(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 365 729 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.09.2011 Bulletin 2011/37

(51) Int Cl.:
H05B 3/74 *(2006.01)*

(21) Application number: **11382060.9**

(22) Date of filing: **08.03.2011**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(30) Priority: **10.03.2010 ES 201030209 U**

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(54) Electrical radiant heater adapted to a cooking hob plate

(57) Electrical radiant heater adapted to a cooking hob (2), in particular in a glass-ceramic cooker, which comprises at least one heating resistance (4), an insulating base (3) on which is fixed the heating resistance (4), an insulating ring (6) arranged supported on the insulating base (3) and on which is arranged supported the cooking hob (2), a casing (5) in the interior of which is housed the insulating base (3) and, at least partially, the insulating ring (6). The casing (5) has a bottom surface (5c) that includes an opening (8).

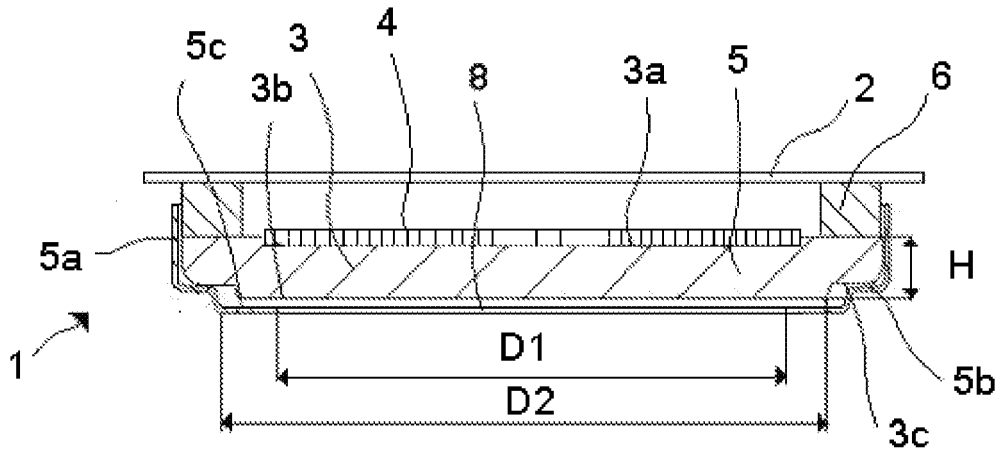

FIG. 1

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Description

TECHNICAL FIELD

[0001] This invention relates to an electrical radiant heater adapted to a cooking hob plate, in particular of a glass-ceramic cooker.

PRIOR ART

[0002] The prior art contains known electrical radiant heaters adapted to a cooking hob plate, which comprise a substantially cylindrical insulating base on which is fixed at least one heating resistance, an insulating ring that is arranged supported on the insulating base and on which is supported the cooking hob, and reinforcement means in the form of a metal casing that houses the insulating base in its interior and, partially, the insulating ring, the metal casing being a support for a temperature-limiting device and a connection terminal, as disclosed in document DE1 02006045451 A1.

[0003] In EP1022930A2 the reinforcement means include at least one strip that extends all along the insulating base, the opposite ends of the strip being arranged extended, at least partially, on the side wall of the insulating base. The radiant heater described herein preferably includes two strips that are arranged substantially orthogonal to each other, supporting the insulating base.

BRIEF DISCLOSURE OF THE INVENTION

[0004] The object of this invention is to provide an electrical radiant heater adapted to a cooking hob plate, in particular of a glass-ceramic cooker, as defined in the claims.

[0005] The electrical radiant heater comprises at least one resistance, an insulating base on which is fixed the resistance, an insulating ring arranged supported on the insulating base and on which is arranged supported the cooking hob plate, and a casing in the interior of which is housed the insulating base and at least partially the insulating ring.

[0006] The casing has a bottom surface that includes an opening, with the result that the conduction of heat between the insulating base and the casing is reduced, as the opposing surface between said insulating base and the bottom surface is reduced. In addition, the weight of the casing is reduced, a radiant heater with a high insulation capacity and of minimal cost being obtained, thanks to the optimised shape of the casing, which enables its repetitive manufacturing.

