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(54) Radiant electric heater

(57) A radiant electric heater comprises a dish-like support (2) having therein at least one elongate electric heating element (4, 5) and a terminal block (10) secured at an edge of the support. The terminal block comprises a body (15) of electrically insulating material supporting one or more electrically conductive terminal members (17) electrically connected to, or integral with, the at least one heating element (4, 5). The terminal body (15) has extending therefrom at least one shield member (16) adapted to overlie at least one portion (11, 12) of the at least one heating element (4, 5) and reduce or minimise visibility of radiance therefrom.

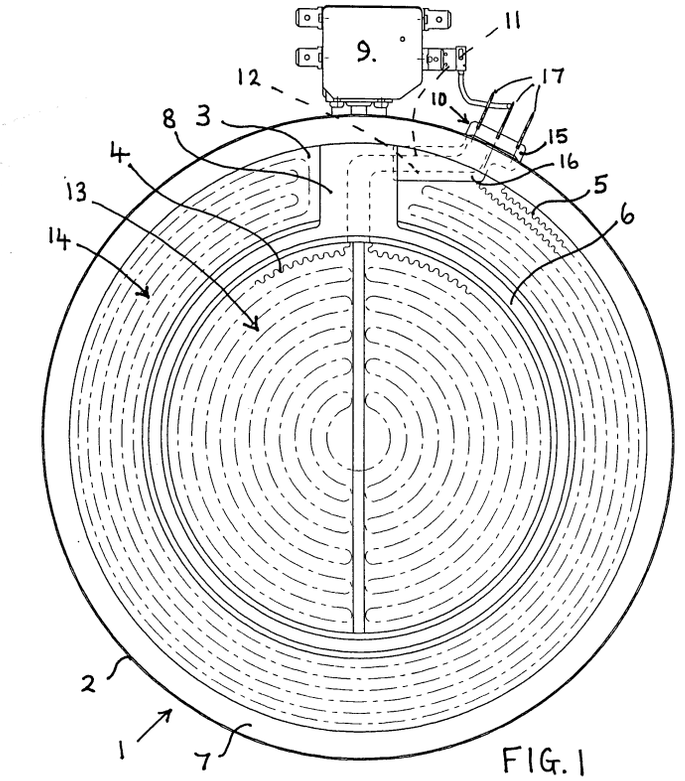

FIG. 1

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Description

[0001] This invention relates to a radiant electric heater, particularly, but not exclusively, for use in cooking appliances.

[0002] The invention finds particular application to radiant electric heaters for use in glass-ceramic top cooking appliances and particularly, but not exclusively, to multiple zone heaters for use in such appliances.

[0003] Radiant electric heaters are well known in which one or more heating elements such as of wire or ribbon form are supported on a base of thermal and electrical insulation material, such as microporous thermal insulation material. The insulation material may comprise or be included in a dish-like support and the one or more heating elements are generally arranged to be electrically connected to one or more terminal blocks provided on an outer edge of the support.

[0004] Multiple zone heaters are well known in which two or more heating elements are arranged in adjacent regions of a heater to provide two or more separate heating zones which may be separated by one or more walls of insulation material. Such two or more separate heating zones may be arranged concentrically, or arranged laterally in elongate forms of heater, such as multiple zone heaters of oval or elongate rectangular form.

[0005] With multiple zone heaters there is often a requirement for terminal portions of a heating element in one zone to pass through another zone in order to be connected to a terminal block at the edge of the heater. A heating element in one zone may be arranged to be energised when a heating element in the other zone through which its terminal portions pass is not energised. This means that these terminal portions will exhibit visible radiance which is aesthetically undesirable, particularly when the heater is operated beneath a glass-ceramic cook top.

[0006] In addition to the aforementioned problem with multiple zone heaters, there may also be a requirement to visibly obscure terminal regions of heating element in single zone heaters.

[0007] GB-A-2 324 946 describes an electrically insulating refractory component which has a portion received in an insulation base of a heater and a further portion overlying one or more terminal regions of a heating element to obscure visible radiance from the terminal regions of the heating element. A disadvantage of this approach is that it requires a step of embedding a portion of the component into the insulation base to support the component.

[0008] It is an object of the present invention to overcome this disadvantage.

[0009] According to the present invention there is provided a radiant electric heater comprising a dish-like support having therein at least one elongate electric heating element, a terminal block secured at an edge of the support, the terminal block comprising a body of electrically insulating material supporting one or more electrically conductive terminal members electrically connected to, or integral with, the at least one heating element, wherein the body has extending therefrom at least one shield member adapted to overlie at least one portion of the at least one heating element and reduce or minimise visibility of radiance therefrom.

[0010] The at least one shield member may also serve to dissipate heat from the at least one portion of the at least one heating element.

[0011] The at least one shield member may be integral with the body of the terminal block.

[0012] The at least one shield member may be of generally elongate form.

[0013] The at least one shield member may overlie at least one end portion of the at least one heating element.

