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- **ZANGOLI, Massimo**  
**47122 Forli (IT)**
- **NEGRETTI, Peter**  
**47100 Forli (IT)**
- **NOSTRO, Massimo**  
**47122 Forli (IT)**
- **URGESE, Emanuel**  
**47100 Forli (IT)**

(71) Applicant: **ELECTROLUX APPLIANCES AKTIEBOLAG**  
**105 45 Stockholm (SE)**

(74) Representative: **Electrolux Group Patents**  
**AB Electrolux**  
**S:t Göransgatan 143**  
**10545 Stockholm (SE)**

(72) Inventors:  
• **FORTI, Michele**  
**47122 Forli (IT)**

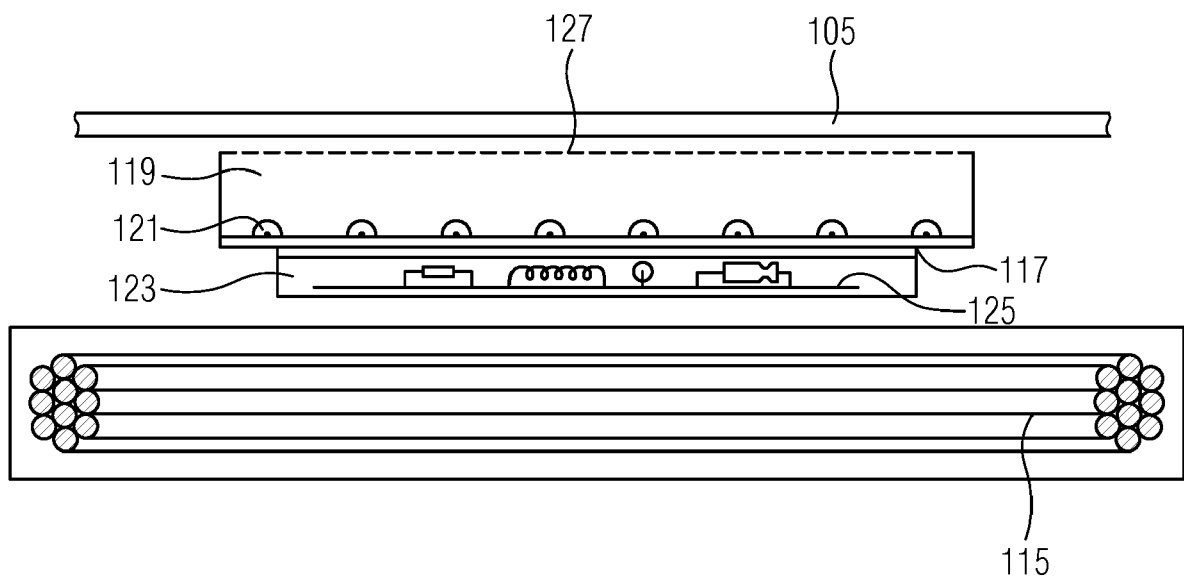
(54) **HOUSEHOLD APPLIANCE AND METHOD FOR POWERING AT LEAST A FIRST AND A SECOND ELECTRIC OR ELECTRONIC COMPONENT OR ASSEMBLY**

(57) The present invention relates to a household appliance (101, 201, 301), particularly a cooking hob, which comprises a control unit for controlling at least one first electric or electronic component or assembly, particularly a heating element (115, 215), e.g. an induction heating coil. The control unit and/or the at least one first electric or electronic component is supplied by a power source by means of a supply wire. At least one second electric or electronic component or assembly (117, 217) is arranged in the interior of the household appliance (101, 210, 301). The second electric or electronic component or assembly (117, 217) comprises energy production, harvesting, receiving or tapping means (125, 225) for providing electrical energy adapted for at least a self-supply of the second electric or electronic component or assembly (117, 217).

Further, the invention relates a method for powering

at least a first and a second electric or electronic component or assembly in a household appliance (101, 210, 301), particularly in a cooking hob. A control unit controls at least one first electric or electronic component or assembly, particularly a heating element (115, 215), e.g. an induction heating coil. A power source, particularly an electronic power board, supplies the control unit and/or the at least one first electric or electronic component or assembly by means of a supply wire. The first electric or electronic component or assembly transmits energy wirelessly during its operation to at least one second electric or electronic component or assembly (117, 217) for an energy supply of the second electric or electronic component or assembly (117, 217).

Fig.3



## Description

**[0001]** The present invention relates to a household appliance comprising a control unit for controlling at least one first electric or electronic component or assembly according to the characterizing part of claim 1. The present invention further relates to a method for powering at least a first and a second electric or electronic component or assembly in a household appliance according to the characterizing part of claim 11.

**[0002]** There are household appliances known in the art which indicate specific status information using signalling means, which may be illuminating means. Particularly cooking hobs are existing which comprise a transparent or semi-transparent top plate and illuminating means arranged beneath said top plate for partially illuminating the top plate from below. Said illuminating means are typically connected to and controlled by a control unit of the cooking hob.

**[0003]** The document US 2018/0124879 A1 discloses a cooking hob comprising a transparent or semi-transparent top plate and multiple heating elements and illuminating means arranged below said top plate. The illuminating means provide light markings at the upper side of the top plate, which light markings indicating cooking zones associated with the heating elements. The illumination means comprise a light box including lighting elements for illuminating an interior space of the light box. The cooking hob further comprises a control unit adapted to control illumination properties provided by the light box based on the cooking level the cooking hob is operated with.

**[0004]** It is an object of the present invention to provide a household appliance and a method for powering at least a first and a second electric or electronic component or assembly in a household appliance which end up in reduced manufacturing costs and an increased space.

**[0005]** The object is achieved for a household appliance, particularly a cooking hob, more particularly an induction cooking hob, according to the preamble of claim 1 by means of the characterizing features of claim 1.

**[0006]** According to a first aspect of the invention, a household appliance, particularly a cooking hob, more particularly an induction cooking hob, comprises a control unit for controlling at least one first electric or electronic component or assembly, which may be one or more heating elements, particularly one or more induction heating coils. The control unit and/or the at least one first electric or electronic component or assembly is/are supplied by a power source by means of a supply wire. By way of example, in particular in the case of a cooking hob, said power source is at least one electronic power board. At least one second electric or electronic component or assembly is arranged in the interior of the household appliance and comprises energy production means or energy harvesting means or energy receiving means or energy tapping means for providing electrical energy adapted for at least a self-supply of the second electric or elec-

tronic component or assembly. The main purpose is to make the second electric or electronic component or assembly independent from the power source of the first electric or electronic component or assembly, which may be the main power source for the household appliance, and respective wiring arrangement, particularly wiring to the power source. A further advantage may be flexibility with respect to the arrangement of or position definition for the second electric or electronic component or assembly.

