

(19)



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

**EP 0 932 326 A2**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**28.07.1999 Bulletin 1999/30**

(51) Int Cl.<sup>6</sup>: **H05B 3/74**

(21) Application number: **99300056.1**

(22) Date of filing: **05.01.1999**

(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**

(30) Priority: **22.01.1998 GB 9801241**

(71) Applicant: **Ceramaspeed Limited**  
**Droitwich, Worcestershire WR9 7DJ (GB)**

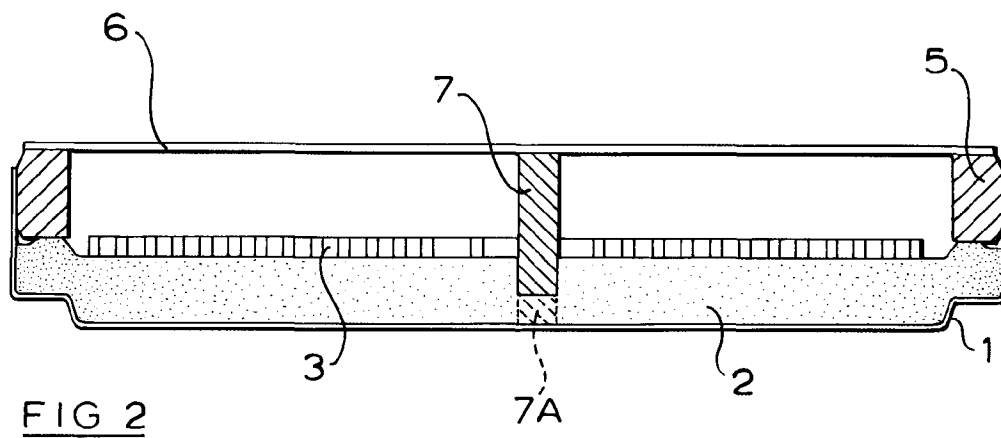
(72) Inventor: **Wilkins, Peter Ravenscroft**  
**Droitwich, Worcestershire WR9 7DU (GB)**

(74) Representative: **Jackson, Derek Charles**  
**Derek Jackson Associates**  
**The Haven**  
**Plough Road**  
**Tibberton Droitwich**  
**Worcestershire WR9 7NQ (GB)**

(54) **Radiant electric heater**

(57) A radiant electric heater comprises a dish-like support (1) containing a base layer (2) of thermal and electrical insulation material and having supported therein one or more radiant electric heating elements (3). A metal grid or mesh (6) overlies the base layer and is spaced from the one or more heating elements, and

at least one spacer (7) is provided inside the dish-like support and cooperating with the metal grid or mesh. The at least one spacer (7) is engaged in the base layer (2) of insulation material and extends between the metal grid or mesh (6) and the dish-like support (1) and/or the base layer (2) of insulation material.



**FIG 2**

**EP 0 932 326 A2**

## Description

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

**[0002]** Radiant electric heaters are well known comprising a dish-like support containing thermal and electrical insulation material and having supported therein one or more radiant electric heating elements. In a well known construction, a metal dish-like support has therein a base layer of insulation material, such as microporous thermal and electrical insulation material and one or more radiant heating elements, such as of wire or ribbon form are supported on the base layer. A wall of insulation material is also known to be provided around the periphery of the dish-like support, such wall being separate from, or integral with, the base layer.

**[0003]** It is well known to use such radiant heaters behind a sheet of glass-ceramic material, particularly in cooking appliances. However there are applications, such as in deep fat fryers, where the use of a sheet of glass-ceramic material is not required but where some form of protection against mechanical damage is required for the heater. In this regard it has been proposed to provide a metal grid or mesh overlying the heater and spaced from the heating element or elements.

**[0004]** Such grid or mesh suitably contacts the upper surface of the peripheral wall of the heater.

**[0005]** A problem has arisen with such an arrangement in that during use of the heater sagging of the grid or mesh can occur, to the extent that there is a risk of it contacting the heating element or elements, which is unacceptably dangerous.

