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ALUMINUM SHEATHED HEATING ELEMENTS
IN ALUMINUM DIE CASTINGS
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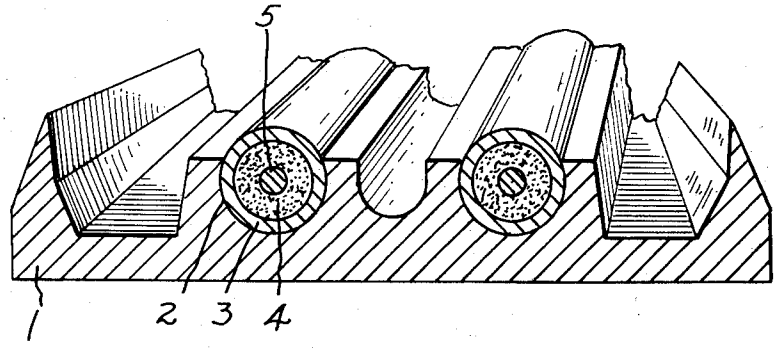

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ALUMINUM SHEATHED HEATING ELEMENTS IN ALUMINUM DIE CASTINGS

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1 Claim. (Cl. 219—34)

This invention relates as indicated to aluminum sheathed heating elements in aluminum die castings and more particularly to a method of producing the same.

Two types of heating units are used in conjunction with electrical appliances. The open coil or exposed heating unit and the sheathed heating unit. The present invention is concerned with the sheathed heating units in which the sheathing material is aluminum.

Various kinds of electrically heated appliances such as flat iron sole plates, fry pans, percolators, have been and are presently being made by die casting of aluminum.

The prior art die cast aluminum appliances are made with sheathed heating elements, which sheathing comprises various types of steel alloys. These steel sheathed heating elements have many objectionable drawbacks, such as, they are not corrosion resistant, they have a different specific heat than the surrounding aluminum thus are slow in heating up the appliance and they give uneven heat distribution.

It is therefore the principal object of the present invention to provide an electrically heated appliance with a heating element which overcomes the above discussed objections.

Other objects will become apparent as the description proceeds.

To the accomplishments of the foregoing and related ends, the invention then comprises the features hereinafter fully described and particularly pointed out in the claim, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

In said annexed drawing:

The single figure is a cross-sectional isometric view through a flat iron sole plate showing an aluminum sheathed heating element embedded therein.

Referring more specifically to the drawing, sole plate 1 is a light-weight aluminum die casting, having embedded therein aluminum sheathed heating element 2. Heating element 2 comprises tubular aluminum sheath 3 having therein a resistance 5 surrounded by a heat conductive and insulating material 4. The insulating material used comprises those inorganic refractory compositions well known to those skilled in the art which at elevated temperatures serve both to electrically insulate the heating element from the surrounding sheath and to conduct the heat to the sheath. Such materials as magnesium oxide, titanium oxide, the spinels, etc. are examples of typical substances used for this purpose.

Those skilled in the art will readily recognize several outstanding features in the sole plate illustrated in the

figure. First, it will be seen that while heating element 2 is embedded in sole plate 1 it is not completely covered by the casting. In prior art appliances it is necessary to cover the heating element with aluminum during the die casting process. Since the sheath of prior art heating elements lack corrosion resistance they must be covered with the aluminum metal for protection. Secondly, since the sheath of the present heating element is aluminum it has substantially the same specific heat as the surrounding sole plate; thus resulting in an appliance having a more even distribution of heat and quicker heat up ability. Third, since it is possible to leave the heating element exposed the die castings can be made thinner and thus be much lighter in weight.

In order to successfully practice my invention it is necessary to cast the molten aluminum around the heating element without melting the aluminum sheathing of the heating element. This can be accomplished by injecting the molten aluminum into the die under the following conditions:

A. A holding or die closure time of 6–15 seconds;
B. Melt temperature range between 1150° F. and 1300° F; and
C. Plunger pressure from 2800 to 4800 p.s.i.

While the annexed drawing and above description describes a flat iron sole plate the present invention is applicable to other appliances, such as, electric percolators, electric fry pans, electric waffle irons, electric deep fryers, etc.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in the following claim or the equivalent of such be employed.

I, therefore, particularly point out and distinctly claim as my invention:

In electrical heating device comprising, an electrical resistance element, a tubular aluminum sheath surrounding said resistance element in spaced concentric relation therefrom, and electrical insulating and heat conducting material filling the space between said element and said sheath, and an aluminum heat transmitting body having a portion cast in continuous intimate engagement with a pre-determined circumferential portion of said tubular sheath, said circumferential portion being greater than 180° of the circumferential dimension of said sheath, the remaining circumferential portion of said sheath remaining exposed.

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