**[0007]** Preferably, the second electric or electronic component or assembly is or comprises an electronic module, which may perform or support energy receiving or harvesting or tapping. The second electric or electronic component or assembly may be an autarkic, preferably self-sustaining, component or assembly.

**[0008]** The household appliance may further comprise a transparent or semi-transparent panel. In the case of a cooking hob, said panel may be a display panel or a top plate. Preferably, the at least one second electric or electronic component or assembly is arranged in close proximity to or touches the transparent or semi-transparent panel. Specifically, the second electric or electronic component or assembly is arranged directly below the top plate of a cooking hob.

**[0009]** In a specific embodiment, the second electric or electronic component or assembly is or comprises an illuminating means providing light markings on the panel, particularly for indicating a heating zone of the cooking hob. Such indication of a heating zone of the cooking hob, preferably a selected or defined or activated heating zone, is a typical application area for said indication means or illumination means, respectively. However, other parts or areas of the cooking hob, e. g. on outer limitation or frame of a total heating area and/or a visual assignment of a heating zone to an allocated control element, may be considered.

**[0010]** The second electric or electronic component or assembly may further comprise a signalling means, in particular a signalling by way of illumination, and/or a sensor means or sensor circuit, particularly for temperature detection. If providing both signalling means and sensor means or circuit, the signalling, particularly the illumination, may be dependent on a sensed property of the household appliance or an object treated by the household appliance.

**[0011]** In a preferred embodiment, the energy production means or energy harvesting means or energy receiving means or energy tapping means are adapted to make use of energy generated and/or emitted by at least one of the at least one first electric or electronic component or assembly, particularly of at least one of the at least one heating element, more particularly of at least one of the at least one induction heating coil.

**[0012]** Advantageously, the at least one second electric or electronic component or assembly is positioned close by the at least one first electric or electronic component or assembly, in particular positioned directly un-

der, besides or above, or embedded in the at least one first electric or electronic component or assembly. Such proximate arrangement may increase a coupling effect or result between first and second electric or electronic components or assemblies in relation to energy tapping, receiving or harvesting.

**[0013]** In a preferred embodiment, the at least one second electric or electronic component or assembly is connected by wireless connection to the control unit or comprises an own control means for a self-regulated operation. This arrangement, favourably, comprises connection means for wireless connection, particularly for wireless control, and allows an operation of the second electric or electronic component or assembly wirelessly by the control means of the household appliance and/or by way of remote control by the user through the user interface of the household appliance. That way, a control of the second electric or electronic component or assembly through the household appliance means is possible without the need for spending space within the household appliance for wiring. Naturally, the second electric or electronic component or assembly may alternatively be connected to the control unit by wired connection. Such kind of wired connection may be more cost efficient compared to a provision of means for wireless connection and it may also allow transmission of supply energy from the second electric or electronic component or assembly to the control unit, particularly for a supply not only of the second electric or electronic component or assembly but also of the control unit or parts thereof.

**[0014]** In order to avoid damages of said own control means arranged at or within the at least one second electric or electronic component or assembly or to avoid or reduce the risk of malfunctions at the own control means, said own control means or components thereof are beneficially designed with increased thermal resistance.

**[0015]** The household appliance may comprise energy transfer means operating with inductive coupling and/or being based on electromagnetic waves, wherein the first electric or electronic component or assembly, particularly the heating element, more particularly the induction heating coil, comprises or serves as an energy emitting means and the second electric or electronic component or assembly comprises or serves as an energy receiving means. In the case of an induction cooking hob, this kind of energy transfer works in the same or in a similar way as the energy or power transfer from the induction heating coil to the cookware placed on the respective heating zone. Preferably, the power or energy transfer from the induction heating coil to both the cookware and the second electric or electronic component or assembly is executed in parallel or simultaneously. In that case, the induction coil generates an electromagnetic field primarily for the energy or power transfer to the cookware, but as a kind of secondary effect, the second electric or electronic component or assembly, particularly a specific sensing or receiving circuit thereof, receives or taps or harvests energy for driving the second electric or elec-

tronic component or assembly, particularly any loads thereof.

**[0016]** The second electric or electronic component or assembly may further comprise rechargeable battery means or capacitive storage means operating as a buffer for electric energy. With said energy buffer also during time periods, in which no energy receiving or tapping or harvesting is possible, the operation of the second electric or electronic component or assembly, particularly any loads thereof, is possible. The second electric or electronic component or assembly may further comprise a timer and/or a temperature sensing means, e.g. for a control of a warning signal for high temperature at surfaces. A respective warning signal may be operated or operatable, specifically during a defined or controlled period of time, also when no emitted energy for harvesting is available. Similar to the above-described own control means, in order to avoid damages of said rechargeable battery means or capacitive storage means, said timer and/or said temperature sensing means are advantageously designed for resisting the temperature levels occurring at their installation locations.

**[0017]** In a preferred embodiment, the second electric or electronic component or assembly is or comprises an illuminating means and further comprises a control means and/or a sensing means controlling at least one of

- light intensity;
- duty cycle;
- colour;
- light marking extension, in case of a linear markings e. g. line width, line interruptions and/or number of lines,

of the illuminating means, the control of the illuminating means particularly being based on a current operating program or state, more particularly based on a current cooking level of the cooking hob. Also especially optically noticeable illuminating signals, like blinking or flashing, may be considerable.

**[0018]** The object is achieved for a method for powering at least a first and a second electric or electronic component or assembly according to the preamble of claim 11 by means of the characterizing the features of claim 11.

**[0019]** According to a further aspect of the invention, a method for powering at least a first and a second electric or electronic component or assembly in a household appliance, particularly in a cooking hob, more particularly in an induction cooking hob, is provided. A control unit arranged in the household appliance controls at least one first electric or electronic component or assembly. The at least one first electric or electronic component or assembly may be at least one heating element, particularly at least one induction heating coil. A power source, which may be an electronic power board, supplies the control unit and/or the at least one first electric or electronic component or assembly by means of at least one supply wire.

The at least one first electric or electronic component or assembly transmits energy wirelessly during its operation to at least one second electric or electronic component or assembly for an energy supply of the at least one second electric or electronic component or assembly.

