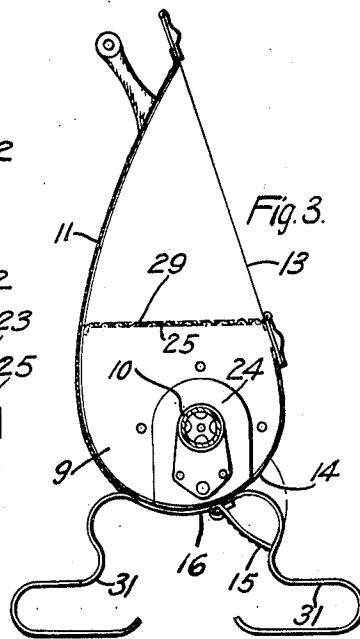
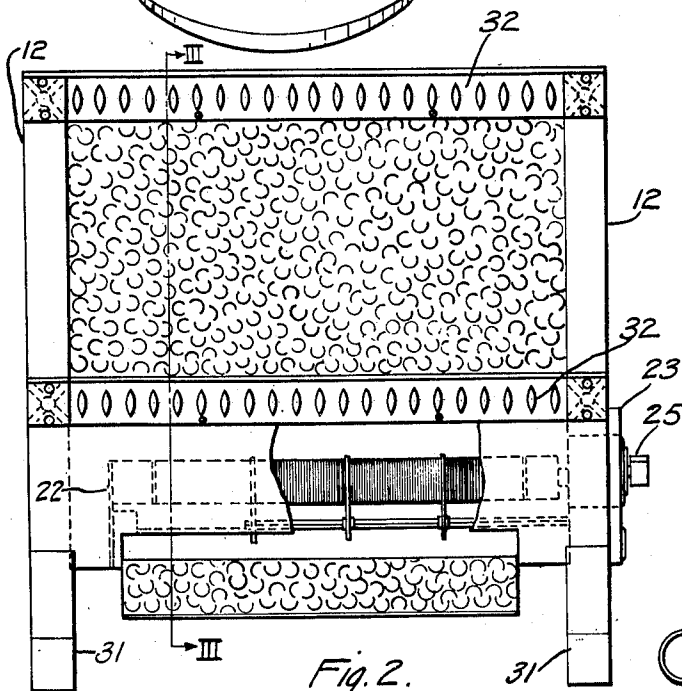
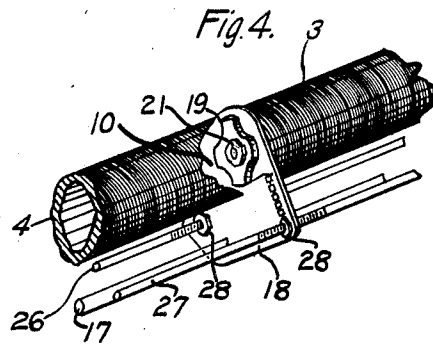
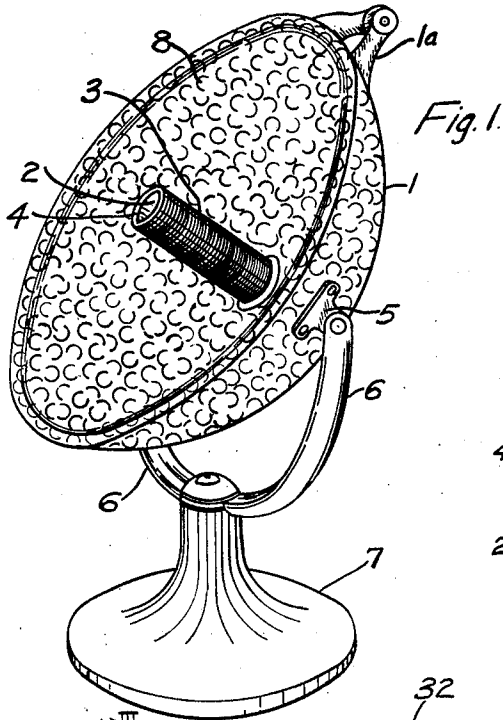


Sept. 15, 1925.

1,553,392

J. A. ORANGE  
RADIANT AIR HEATER  
Filed Aug. 28, 1922



WITNESSES:

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1,553,392

# UNITED STATES PATENT OFFICE.

JOHN ARTHUR ORANGE, OF ENFIELD, ENGLAND, ASSIGNOR TO METROPOLITAN-VICKERS ELECTRICAL COMPANY LIMITED, A BRITISH COMPANY.

## RADIANT AIR HEATER.

Application filed August 28, 1922. Serial No. 584,640.

*To all whom it may concern:*

Be it known that I, JOHN A. ORANGE, a subject of the King of Great Britain, and a resident of Enfield, in the county of Middlesex, England, have invented a new and useful Improvement in Radiant Air Heaters, of which the following is a specification.

