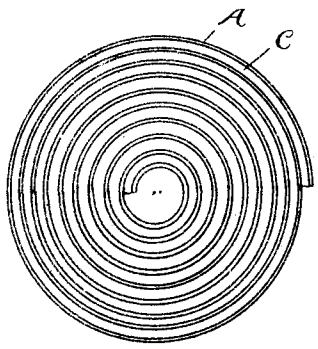
R. W. DAVENPORT.

METHOD OF FORMING ELECTRICAL HEAT UNITS.

APPLICATION FILED APR. 8, 1915.

1,219,629. Patented Mar. 20, 1917.

Fig. 1.



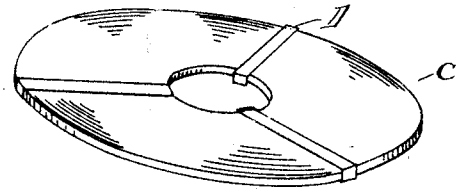


Fig. 2.

Fig. 3.

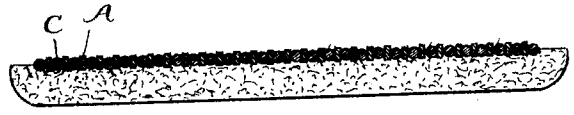


Fig. 4.

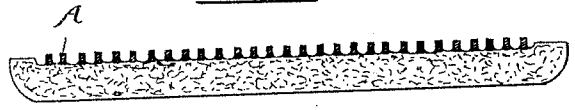
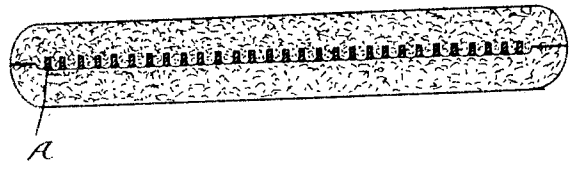


Fig. 5.



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UNITED STATES PATENT OFFICE.

RANSOM W. DAVENPORT, OF DETROIT, MICHIGAN, ASSIGNOR TO DETROIT STOVE WORKS OF DETROIT, MICHIGAN, A CORPORATION OF MICHIGAN.

METHOD OF FORMING ELECTRICAL HEAT UNITS.

1,219,629. Specification of Letters Patent. Patented Mar. 20, 1917.

Original application filed February 13, 1914, Serial No. 818,469. Divided and this application filed April 8, 1915. Serial No. 20,011.

To all whom it may concern:

Be it known that I, RANSOM W. DAVENPORT, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Methods of Forming Electrical Heating Units, of which the following is a specification, reference being had therein to the accompanying drawings

The invention relates to the method of forming electrical heating units of the embedded resistor type, and it is the object of the invention to facilitate the embedding of the resistor, and also to obtain a construction in which there is good thermal conduction from the resistor on one side and thermal insulation upon the opposite side. It is a further object to obtain a construction in which the convolutions of the resistor are but slightly separated from each other, to concentrate the heat development without any danger of short circuiting between convolutions.

An electrical heating unit of the embedded resistor type is disclosed in my earlier application, Serial No. 818,469, filed Feb. 13, 1914, the present application being a division thereof.

In the drawings:

Figure 1 is an elevation showing the method of coiling the resistor;

Fig. 2 is a perspective view of the coiled resistor;

Fig. 3 is a section showing the manner of engaging the resistor with the heat-insulating body;

Fig. 4 is a similar view showing the spacing member removed; and

Fig. 5 is a cross section through the completed unit.

In the first step of my improved method of forming heating units, the resistor A, which is preferably in the form of a flat ribbon, is placed adjacent to a destructible strip or ribbon C, such as string, cord, twine, etc., and is then bent or fashioned to have adjacent contacting portions. As specifically shown in Fig. 1, the bending is in a volute form, the convolutions of the resistor being separated by the parallel convolutions of the destructible strip. After the coiling the convolutions are held from separation by suitable means such as binding strips D, and are preferably dipped in some adhesive, such as shellac.

The second step is the covering of the coil with a plastic material, which is preferably a material of relatively low thermal conductivity, an example of this material being infusorial silica with clay added for plasticity. The destructible strip is preferably slightly less in width than the resistor, and therefore the plastic material will slightly enter in between the resistor convolutions to obtain a binding effect thereon.

