Aug. 19, 1930. C. S. MALLETT ET AL 1,773,687

ELECTRIC HEATER

Original Filed Nov. 29, 1926

Fig. 1.

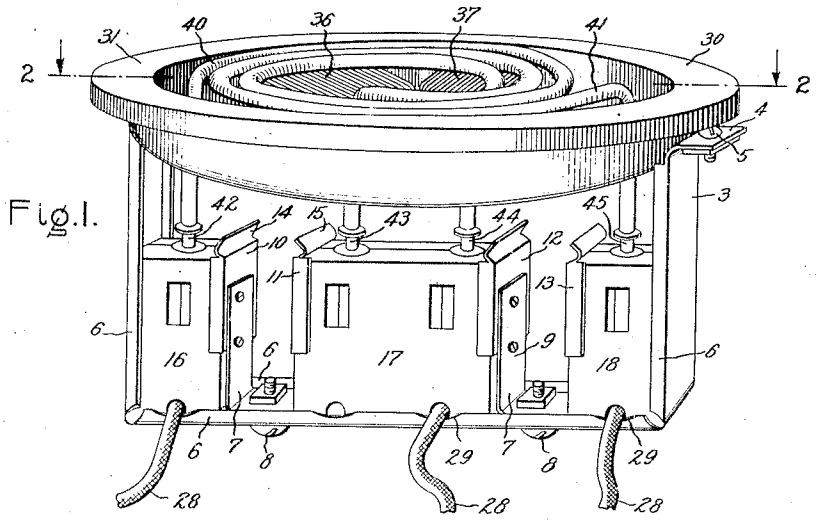


Fig. 2.

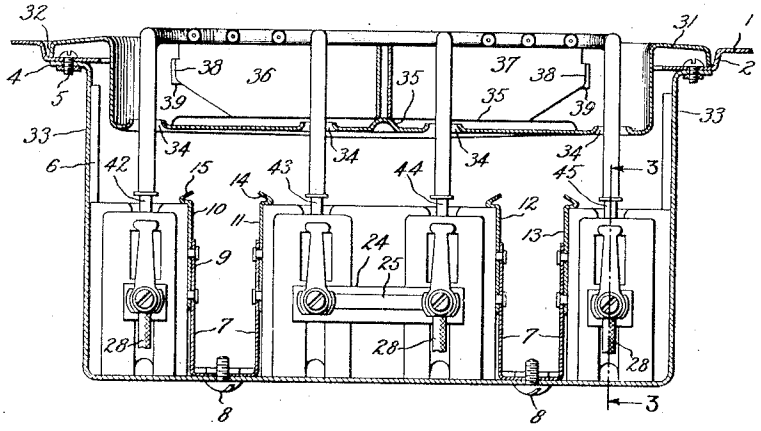
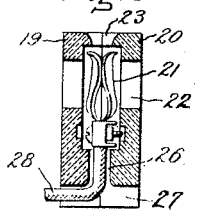


Fig. 3.



Inventors:
Charles S. Mallett,
George W. Heinbuch,
by Miranda S. Lamb
Their Attorney.

Patented Aug. 19, 1930 1,773,687

UNITED STATES PATENT OFFICE

CHARLES S. MALLETT AND GEORGE W. HEINBUCH, OF TORONTO, ONTARIO, CANADA, ASSIGNORS TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK

ELECTRIC HEATER

Application filed November 29, 1926, Serial No. 151,381, and in Canada September 17, 1926. Renewed January 8, 1930.

Our invention relates to heating devices, and more particularly to electric stove elements and their associated parts, and the manner of assembling these so that they may be readily separated for cleaning, while at the same time they are firmly held in their assembled position against accidental displacement.

In carrying out our invention we employ an electric heating element of the general type shown in U. S. patent to Abbott, No. 1,345,730, dated July 6, 1920, in which the element consists of sheathed wire coiled and located in the stove opening in such a manner that the cooking utensils are directly received thereon. This construction has the advantage that the element heats rapidly and the utensil being in direct contact therewith also heats rapidly, as there is a good transfer of heat both by conduction and by direct radiation. Grease and material being cooked are apt to spill and accumulate on the element itself and the parts beneath, and our invention provides a construction whereby this objection is minimized as it permits rapid disassembly of the parts so that they can be separated, cleaned, and readily assembled.