**[0020]** Preferably, the first electric or electronic component or assembly transmits energy based on electromagnetic field, particularly by means of inductive energy transmission. Other ways of contactless energy transfer may be considered as well, e.g. capacitive coupling or generally also the principle of far field transmission technology.

**[0021]** A preferred embodiment is characterized by a signalling means, particularly illuminating means, which is arranged in the at least one second electric or electronic component or assembly and is powered by a sensing circuit that is also arranged in the at least one second electric or electronic component or assembly. Said sensing circuit receives or taps or harvests energy provided by the first electric or electronic component or assembly and transferred by means of electromagnetic waves and/or by way of inductive coupling or other type of contactless energy transfer.

**[0022]** Another preferred embodiment provides for at least one of the following properties:

- light intensity;
- duty cycle;
- colour;
- light marking extension, in case of a linear markings e. g. line width and/or number of lines,

of the illuminating means. Said at least one of these properties may be adjusted based on a current operating program or state, preferably based on a current and/or target cooking level, and/or based on a currently transferred power intensity.

**[0023]** A particularly preferred embodiment is characterized by a method in which a pot detection means in an induction cooking hob selectively activates or causes activation of specific induction coils of the induction cooking hob based on the size and/or dimensions of a pot placed thereon. The activated induction coils transmit power during their operation according to a duty cycle to the pot as well as to energy receiving or tapping or harvesting means, particularly being or comprising a sensing circuit, arranged in the at least one second electric or electronic component or assembly. The energy receiving or tapping or harvesting means may transfer the energy into electric current flowing through illumination means thereby transferring the electrical energy into luminous energy.

**[0024]** A yet further specific embodiment of the household appliance and/or of the method for powering at least a first and a second electric or electronic component or assembly in a household appliance according to the current invention provides for or is applicable on an induction cooking hob which comprises an array or a matrix ar-

rangement of heating elements, particularly induction heating coils, in which one or more heating zone or zones is/are defined by interconnection of neighbouring induction heating coils, particularly determined by one or more cookware placed on a top plate and pot detection means of the induction cooking hob. In said embodiment, illumination means allocated to the selected induction heating coils defining said zone(s) are empowered along the features described above.

**[0025]** Novel and inventive features of the present invention are set forth in the appended claims.

**[0026]** The present invention will now be described in further detail with reference to the drawings, in which

15 FIG 1 illustrates a perspective view of an induction cooking hob according to a first embodiment comprising a self-supplied illuminating device;

FIG 2 illustrates schematically the general structure of the self-supplied illuminating device of FIG 1;

FIG 3 illustrates a cross-sectional view of a heating zone of the induction cooking hob of FIG 1 along the line III - III;

FIG 4 illustrates a cross-sectional view of a heating zone of the induction cooking hob of FIG 1 along the line IV - IV;

30 FIG 5 illustrates a perspective view of an induction cooking hob according to a second embodiment comprising a self-supplied illuminating device;

35 FIG 6 illustrates a cross-sectional view of two adjacent heating elements of the cooking hob of FIG 1 along the line VI - VI; and

FIG 7 illustrates a perspective view of a cooking hob according to a third embodiment comprising a self-supplied illuminating device.

**[0027]** A first embodiment of an induction cooking hob according to the present invention is shown in FIG 1. The cooking hob 101 comprises a housing 103 covered by a hob plate 105. Said hob plate 105 is partitioned into a cooking area 107 and an operating area 109. The operating area 109 comprises a user interface 111 for receiving user input and/or for providing information, which user interface 111 is formed as a touchscreen device. Four heating zones 113 are arranged in the cooking area, which are correlated with induction coils 115 located beneath the hob plate 105 and adapted to inductively heat cookware after it has been placed on one of the heating zones 113 and the heating zone 113 has been switched on. The heating zones 113 may be of different size in order to place differently dimensioned cookware thereon, or they may be of equal diameter, as illustrated. The heat-

ing zones 113 may be adapted to be coupled, e.g. in pairs, in order to adapt the heating area to large-sized cookware, or all heating zones 113 may be operated individually.

**[0028]** The user is informed by respective display on the user interface 111, which heating zone 113 is currently activated and in which way, i. e. paired or separately. However, in order to provide peculiar and apparent information, the activated and, when indicated, combined heating zones 113 are alternatively or additionally marked by specific light markings arranged directly at or close-by the heating zones 113. To this end the hob plate 105 is of a transparent or semi-transparent design and may be made of glass ceramic material and the illumination of the activated heating zone 113 is performed by an illuminating device 117 arranged directly below the hob plate 105 and emitting light through the light-transmissive hob plate 105. When illuminated, a respective light-marking 118 is visible to the user on the top side of the hob plate 105.

**[0029]** FIG 1 indicates a respective light-marking 118 purely as a rectangular spot and only arranged at one heating zone 113 for reasons of simplicity. In reality, the light-markings 118 may be of different size and of different shape, depending on the intended information to be provided. If, for example, a simple activation state shall be provided, an indication by a spot of whatever shape and size inside of the heating zone 113 may be feasible. Alternatively, the light-marking 118 may be designed as an illumination of the circumferential line of the heating zone 113, in which case the illuminating device 117 is designed as an angular unit. An indication of an operation of two heating zones 113 forming a combined heating area may be illustrated by way of bracket-shaped illumination units encompassing the combined heating zones 113. Naturally, other indicative illuminations are possible.

**[0030]** As is shown by way of a schematic diagram, Fig. 2 illustrates the general structure of the illuminating device 117. Said illuminating device 117 is a self-supplied unit and is operated without the need of being electrically supplied from supply means of the induction cooking hob 101 by means of a supply wire, i. e. the illuminating device 117 is, to a certain extent flexibly positionable below the hob plate 105.

**[0031]** As can be seen in FIG 2, the illuminating device 117 is subdivided into an upper compartment 119 housing lightening elements 121, which may be light emitting diodes, and a lower compartment 123 housing energy harvesting unit 125 arranged on a printed circuit board, in FIG 2 symbolized as a coil, as it is used for an inductive coupling. Said energy harvesting unit 125 is adapted to tap or harvest energy and to provide the tapped or harvested energy for the supply of the lightening elements 121.

