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(54) Combined control system for the power consumed in an oven and a glass ceramic hob

(57) Especially applicable in homes and hotel and catering premises, said control system (1) is based on the combined action of a domestic oven (10) and a glass ceramic hob, so that the switching on of both apparatus is performed in a totally synchronized and controlled manner, avoiding at all times exceeding a limit value of

power previously assigned to the oven (19) and hob (20) unit, thereby managing to avoid problems related to tripping, which often cause the disconnection of the cooking apparatus, oven (10) and hob (20) and, with this, the loss of the programmed values of power, temperature, functions (cooking, rotisserie, toaster, grill, etc.), times, etc.

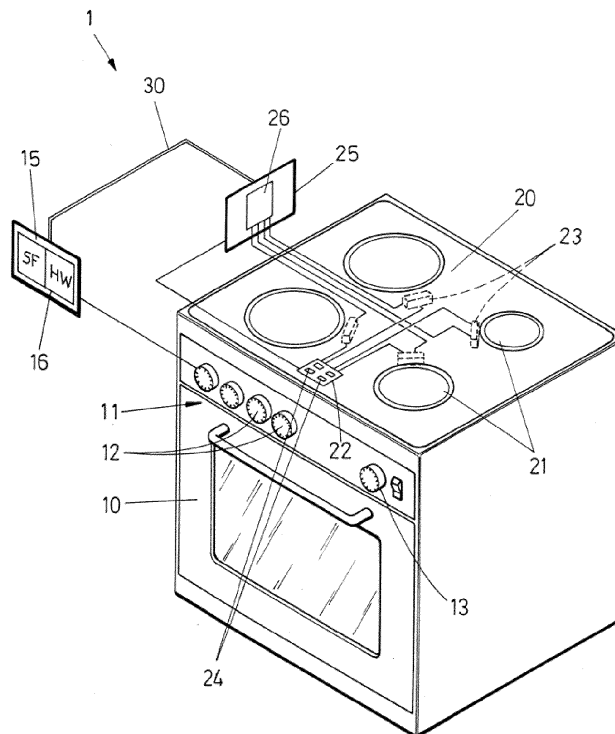


FIG.1

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Description**OBJECT OF THE INVENTION**

[0001] The present invention belongs to the sector of electrical appliances and cooking apparatus, and more specifically to control and regulation systems of ovens and glass ceramic hobs.

[0002] The main object of the present invention is a control system, especially applicable in homes, which enables obtaining a simultaneous and combined control of the power consumed in an oven and a glass ceramic hob, in order so that the contract demand limit is not exceeded, avoiding tripping in the electrical installation and achieving a reduction in the users' electricity bill.

BACKGROUND OF THE INVENTION

[0003] At present, it is known that in some countries there are electricity limitations in buildings, homes, etc., as they work with old distribution networks where the wiring and transformation centres on which said buildings depend have expansion limits, whether due to questions of size of the electricity network or due to the degree of investment involved in the change. On the other hand, there are other countries wherein the power limits of newly-built buildings are imposed by the law or the country's energy resources.

[0004] The order of electrical power installed currently in 60 cm embedded oven (volume of 54 litres approx.) and four-ring glass ceramic hob units is in the order of 7 - 8 kW. The use of oven and hob at the same time entails an excessive load, both for the home's individual electrical installation and for the rest of the building (apartment block, or buildings with several storeys).

[0005] When due to user requirements both apparatus, oven and hob, are made to work simultaneously, the current in amperes consumed by the hob and oven unit, the joint power whereof is, for example, 7 kW at 210 V is of 31.8 A. A 20 A power control switch (PCS), typical in kitchens to supply the oven and hob unit, enables the passage of said 31.8 A (1.5 In) during a few seconds. The immediate result is that the overload protections (power switches of the kitchen circuit or the general home circuit) trip and disconnect the electric circuit, causing a power cut in the home or the disconnection of the oven and the hob, with the consequent loss of the programmed values for power, functions (grill, cooking, rotisserie, toaster, etc.), times and other parameters such as weight and temperature, assigned to the oven and hob.

[0006] Therefore, the technical problem posed here is to avoid the sudden drops and disconnections caused in domestic cookers as a consequence of having exceeded the contract demand limit for the oven and glass ceramic hob unit, when both apparatus are connected at the same time. These disconnections in the power supply entail a loss of power, temperature or time values programmed in each of the apparatus, which leads to a lack of control

in the food cooking process, with the subsequent "doubtful" result of the products finally obtained, not to mention the trouble caused to the user of having to go to the home's main switchboard for their reconnection.

