accidentally place the hot object upon the user interface 10, in particular upon the displaying portion of said user interface 10. The inventive user interface 10 with the sensor elements 22 and the at least one signalling device and/or the turn-off device prevent or avoid the destruction of the user interface 10.

[0038] Although an illustrative embodiment of the present invention has been described herein with reference to the accompanying drawing, it is to be understood that the present invention is not limited to that precise embodiment, and that various other changes and modifications may be affected therein by one skilled in the art without departing from the scope or spirit of the invention. All such changes and modifications are intended to be included within the scope of the invention as defined by the appended claims.

List of reference numerals

[0039]

10	user interface
12	circuit board
14	control element
16	display device
18	seven-segment display
20	illumination unit
22	sensor element
24	electronic device

Claims

1. A user interface (10) for a cooking hob, wherein
 - at least a part of the user interface (10) is arranged or arrangeable underneath a glass ceramic panel of the cooking hob,
 - the user interface (10) comprises a plurality of control elements (14),
 - the control elements (14) are provided for adjusting parameter of the cooking hob by a user,
 - the user interface (10) comprises at least one

display device (16),

- the display device (16) is provided for indicating at least one operational state of the cooking hob and/or at least one switching status of at least one of the control elements (14),
- the user interface (10) comprises at least one sensor element (22) provided for detecting the presence of an object, particularly a cooking utensil, more particularly a cooking vessel, upon the user interface (10), and
- the at least one sensor element (22) is arranged within the user interface.

2. The user interface according to claim 1, **characterised in that** at least one sensor element (22) is a touch sensor, a touch switch and/or a proximity sensor.
3. The user interface according to claim 1 or 2, **characterised in that** the user interface (10) comprises at least one signalling device provided for indicating a signal, if the presence of the object upon the user interface (10) has been detected, wherein preferably the at least one signalling device indicates an optical and/or acoustic signal.
4. The user interface according to any one of the preceding claims, **characterised in that** the user interface (10) comprises at least one turn-off device provided for switching-off the cooking hob or at least one cooking zones beside said user interface (10), if the presence of the object upon the user interface (10) has been detected.
5. The user interface according to any one of the preceding claims, **characterised in that** the user interface (10) comprises at least one turn-off device provided for switching-off the cooking hob or at least one cooking zone beside said user interface (10) after a predetermined time interval, after the presence of the object upon the user interface (10) has been detected and if the cooking hob or the at least one cooking zone beside said user interface (10) has not been switch off by the user.
6. The user interface according to any one of the preceding claims, **characterised in that** the user interface (10) is additionally provided for controlling and/or monitoring a cooking oven.
7. The user interface according to any one of the preceding claims, **characterised in that** the at least one sensor element (22) is arranged be-

side the display device (16) and/or between the display devices (16).

8. The user interface according to any one of the preceding claims,
characterised in that
the user interface (10) includes at least one operating portion and at least one displaying portion, wherein the operating portion is defined by the arrangement of the control elements (14), while the displaying portion is defined by the arrangement of the at least one display device (16), and wherein the at least one sensor element (22) is arranged within said displaying portion.
9. The user interface according to any one of the preceding claims,
characterised in that
at least one of the control elements (14) is a touch sensor, a touch switch and/or a proximity sensor.
10. The user interface according to any one of the preceding claims,
characterised in that
at least one of the control elements (14) is a mechanical key, in particular a push-button.
11. The user interface according to any one of the preceding claims,
characterised in that
at least one of the control elements (14) is a touch slide element and/or said touch slide element is formed by a series of control elements (14).
12. The user interface according to any one of the preceding claims,
characterised in that
the display device (16) includes at least one seven-segment display (18), wherein preferably the seven-segment display (18) is provided for indicating at least one parameter value of the cooking hob and/or of an oven cavity of the cooking oven.
13. The user interface according to any one of the preceding claims,
characterised in that
the display device (16) includes at least one illumination unit (20), wherein preferably at least one illumination unit (20) is provided for indicating at least one operational state of the cooking hob and/or of the oven cavity of the cooking oven and/or for indicating at least one switching status of at least one control element (12).
14. A cooking hob,
characterised in that
the cooking hob comprises at least one user interface (10) according to any one of the claims 1 to 13,

wherein the at least one user interface (10) is provided for controlling and/or monitoring the cooking hob.

