

[54] **ELECTRIC HEATER ASSEMBLY**

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[56]

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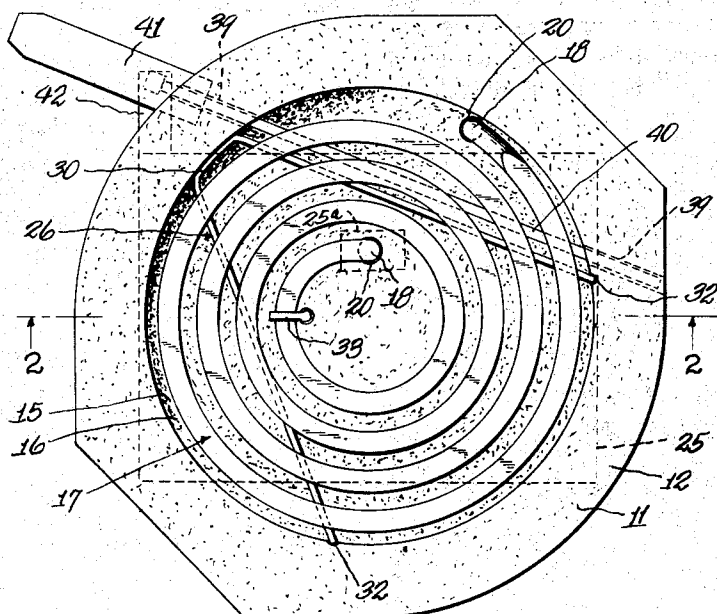