DESCRIPTION OF THE INVENTION

[0007] The present invention resolves the aforementioned drawbacks, providing a combined control system of the electricity consumed in an oven and a glass ceramic hob, especially applicable in homes and hotel and catering premises, said control system being based on the combined action of both apparatus, oven and glass ceramic hob, so that their switching on is performed in a totally synchronized form, avoiding at all times exceeding the contract demand limit, and with this, avoiding the power cuts or disconnections that cause the loss of previously programmed values in both apparatus.

[0008] More specifically, the control system described here is applicable to the unit formed by a domestic oven and a glass ceramic hob. Said oven is equipped with first means of regulation for the programming of different cooking parameters, such as power, function, temperature or time. Said oven may be basic, with switch to select the cooking mode (rotisserie, toaster, grill, etc.) and a thermostat; or it may be an electronic oven with user interface, digital displays, LCD screens, touch command input, etc.

[0009] For its part, the glass ceramic hob is provided with rings or electric heat points and second means of regulation of the energy consumed in each one of its rings. Said means of regulation of the hob basically comprises control relays connected to each one of the rings, a user interface provided with "touch control" key commands, and "display" digital indicators to observe the power level applied in each one of the rings.

[0010] The control system object of the invention fundamentally stands out as it comprises a first control unit of the oven, connected to said first means of regulation, and a second control unit of the hob connected to each one of the rings, both control units being associated through a communication module, which may be by cable or wireless via radiofrequency RF, so that the switching on of the oven and the hob is performed in a synchronized and controlled manner, avoiding at all times exceeding a contract demand limit when both apparatus are simultaneously connected.

[0011] More in particular, the control unit of the oven has hardware / software means that makes it possible to know the quantity of power selected in the oven, and in accordance with this value sends an electric signal to the hob control unit, which has a microprocessor which manages and processes the information received, said microprocessor being connected to each one of the control relays of the rings or heat points of the hob, so that this microprocessor regulates and finally reprograms the manner of working of each one of said rings, reducing or increasing their power without ever exceeding a thresh-

old value of power previously assigned to the oven and hob unit.

[0012] Likewise, it has been provided that the microprocessor of the hob control unit is adapted to maintain the last power indication selected by the user, so that if they want to increase the power level in one of the rings, the power of the remaining rings in operation will suitably lower theirs.

[0013] Furthermore, it has been provided that said microprocessor of the hob control unit incorporates a safety algorithm so that, both apparatus, oven and hob, being operational, if the oven stops being used and is switched off, the power values of each one of the hob rings is maintained, i.e. they do not raise their power level, thus avoiding possible risks of excessive heating of the food which is being cooked.

[0014] In accordance with another preferred embodiment, the microprocessor of the hob control unit further comprises a time control algorithm which makes it possible to know the working and rest times of the oven, said rest times of the oven being used by the hob to optimise the food heating process, reducing the time used for it.

[0015] Therefore, through the control system object of the invention it is possible to obtain a combined action of the unit formed by oven and glass ceramic hob, so that its switching on is performed in synchronized manner, making it possible to avoid tripping in homes and domestic cookers as a consequence of exceeding the contract demand limit when both apparatus are simultaneously connected, with the advantages entailed by all of this both for the user and the quality of food cooked, and for the electrical installation, since it would not suffer unforeseen drops or surges in current which would also affect the quality of the electrical system.

DESCRIPTION OF THE DRAWINGS

[0016] To complement the description being made and in order to aid towards a better understanding of the characteristics of the invention, in accordance with a preferred example of practical embodiment thereof, a set of drawings is attached as an integral part of said description wherein, with illustrative and non-limiting character, the following has been represented:

Figure 1. - Shows a schematic view of the control system of the invention applied to an oven and hob unit.

PREFERRED EMBODIMENT OF THE INVENTION

[0017] An example of preferred embodiment of the combined power control system (1) object of the invention is described below, without this entailing any limitation in the scope of protection thereof.

[0018] In accordance with the present embodiment, there is a domestic oven (10) which allows a maximum power consumption of 2.3 kW, and a glass ceramic hob

(20) provided with four electric rings (21), which switched on at maximum power have a consumption of 5.2 kW. Through the control system (1) described here, it is possible to obtain the synchronized action of the oven (10) and the hob (20) never exceeding the value of 5.2 kW, which could lead to a tripping of the electricity supply, switching off both apparatus, oven (10) and hob (20), and in consequence losing all the values previously programmed in them, such as power, time, cooking function, temperature, etc.