- 5 15. The cooking hob according to claim 14,
characterised in that
the cooking hob corresponds with a cooking oven, wherein the at least one user interface (10) is provided for controlling and/or monitoring said cooking oven.

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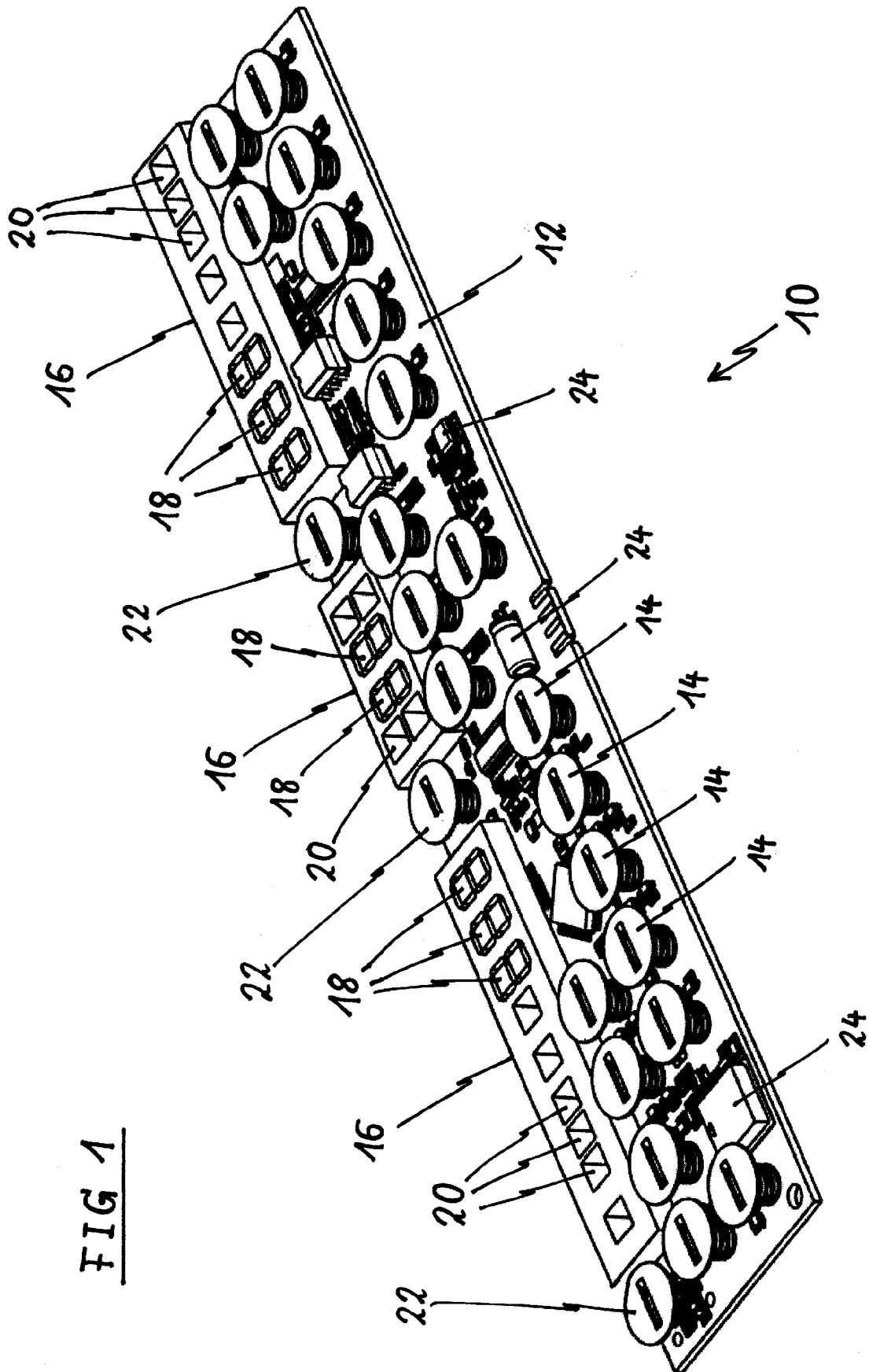


FIG 1



EUROPEAN SEARCH REPORT

Application Number
EP 16 16 4989

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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 14 September 2016	Examiner Adant, Vincent
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			

EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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