[0007] These and other advantages and characteristics of the invention will be made evident in the light of the drawings and the detailed description thereof.

DESCRIPTION OF THE DRAWINGS

[0008]

Figure 1 is a cross-section of a first embodiment of the radiant heater according to the invention.

Figure 2 is a ground view of the casing of the radiant heater shown in Figure 1.

Figure 3 is a cross-section of a second embodiment of the radiant heater according to the invention.

DETAILED DISCLOSURE OF THE INVENTION

[0009] Figures 1 to 3 show an electrical radiant heater 1 according to the invention, adapted to a cooktop 2, the radiant heater 1 comprising a substantially revolving insulating base 3 that has a substantially flat upper surface 3a on which is fixed one or more heating resistances 4, an insulating ring 6 that is supported on the upper surface 3a of the insulating base 3 and which comes into contact with the inner surface of the cooktop 2, and the casing 5 adapted to the outer shape of the insulating base 3 and to the insulating ring 6, the casing 5 housing in its interior said insulating base 3 and, partially, said insulating ring 6.

[0010] The electrical radiant heater 1 also comprises a temperature-limiting device, not shown in the figures, that passes, at least partially, through the insulating base 3 over the resistances 4, and a connection terminal, not shown in the figures, through which the resistances are connected to the supply, the connection terminal being fixed to the casing 5.

[0011] The casing 5 includes a substantially circular bottom surface 5c, a substantially horizontal ring-shaped outer rim 5b that projects out in relation to the bottom surface 5c, and a substantially vertical wall 5a that extends from the outer rim 5b at a height greater than the thickness H of the insulating base 3. The insulating base 3 includes a substantially flat and circular lower surface 3b that is arranged facing the bottom surface 5c, and an intermediate surface 3c that is substantially ring-shaped and substantially parallel to the upper surface 3a and to the lower surface 3b and which is arranged supported on the rim 5b of the casing 5.

[0012] In addition, the bottom surface 5c of the casing 5 includes a substantially circular opening 8, arranged substantially concentric to the bottom surface 5c, with the result that the bottom surface 5c facing the insulating base 3 is reduced. The diameter D1 of the opening 8 is at least approximately three-fifths the diameter D2 of the back surface 5c.

[0013] In a first embodiment shown in Figures 1 and 2, the casing 5 is made of a metal material, preferably galvanised sheet metal or sheet aluminium. Thanks to the opening 8 in the bottom surface 5c, the conduction of heat between the insulating base 3 and the casing 5 is minimized, as the opposing surface between said insulating base 3 and the bottom surface is reduced 5c, thereby reducing the heat bridge between the bottom surface 5c and the wall 5a.

[0014] Additionally, in the case of heaters 1 of a sig-

nificant size, the excess material may be used to manufacture a radiant heater 1 of a smaller diameter, thereby bringing about a significant reduction in material and manufacturing costs.

[0015] In a second embodiment shown in Figure 3, the radiant heater 1 also comprises a cover 7 that is arranged supported on the bottom surface 5c, closing the opening 8. As a result, it is possible to manufacture radiant heaters 1 of high diameters, wherein the insulating base 3 is formed along with the casing 5.

[0016] The cover 7 is made of a plastic material that has a melting temperature greater than approximately 300ºC, good dimensional stability, and is flame retardant, the plastic material preferably being a liquid crystal polymer preferably with a 30% fibre volume.

[0017] In other embodiments the cover 7 may be built into the casing 5 itself to form a single piece, either by injection on the casing 5 or by other known means.

[0018] In other embodiments, the casing 5 may be made of a plastic material that has a melting temperature greater than approximately 300ºC, good dimensional stability, and is flame retardant. Preferably, the plastic material is a liquid crystal polymer with a 30% fibre volume, which also enables the injection of pieces with thin thicknesses, with the result that the volume of the casing 5 does not increase comparatively in relation to a casing 5 made of sheet metal.

[0019] In the event that the casing 5 is made of a plastic material, the radiant heater 1 may include a cover 7 made of a metal material, preferably sheet metal. The cover 7 is arranged on the back surface 5c of the casing 5. In other embodiments, the cover 7 may be built into the casing 5 itself to form a single piece. As in the second embodiment shown in Figure 3, as the cover 7 is included, it is possible to manufacture radiant heaters 1 of high diameters, wherein the insulating base 3 is conformed along with the casing 5.