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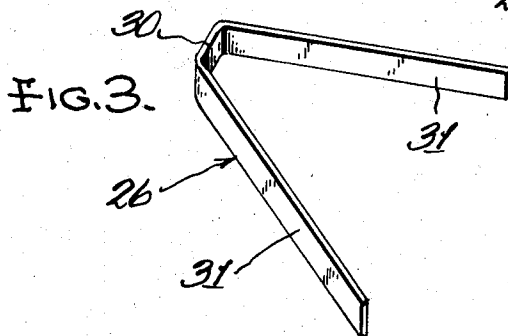
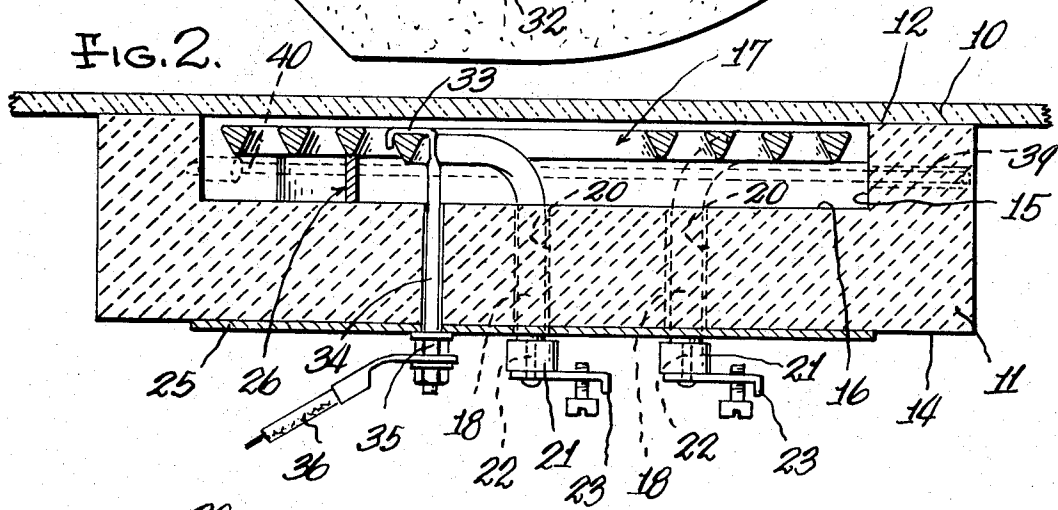
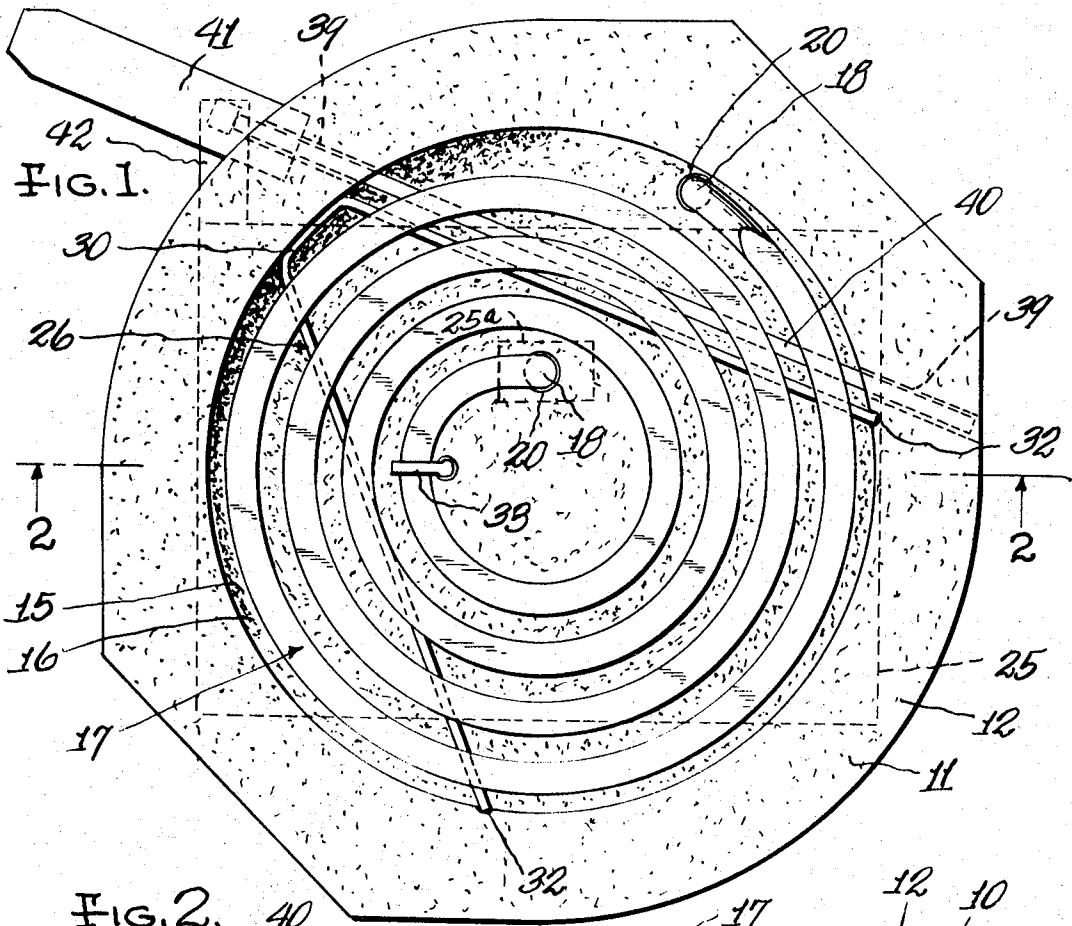
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ABSTRACT

