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(56) Documents cited
GB 2186166 A **EP 0294136 A** **EP 0286217 A**
EP 0147056 A **US 4700051 A**

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INT CL[5] **H05B**
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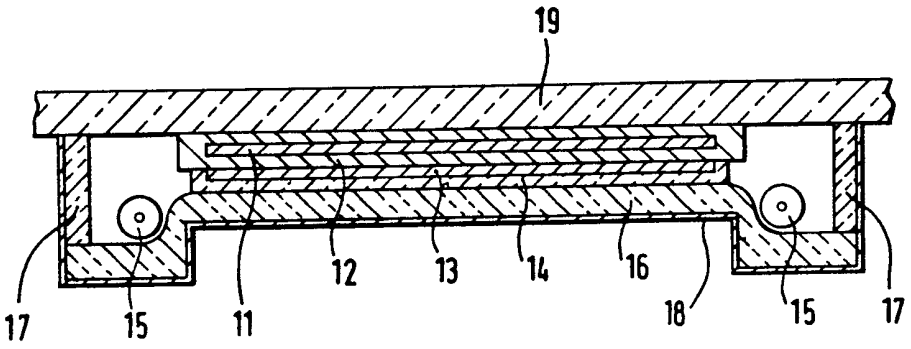
(54) Lamp and thick film heated ceramic hob plate

(57) A ceramic glass cooker hob includes a heater element comprising a thick-film electrically resistive track 13 printed on an electrically insulating substrate and maintained in heat-transmitting relationship with the underside of the ceramic glass hob plate 19, in combination with one or more quartz halogen heater lamps 15 located below the ceramic glass hob plate. Increasing lengths of the track can be energised in order to increase the temperature of the hob plate. The track can be a nickel and glass frit mixture.



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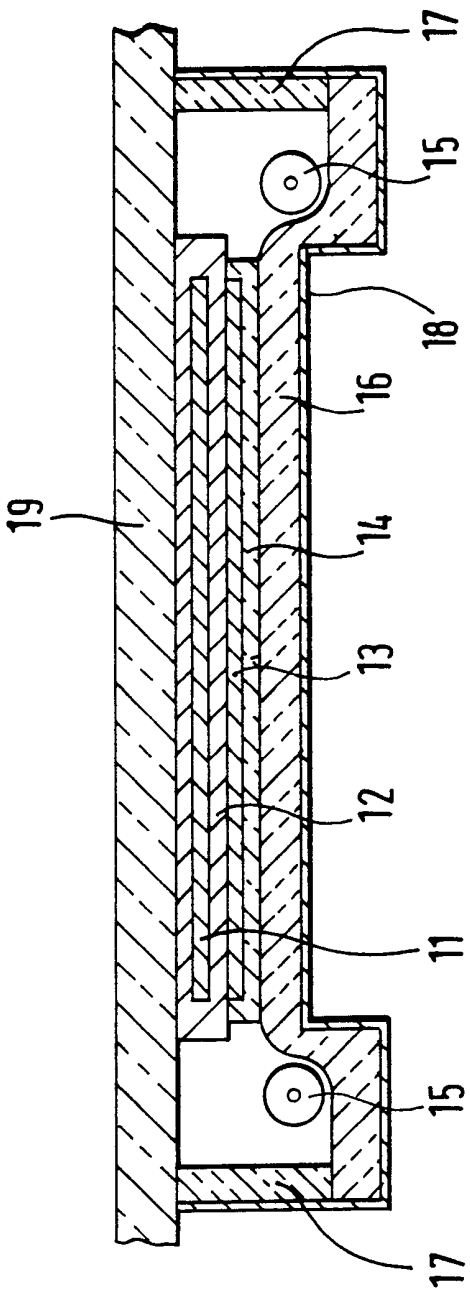
At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.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CERAMIC GLASS COOKER HOB

This invention relates to ceramic glass cooker hobs.

It is known to provide heat to electrically-powered ceramic glass cooker hobs by traditional radiant-ring elements mounted below the ceramic glass, optionally in conjunction with quartz-halogen heaters also mounted below the glass.

