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L. REICHOLD

2,432,800

HEATING ELEMENT AND METHOD OF MAKING SAME

Filed March 2, 1946

Fig. 1.

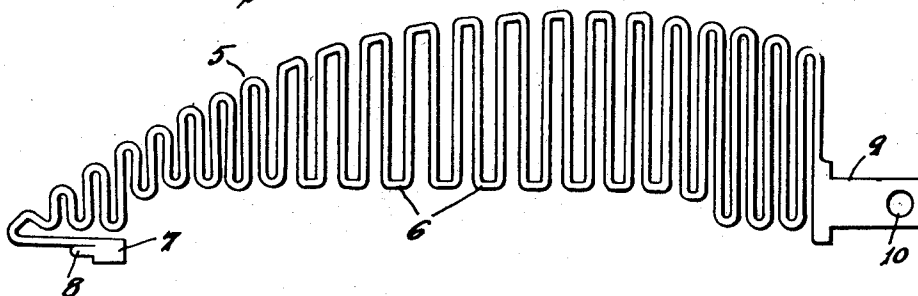


Fig. 2.

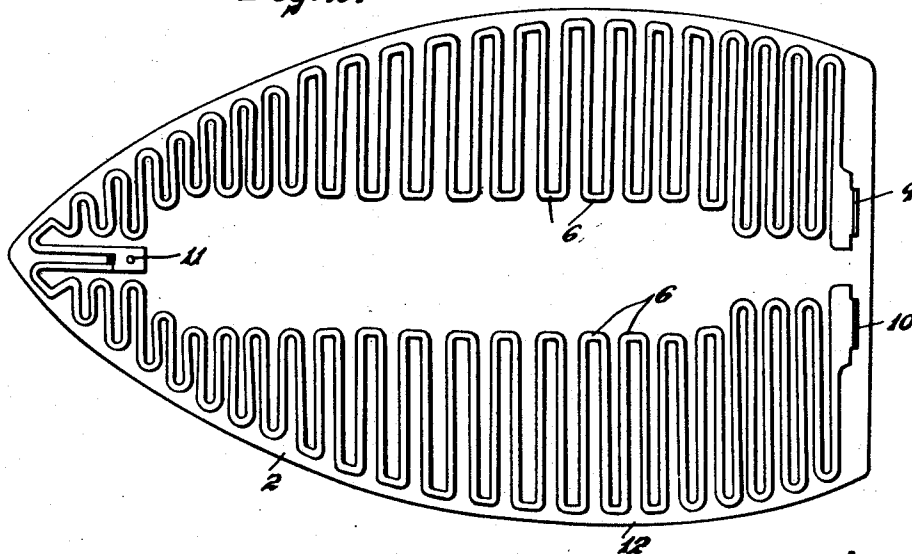


Fig. 3.

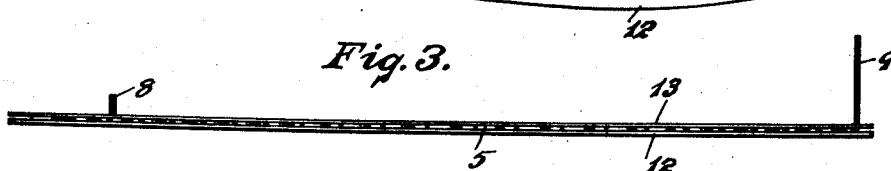
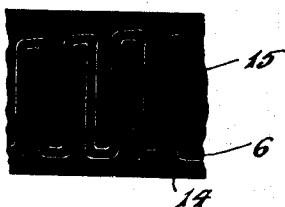


Fig. 4.



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HEATING ELEMENT AND METHOD OF
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3 Claims. (Cl. 201—69)

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This invention relates to heating elements and method of making same and more particularly to a heating element such as used in flat form for such electrical appliances as pressing irons, waffle irons, and the like.

An object of this invention is to provide a heating element which is exceedingly thin and in which the resistance is so constructed that it can be produced in halves and then electrically connected.