[0019] As observed in figure 1, the control system (1) is applied to a basic domestic oven (10) provided with first means of regulation (11) such as switches (12) and thermostat (13), whereby it is possible to program different cooking parameters (roisserie, toaster, grill, etc.).

[0020] For its part, the glass ceramic hob (20) comprises four rings (21) and second means of regulation (22) of the energy consumed in each one of said rings (21), and which in the present embodiment comprises four control relays (23) connected to each one of the four rings (21), a user interface provided with "touch control" type keys and "display" digital indicators (24) of seven segments that allow the user to observe the power level applied in each of the rings (21), from "0" (ring switched off) to "9" (ring at maximum heating power).

[0021] More in particular, the control system (1) of the invention stands out as it comprises a first control unit (15) of the oven (20), and a second control unit (25) of the hob (20), both associated through a communication module (30) in this case by cable, so that the switching on of the oven (10) and the hob (20) are performed in synchronized manner, avoiding exceeding the contract demand limit.

[0022] The first control unit (15) has hardware / software means (16) that makes it possible to know the power level selected by the user in the oven (10), and in accordance with this value said first control unit (15) sends an electric signal to the second control unit (25), which has a microprocessor (26) which processes said electric signal and manages the information received, said microprocessor (26) being connected to each one of the control relays (23) of the rings (21) of the hob (20), said microprocessor (26) regulating and reprogramming the manner of working of each one of the rings (21), reducing or increasing their power without exceeding the power threshold assigned to the oven (10) and hob (20) unit.

[0023] In this way, if we are initially cooking with the four rings (21) of the hob (20) at maximum power, 5.2 kW, i.e. all rings (21) with power level "9", said number being represented in the digital indicators (24), and later the user switches on the oven (10) at maximum power, 2.3 kW, then, the microprocessor (26) of the second control unit (25) orders through the control relays (23) an instantaneous reduction in the power of the four rings (21), so that they lower their consumption to power level "7", said change of numbering also appearing in the digital indicators (24).

[0024] On the other hand, once the four rings (21) of

the hob (20) have reduced their value of power consumed to "7", if the user wants to raise the power in one of said rings (21), for example, by raising it to "9", the microprocessor (26) of the second control unit (25) makes it possible to maintain this power level in said ring (21) in exchange for reducing power in the remaining three rings (21), for example lowering to "5".

[0025] Furthermore, if the user later decides to switch off the oven (10), with the four rings (21) of the hob operating with reduced power values, for example, at level "5", it has then been provided that the microprocessor (26) has a safety algorithm, so that the second control unit (25) sends an order to the control relays (23) so that they continue maintaining their reduced values, and do not rise, which would be a danger both to the user and for the food being cooked, avoiding them from burning.

[0026] On the other hand, it has been provided that said microprocessor (26) of the second control unit (25) of the hob (20) also has a time control algorithm, whereby it is possible to know the working and rest times of the oven (10), so that the times wherein the oven (10) stops functioning, generally 50 % of the total use time, are made use of by the hob (20) to reduce the food heating time. Preferably, this operating mode is selected by the user through the user interface provided in the hob (20).

[0027] Finally, in accordance with another preferred embodiment, not represented, the communication module between the first control unit (15) and the second control unit (25) is wireless, both apparatus, oven (10) and hob (20) being communicated by radiofrequency RF. This second option is especially applicable in restaurants and hotel and catering premises where the oven (10) may be located a certain distance with respect to the hob (20).

Claims

1. Combined control system (1) of the power consumed in an oven (10) and a glass ceramic hob (20), applicable to the unit formed by an oven (10) equipped with first means of regulation (11) for the programming of different cooking parameters; and a hob (20) provided with rings (21) or electric heat points and second means of regulation (22) of the energy consumed in each one of said rings (21), said second means of regulation (22) being constituted by control relays (23) connected to each one of the rings (21), a user interface provided with touch commands and "display" digital indicators (24), **characterized in that** it additionally comprises:

- a first control unit (15) of the oven (10) connected to the first means of regulation (11), and
- a second control unit (25) of the hob (20) connected to each one of the rings (21) or heat points,

both control units (15, 25) being associated through a communication module (30), and the first control unit (15) having hardware / software means (16) that makes it possible to know the power level selected by the user in the oven (10) and, in accordance with this value, said first control unit (15) sends an electric signal to the second control unit (25), which has a microprocessor (26) which processes said electric signal and manages the information received, said microprocessor (26) being connected to each one of the control relays (23) of the rings (21) of the hob (20), said microprocessor (26) regulating and reprogramming the manner of working of each one of the rings (21), reducing or increasing their power without ever exceeding a threshold value of power previously assigned to the oven (10) and hob (20) unit.

