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ELECTRIC HEATING

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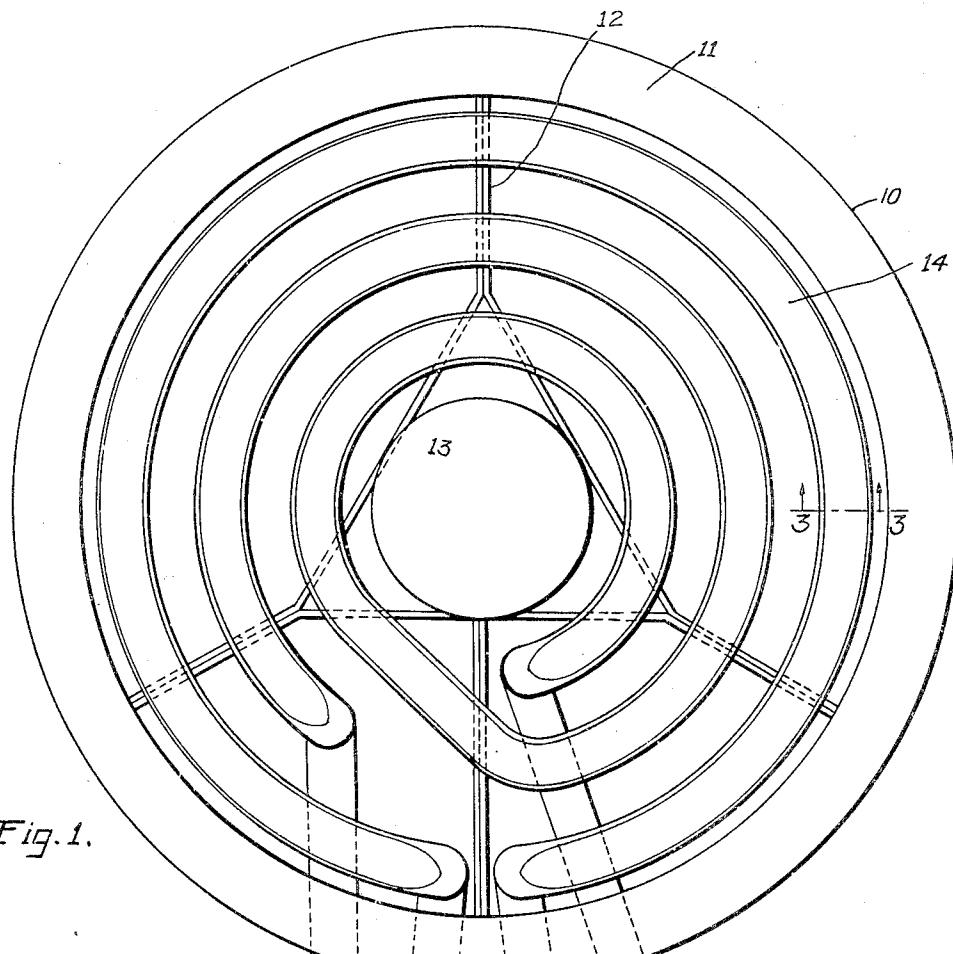


Fig. 1.

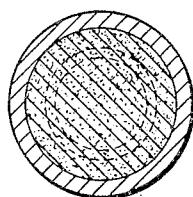
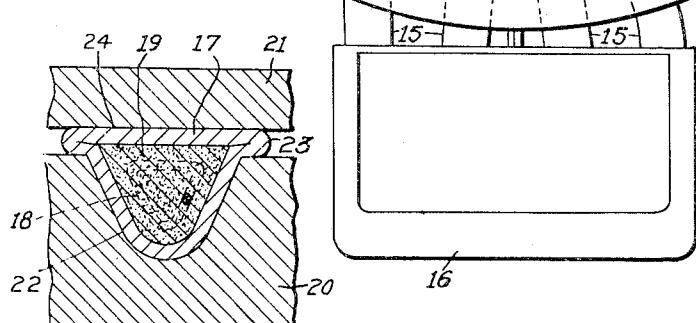


Fig. 2.

Fig. 3

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ELECTRIC HEATING

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11 Claims. (Cl. 201—67)

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My invention relates to electric heating, and to tubular sheathed embedded-resistor electric heating elements, and to electric heating units comprising one or more such elements, and the principal object of my invention is the production of new and improved elements and units of the type indicated.

In the drawing accompanying this specification and forming a part of this application I have shown for purposes of illustration one form which my invention may assume, and in this drawing:

Figure 1 is a top plan view of a range unit embodying my invention,

Figure 2 is a cross-sectional view showing the element in an original circular cross-section, and

Figure 3 is a cross-sectional view on the line 3—3 of Figure 1.