A heater assembly for use with a stove having a flat top surface. The assembly includes a base molded of integrated inorganic refractory material having opposed flat sides, the upper side being adapted to be pressed against the underside of the flat top surface. The base upper side has a recess for receiving a tubular electric heating element which is shaped to a flat spiral. A support member is formed of strip metal positioned on edge and bent to provide a pair of legs connected by a bight portion. The support member is disposed within the base recess to support the heating element and the combined thickness of the support member and the flat spiral is less than the depth of the recess so that the flat spiral is spaced from the underside of the flat top surface. The support member is devoid of any mechanical connection with the flat spiral and the base, and a single hook member is engaged over a portion of a spiral convolution and has a shank extending through a vertical opening in the base, the end of the shank being threaded to receive a nut to draw the hook member against the convolution portion and thus draw the flat spiral against the support member and the latter against the bottom of the heater.

12 Claims, 3 Drawing Figures





ELECTRIC HEATER ASSEMBLY

BACKGROUND AND SUMMARY

Cooking surfaces consisting of a ceramic, glass-like, flat cooking top are increasing in popularity because of the neat and attractive appearance and the ease of cleaning a flat panel, as opposed to tubular heating elements of spiral form upon which a cooking vessel is supported.

However, some difficulty has been encountered in the design of an electric heater for use with a ceramic panel because the composition of the latter becomes unstable under excessive heat and discolors or fractures. Many of the attempts in the prior art have utilized some form of a molded base for supporting a ribbon or open coil resistor adjacent to the undersurface of the glass panel, and have met with a certain degree of success. However, such attempts have resulted in costly assemblies and attention has been directed to the utilization of a sheathed, tubular electric heating element providing a flat, spiral heating surface.

Although a sheathed electric heating element is more expensive than an open coil unit, our invention provides a low cost assembly of relatively few parts and thus obtains the benefits of the sheathed unit while compensating for the increased cost of this item in the assembly.

Our invention includes a base which is molded of alumina silica and a hardener, as required to provide a support which is highly uniform and continuous in cross-section, thus minimizing electrically hazardous and thermally inefficient voids, and permits formation of the exact desired product configuration.

A supporting spider is merely deposited within a recess in the base, with no mechanical connection with either the base or the heating element which overlies it. The heating element is quickly and easily assembled, merely by disposing its terminal portions through vertical openings in the base, and single connection holds the assembly intact.

DESCRIPTION OF THE DRAWING

In the drawing accompanying this description and forming a part of this application, there is shown, for purpose of illustration, an embodiment which our invention may assume, and in this drawing:

FIG. 1 is a plan view of the heater assembly,

FIG. 2 is a sectional view corresponding to the line 2-2 of FIG. 1, showing the assembly applied to a flat top panel of a stove, and

FIG. 3 is a perspective view of the spider member used in the assembly.

DESCRIPTION OF PREFERRED EMBODIMENT

Our improved assembly is particularly adapted for use with a flat glass panel 10 of a modern range, and may be held assembled therewith in any suitable manner. The assembly comprises a base 11 of electrical insulating material and in the presently disclosed embodiment is molded of integrated inorganic refractory material, such as aluminum silicate combined with a suitable hardener.

The base 11 has plane opposite side faces 12 and 14 and the upper face 12 has an annular recess 15 extending inwardly thereof and terminating in a flat bottom surface 16. The recess 15 is of transverse size to freely pass the marginal portion of a flat sheathed heater 17. In the disclosed embodiment, the heater has a tubular

sheath which is wound into a flat spiral and has terminal portions 18,18 which extend downwardly from the flat spiral at right angles thereto. A heater suitable for the purpose is disclosed in U. S. Pat. No. 2,428,899, issued Oct. 14, 1947, to Edwin L. Wiegand.

As seen in FIG. 1, the outer convolution of the flat spiral winding comfortably fits within the confines of the annular recess 15. Vertical openings 20, 20 are formed in the base to closely but freely pass the terminal portions 18,18 of the heater. Ceramic bushings 21 are disposed over the terminal pins 22 extending outwardly of the extremity of each terminal portion, and the end of each terminal pin passes through an opening in a terminal clip 23 and is headed against or welded to the clip to hold the latter firmly assembled. A flat metal plate 25 is disposed against the bottom side 14 of the base 11 and has a large opening 25a to electrically clear the centrally disposed terminal portion 18. The plate provides a reinforcement for the base 11.

A supporting member or spider 26 is interposed between the bottom 16 of the recess 15 and the underside of the flat spiral winding and, as seen in FIG. 2, the combined thickness of the winding and the spider is less than the depth of the recess, so that the upper surface of the winding is slightly spaced from the undersurface of the glass panel. The spider is formed of strip metal and positioned on edge, as seen in FIG. 2. The metal strip is bent substantially to the V-shape seen in FIG. 3, to provide a bight portion 30 and a pair of legs 31,31. In the assembly, the lower edge of the spider rests on the flat bottom 16 of the recess 15 and the flat spiral winding rests on the top edge of the spider. The upright wall of the recess 15 is formed with small notches 32 to properly locate the spider, and the legs 31,31 are of sufficient length so that the bight portion 30 bears against an opposed portion of the recess upright wall as seen in FIG. 1.

It will be noted that there is no mechanical connection between the spider 26 and the base 11 and heating element 17, so that in assembling the parts, the spider is merely laid in the recess 15 and the flat spiral winding is laid on the spider, with the terminal portions 18,18 extending through base openings 20,20. After the terminal pins 22,22 are headed over the terminal clips 23,23, the parts are held against disassembly. It is preferred to firmly anchor the heating element 17 and the metal plate 25 to the base and for this purpose a single hook member is utilized, including a hook 33 which fits over a portion of the inner convolution, as seen in FIG. 2, and has a shank 34 extending downwardly through a vertical opening in the base 11 and through an aligned opening in the plate 25. A nut 35 is threaded on the lower end of the shank 34 and is drawn up tightly. A ground wire 36 may be attached to the shank 34 to provide a safe ground in the event of electrical leakage to the sheath of the electric heater 17.