2. Control system (1), according to claim 1, **characterised in that** the communication module between the first control unit (15) and the second control unit (25) is wireless, both apparatus, oven (10) and hob (20), being communicated by radiofrequency RF.

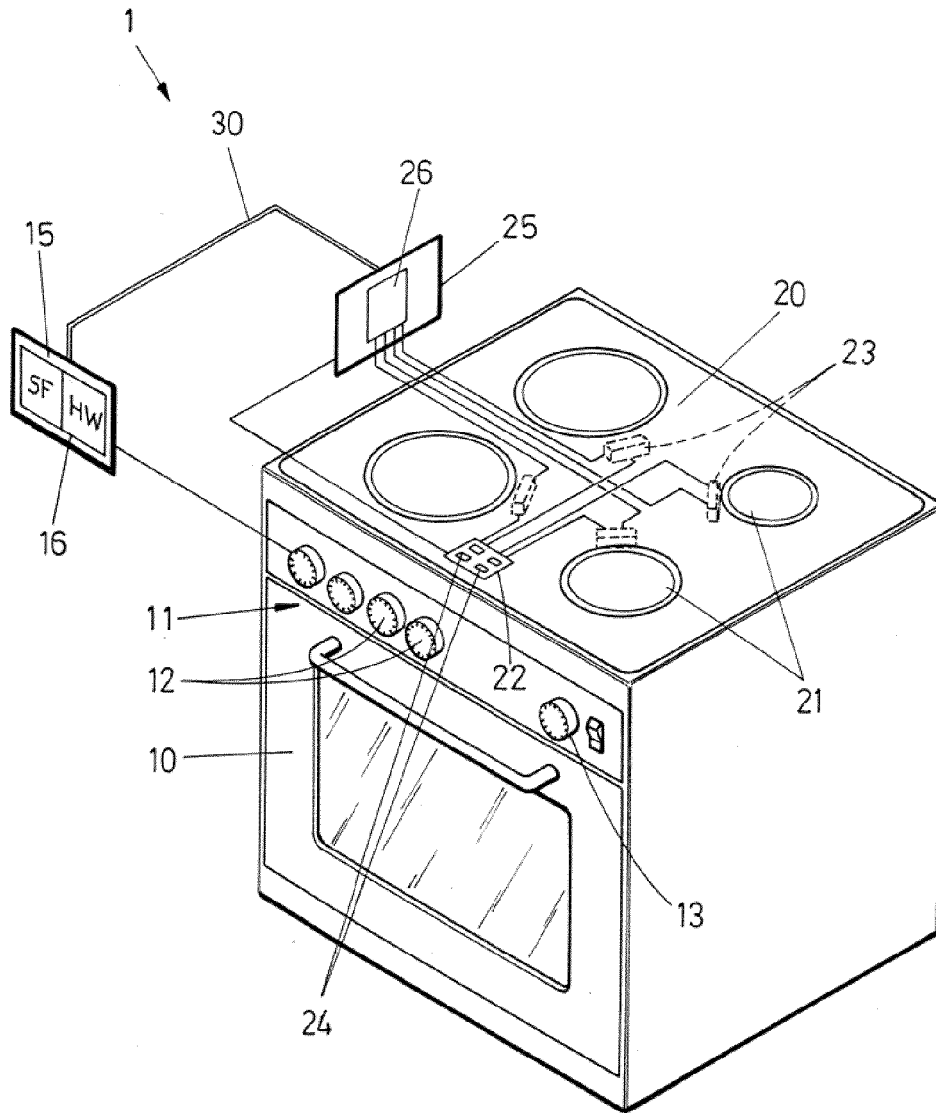


FIG.1



EUROPEAN SEARCH REPORT

Application Number
EP 12 18 8868

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	DE 103 27 273 A1 (BSH BOSCH SIEMENS HAUSGERAETE [DE]) 5 January 2005 (2005-01-05) * paragraphs [0021], [0022]; figure 1 * -----	1,2	INV. F24C7/08 F24C15/10
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A	DE 40 38 560 A1 (LICENTIA GMBH [DE]) 11 June 1992 (1992-06-11) * the whole document * -----	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			F24C
Place of search		Date of completion of the search	Examiner
The Hague		19 February 2013	Rodriguez, Alexander
CATEGORY OF CITED DOCUMENTS		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	
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			

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EPO FORM 1503 03.82 (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. The members are as contained in the European Patent Office EDP file on
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