According to the present invention, a ceramic glass cooker hob includes a heater element comprising a thick-film electrically resistive track applied to an electrically insulating substrate and maintained in heat-transmitting relationship with the underside of the ceramic glass hob plate, in combination with one or more quartz halogen heater lamps located below the ceramic glass hob plate.

The resistive track is preferably applied in a meandering or serpentine pattern by a screen printing technique and is provided for temperature control purposes with selective isolation means whereby for maximum temperature the entire track is electrically energised and for lower temperature settings portions of the track may be selectively isolated to reduce the overall heat output. For all temperature settings, therefore, a hob according to the invention may operate

on a constant input current rather than an intermittent on/off current. However, conventional energy regulation may alternatively be employed, and furthermore as another variant, the lamps may be arranged to be on only when maximum temperature is required.

One advantage of a hob according to the invention is that the control circuitry is rendered simpler than with conventional hobs, in that series/parallel switching is not necessarily required. It is possible to achieve accurate control from a maximum of for example 1.8 kilowatts down to a minimum of for example 120 watts. Control may, furthermore, be rendered more flexible by the use of a larger number of resistive tracks.

In cooker hobs according to the invention, the thick film track is preferably applied to a metal plate coated with an electrically insulating ceramic material. The track, which may comprise particles of nickel or other electrically-resistive material in a glass frit, may then be covered with a layer of an electrically insulating overglaze and the plate mounted on a bed of heat insulating material, preferably microporous insulating material, contained in a flanged dish and preferably surrounded peripherally within the

dish with fibrous ceramic insulating material. The plate is mounted in the dish with the resistive track on the underside of the plate and the dish is mounted below the ceramic glass hob plate and resiliently biassed towards the glass so that the upper surface of the plate is in heat-conductive contact with the underside of the hob plate, optionally via an intermediate resilient layer to improve thermal contact.

The quartz halogen heater lamps may be disposed in relation to the thick film track in various ways. As one example, the lamp or lamps may be mounted around the resistive track, for example in an annular or concentric annular arrangement, also below the ceramic glass hob plate and facing upwardly thereto. Alternatively, the lamps may be linear and extend across the hot plate area as a diameter or as chords with thick film tracks formed on either side or therebetween. Again, a central lamp may be used, surrounded by thick film tracks.

One way of mounting the lamps is to locate them in slots or wells cut or otherwise formed within the thick film plate.

With hobs according to the invention, it is not

necessary to provide a conventional thermal limiter to act as an over-temperature cut-out, because thick film resistive tracks do not attain or need not be made to attain, due to direct thermal contact with the glass ceramic, temperatures which would cause a cut-out to occur. However, to guard against excessively high temperatures for any other reasons, it is convenient to provide an over-temperature warning or cut-out device comprising one or more thick film resistive tracks in addition to the heater tracks, and to pass a current therethrough which will vary according to temperature and can therefore be made to activate a warning or isolation device. Any temperature sensing element must of course be protected from direct radiant heating and this may be achieved by applying thereto a reflective coating comprising for example silver or gold..

Embodiments of the invention are shown by way of example in the accompanying drawing, which is a cross-sectional view of a heater area of a cooker hob according to the invention.

In the drawing, 11 represents a metal plate coated with electrically insulating ceramic material. 12, 13 represents an electrically resistive track heater (electrical connections not shown) and 14 represents an overglaze layer. 15 represents a quartz halogen annular

heater; the heaters are bedded on microporous insulation material 16 and surrounded by a ring of fibrous insulation material 17 contained in a dish 18 held against the under-surface of the ceramic glass plate 19 forming the working surface of the hob.

CLAIMS

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1. A ceramic glass cooker hob including a heater element comprising a thick-film electrically resistive track applied to an electrically insulating substrate and maintained in heat-transmitting relationship with the underside of the ceramic glass hob plate, in combination with one or more quartz halogen heater lamps located below the ceramic glass hob plate.

2. A hob according to claim 1 wherein the resistive track is applied by a screen printing technique.

3. A hob according to claim 1 or claim 2 including means for controlling the temperature of the resistive track, the said means includes selective isolation means whereby for maximum temperature the entire track is electrically energised and for lower temperature settings at least one portion of the track is isolated.

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