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2,553,875

ELECTRIC HEATING ELEMENT

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9 Claims. (Cl. 201-74)

1

This invention relates to improvements in electric heating elements and more particularly to heating elements of the type wherein the major portion of the heat is emitted by radiation.

In my prior Patents Nos. 2,217,296, issued October 8, 1940, and 2,265,549, issued December 9, 1941, is disclosed the use of heating elements formed of thin, light weight metal which is substantially U-shaped in cross-section. One of the problems in connection with such an element is to provide satisfactory support against sagging or lateral displacement. In Patent No. 2,217,296, the element is arranged in helical form and there are helical supports of insulating material co-operable between the edge flanges of the element to support the turns from one another, and to provide for support of the element in spaced relationship with respect to an inclosing housing. In Patent No. 2,265,549, another form of helical insulating support is disclosed and there is also disclosed means for supporting elongated parallel elements by means of a relatively complicated arrangement of porcelain insulator segments. While these constructions are entirely satisfactory for the purpose, nevertheless, because of the expense of the constructions, they are suitable mainly for commercial purposes and are not entirely practical for use in household heaters because they are relatively unattractive and cannot be produced at a sufficiently low cost to form a part of a highly competitive item.

It is a general object of the present invention to provide an improved electric heating element for use more particularly in household radiant heaters, in paint drying heaters, and in infrared heaters, the said element being so constructed that it can be produced inexpensively and having advantages over other heating elements now available for similar purposes.

Such heating elements as are now available are usually exposed to allow for free radiation. Thus, they cannot be protected from accidental contact by the hand or by metal, or by splashing water, such as might result in an electric shock. There are, of course, heaters such as those used for infra-red heating purposes which are in the form of an enclosed lamp utilizing a filament type of heating element having a relatively small area and carrying a high temperature. The heating capacity of this type of lamp is, however, limited as is the life of the filament.

It is therefore one of the principal objects of the present invention to provide a radiant heating element wherein the electric conductor or element proper is enclosed in glass or other transparent material, the element having high capacity, large radiating area, and long life, and being

2

capable of providing a penetrating heat while the element proper is fully shielded from direct contact so as to be safe in the presence of children.

A further object of the invention is to provide an electric heating element as above described, wherein the element is formed of thin, lightweight metal and is provided with at least one edge flange, the element being so arranged in a transparent heat resisting tube as to provide an attractive, visible unit, the element being so constructed and arranged that the amount of contact with the glass which is necessary to provide for proper support is kept to a minimum whereby major surface portions of the element are maintained in spaced position from the glass to prevent local overheating of the latter and to provide for quick heating of the element.

A further object of the invention is to provide a radiant heater wherein the elements heat up and cool off quickly and economically because of the relatively small cross-section in relation to surface areas as compared with a conventional wire-heating element, and because there is no continuous porcelain core.

A further object of the invention is to provide a heating element, including a casing in the form of heat resistant glass, wherein the latter is part of the source of radiant heat.

A further object of the invention is to provide a heating element comprising a tube of glass or the like having novel means in the form of caps co-operable with the ends of the tube for supporting the heating element proper therein.

A further object is to provide as one form of the invention, an arrangement of a plurality of approximately straight, elongated, heating-element-forming conductors, said conductors having at least one edge flange and being supported in a novel manner to extend longitudinally within a heat resistant glass tube and provide an arrangement which is particularly suitable when the element is to be disposed vertically. This type of construction eliminates difficulties which might be encountered as a result of the sagging of the turns of a helical element when the latter is enclosed in a vertical tube.

A more specific object of the invention is to provide an electric heating element of the class described including a tube of heat resistant transparent material, there being a conductor within the tube in the form of a ribbon of thin metal having a flange on at least one edge, at least part of said flange projecting toward the inner surface of the tube whereby major surface portions are spaced a substantial distance from the surface of the tube.

A further object of the invention is to provide