[0014] The terminal block and the at least one shield member may comprise a refractory material such as a ceramic material.

[0015] For a better understanding of the present invention and to show more clearly how it may be carried into effect reference will now be made, by way of example, to the accompanying drawings in which:

Figure 1 is a plan view of one embodiment of a radiant electric heater according to the present invention; and

Figure 2 is a plan view of a terminal block provided with a shield member, for use in the radiant electric heater of Figure 1.

[0016] Referring to the drawings, a radiant electric heater 1 is provided for use beneath a glass-ceramic top (not shown) in a cooking appliance. The heater 1 comprises a metal dish-like support 2 having therein a base 3 of compacted microporous thermal and electrical insulation material.

[0017] Two elongate heating elements 4, 5 are provided in the heater. Heating element 4 is supported on the base 3 at a central region of the heater and heating element 5 surrounds the heating element 4 and is likewise supported on the base 3. Heating elements 4 and 5 suitably comprise corrugated metal ribbons of well known form supported edgewise on the base 3 and secured by partial embedding in the base 3.

[0018] The heating elements 4 and 5 are separated by a circular wall 6 of thermal insulation material and a further circular wall 7 of thermal insulation material surrounds the heater at the periphery thereof.

[0019] A gap is provided between turns of the outer heating element 5 and a block 8 of thermal insulation material is located in this region between the inner wall 6 and the outer wall 7. The block 8 is hollowed out inside to form a tunnel and a well known form of temperature limiter 9 passes through the tunnel and crosses the central heating element 4. The limiter is therefore respon-

sive only to the central heating element 4, being thermally isolated from the outer heating element 5 by means of the block 8.

[0020] A terminal block 10 is provided at the edge of the heater and the ends of the heating elements 4 and 5 are connected thereto. End portions 11, 12 of the central heating element 4 pass through the tunnel 8 and enter the area occupied by the outer heating element 5 before being connected to the terminal block 10.

[0021] The heating elements 4, 5 are arranged such that two heating zones 13, 14 are provided. The central heating element 4 can be energised alone to provide heated zone 13 to heat a small cooking utensil located on an overlying glass-ceramic cook top (not shown). Both heating elements 4 and 5 can also be energised together to provide heated zones 13 and 14, to heat a larger cooking utensil covering both zones on the overlying cook top.

[0022] When the central heating element 4 is energised alone, the resulting radiance therefrom is visible through the glass-ceramic cook top. In the absence of the present invention, radiance from the end portions 11, 12 of the heating element 4 would also be visible in the area occupied by the unenergised outer heating element 5. This would be aesthetically unsatisfactory.

[0023] The invention solves this problem in the following manner.

[0024] The terminal block 10 has a body 15 comprising an electrically insulating refractory material, suitably a ceramic material such as steatite or alumina. Integral with the body 15 and extending therefrom is a shield member 16 of generally elongate form which is arranged to overlie the end portions 11, 12 of the heating element 4 and obscure visible radiation from these end portions of the heating element when observed through the glass-ceramic cook top. Furthermore, since the shield member 16 and the integral body 15 of the terminal block are formed of a ceramic material having good thermal conductivity, heat from the end portions 11, 12 of the heating element 4 is able to be dissipated into the surroundings thereby preventing unacceptably high temperature from occurring in the end portions 11, 12 of the heating element 4 where overlain by the shield member 16.

[0025] The shield member primarily provides an elongate cover plate overlying the end portions of the heating element, but it may advantageously be provided with one or more depending side walls or flanges to increase the shielding effect thereof. Alternatively, the shield member could be of elongate block form with one or more channels therein for accommodating one or more end portions 11, 12 of the heating element 4.

[0026] The body 15 of the terminal block 10 supports electrically conductive terminal members 17, electrically connected to, or integral with the heating elements 4, 5.

[0027] Instead of the shield member 16 being formed integral with the body 15 of the terminal block, it could be formed separately and secured to the body 15.

Claims

1. A radiant electric heater comprising a dish-like support (2) having therein at least one elongate electric heating element (4, 5), a terminal block (10) secured at an edge of the support, the terminal block comprising a body (15) of electrically insulating material supporting one or more electrically conductive terminal members (17) electrically connected to, or integral with, the at least one heating element (4, 5), characterised in that the body (15) has extending therefrom at least one shield member (16) adapted to overlie at least one portion (11, 12) of the at least one heating element (4, 5) and reduce or minimise visibility of radiance therefrom.

2. A heater according to claim 1, characterised in that the at least one shield member (16) also serves to dissipate heat from the at least one portion (11, 12) of the at least one heating element (4, 5).

3. A heater according to claim 1 or 2, characterised in that the at least one shield member (16) is integral with the body (15) of the terminal block.

4. A heater according to claim 1, 2 or 3, characterised in that the at least one shield member (16) is of generally elongate form.