**[0006]** GB-A-2 254 776 describes an electric cooking grill in which a heating element is supported in spaced relationship relative to a backing layer made from a heat insulation layer. A layer of diffusing material, for example of perforated metal, is supported in spaced relationship relative to the heating element on that side thereof remote from the backing layer. A bridging member serves to prevent the diffusing layer bowing upwards to contact the heating element in use. Alternatively, ribs may be provided which additionally support the heating element. However, GB-A-2 254 776 is limited in its application because the bridging member or ribs is required to withstand the entire force that may be applied thereto by the layer of diffusing material.

**[0007]** It is an object of the present invention to overcome these disadvantages.

**[0008]** The present invention provides a radiant electric heater comprising a dish-like support containing a base layer of thermal and electrical insulation material and having supported therein one or more radiant electric heating elements, a metal grid or mesh means overlying the heater and spaced from the one or more heating elements, and at least one spacer means provided inside the dish-like support and cooperating with the metal grid or mesh means, wherein the at least one

spacer means is engaged in the base layer of insulation material and extends between the metal grid or mesh means and the dish-like support and/or the base layer of insulation material.

5 **[0009]** The at least one spacer means may contact, and be optionally secured to, the metal grid or mesh means.

**[0010]** The at least one spacer means may be moulded into the base layer of insulation material.

10 **[0011]** The base layer of insulation material may comprise microporous thermal and electrical insulation material. Such microporous insulation material may be moulded into the dish-like support and the at least one spacer means may be simultaneously moulded into the base layer.

15 **[0012]** The at least one spacer means may comprise at least one boss, peg or pillar, such as of ceramic or metal.

**[0013]** A single spacer means may be provided, located substantially in a central region of the heater.

20 **[0014]** The dish-like support may have a peripheral wall, the metal grid or mesh means being arranged to be provided in a plane defined substantially by an upper surface of the wall.

25 **[0015]** The peripheral wall may be provided of thermal insulation material and may be separate from, or integral with, the base layer of insulation material.

**[0016]** The one or more heating elements may be of wire, ribbon or lamp form, or combinations thereof.

30 **[0017]** The dish-like support may comprise a metal.

**[0018]** The invention is now described by way of example with reference to the accompanying drawings in which:

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

Figure 2 is a cross section through the heater of Figure 1.

40 **[0019]** A radiant electric heater is constructed for use, for example, in a cooking appliance such as the base of a deep fat fryer. The heater comprises a metal dish-like support 1 containing a base layer 2 of microporous thermal and electrical insulation material. One or more radiant electrical heating elements 3 is or are provided in the dish-like support 1. As shown, a heating element comprises a metal ribbon secured edgewise on the surface of the base layer 2. However other forms of heating element could be considered, such as coiled wire or lamp elements. Combinations of elements could be provided. A terminal block 4 is provided at the edge of the heater for connecting the heating element or elements 3 to a voltage supply.

50 **[0020]** A peripheral wall 5 of thermal insulation material of well known form is provided at the edge of the heater. The peripheral wall 5 is shown as separate from the base layer 2, but could be provided integral there-

with.

**[0021]** The heater is arranged for operation behind or beneath a protective metal grid or mesh means 6 which is arranged to overlie the top surface of the peripheral wall 5, or at least in a plane defined substantially by the top surface of the peripheral wall.

**[0022]** There is a risk that, during operation of the heater, the metal grid or mesh means 6 may sag and contact, or approach undesirably close to, the heating element or elements 3. This is dangerous and must be avoided.

**[0023]** To prevent such sagging of the metal grid or mesh means 6, at least one spacer means 7 is provided cooperating between the metal grid or mesh means 6 and the base layer 2. As shown in the accompanying drawings, a single spacer means 7 is provided located substantially in a central region of the heater. However a plurality of spacer means could be provided if desired.

**[0024]** The spacer means 7 comprises an upstanding boss, peg or pillar, preferably of ceramic although it could be of metal.