[0020] Finally, in the embodiments shown in Figures 1 to 3, the insulating base 3 is made by moulding of a single layer of uniform, microporous material providing good heat insulation, good mechanical properties and resistant to the absorption of moisture, which comprises a silica aerogel powder mixed with fibre-reinforced ceramic, optionally opacifying materials and ceramic loads. In addition, the insulating ring 6 is made of an insulating material providing good mechanical properties and high temperature resistance.

Claims

1. Electrical radiant heater adapted to a cooking hob (2), in particular in a glass-ceramic cooker, which comprises at least one heating resistance (4), an insulating base (3) on which is fixed the heating resistance (4), an insulating ring (6) arranged supported on the insulating base (3) and on which is arranged supported the cooking hob (2), a casing (5) in the interior of which is housed the insulating base (3) and, at least partially, the insulating ring (6), **characterised in that** the casing (5) has a bottom surface (5c) that includes an opening (8).

2. Electrical radiant heater according to the preceding claim, wherein the casing (5) includes an outer rim (5b) that projects out in relation to the bottom surface (5c) on which the insulating base (3) is supported.

3. Electrical radiant heater according to any of the preceding claims, wherein the opening (8) is a substantially circular opening arranged substantially concentric to the bottom surface (5c).

4. Electrical radiant heater according to the preceding claim, wherein the diameter (D1) of the opening (8) is at least approximately three-fifths the diameter (D2) of the bottom surface (5c).

5. Electrical radiant heater according to any of the preceding claims, comprising a cover (7) that closes the opening (8).

6. Electrical radiant heater according to the preceding claim, wherein the cover (7) is arranged supported on the bottom surface (5c) of the casing (5).

7. Electrical radiant heater according to claim 5, wherein the cover (7) is built into the bottom surface (5c) of the casing (5).

8. Electrical radiant heater according to any of the preceding claims, wherein the casing (5) is made of a metal material.

9. Electrical radiant heater according to any of claims 1 to 7, wherein the casing (5) is made of a plastic material.

10. Electrical radiant heater according to the preceding claim, wherein the casing (5) is made of a material that has a melting temperature substantially greater than, approximately, 300ºC.

11. Electrical radiant heater according to any of claims 1 to 8, wherein the cover (7) is made of a plastic material.

12. Electrical radiant heater according to the preceding claim, wherein the cover (7) is made of a material that has a melting temperature substantially greater than, approximately, 300°C.