By our construction the parts can be separated in an instant by simply pulling them apart, and this ease of disassembly and assembly assures that they will be more frequently cleaned than if various connections had to be undone.

The following description taken in conjunction with the accompanying drawings wherein the parts are referred to by the same reference character throughout the several views is an acceptable form of our invention.

Fig. 1 is a perspective view.

Fig. 2 is a cross-sectional view as indicated by the line 2—2, on Fig. 1.

Fig. 3 is a cross-sectional view of the terminal receiving plug as indicated by the line 3—3 on Fig. 2.

On the drawings 1 represents a portion of the surface plate of a heater having an opening therein. Adjacent the opening the surface is depressed as shown at 2, defining an annular flange projecting into the opening. To this flange is secured a U-shaped metal strap 3 having out-turned ends 4 which are secured to the flange in any suitable manner as by bolts 5. The horizontally extending portion of the strip 3 extends centrally beneath the opening in the surface plate and is provided with inturned flanges 6 on opposite sides thereof. A pair of U-shaped springs 7 of a width to be neatly accommodated in the channel formed by the flanges 6 on the members 3 is secured to the strap by bolts 8 passing through holes provided in the strap and spring. Secured to each upstanding end 9 of each spring, in any suitable manner such as by spot-welding or riveting is a sheet metal clamping member, the four of these being designated by the reference characters 10, 11, 12 and 13. Each of these members has turned-over side and top edges 14, the top edge being turned back as indicated at 15 to provide a finger hold.

The location of these springs and attached members is such that three blocks designated as a whole as 16, 17 and 18 are received and releasably held, one, 16, between the member 10 and the upright part of the frame 3, another similar one 18, between the member 13 and the other upright part of the frame 3, and the third and larger between the remaining members 11 and 12. Each block as best seen in Figure 3, consists of two mating halves 19 and 20 recessed in the well known manner for the reception of the terminal receiving spring contact fingers 21 and their retention and support therein. Ventilating openings 22 are provided through each half of the block and the mating surfaces are provided with grooves 23, in the usual manner to provide for entry of the terminal to the fingers 21

Block 17 is similar to the block just described except that it is large enough to accommodate two terminals and an interconnecting groove 24 is provided in the mating surfaces to accommodate a conducting connection 25 between the two pairs of contact fingers of this block. The mating blocks are also provided with grooves 26 and 27 to accommodate flexible connectors 28 which are led away to a selective switch, not shown. The edges of the bottom flange 6 are turned

down as indicated at 29 to prevent excessive wear on the connector where it passes from the block. 30 indicates a sheet metal pan member which has a horizontally extending member 31 having a down-turned periphery 32 and a depressed central portion 33. A series of openings 34 with upturned edges are provided in the bottom which are spaced so that they are directly over the openings 23 when the pan is in position. The bottom of the pan is further provided with raised ribs 35 to prevent dishing of the pan when heated. The pan may be provided with additional drainage openings. 36 and 37 represent a pair of sheet metal bars which rest on the bottom of the pan and are prevented from accidental displacement by having reduced ends 38 removably received in openings 39 in the side wall of the depressed portion.

40 and 41 represent a pair of coiled sheathed wire elements having terminals 42, 43 and 44, 45 respectively which are received in the corresponding sockets.

By sheathed wire is meant that type of heating wire which has an outer sheath or casing, and a resistance conductor therein surrounded by and insulated therefrom. One type of such wire which is suitable for this purpose consists of a metallic sheath having a helical resistor centrally located and having terminals connected to its ends which project from the sheath when completed. The space between the helix and the sheath is filled with powdered magnesia which is compacted by swaging down the tube. Insulating washers of mica are placed over the terminals and an outer terminal member placed over the end which is compressed to firmly grip the inner terminal and at the same time press the mica washers firmly against the end of the tube as described in U. S. Patent No. 1,494,938, to Abbott, dated May 20, 1924. This construction provides a heating element which has a high rate of heat transfer from the heating wire to the sheath and in which the conducting element is well insulated from the sheath and in which the terminals form rigid projections of substantial size at the ends thereof. When so formed this element may be bent into any desired form and when so bent forms a structure sufficiently rigid to stand frequent handling without losing its shape.