**[0032]** FIG 3 (longitudinal section of the illumination device 117 along the line III - III) and FIG 4 (cross-section of the illumination device 117 along the line IV - IV) exemplarily illustrate the illuminating device 117 in more

detail by way of a cross-sectional view of a heating zone 113 of the first embodiment according to FIG 1. The illuminating device 117, as is schematically shown in FIG 2 with its upper and lower compartments 119, 123, is positioned directly below the hob plate 105 with an upper side thereof. Said upper side may be uncovered in order to allow light to be emitted upwardly through the hob plate 105, or it may be covered by means of a diffuser foil 127, as illustrated. The illuminating device 117, in particular its upper compartment 119, may be a cuboid box, as illustrated with FIGs 3 and 4. Alternatively, the shape of the illuminating device may differ from the exemplarily illustrated embodiment, e. g. by way of a frustoconical or pyramidal-trunk chassis or an elongated body with trapezoid cross-section. The lower compartment 123 of the illuminating device 117 is facing the induction coil 115 which is positioned below the illuminating device 117.

**[0033]** The upper compartment 119 of the illuminating device 117, which is exemplarily configured as an elongated box in order to provide a strip lighting, houses multiple electrically connected lightening elements 121 on a bottom side thereof. According to FIG 3, the lightening elements 121 are arranged in a straight line, what is also purely an exemplary arrangement. The string of lightening elements 121 is electrically supplied by the energy harvesting unit 125 arranged inside the lower compartment 123, hence, lightening elements 121 and energy harvesting unit 125 are electrically coupled by means of a supply wire (not shown).

**[0034]** The energy harvesting unit 125 is inductively coupled with the induction coil 115. The primary task of the induction coil 115 in an induction cooking hob 101 is to provide energy for heating a cookware placed on the allocated heating zone 113. As a secondary effect, the energy harvesting unit 125 is harvesting energy from the electromagnetic waves emitted during the operation of the heating zone 113. The skilled person will readily understand that energy harvesting is only enabled when electromagnetic waves are emitted. As long as energy transmission to the heating zone 113 is paused, e. g. when the induction coil 115 is totally switched-off or during an idle time of a duty cycle, the energy harvesting unit 125 is not supplied with energy. Therefore, in order to avoid that illumination performed by the illuminating device 117 is breaking as well, a rechargeable battery means or capacitive storage means operating as a buffer for electric energy may be provided on the printed circuit board comprising the energy harvesting unit 125. The storage capacity of such rechargeable battery means or capacitive storage means is preferably at least as large as the idle time of the lowest power setting on the induction cooking hob 101 can be bridged. The current sourcing from the energy provided by the energy harvesting unit 125 during the operating time of the duty cycle or by the rechargeable battery means or capacitive storage means during the idle time is conducted to the lightening elements 121 for providing the light-marking 118.

**[0035]** FIG 5 illustrates a second embodiment of an

induction cooking hob according to the present invention. Instead of providing four defined heating zones 113 on the cooking area 107 according to the first embodiment, the induction cooking hob 201 of the second embodiment is characterized by a full-surface cooking area 207 which allows the user to position the cookware in a "cook anywhere" manner, as is known in the art. According to FIG 5, smaller induction coils 215 are arranged beneath the hob plate 205 in a two-dimensional matrix, e. g. in a 5x6 matrix as illustrated, which, however, may be more fine-meshed by way of even more and even smaller induction coils. The heating zone of the induction cooking hob 201 of the second embodiment is defined as soon as cookware, e.g. a pot, is placed on the cooking area 207 and a pot detection means of the induction cooking hob 201 has identified its position and has notified this position to the control unit of the induction cooking hob 201.

**[0036]** FIG 6 is a cross-sectional view of two adjacent heating coils 215 along the line IV - IV according to FIG 5. As illustrated, similar to the structure of the first embodiment, an illuminating device 217 is allocated to each induction coil 215, which illuminating device 217 is adapted to the smaller dimension of the induction coil 215 in comparison to the first embodiment.

**[0037]** Anyway, also the illuminating device 217 of the second embodiment comprises an upper compartment 219 housing lightening elements 221 and a lower compartment 223 housing an energy harvesting unit 225. The illustrated illuminating device 217 is designed to provide a light-marking 218 shaped as a circular spot with smaller diameter than the diameter of the induction coil 215. The illuminating device 217 of the second embodiment is operated in the same way as the illuminating device 117 of the first embodiment.

**[0038]** The illuminating device 217, which is illustrated with FIGs 5 and 6 as circular spots, may be arranged and shaped alternatively in various different embodiments. The illuminating devices 217 may be arranged with respect to the induction coils 215 such that due to the activating/deactivating of lightening elements 221 included in the illuminating device 217, the light-marking 218 may be provided at the upper side of the hob plate 205. For example, the illuminating devices 217 may be distributed over the hob plate 205. According to the present second embodiment, the illuminating devices 217 may be arranged in rows and columns, specifically, in spaces between the induction coils 215 and at the outer edge of the cooking area 207. The illuminating devices 217 may have a longitudinal shape and may extend through the whole or essentially the whole length and/or width of the hob plate 201 or of the cooking area 207. According to another embodiment, the illuminating devices 217 may be segmented, i. e. may only partially surround a heating zone defined by combined induction coils 215. The illuminating devices 217 may have a linear shape or may have a curved shape, e. g. a bracket-like shape. When activating the lightening elements 221 within the illuminating devices 217, a strip-like light may be emitted and

provided through the hob plate 205 thereby generating an illumination stripe at the upper surface of the hob plate 205. In addition, a masking may be provided at the bottom side of the hob plate 205 in order to confine the illumination stripe. Said masking may be provided by a printing or coating at the bottom side of the hob plate 205. The illuminating devices 217 may be integrated within the induction cooking hob 201 in different ways. For example, the illuminating devices 217 may be directly arranged at the bottom side of the hob plate 205, it may be arranged at the induction coils 215 or it may be coupled with a bracket to the hob plate 205 or the induction coils 215.

**[0039]** A third embodiment of an induction cooking hob according to the present invention is shown in FIG 7. Contrary to the first embodiment, the light-marking 318 of the third embodiment does not indicate a heating zone 113 when activated as is performed in the first embodiment. Rather, the light-marking 318 of the third embodiment, as illustrated with FIG 7, is indicating a heating zone 313 which has a temperature higher than a pre-defined threshold temperature. As soon as the threshold temperature is reached due to heating up a cookware placed thereon, the light-marking 318 illustrates an "H" symbol by activating at least one respective illuminating device. Said at least one illuminating device is not shown in FIG 7, however, the skilled person will readily understand how it has to be designed using his understanding of the above-described first and second embodiments. As an alternative to, or even in addition to, providing an "H" symbol for the indication of a high temperature, i. e. a residual heat, at a heating zone 113, 313, said high temperature may be indicated by way of a modified, in particular increased, illumination intensity provided by the illuminating device 117, 217 and/or by way of a modified illumination colour.

