



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
30.08.2000 Bulletin 2000/35

(51) Int Cl.7: **H05B 3/74**

(21) Application number: **00830117.8**

(22) Date of filing: **18.02.2000**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
 Designated Extension States:
AL LT LV MK RO SI

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(30) Priority: **24.02.1999 IT MC990007**

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(54) **Pyroceram cooktop with safety barrier**

(57) The present invention relates to a cooktop provided with a safety virtual barrier activated to prevent users from involuntarily touching the hot plates that are turned off, but still have a very high temperature. In fact, when the user stretches his/her hand out towards the

centre of the cooktop, he/she generates an interference with the virtual barrier. This results in the immediate automatic activation of an audible and/or visible signal to warn the user of the possible dangerous contact with the hot plates.

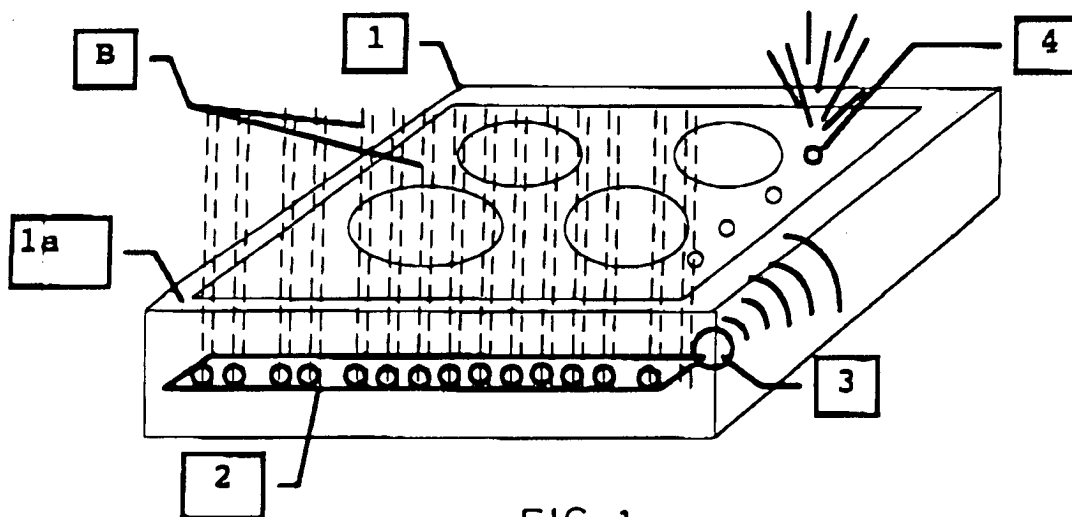


FIG. 1

Description

[0001] The present patent application relates to a pyroceram cooktop with safety barrier.

[0002] As it is known, in some of the cooktops available on the market traditional gas burners have been replaced by electrical or gas hot plates protected by a glass on which pans can be placed.

[0003] This type of cooktops has proved quite successful thanks to the good efficiency, the esthetical look and the easiness of cleaning operations.

[0004] However, a serious inconvenience of electrical cooktops is represented by the risk of burning the user's hands.

[0005] The risk is particularly high after the cooktop has been turned off, since the hot plates need a quite long time to dissipate the operating temperature. During this period of time, no visible sign is given to warn the user on the danger caused by their high residual temperature.

[0006] In case of distract users, the risk of involuntarily touching the hot plate with a high temperature is considerable and involves serious injuries.

[0007] Once the electric cooktop has been turned off, users generally tend to be less careful as regards possible contacts with the hot plates, although the risk of getting burned remains high.

[0008] As a matter of fact, some cooktop manufacturers have tried to find a solution to this problem.

[0009] In particular, they have provided the cooktop with an optical detection device - such as a small lamp, LED, etc. - that remains on (either with a fixed or flashing light) as long as the hot plate maintains a temperature that is considered as dangerous for the users.

[0010] It must be said, however, that this solution has not been effective, since the aforesaid visible signallers sometimes fail to draw the users' attention, especially if engaged in another activity.

[0011] Based on this negative experience, the special cooktop provided with safety characteristics according to the present invention has been devised.

[0012] The cooktop according to the present invention is provided with an electronic device capable of creating an invisible virtual barrier with a certain height. The virtual barrier can be provided on the cooktop front edge, on various edges or on the entire perimeter.

[0013] The barrier is automatically activated when the user turns off the hot plate of the cooktop and remains activated until the temperature of the glass top drops to a safe level. Then, it remains off until the cooktop is used again.

[0014] The barrier is connected to an audible and/or visible signaller that is automatically activated as soon as the barrier is interrupted due to the interference of a kitchen tool or when the user stretches his/her hand towards the centre of the cooktop.

[0015] It is clear that the immediate activation of the audible or visible signaller is capable of producing and

giving an instantaneous warning to the user that cannot remain unattended.