5. A heater according to any preceding claim, characterised in that the at least one shield member (16) overlies at least one end portion (11, 12) of the at least one heating element (4, 5).

6. A heater according to any preceding claim, characterised in that the terminal block (10) and the at least one shield member (16) comprise a refractory material.

7. A heater according to claim 6, characterised in that the refractory material comprises a ceramic material.

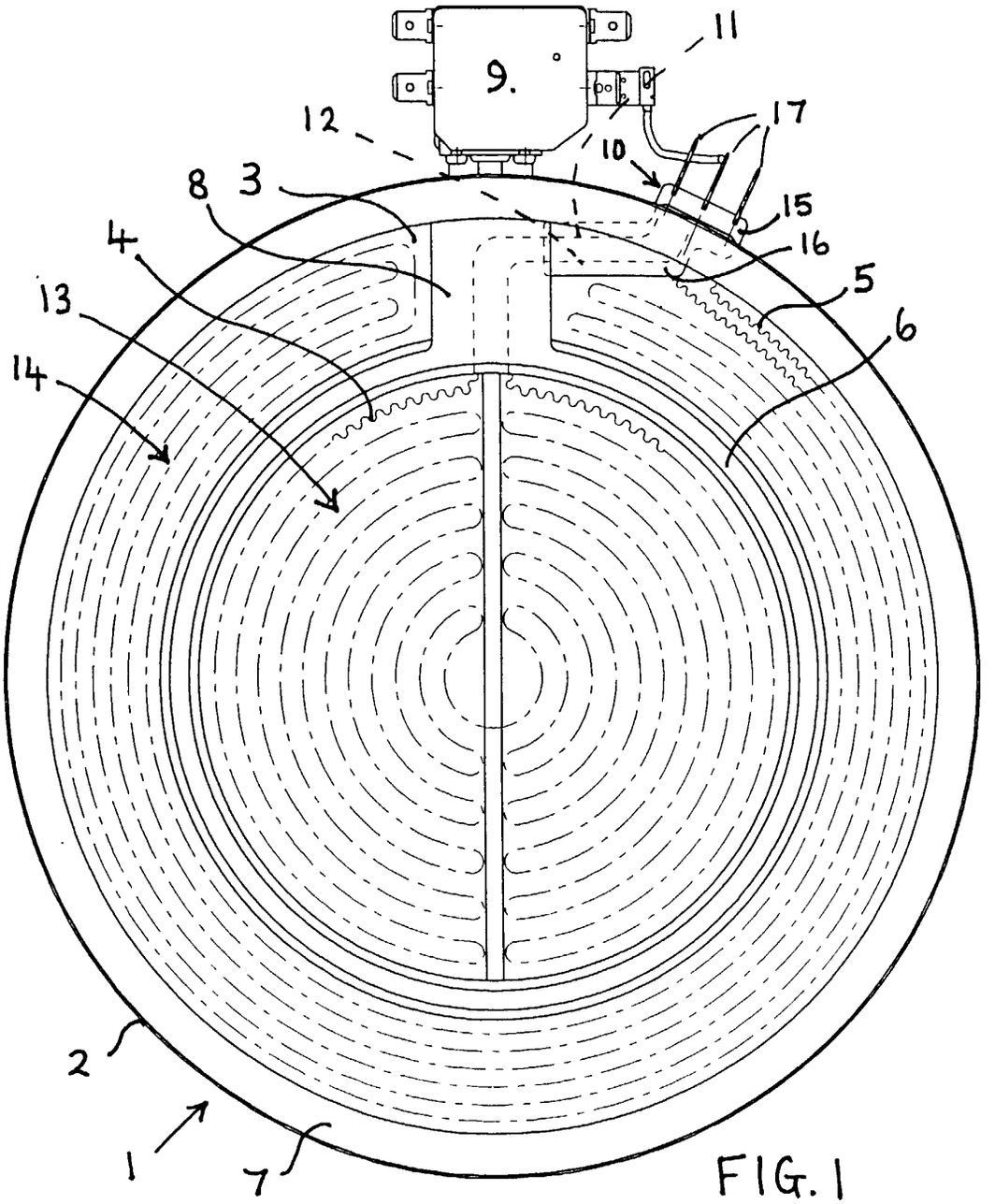

FIG. 1

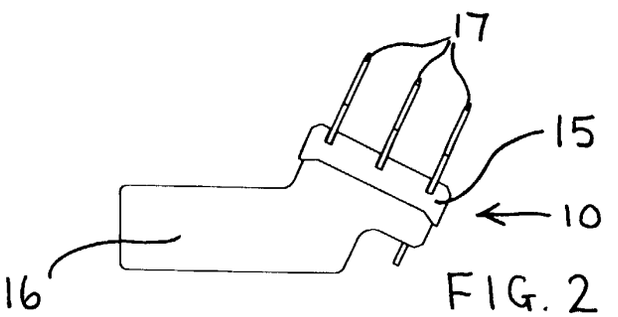

FIG. 2