Sept. 2, 1924. 1,507,142

J. SCHOENFELD

ELECTRIC HEATER

Filed Aug. 1, 1922

Fig. 1.

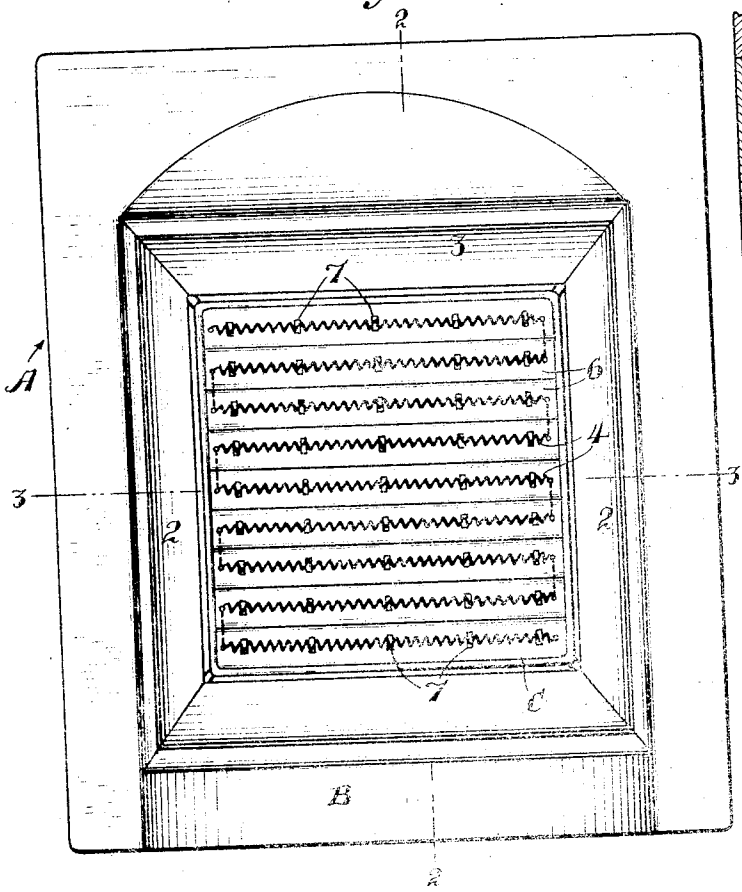


Fig. 2.

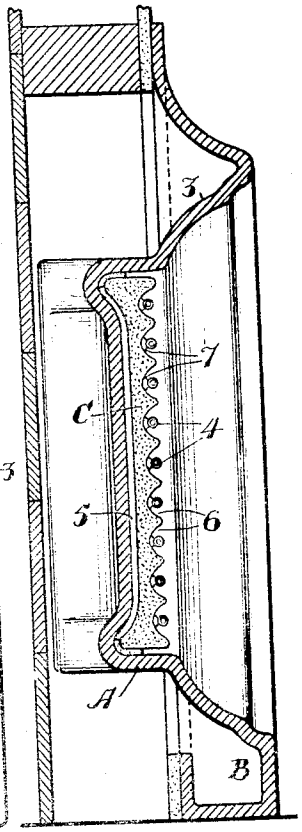
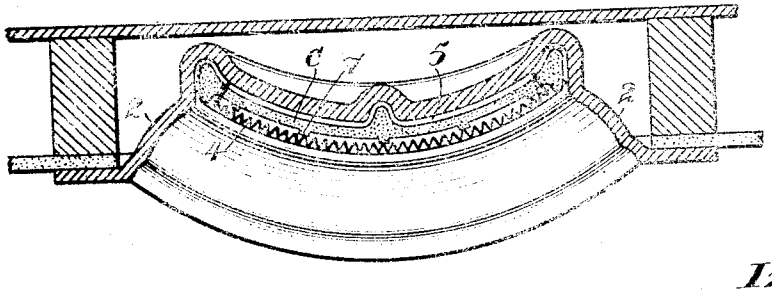


Fig. 3.



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JOSEPH SCHOENFELD, OF SAN FRANCISCO, CALIFORNIA.

ELECTRIC HEATER.