**[0040]** The control of the illuminating device(s) of the third embodiment is, however, different from the first and second embodiments which are activated when and as long as the heating zone 113 is operated or defined by means of the pot detection means. For the third embodiment at least one temperature sensor (not shown) and self-controlling means (not shown) using the signals from the temperature sensor have to be provided on the printed circuit board comprising the energy harvesting unit in order to switch on and to switch off the light-marking 318 indicating a warning signal for high temperature on the heating zone 313. Also for the solution according to the third embodiment a rechargeable battery means or capacitive storage means operating as a buffer for electric energy is favourable having a storage capacity which is at least as large as necessary to provide said warning signal until the temperature of the heating zone 313 goes below the pre-defined threshold temperature.

**[0041]** The afore-described indication of specifically high temperature or residual heat, respectively, may be an exclusive feature of the induction cooking hob 301. Alternatively, as being a safety indication, not least of all depending on currently valid technical standards, this so-

lution may support any standardized embodiment of residual heat indication.

**[0042]** 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. As an example, the energy harvesting by means of inductive coupling using electromagnetic waves may be a preferred solution for the induction cooking hob 101, 201, 301 as described above. However, various other known energy harvesting technology may be considered as well, e.g. pyroelectric energy harvesting, vibration or light harvesting, piezoelectric energy harvesting or thermoelectric energy harvesting. Further, the illustrated positioning of the illuminating device 117 between induction coil 115 and hob plate 105 may also be only one of different other solutions. In particular, the illuminating device 117 may be arranged circumferentially around or besides the induction coil 115 or besides adjacent heating coils 115, particularly on the same level as the induction coil 115.

#### List of reference numerals

#### **[0043]**

|               |                        |
|---------------|------------------------|
| 101, 201, 301 | induction cooking hob  |
| 103, 203, 303 | housing                |
| 105, 205, 305 | hob plate              |
| 107, 207, 307 | cooking area           |
| 109, 209, 309 | operating area         |
| 111, 211, 311 | user interface         |
| 113, 313      | heating zone           |
| 115, 215      | induction coil         |
| 117, 217      | illuminating device    |
| 118, 218, 318 | light-marking          |
| 119, 219      | upper compartment      |
| 121, 221      | lightening element     |
| 123, 223      | lower compartment      |
| 125, 225      | energy harvesting unit |
| 127, 227      | diffuser foil          |

#### **Claims**

1. A household appliance (101, 201, 301), particularly a cooking hob, more particularly an induction cooking hob, comprising a control unit for controlling at least one first electric or electronic component or assembly, particularly for controlling at least one heating element (115, 215), more particularly for controlling at least one induction heating coil, the control unit and/or the at least one first electric or electronic

component or assembly being supplied by a power source, particularly by at least one electronic power board, by means of a supply wire,

#### **characterized in that**

at least one second electric or electronic component or assembly (117, 217), in particular being or comprising an electronic module, is arranged in the interior of the household appliance (101, 201, 301) and comprises energy production means or energy harvesting means (125, 225) or energy receiving means or energy tapping means for providing electrical energy adapted for at least a self-supply of the second electric or electronic component or assembly (117, 217), the at least one second electric or electronic component or assembly (117, 217) particularly being an autarkic, preferably self-sustaining, component or assembly.

2. The household appliance according to claim 1, further comprising a transparent or semi-transparent panel (105, 205, 305), in particular a display panel or a top plate particularly of a cooking hob, wherein the at least one second electric or electronic component or assembly (117, 217) is arranged in close proximity to or touches the transparent or semi-transparent panel (105, 205, 305).

3. The household appliance according to claim 2, wherein the second electric or electronic component or assembly (117, 217) is or comprises an illuminating means (121, 221) providing light-markings (118, 218, 318) on the panel (105, 205, 305), preferably for indicating a heating zone (113, 313) of the cooking hob.

4. The household appliance according to anyone of the preceding claims, wherein the second electric or electronic component or assembly (117, 217) further comprises a signalling means, in particular for indication of an area having a temperature which exceeds a predefined temperature value, preferably an illuminating means (117, 217), and/or a sensor means or sensor circuit, particularly for temperature detection.

5. The household appliance according to anyone of the preceding claims, wherein the energy production means or energy harvesting means (125, 225) or energy receiving means or energy tapping means are adapted to make use of energy generated by at least one of the at least one first electric or electronic component or assembly, particularly of at least one of the at least one heating element (115, 215), more particularly of at least one of the at least one induction heating coil.

6. The household appliance according to claim 5, wherein the at least one second electric or electronic

component or assembly (117, 217) is positioned close by the at least one first electric or electronic component or assembly, in particular positioned directly under, besides or above, or embedded in the at least one first electric or electronic component or assembly.

7. The household appliance according to anyone of the preceding claims, wherein the at least one second electric or electronic component or assembly (117, 217) is connected by wireless connection to the control unit or comprises an own control means for a self-regulated operation.

8. The household appliance according to anyone of the preceding claims, further comprising energy transfer means operating with inductive coupling and/or being based on electromagnetic waves, wherein the first electric or electronic component or assembly, particularly the heating element (115, 215), more particularly the induction heating coil, comprises or serves as an energy emitting means and the second electric or electronic component or assembly (117, 217) comprises or serves as an energy receiving means (125, 225).

9. The household appliance according to anyone of the preceding claims, wherein the second electric or electronic component or assembly (117, 217) further comprises rechargeable battery means or capacitive storage means operating as a buffer for electric energy, particularly further comprising timer and/or temperature sensing means for a control of a warning signal for high temperature at surfaces.

10. The household appliance according to anyone of the preceding claims, wherein the second electric or electronic component or assembly (117, 217) is or comprises an illuminating means (121, 221) and further comprises a control means and/or a sensing means controlling at least one of

- light intensity;
- duty cycle;
- colour;
- light marking extension, particularly line width and/or number of lines,

of the illuminating means (121, 221), the control of the illuminating means (121, 221) particularly being based on a current operating program or state, more particularly based on a current cooking level of the cooking hob.