Two such elements are shown in the drawing each formed into a coil having its ends downturned. The proportions are such that one coil fits within the other and the four downturned ends pass freely through the opening 34 in the pan to be received in their corresponding sockets. The coil thus forms a grid which is freely supported on the members 36 and 37 and are free to expand when heated.

By the construction just described it will be seen that a structure is provided that can be readily disassembled for cleaning. By grasping the coil members and pulling upwards they can be separately removed, the pan member which simply rests on the frame can be lifted off and these elements being separated can be easily and thoroughly cleaned. When the element and the pan are removed as above described, ready access is had to the terminal receiving members 16, 17 and 18. If these have become fouled by leakage from the pan they can be readily removed for leaning by simply pressing at the point 15 of the appropriate clamping members which yield due to the spring construction and thereby release the blocks. The process of replacing the parts is equally simple and expeditious.

While we have described one form of our invention in considerable detail in accordance with the provisions of the patent statutes, it should be understood that we do not limit our invention thereto as various modifications thereof will suggest themselves to those skilled in the art without departing from the spirit of our invention as defined in the annexed claims.

Wherever the term sheathed wire is used in the claims it refers to a heating element comprising an outer sheath with an inner resistance conductor, insulated therefrom.

What we claim as new and desire to secure by Letters Patent of the United States, is:—

1. An electric heater comprising a support, a sheathed wire heating unit removably mounted on said support, said heating unit being formed into a grid so as to serve as a support for articles to be heated, rigid projecting terminals on the ends of said unit and current input contact members arranged to receive and frictionally hold said terminals.

2. An electric heater comprising a sheathed wire formed into a grid so as to support articles to be heated directly thereon, a support on which the grid is removably supported, current input contact members supported beneath the grid, the ends of the grid being downturned and having enlarged rigid projecting terminals insulated from the sheathing around said wire, slidably received and frictionally held by said contact members.

3. An electric heater comprising a pan member, a sheathed wire formed into a grid resting on said pan member so as to be removable therefrom, contact members below said pan member, the pan member having openings therein and being in turn removably supported on the heater structure, the ends of the grid passing freely through the pan and having terminals received and frictionally held in said contact members.

4. An electric heater comprising a sheathed wire heating element formed into a removable grid designed to support articles to be heated directly thereon, the ends of the ele-

ment having enlarged terminals connected with said wire and insulated from said sheathing, said ends being downturned and spaced apart, a support for removably supporting said grid and separate receptacles on said support for receiving and frictionally holding said terminals.

5. An electric heater comprising a pan member, a sheathed wire element formed into a removable grid resting unconfined on said pan member, said pan member having openings in the bottom thereof, and resting freely on a supporting structure, current carrying contacts supported beneath said element and pan, the ends of the element being downturned and passing freely through the openings in the pan and being engaged and frictionally held by the said contacts.

6. An electric heater comprising a sheathed wire utensil supporting grid having projecting ends with rigid terminals, current receiving contact members to receive and frictionally hold the terminals, a separable block of insulating material for supporting said contact members, and a spring pressed clamp securing said block.

7. An electric heater comprising a sheathed wire heating element formed into a grid designed to support articles to be heated directly thereon, the ends of the element having terminals and being downturned and spaced apart, a support beneath the grid, separate receptacles for receiving and frictionally holding said terminals, each receptacle comprising a pair of mating blocks enclosing current supply contacts, and a spring pressed clamp releasably holding said mating blocks in assembled relation.

8. An electric heater comprising a heating element having downturned terminals, a support, a strap having inturned edges secured to the support, a receptacle composed of mating parts held at the bottom and one of the sides by said flanges, current supply contacts between said mating parts, and a spring member secured to the strap provided with flanges embracing the other side and top of the mating blocks.

9. An electric heater comprising a pair of intercoiled heating elements having downturned terminal carrying ends spaced apart and in line, a support, a strap secured to the support and extending beneath the terminals, flanges on the strap, a pair of U-shaped spring members secured to the strap with their legs upstanding and having side and end flanges, three divided blocks of insulating material, the first being held in position by the flanges of the strap and one leg of the first spring member, the second being held in position and assembled by the flanges of the strap and one leg of the second spring member, the third block being held in position by the flanges of the strap and the remaining leg of the spring members, and current supplying contact fingers supported within the blocks.

In witness whereof, we have hereunto set our hands this 26th day of November, 1926.

CHARLES S. MALLETT.
GEORGE W. HEINBUCH.