A further object of the invention is to provide such a heating element having novel means for positioning the resistance between two sheets of non-conducted material.

A still further object is to provide a novel process for producing such heating elements.

Further objects and advantages of this invention will be more clearly understood from the following description and from the accompanying drawings in which:

Fig. 1 is an elevational plan view showing one-half of a heating element resistance embodying my invention.

Fig. 2 is a similar view showing two of the halves connected and mounted upon a supporting plate.

Fig. 3 is an elevational edge view of a complete heating element.

Fig. 4 is an elevational plan view illustrating the process of producing said heating element.

As shown in the drawings, the numeral 5 denotes a heating element section comprising one-half of a complete heating element resistance. This section is constructed of a sheet of thin metallic material, such as used for electrical resistances, and with a series of flat loops 6 which are spaced in accordance with the desired distribution of heat over a surface to be heated. For the purpose of economy in manufacturing, the said section is made to provide only one-half of a heating element resistance since the material from which said elements are made is rather expensive and producing the resistance in halves will permit a considerable saving by reducing waste to a minimum.

Each of said halves are produced in exactly the same form and, in order to insure a safe and durable electric connection between the two halves of the resistance, there is provided an offset end 7 which is wider than the resistance portion of the element and has a tongue 8 for a purpose to be hereinafter described. At the opposite end of the resistance, there is provided an extension 9 having a hole 10 therein to receive

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an electrical connection such as a binding screw or the like.

In assembling the heating element, two halves 5 are placed in opposed positions with the ends 7 of each half overlapping the end of the other half. The said ends are then spot welded together, as indicated at 11, to provide a positive electrical connection.

The resistance provided by the two connected halves is then mounted between a lower plate 12 and an upper plate 13 of insulating material such as mica. To position the said resistance against displacement between the said plates, the tongues 8 and the extensions 9 are bent vertically and inverted through relatively disposed slots in the upper plate 13. Thus my improved heating element is produced with the use of only two plates 12 and 13 since the usual core, on which resistance wire is commonly wound, is eliminated by my novel construction of the resistance. The said resistance is retained in position without the use of rivets, or the like, as have heretofore commonly been used for retaining the core in position between the two outer plates.

My present invention also comprises a novel method for producing the said resistance out of a flat sheet of metallic material of such as Nichrome, or other suitable electrical resistance material. In the said process, a strip 14 of the material, wide enough to produce one-half of the heating element resistance, is printed on both sides with a suitable masking material 15, such as indicated in black in Fig. 4. This masking material is applied so as to leave exposed fine lines defining the contour of the resistance section to be produced. The said strip is then immersed in a bath of etching acid, such as nitric acid or the like, whereupon the acid will eat through the metallic on the said exposed lines and thus separate the finished resistance section from the remaining material. The process is somewhat similar to the ordinary etching process but herein it is permitted to consume through the entire thickness of the material on the exposed lines so as to leave an electrical resistance section which is accurate in size for uniform resistance throughout the length of the coils and also as accurate in every other respect as can be produced with commonly known methods of cutting the material in a suitable die which, in producing sections such as herein described, would be very difficult as well as expensive since the particular shape desired would be hard to produce in a cutting die.

It will be understood therefore that my in-

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vention provides a novel resistance for heating elements as well as a process for producing the same.

I claim:

1. The process for producing an electrical resistance member of the character described from a sheet of resistance material, wherein the said sheet is treated with a masking material and immersed in an etching acid to thereby separate a finished resistance member from the sheet.

2. The process of producing an electrical resistance member of the character described wherein the resistance is produced by etching through a sheet of metallic resistance material to separate said sheet on lines defining said resistance member.

3. An electrical heating element resistance

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member of the character described comprising a flat coil having a plurality of loops and produced from a flat sheet of metallic resistance material by separating said member from the remainder of the sheet with an etching acid.

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REFERENCES CITED

The following references are of record in the file of this patent:

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