13. Electrical radiant heater according to either of claims 9 or 10, wherein the cover (7) is made of a metal material.

14. Electrical radiant heater according to the preceding claim, wherein the casing (5) is injected on the cover (7).

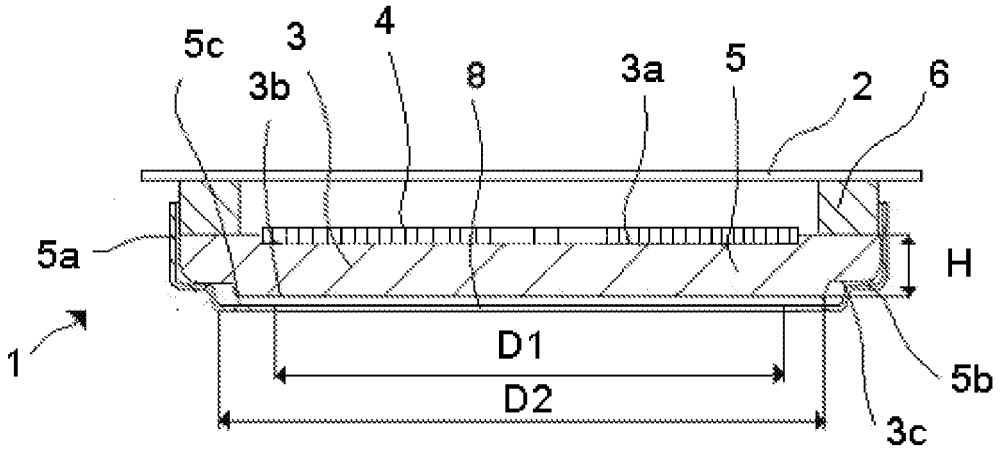

FIG. 1

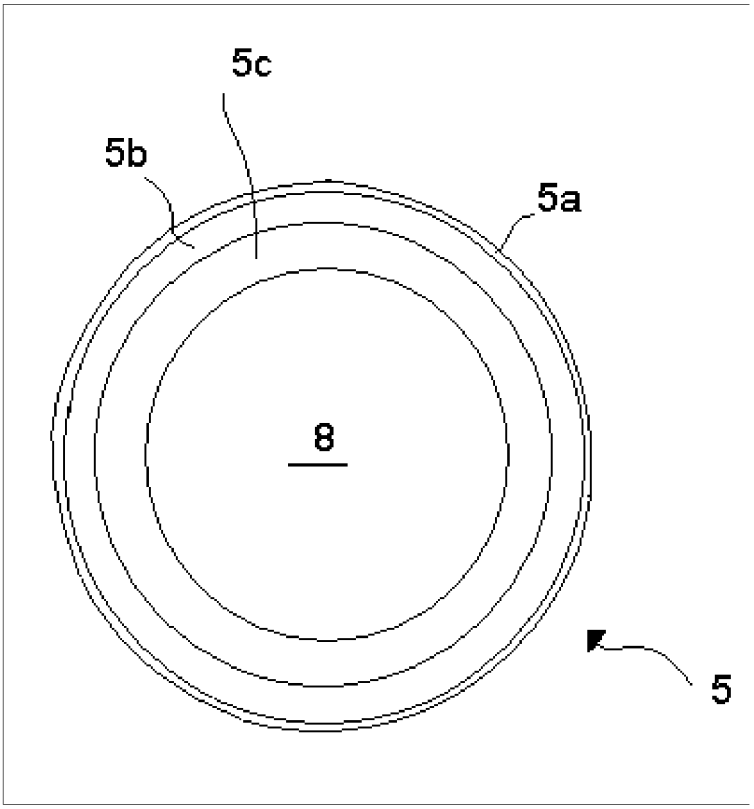

FIG. 2

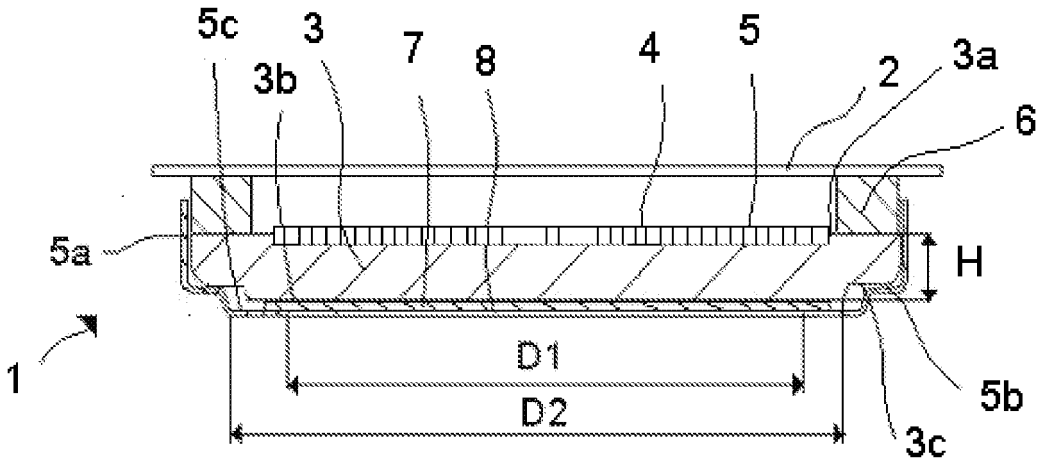

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 11 38 2060

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	US 5 001 328 A (SCHREDER FELIX [DE] ET AL) 19 March 1991 (1991-03-19) * figures 3,8 * -----	1-8,10, 12,13 9,11	INV. H05B3/74
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TECHNICAL FIELDS SEARCHED (IPC)

H05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 June 2011	Tasiaux, Baudouin

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 11 38 2060

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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08-06-2011

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- DE 102006045451 A1 **[0002]**
- EP 1022930 A2 **[0003]**