In the drawing I have shown a range unit 10 comprising a ring 11 by which the unit may be supported from the top of an electric range, a spider 12 mounted in the ring 11 and carrying centrally a medallion 13, and two electric heating elements 14 supported on the spider 12, having their end portions 15 extending to a terminal block 16, and each comprising a tubular sheath 17, a resistor 18 disposed within the sheath 17, and compacted granular refractory 19 embedding the resistor 18 and serving to insulate the resistor and to conduct the heat from the resistor to the sheath.

In the illustrated embodiment of my invention each of the heating elements 14 is originally constructed circular in cross-section, as shown in Figure 2, and then preferably the entire active portion of the element is side pressed to the cross-section shown particularly in Figure 3, as by means of coacting dies 20 and 21, the die 20 being provided with a groove or channel 22 in which the element is disposed, the die 21 being substantially flat, and the operation comprising relative approach of the dies to substantially the position indicated in Figure 3, whereby the included section of the element is formed generally to the contour of the die cavity, but with lateral projections 23 substantially extending the area of the corresponding element surface 24.

As appears from Figures 2 and 3, the final cross-section shown in Figure 3 is substantially less than the initial cross-section shown in Figure 2, whereby the refractory 19 is firmly and suitably compacted, but inasmuch as the dies 20 and 21 are not brought together, the operation avoids the likelihood of pinching and splitting the sheath, and permits the formation to final cross-section in a single operation.

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Further, when the elements are used in a range unit, as shown in Figure 1, the provisions of the lateral projections 23, and the increased width of the upper face 24, afford the very important advantage of a substantial increase in the area of contact between the elements and the pan or other culinary utensil positioned thereon, thus facilitating the transfer of the heat from the elements to the utensil, permitting higher watt density in the elements, and resulting in substantially increased cooking speed.

From the foregoing it will be understood by those skilled in the art that the illustrated embodiment of my invention provides a new and improved electric heating element and method of making the same, and a new and improved heating unit, and therefore accomplishes at least the principal object of my invention, and also it will be understood that the particular embodiment of my invention herein shown and described is illustrative only, and that various changes and modifications may be made, within the scope of my invention, and accordingly that my invention is not limited to the particular illustrated embodiment.

Wherefore I claim:

1. A tubular sheathed embedded-resistor electric heating element having an active section comprising a tubular sheath formed to a cross-section consisting substantially of two wall sections disposed in approximately V-relation and having their adjacent edges closed to each other and a complementary wall section generally inverted channel shape in cross-section and having its base extending laterally beyond the separate edges of said two wall sections and its sides continued inwardly and respectively closed to said separate edges, resistor means disposed in said sheath, and compacted granular refractory material disposed in said sheath embedding said resistor means and serving to electrically insulate said resistor means and to conduct the heat from said resistor means to said sheath.

2. A tubular sheathed embedded-resistor electric heating element having a curvilinear active section comprising a tubular sheath formed to a cross-section consisting substantially of two wall sections disposed in approximately V-relation and having their adjacent edges closed to each other and a complementary wall section generally inverted channel shape in cross-section having its base portion extending laterally beyond the separate edges of said two wall sections and its side portions continued inwardly and respectively closed to said separate edges, resistor means dis-

posed in said sheath, and compacted granular refractory material disposed in said sheath embedding said resistor means and serving to electrically insulate said resistor means and to conduct the heat from said resistor means to said sheath.

3. A tubular sheathed embedded-resistor electric heating element having a curvilinear active section disposed in a formation defining a surface and comprising a tubular sheath formed to a cross-section consisting substantially of two wall sections disposed in approximately V-relation and having their adjacent edges closed to each other and a complementary wall section generally inverted channel shape in cross-section having its base extending laterally beyond the separate edges of said two wall sections and disposed substantially in said surface and its sides continued inwardly and respectively closed to said separate edges, resistor means disposed in said sheath, and compacted granular refractory material disposed in said sheath embedding said resistor means and serving to electrically insulate said resistor means and to conduct the heat from said resistor means to said sheath.

4. A tubular sheathed embedded-resistor electric heating element having a curvilinear active section disposed in a formation defining a plane and comprising a tubular sheath formed to a cross-section consisting substantially of two wall sections disposed in approximately V-relation and having their adjacent edges closed to each other and a complementary wall section generally inverted channel shape in cross-section having its base extending laterally beyond the separate edges of said two wall sections and disposed substantially in said plane and its sides continued inwardly and respectively closed to said separate edges, resistor means disposed in said sheath, and compacted granular refractory material disposed in said sheath embedding said resistor means and serving to electrically insulate said resistor means and to conduct the heat from said resistor means to said sheath.