The third step is the removal of the destructible strip, preferably by combustion, after which the ashes are cleared away, preferably by blowing. This leaves the spaced convolutions of the resistor, which are held by the slight embedding of their edges in the insulating material.

The next step is in filling the interstices or spaces between the resistor convolutions with a plastic material of relatively good thermal conductivity, an example of this material being calcined bauxite or aluminum oxid with clay added for plasticity, and the material is extended a sufficient depth to form the heat distributing body.

The unit when completed as described will have the maximum portion of the surface of the resistor convolutions in contact with a good heat-conducting material, which will rapidly conduct the heat into the distributing body. At the same time the heat insulating body, which is upon the opposite side of the resistor, will prevent loss of heat in this direction, and as both of the bodies are united to each other, the resistor will be completely embedded and thoroughly insulated electrically.

The destructible spacer strip which is wound between the resistor convolutions is preferably a round cord, which will leave sufficient space at the edge of the resistor for binding engagement of the plastic material.

What I claim as my invention is:—

1. The method of forming electrical heating elements, comprising the placing of a resistor strip and a strip formed of destructible material adjacent to each other, bending said strips to form adjacent contacting portions, placing plastic material on one side in binding contact with the resistor, and destroying the destructible element.

2. The method of forming electrical heating elements, comprising the placing of a resistor ribbon and a destructible strip in parallelism, bending said parallel strips to form contacting adjacent portions, covering an area, placing plastic material of an electrically insulating character on one side in binding contact with the edges of the resistor, and destroying the destructible strip.

3. The method of forming electrical heating elements, comprising coiling an electrical resistor and a parallel spacing strip to cover an area, placing plastic material on one side of said area into binding contact with the edge of the resistor, and removing the spacing strip.

4. The method of forming electrical heating elements, comprising winding together into a volute coil a length of resistor and an adjacent length of destructible strip, cementing a plate of insulating material to one face of said volute coil in binding contact with the edge of the resistor, and in burning out said destructible strip.

5. The method of forming electrical heating elements, comprising winding together a resistor and a parallel destructible spacer strip to form a close coil, cementing a plate of insulating material upon one side of said coil, destroying the spacer strip and removing the same, and filling the spaces vacated by said destructible strip with an electrically insulating refractory material.

6. The method of forming electrical heating elements, comprising the winding together of a resistor ribbon and a destructible spacer strip to form a close coil, cementing a plastic material of low thermal conductivity upon one side of said coil, destroying said spacing strip, and placing a plastic material of relatively high thermal conductivity upon the opposite side of the coil and filling the interstices between the convolutions.

7. The method of forming electrical heating elements, comprising the winding of a resistor and a destructible spacing strip into a volute coil, coating one side of this coil with a plastic material, destroying the spacing strip and removing the same from the convolutions of the resistor, and coating the opposite side of said resistor with a plastic material.

8. The method of forming electrical heating units, comprising the winding of a resistor element and a parallel destructible spacing strip into a volute coil, binding the convolutions together to temporarily hold the same in fixed relation, placing a plastic material on one side of the coil and forcing the same sufficiently into engagement with the convolutions of the resistor to bind the same in fixed relation, destroying the spacing strip and removing the same from between the resistor convolutions, and filling the space between said convolutions and upon the opposite face of the coil with a plastic material.

9. The method of forming electrical heating elements, comprising the winding of a resistor ribbon and a parallel strip of destructible material into a volute coil, coating one side of said coil with a plastic material of low thermo-conductivity and forcing the same sufficiently in engagement with the convolutions of the resistor to bind the same, destroying the spacing strip and removing it from between the resistor convolutions, and filling the space between said convolutions and upon the opposite side of the coil with a plastic material of relatively high thermo-conductivity.

10. The method of forming electrical heating elements, comprising the winding of a resistor and a spacing strip into a volute coil, coating one side of this coil with a plastic material, removing the strip from between the convolutions of the resistor, and filling the interstices between the convolutions with an electrical-insulating, heat-conducting material.

In testimony whereof I [illegible] my signature in presence of two witnesses.

RANSOM W. DAVENPORT.

Witnesses:
WM. J. BELKNAP,
JAMES P. BARRY.