11. A method for powering at least a first and a second electric or electronic component or assembly in a household appliance (101, 201, 301), particularly in a cooking hob, more particularly in an induction cook-

ing hob, in which a control unit controls at least one first electric or electronic component or assembly, particularly at least one heating element (115, 215), more particularly at least one induction heating coil, and in which a power source, particularly an electronic power board, supplies the control unit and/or the at least one first electric or electronic component or assembly by means of at least one supply wire, **characterized in that**

the at least one first electric or electronic component or assembly transmits energy wirelessly during its operation to at least one second electric or electronic component or assembly (117, 217) for an energy supply of the at least one second electric or electronic component or assembly (117, 217).

12. The method according to claim 11, wherein the first electric or electronic component or assembly transmits energy by means of inductive energy transmission.

13. The method according to claim 11 or 12, wherein a signalling means, particularly illuminating means (121, 221), arranged in the at least one second electric or electronic component or assembly (117, 217), is powered by a sensing circuit (125, 225) also arranged in the at least one second electric or electronic component or assembly (117, 217), which sensing circuit (125, 225) receives or taps or harvests energy provided by the first electric or electronic component or assembly and transferred by means of electromagnetic waves and/or by way of inductive energy transmission or inductive coupling.

14. The method according to anyone of the claims 11 to 13, wherein at least one of

- light intensity;
- duty cycle;
- colour;
- light marking extension, particularly line width and/or number of lines,

of the illuminating means (121, 221) is adjusted based on a current operating program or state, preferably based on a current and/or target cooking level, and/or based on a currently transferred power intensity.

15. The method according to anyone of the claims 11 to 14, wherein a pot detection means in an induction cooking hob selectively activates or causes activation of specific induction coils (115, 215) of the induction cooking hob based on the dimensions of a cookware placed thereon, which activated induction coils (115, 215) transmit power during their operation according to a duty cycle to the cookware as well as to energy receiving or tapping or harvesting means

(125, 225), particularly a sensing circuit, arranged in the at least one second electric or electronic component or assembly (117, 217), the energy receiving or tapping or harvesting means (125, 225) transfer the energy into electric current flowing through illumination means (121, 221) thereby transferring the electrical energy into luminous energy.