[0016] Based on the results of the tests that have been carried out on the cooktop according to the present invention, the sudden production of the audible signal determines an involuntary spontaneous reaction in the user, who instinctively tends to remove his/her from the electrical cooktop.

[0017] As regards its practical realisation, the virtual barrier can be of different types, according to the technology used: an optical barrier (by means of optoelectronic sensors, cameras, etc.) or, alternatively, a barrier obtained with infrared rays or ultrasounds.

[0018] For major clarity the description of the invention continues with reference to the enclosed drawings, which are intended for purposes of illustration and not in a limiting sense, whereby:

- Fig. 1 is an axonometric view of the cooktop according to the present invention, in a version provided with safety barrier on the front edge only;
- Fig. 2 is a block diagram that illustrates the operating principle of the safety barrier.

[0019] With reference to figure 1, the electrical cooktop (1) according to the present invention features an electronic device (2) capable of activating a virtual barrier (B) with length approximately equal to the front edge (1a) of the cooktop (1) when one of the hot plates is turned off.

[0020] As mentioned above, the interruption of the virtual barrier (B) determines the automatic immediate activation of an audible (3) and visible (4) signaller.

[0021] As regards the operating principle of the virtual barrier (B), the description continues with reference to the block diagram illustrated in fig. 2.

[0022] The electronic device uses a microprocessor (not shown in the enclosed figures) interfaced with the presence sensors used to activate the virtual barrier, with a temperature sensor located in each plate of the cooktop and/or a timer and an audible and/or visible signaller.

[0023] As long as all the hot plates are turned off, the presence sensors that are used to activate the safety barrier remain in idle state, meaning that the safety barrier is not activated.

[0024] When one of the plates is first turned on and then off, the microprocessor checks the temperature of that particular plate to ensure that no danger exists.

[0025] This can be done by means of the temperature sensor or by checking whether the plate has remained on for a period of time equal or higher than the pre-set "threshold time" (that is the time needed to cause a dangerous temperature level in the plate).

[0026] If the microprocessor determines that the temperature of the plate that has just been turned off is not dangerous, no further actions are taken.

[0027] In the opposite situation, the microprocessor

sends the activation command for the safety virtual barrier to the presence sensors.

[0028] Once the barrier has been activated, its involuntary interference or interruption is interpreted by the microprocessor as an impulse for the immediate activation of the audible and/or visible signaller. 5

[0029] The microprocessor automatically deactivates the virtual barrier as soon as the temperature sensors of the plates or the timer confirm that the plate temperature has dropped under the levels that are considered dangerous for the cooktop users. 10

check the plate temperature is a timer that compares the time each hot plate remains on with the pre-set threshold time.

Claims

1. Pyroceram cooktop with safety barrier characterised by the fact that it comprises suitable means to activate a safety virtual barrier (B) on one or more edges of the cooktop (1), suitable means to check the plate temperature, an audible (3) and/or visible (4) signaller and a management/control microprocessor; it being provided that, when one of the plates is turned off and if the control means determine that the temperature of that particular plate is higher than the temperature threshold, the microprocessor sends the activation signal to the means used to generate the safety virtual barrier (B), which in turns immediately activates the audible (3) and/or visible (4) signaller in case of an interference that interrupts the barrier continuity; it also being provided that the microprocessor sends a deactivation signal to the means used to generate the safety virtual barrier (B) when the temperature of all the hot plates has dropped under the temperature threshold. 15
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2. Pyroceram cooktop with safety barrier according to claim 1 characterised by the fact that the means used to generate the safety virtual barrier (8) consist in optical devices, such as opto-electric sensors or cameras. 40
3. Pyroceram cooktop with safety barrier according to claim 1 characterised in that the means used to generate the safety virtual barrier (8) consist in infrared devices. 45
4. Pyroceram cooktop with safety barrier according to claim 1 characterised in that the means used to generate the safety virtual barrier (8) consist in ultrasound devices. 50
5. Pyroceram cooktop with safety barrier according to claim 1 characterised in that the means used to check the plate temperature consist in temperature sensors. 55
6. Pyroceram cooktop with safety barrier according to claim 1 characterised in that the means used to