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To all whom it may concern:

Be it known that I, JOSEPH SCHOENFELD, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Electric Heaters, of which the following is a specification.

This invention relates to an electric heater and especially to the radiant or reflecting type of heater.

Electric heaters in general use today can for practical purposes be grouped into two classes, first that class in which the heat is transmitted by convection and direct radiation, and secondly that class in which the heat is transmitted by reflection and direct radiation. Both types have their advantages and also their objections. For instance the first class mentioned permits low temperature variation of the heating elements which eliminates fire hazard. They are also adapted for the maintenance of even and constant temperatures when in operation and are usually provided with large heating areas which permit spreading and uniform heating of a room. The main objections are low efficiency when current consumption is considered and lack of ability to rapidly heat where a quick heat is desired, for instance bathrooms, bedrooms, etc. The second class mentioned, or in other words the reflector type, is more efficient when current consumption is considered and they are furthermore advantageous as they permit rapid heating. This is due to the fact that the heating elements almost instantly reach a maximum temperature. The main objection to this type of heater is that the heat rays provided are too concentrated and for this reason only heat a small portion of a room.

The electric heater forming the subject matter of the present application combines the advantages of both types referred to; the object being to generally improved and simplify electric heaters; to provide a heater which transmits heat both by convection, reflection and direct radiation; a heater which may be provided with large heating areas, and which permits low temperature operation; a heater adapted to fan out, or in other ways uniformly spread the heat rays projected, and further a heater in which heat losses by conduction are reduced to a minimum.

One form which my invention may assume is exemplified in the following description and illustrated in the accompanying drawings, in which—

Fig. 1 is a front view of the heater.

Fig. 2 is a central, vertical, longitudinal section taken on line 2—2, Fig. 1.

Fig. 3 is a cross section taken on line 3—3, Fig. 1.

Referring to the drawings in detail, A indicates the main frame, constructed of any suitable material. This frame consists of a base section B, side sections 2, and a top section 3. The rear faces presented by the base, side and top sections are flush and as such permit the heater as a whole to be set directly against a flat surface, such for instance as the inside partition or wall of a building as illustrated in Fig. 2. The frame proper may be ornamented in any manner desired and is preferably constructed of material which is a poor conductor of heat as one of the features of the present invention is to reduce heat losses by conduction to a minimum. The resistance or heating elements employed in the present instance may be of any suitable construction, but for practical purposes of illustration are indicated by helically wound nichrome wire coils as shown at 4. The coils are supported by a plate generally indicated at C, and this plate is square in outline as shown and presents a curved exterior surface, which surface is provided with a series of parallel horizontally positioned grooves. These grooves present a parabolic curve in cross section, and the faces of the grooves are preferably polished or otherwise prepared to produce reflecting surfaces, the function of which will hereinafter be described.

The plate proper may be constructed of any suitable material, but this material should be a poor conductor of heat as heat losses by conduction are thereby prevented and the general curved efficiency of the heater thereby increased. To further prevent losses by conduction a dead air space is maintained between the plate and the

main frame as indicated at 5 and as the main frame is also constructed of a substantially speaking, non-conducting material, it can readily be seen that such losses will be reduced to a minimum.

The grooves indicated at 6 extend across the entire face of the plate and the heating elements extend from end to end of the respective grooves. They are here maintained in the focal center of the parabolic grooves and are so maintained by a series of supports such as indicated at 7. No contact between the plate and the heating elements is thus permitted, except that caused by the small areas produced by the supports 7, and as the combined area of these supports is merely a fraction of the whole area presented, and as the supports are constructed of the same material as the plate and in fact cast integral therewith, it can readily be seen that conduction losses through the supports will be very small.