**[0025]** The spacer means 7 is secured in the base layer 2 and contacts, and is optionally secured to, the metal grid or mesh means 6, thereby preventing the latter from sagging during operation of the heater.

**[0026]** The base layer 2 of microporous insulation material may be formed by moulding particulate microporous insulation material into the metal dish 1 and the spacer means 7 may be advantageously simultaneously moulded into the base layer 2, that is, it is co-moulded with the base layer 2.

**[0027]** The spacer means 7 may be arranged to contact, and optionally be secured to, the base of the metal dish-like support 1, as shown by the dotted outline 7A in Figure 2.

## Claims

1. A radiant electric heater comprising a dish-like support (1) containing a base layer (2) of thermal and electrical insulation material and having supported therein one or more radiant electric heating elements (3), a metal grid or mesh means (6) overlying the base layer and spaced from the one or more heating elements, and at least one spacer means (7) provided inside the dish-like support and cooperating with the metal grid or mesh means characterised in that the at least one spacer means (7) is engaged in the base layer (2) of insulation material and extends between the metal grid or mesh means (6) and the dish-like support (1) and/or the base layer (2) of insulation material.
2. A heater according to claim 1, characterised in that the at least one spacer means (7) contacts, and is optionally secured to, the metal grid or mesh means (6).
3. A heater according to claim 1 or 2, characterised in that the at least one spacer means (7) is moulded into the base layer (2) of insulation material.
4. A heater according to any preceding claim, characterised in that the base layer (2) comprises microporous thermal and electrical insulation material.
5. A heater according to claim 4, characterised in that the microporous thermal and electrical insulation material is moulded into the dish-like support (1) and the at least one spacer means (7) is simultaneously moulded into the base layer (2).
6. A heater according to any preceding claim, characterised in that the at least one spacer means (7) comprises at least one boss, peg or pillar.
7. A heater according to claim 6, characterised in that the at least one boss, peg or pillar comprises ceramic or metal.
8. A heater according to any preceding claim, characterised in that a single spacer means (7) is provided, located substantially in a central region of the heater.
9. A heater according to any preceding claim, characterised in that the dish-like support (1) has a peripheral wall (5), the metal grid or mesh means (6) being arranged to be provided in a plane defined substantially by an upper surface of the wall.
10. A heater according to claim 9, characterised in that the peripheral wall (5) is provided of thermal insulation material and is separate from, or integral with, the base layer (2) of insulation material.
11. A heater according to any preceding claim, characterised in that the one or more heating elements (3) is or are of wire, ribbon or lamp form, or combinations thereof.
12. A heater according to any preceding claim, characterised in that the dish-like support (1) comprises a metal.