5. A tubular sheathed embedded-resistor electric heating element having a curvilinear active section disposed in a formation defining a surface and comprising a tubular sheath formed to a cross-section consisting substantially of two wall sections disposed in approximately V-relation and having their adjacent edges closed to each other and a complementary wall section generally inverted channel shape in cross-section having its base extending laterally beyond the separate edges of said two wall sections and disposed substantially in said surface and its sides continued inwardly and respectively closed to said separate edges, resistor means disposed in said sheath, and compacted granular refractory material disposed in said sheath embedding said resistor means and serving to electrically insulate said resistor means and to conduct the heat from said resistor means to said sheath, said element comprising also terminal portions, and said terminal portions each extending away from said surface.

6. A tubular sheathed embedded-resistor electric heating element having a curvilinear active section disposed in a formation defining a plane and comprising a tubular sheath formed to a cross-section consisting substantially of two wall sections disposed in approximately V-relation and having their adjacent edges closed to each other and a complementary wall section generally inverted channel shape in cross-section having its base extending laterally beyond the separ-

ate edges of said two wall sections and disposed substantially in said plane and its sides continued inwardly and respectively closed to said separate edges, resistor means disposed in said sheath, and compacted granular refractory material disposed in said sheath embedding said resistor means and serving to electrically insulate said resistor means and to conduct the heat from said resistor means to said sheath, said element comprising also terminal portions, and said terminal portions each extending away from said plane.

7. An electric heating unit comprising supporting means and a tubular sheathed embedded resistor electric heating element carried by said supporting means, said element having a curvilinear active section disposed in a formation defining a surface and comprising a tubular sheath formed to a cross-section consisting substantially of two wall sections disposed in approximately V-relation and having their adjacent edges closed to each other and a complementary wall section generally inverted channel shape in cross-section having its base extending laterally beyond the separate edges of said two wall sections and disposed substantially in said surface and its side portions continued inwardly and respectively closed to said separate edges, resistor means disposed in said sheath, and compacted granular refractory material disposed in said sheath embedding said resistor means and serving to electrically insulate said resistor means and to conduct the heat from said resistor means to said sheath.

35 to said sheath.

3 A electric heating unit comprising supporting means and a tubular sheathed embedded resistor electric heating element carried by said supporting means, said element having a curvilinear active section disposed in a formation defining a plane and comprising a tubular sheath formed to a cross-section consisting substantially of two wall sections disposed in approximately V-relation and having their adjacent edges closed to each other and a complementary wall 40 section generally inverted channel shape in cross-section having its base extending laterally beyond the separate edges of said two wall sections and disposed substantially in said plane and its sides continued inwardly and respectively 45 closed to said separate edges, resistor means disposed in said sheath, and compacted granular refractory material disposed in said sheath embedding said resistor means and serving to electrically insulate said resistor means and to conduct the heat from said resistor means to said 50 sheath.

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sheath.

9. An electric heating unit comprising supporting means and a tubular sheathed embedded-resistor electric heating element carried by said supporting means, said element having a curvilinear active section disposed in a formation defining a surface and comprising a tubular sheath formed to a cross-section consisting substantially of two wall sections disposed in approximately V-relation and having their adjacent edges closed to each other and a complementary wall section generally inverted channel shape in cross-section having its base extending laterally beyond the separate edges of said two wall sections and disposed substantially in said surface and its sides continued inwardly and respectively closed to said separate edges, resistor means disposed in said sheath, and compacted granular refractory material disposed in said sheath embedding said resistor means and

serving to electrically insulate said resistor means and to conduct the heat from said resistor means to said sheath, said element comprising also terminal portions, and said terminal portions each extending away from said surface.

10. An electric heating unit comprising supporting means and a tubular sheathed embedded-resistor electric heating element carried by said supporting means, said element having a curvilinear active section disposed in a formation defining a plane and comprising a tubular sheath formed to a cross-section consisting substantially of two wall sections disposed in approximately V-relation and having their adjacent edges closed to each other and a complementary wall section generally inverted channel shape in cross-section having its base extending laterally beyond the separate edges of said two wall sections and disposed substantially in said plane and its sides continued inwardly and respectively closed to said separate edges, resistor means disposed in said sheath, and compacted granular refractory material disposed in said sheath embedding said resistor means and to conduct the heat from said resistor means to said sheath, said element comprising also terminal portions, and said terminal portions each extending away from said plane.

11. The process of making a tubular sheathed embedded-resistor electric heating element having an active section in which the refractory is highly compacted, which comprises constructing said element and then pressing said active section between a grooved die and a complementary die and forcing the sheath to flow laterally beyond the edges of the grooving forming said active section to a cross-section corresponding to the die cavity but comprising lateral extensions extending the surface of the sheath.

ALBERT P. WIEGAND.

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