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Fig.1

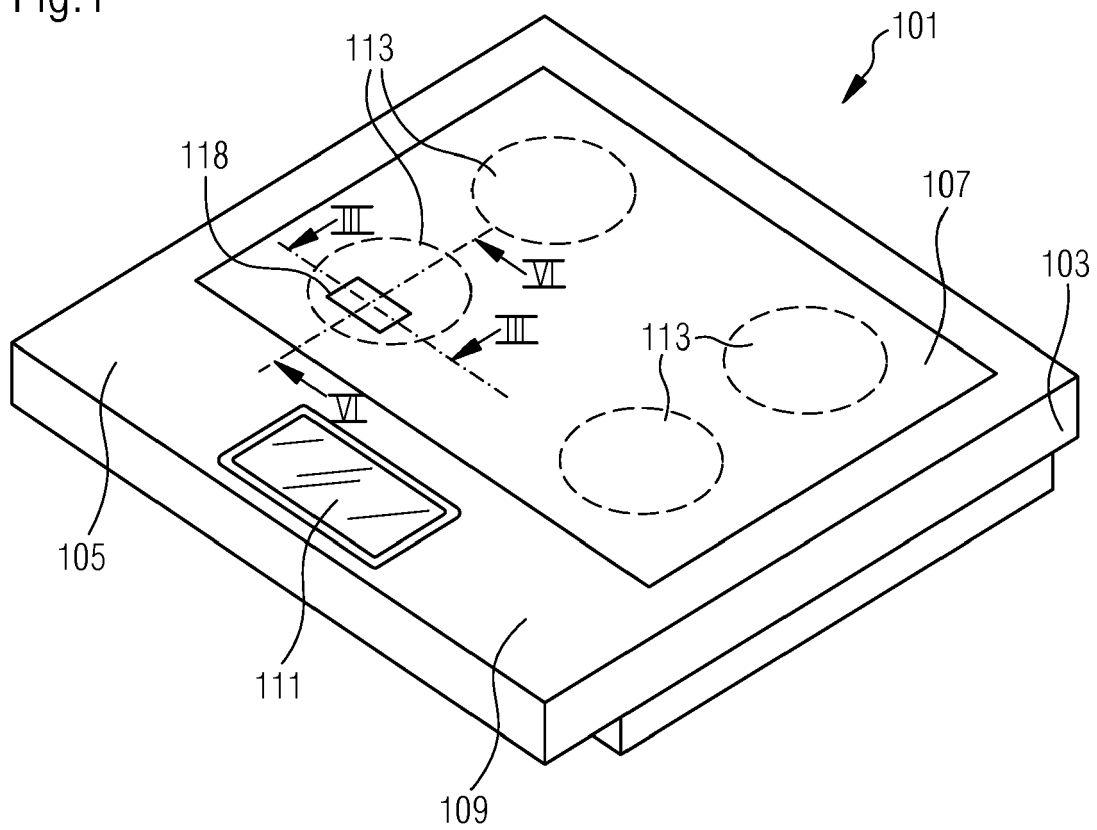


Fig.2

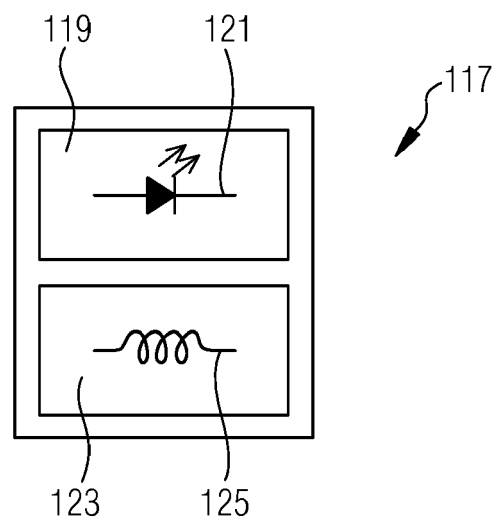


Fig.3

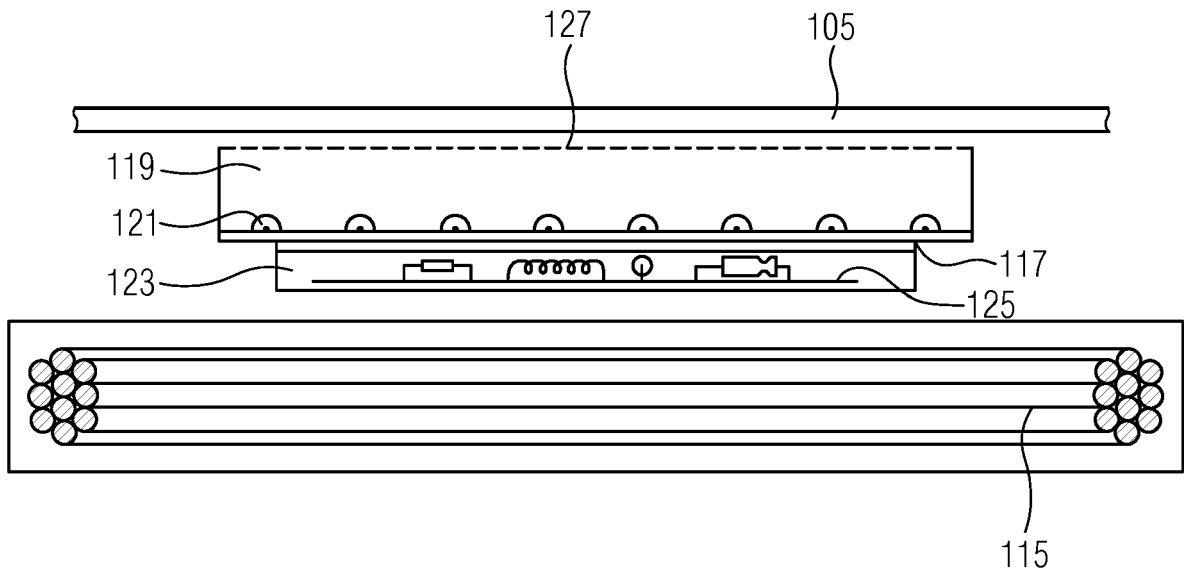


Fig.4

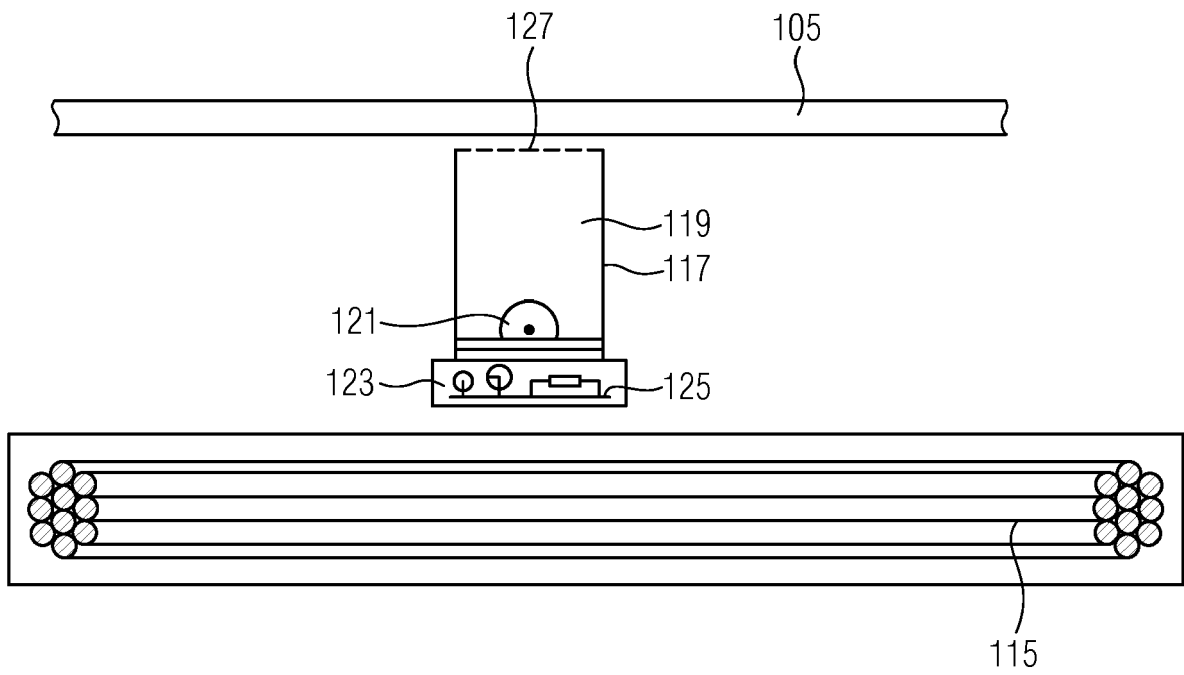


Fig.5

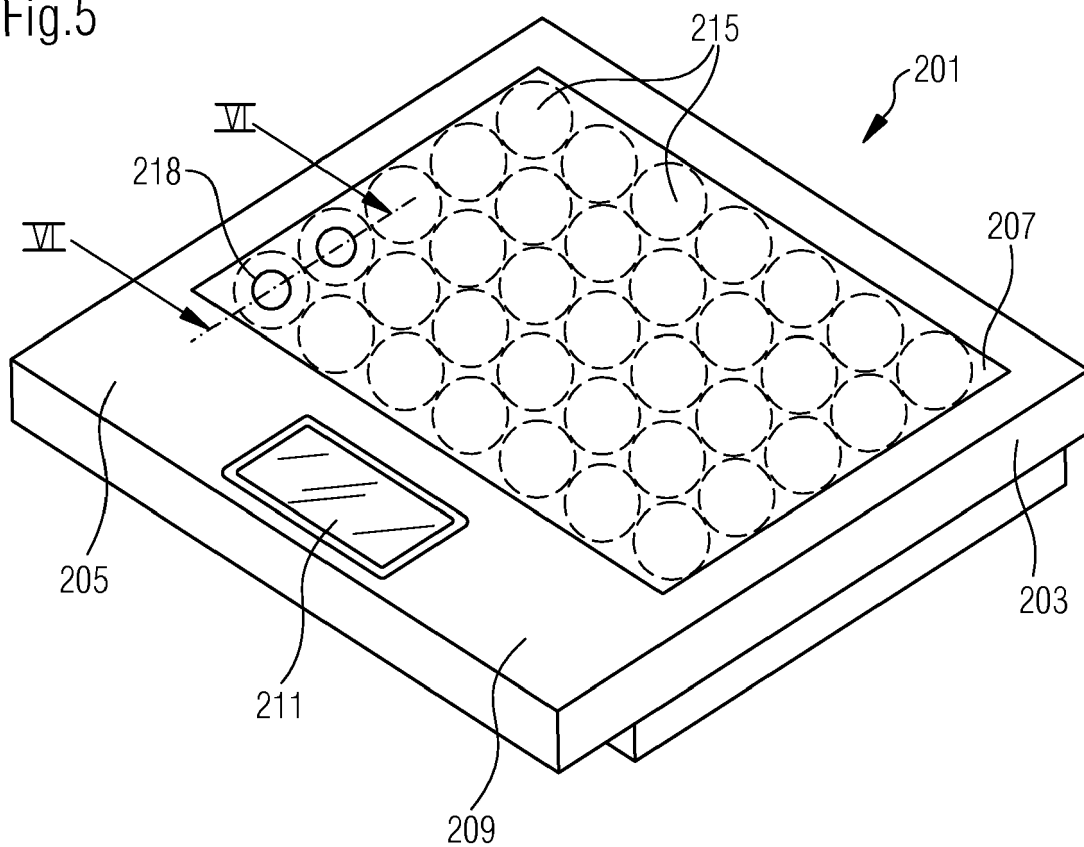


Fig.6

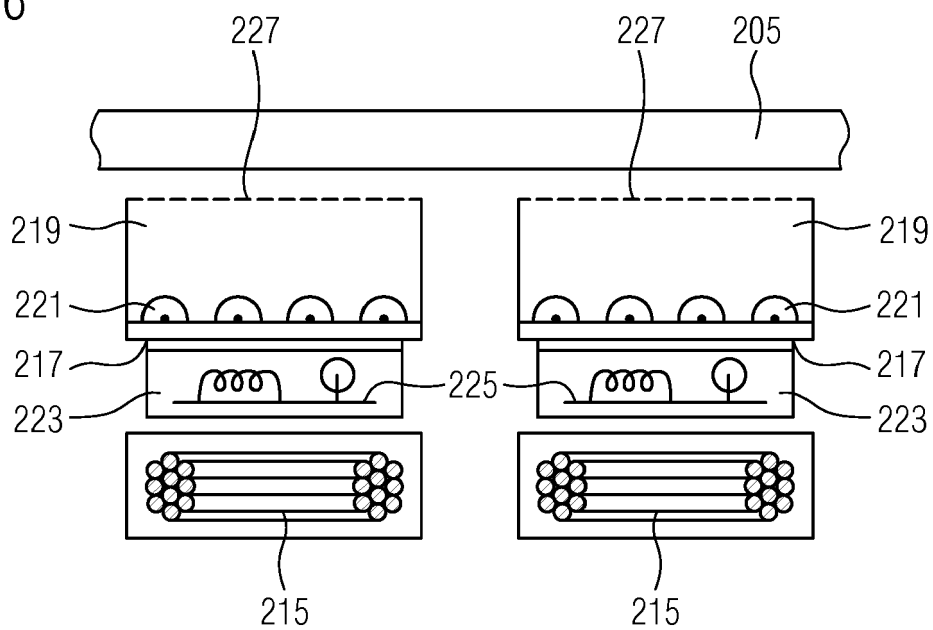
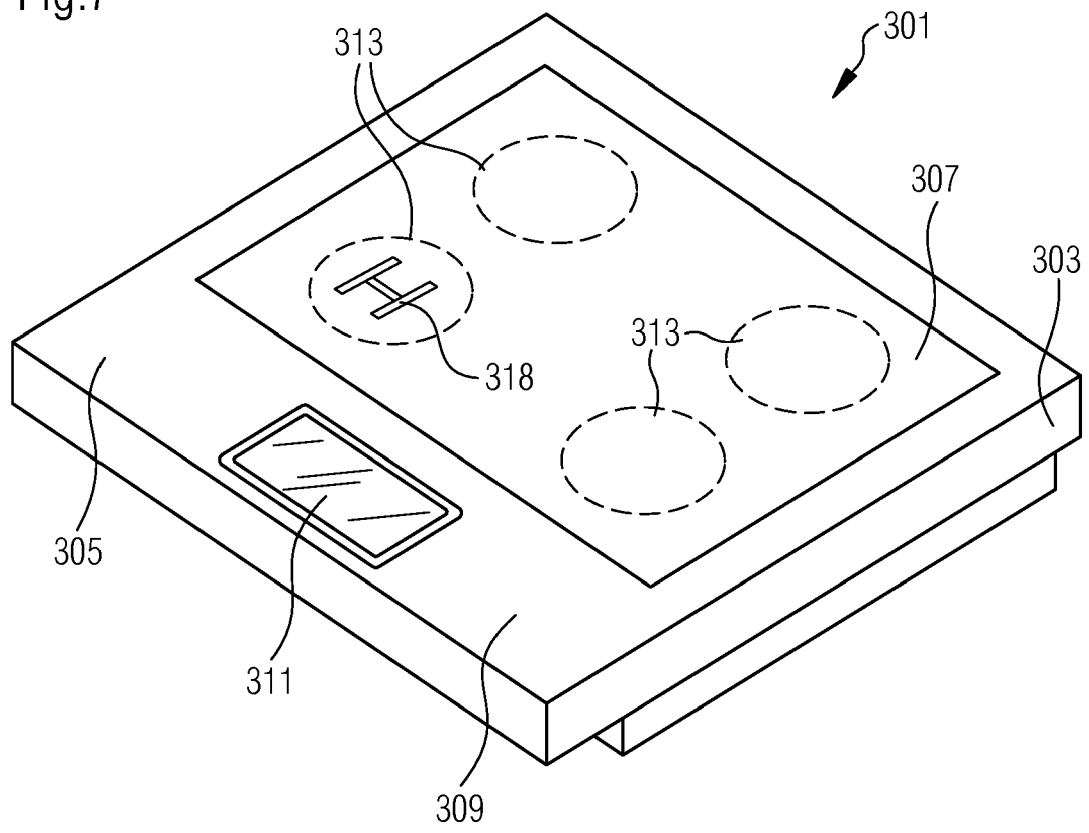


Fig.7





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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                          |                                                             |                                         |
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| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                          |                                                             |                                         |
| Place of search<br><b>Munich</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                          | Date of completion of the search<br><b>12 December 2019</b> | Examiner<br><b>Barzic, Florent</b>      |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                                                                                                                                          |                                                             |                                         |

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The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

12-12-2019

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