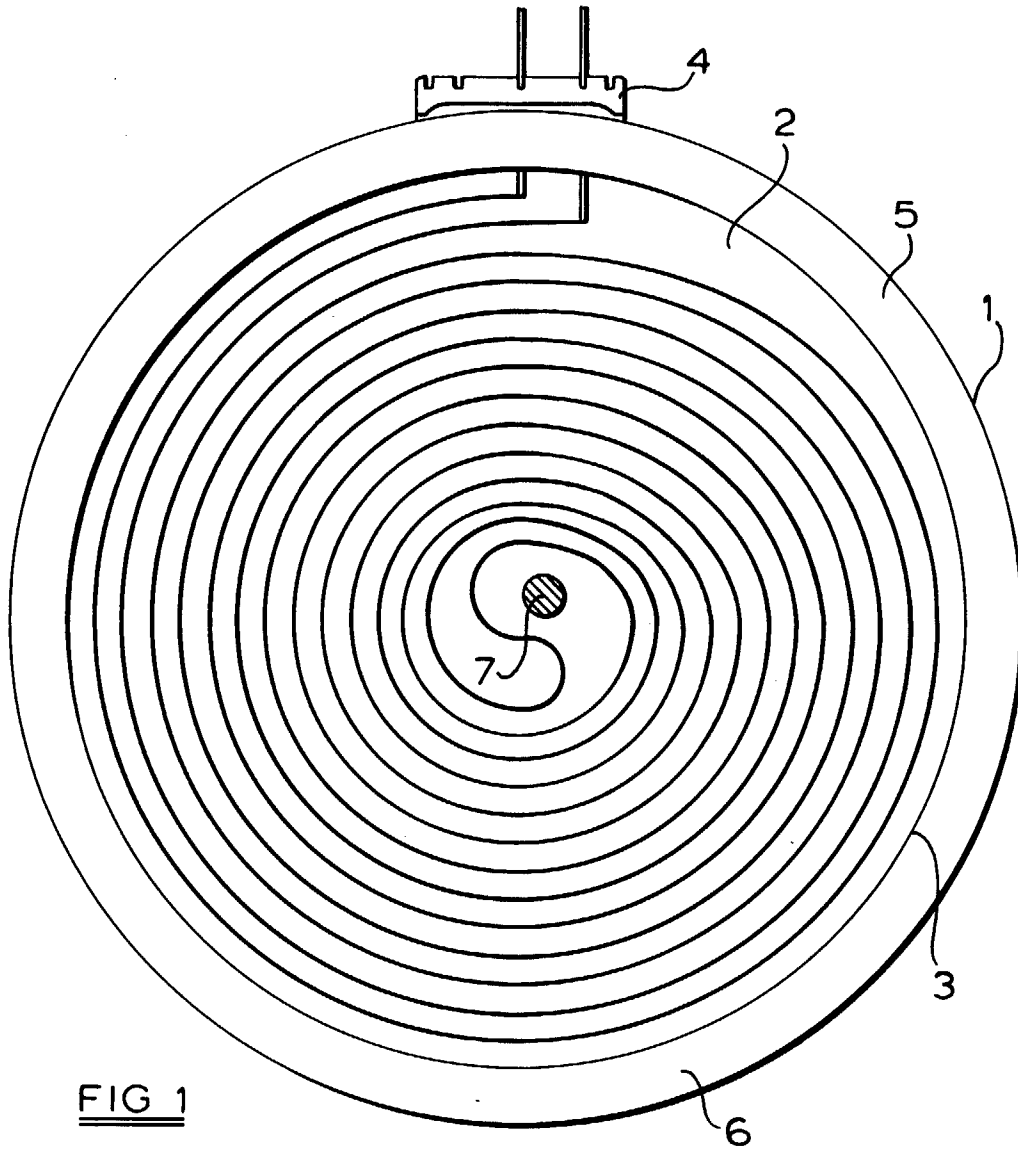


FIG 1

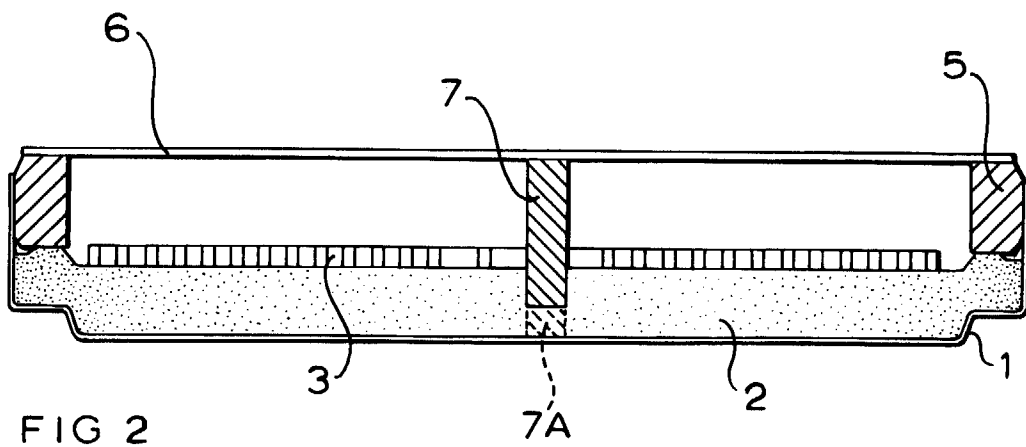


FIG 2