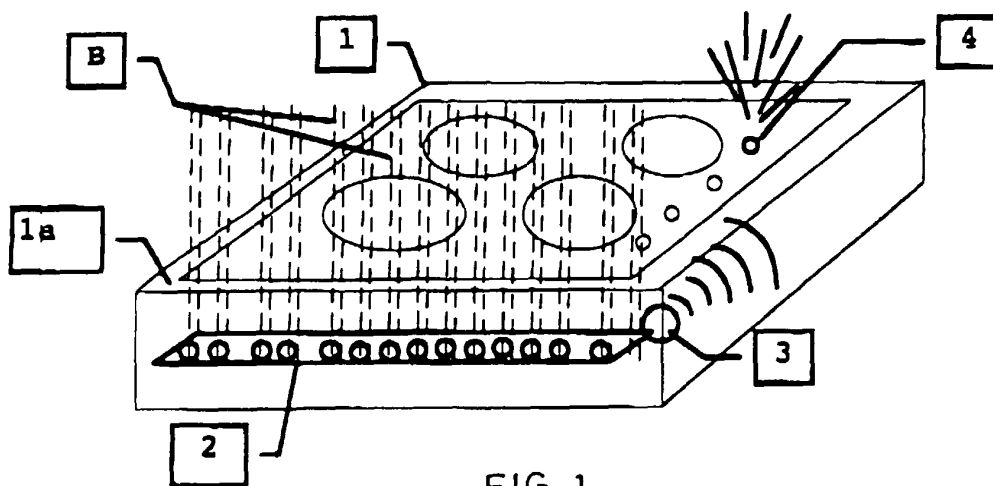


FIG. 1

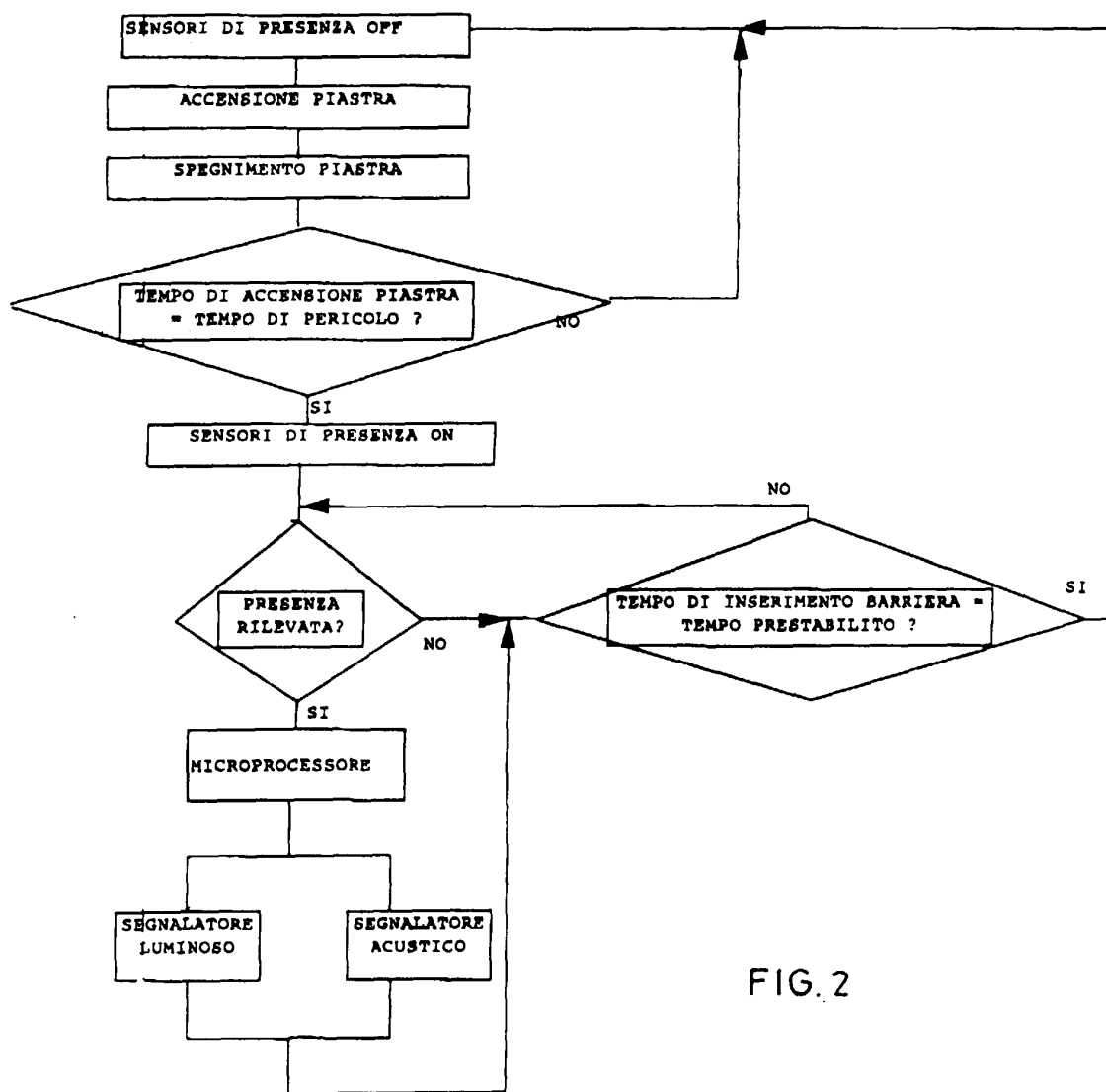


FIG. 2