In actual operation it can readily be seen that the heating elements may be connected in series, parallel or otherwise, and that the heat produced by the current flow through the heating elements is liberated, first by direct radiation, secondly by reflection from the elongated parabolic surfaces presented, and third by convection as air will naturally rise from the floor of the room upwardly past the heating elements and will in this manner be kept in constant circulation. The heat liberated by direct radiation is radiated forwardly in all directions and the heat projected by the reflectors is projected horizontally and is spread out fan fashion due to the curved formation of the plate and the parabolic grooves formed therein. The heat is thus thrown over a large area and uniform heating of the room will take place. A large heating area is presented, low temperature operation is permitted and fire hazard is thus prevented. Current efficiency is brought to its maximum due to the manner of liberating and projecting the heat and also due to the fact that conduction losses of heat are reduced to a minimum. An electric heater is in this manner produced which is particularly suitable for the heating of rooms and the like, but it is also obvious that the plate proper and the heating elements employed may be used in an ordinary electric range or bake oven, and that the arrangement of the grooves and elements may be changed accordingly. The main feature to be maintained is the arrangement of the elongated grooves, which join each other and which are not subjected to the direct heat of the elements as the elements are maintained out of contact therewith.

While certain features of the present invention are more or less specifically illustrated, I wish it understood that various changes in form and proportion may be resorted to within the scope of the appended claims, similarly that the materials and finish of the several parts employed may be such as the experience and judgment of the manufacturer may dictate or various uses may demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is—

1. In a heater of the character described an electric resistance heating element support comprising a plate constructed of material which has poor heat conducting qualities, an elongated groove formed in the plate, said groove in cross section presenting a parabolic curve, and a resistance element disposed in the focal center of the parabolic curve and extending substantially from end to end of the groove.

2. In a heater of the character described an electric resistance heating element support comprising a plate constructed of material which has poor heat conducting qualities, an elongated groove formed in the plate, said groove in cross section presenting a parabolic curve, a resistance element disposed in the focal center of the parabolic curve and extending substantially from end to end of the groove, and means for supporting the resistance element in the focal center and out of contact with the plate.

3. In a heater of the character described an electric resistance heating element support comprising a plate constructed of material which has poor heat conducting qualities, an elongated groove formed in the plate, said groove in cross section presenting a parabolic curve, a resistance element disposed in the focal center of the parabolic curve and extending substantially from end to end of the groove, and a plurality of supporting members disposed in the groove and maintaining the resistance element in the focal center of the parabola.

4. In a heater of the character described an electric resistance heating element support comprising a plate constructed of material which is a poor conductor of heat, an elongated groove formed in the face of the plate, said groove in cross section presenting a parabolic curve and the entire surface of the groove forming an elongated reflecting surface, and a heating element extending from end to end of the groove and disposed in the focal center of the elongated parabola.

5. In a heater of the character described an electric resistance heating element support comprising a plate constructed of material which is a poor conductor of heat, a series of elongated parallel grooves formed in the face of the plate, said grooves being polished to form reflecting faces, said grooves in cross section presenting parabolic curves, a heating element extending from

end to end of each groove, and means for supporting each heating element in the focal center of each groove.

6. In a heater of the character described an electric resistance heating element support comprising a plate constructed of material which is a poor conductor of heat, said plate presenting a curved exterior surface, a series of parallel grooves formed in said curved exterior surface, said grooves being horizontally disposed and having a cross section which presents a parabolic curve, and a heating element extending from end to end of each groove and disposed in the focal center of each parabola.

7. In a heater of the character described an electric resistance heating element support comprising a plate like member, said plate presenting a curved exterior surface, a series of parallel grooves formed in the exterior surface of said plate, said grooves having a cross section which presents a parabolic curve and a heating element extending from end to end of each groove and disposed in the focal center of the parabolic curves.

8. In a heater of the character described a reflecting member presenting a curved exterior surface, said reflecting member being also curved at right angles to its longitudinal axis to form a parabola, and a heating element disposed in the focal center of the parabola.

9. In a heater of the character described an elongated parabolic reflector, a heating element extending substantially from end to end thereof, and said elongated parabolic reflector being bent on the line of its longitudinal axis to present a curved surface.

10. In a heater of the character described, an elongated reflector, said reflector presenting a parabolic curve in cross-section and a heating element extending substantially from end to end thereof, said element being disposed in the focal center of the parabolic curve.

11. In a heater of the character described, an electric resistance heating element support comprising a plate-like member, said plate presenting a curved exterior surface, a series of parallel grooves formed in the exterior surface of said plate, and a heating element disposed in each groove and extending substantially from end to end thereof.

JOSEPH SCHOENFELD.