The base is formed with a pair of axially aligned openings 39,39 so that an elongated heat sensing member 40 may be inserted through one opening, extend through the recess 15 and enter and be supported by the other opening. The sensing member may be of any commercially available type consisting of an outer tube and a coextensive inner member having differential thermal expansion properties so as to actuate a switch 41, also of a suitable commercially available type, to control flow of electrical energy to the heating element. As seen in FIG. 1, the legs 31,31 of the spider 26 are

disposed crosswise of the convolutions of the flat spiral in chord-like manner and the heat sensing member is inclosely spaced relation with one of the legs 31. The switch 41 is preferably supported from the plate 25 by means of a bracket 42, shown only in FIG. 1.

We claim:

1. A heating assembly for use with a stove having a flat top surface comprising a base of insulating material, a flat sheathed electric heating element, said base having a recess extending inwardly from a plane side face and of a transverse size to freely pass the marginal portion of said heating element and to receive the latter in a flatwise manner, said plane side face being adapted to be pressed against the undersurface of said flat top surface, support means between the undersurface of said heating element and the bottom of said recess for supporting said heating element, the combined thickness of said support means and said heating element being less than the depth of said recess so that the upper surface of said heating element is disposed below the plane of said base side, and engaging means securing said heating element and support means to said insulating base.

2. The construction according to claim 1 wherein said base is molded of integrated inorganic refractory material.

3. The construction according to claim 1 wherein said heating element is tubular and shaped to a flat spiral, with terminal ends extending downwardly from said spiral and through respective vertical openings in said base for connection to a source of electrical energy.

4. The construction according to claim 3 wherein said support means is devoid of mechanical connection with said heating element and said base, and further said engaging means including a hook member engaging over a portion of a convolution of said flat spiral and having a shank extending through a vertical opening in said base, and means to draw said hook member against said convolution portion and thus draw said heating element against said support means and the latter against the bottom of said recess.

5. The construction according to claim 4 wherein said support means is formed of strip metal positioned on edge and bent to provide a pair of legs connected by a bight portion, each of said legs underlying and bearing against at least certain of the spiral convolutions.

6. The construction according to claim 5 wherein at least one of said legs underlies said convolutions in chord-like relation, and further including a temperature sensing element having an elongated outer tube disposed alongside said one leg and having its opposite

ends extending through openings in the side wall of said recess.

7. A heating assembly for use with a stove having a flat top surface, comprising a base formed of molded integrated refractory material, an electric heating element having a metal sheath shaped to a flat spiral, said base having a recess extending inwardly from a plane side face and of a transverse size to freely pass the marginal portion of said flat spiral and to receive the latter in flatwise manner, said plane side face being adapted to be disposed flatwise adjacent to the underside of said flat top surface, a support member formed of strip metal positioned on edge, the lower edge of said support member resting on the bottom of said recess and said heating element resting on the upper edge of said support member and engaging means securing said heating element and support means to said refractory base.

8. The construction according to claim 7 wherein said support member is devoid of mechanical connection with said heating element and said base, and further said engaging means including a hook member engaging over a portion of a convolution of said flat spiral and having a shank extending through a vertical opening in said base, and means to draw said hook member against said convolution and thus draw said heating element against said support member and the latter against the bottom of said recess.

9. The construction according to claim 8 wherein a flat metal plate underlies and engages that side face of said base which is opposite said plane side face, said metal plate having an opening to pass the shank of said hook member, and said shank being threaded to receive a nut.

10. The construction according to claim 7 wherein said support member is bent to provide a pair of legs connected by a bight portion, each of said legs underlying and bearing against at least certain of the spiral convolutions.

11. The construction according to claim 10 wherein at least one of said legs underlies said convolutions in chord-like relation, and further including a temperature sensing element having an elongated outer tube disposed alongside said one leg and having its opposite ends extending through openings in the side wall of said recess.

12. The construction according to claim 9 and further including a conductor connected to said flat metal plate and adapted to be connected to ground.

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