My invention relates to electrically heated devices and particularly to radiant air heaters and it has for one of its objects to provide a radiant reflector heater that shall diffuse the heat evenly.

Another object of my invention is to provide a radiant reflector heater that shall cause a glow resembling that of a coal fire without the structure of the heating elements being conspicuous.

Another object of my invention is to provide a radiant reflector heater that shall permit of employing relatively large amounts of energy to be translated into heat.

In practising my invention, I provide a reflector constructed of reflecting material, such as polished sheet copper or copper plated steel, that has been embossed hammered, beaten or otherwise provided with relatively small elevations and indentations, corrugations or depressions, preferably, though not necessarily, irregularly disposed, such, for example, as is found in reversed repoussé work. Such indentations or depressions, which may take a variety of forms, resembling, for example, shagreen, coarse morocco leather, or the bark of a tree, serve to break up the reflecting surface as a whole into a plurality of reflectors which diffuse the heat and light evenly and prevent the heating element from being directly seen by reflection and provide a warm glow substantially resembling a glowing coal fire.

In the single sheet of drawings:

Figure 1 is a view, in perspective, of a bowl type of reflector heater embodying my invention;

Fig. 2 is a view, in front elevation, of a modification of the device embodying my invention so constructed that the heating element is not directly visible;

Fig. 3 is a view, in vertical lateral cross-section, on the line III—III of Fig. 2, and

Fig. 4 is a view, partly in perspective and partly in section, of a portion of a heating element employed in a radiator illustrated in Figs. 2 and 3.

Referring more particularly to Fig. 1, a

reflector 1, of substantially parabolic or spherical curvature is provided with an elongated heating element 2 comprising a resistor wire 3 wound upon a refractory insulating tube 4 and so arranged in the axis of the reflector at or near the focus that the heat is radiated substantially in a beam formation. The reflector 1 is provided with bearing members 5 pivotally mounted in arms 6 which are supported on a pedestal or base 7. A handle member 1a may be provided at the top and back of the reflector to permit of carrying the assembled heater. By tilting the reflector on the arms 6 the heat generated therein may be directed as required or as desired.

The reflector 1 is constructed of a suitable metallic reflecting material, such as polished sheet copper or copper plated steel, and is provided with a plurality of indentations or elevations irregularly disposed and which may be produced in the metallic sheet by embossing, hammering, beating or otherwise. The indentations or depressions 8 may have a maximum width of one-half or even three-fourths of an inch and may be made in a variety of forms resembling, for example, coarse morocco leather, shagreen or the bark of a tree. The said depressions, without substantially altering the nature of the reflector 1, as a whole, serve to break up the reflecting surface into a plurality of relatively small reflectors which diffuse the radiant heat and light evenly and prevent, also, the heating element 2 from being seen directly by reflection, the result being that a warm glow is provided which, in the case of a copper or a copper plated steel reflector, substantially resembles glowing coal.

Referring more particularly to the construction illustrated in Figs. 2 to 4, instead of a reflector of substantially parabolic or spherical curvature, the device comprises a horizontally disposed upwardly reflecting trough or half cylinder 9 within which is located a heating element 10 and which, at the back of the device, merges into a vertically disposed cylindrically curved reflecting portion 11 of greater radius than the trough portion 9 so that the entire reflector has the shape of a scroll or curved shield, as more particularly illustrated in Fig. 3 of the drawing. The surface is provided with indentations or depressions of substantially the same type as herein before de-

scribed in connection with the reflector illustrated in Fig. 1. The ends of the reflector shown in Figs. 2 and 3 are closed by vertical plain sheet reflectors 12 of smooth or unbeaten material so that a box-like structure is formed having an opening 13 of substantially rectangular shape. The front edges of the sides 12, as shown, are preferably rearwardly inclined from the vertical by an angle of substantially 30°.

The heating element 10 is located in a substantially horizontal position approximately along the axis of the cylindrical trough portion 9 of the reflector and is supported in a manner to be hereinafter described in detail. It may be noted that the heating element 10 is hidden from most points of view by the front portion of the trough 9 and that it cannot be seen by reflection owing to the indentations or depressions in the reflecting surface, a construction causing the heat from the heating element to be distributed widely and evenly through the opening 13 and at an inclination of about thirty per cent above the horizontal axis.

A slot or opening 14 is provided in the front part of the trough portion 9 to permit air to enter the radiator and to therefore ventilate the same and preserve the reflecting surface. The slot or opening 14 may be constructed by cutting a tongue or flap 15 from the trough portion 9, the said tongue being connected to the rear edge 16 of the opening and extending downwardly, substantially as shown, to constitute an auxiliary reflector which throws the heat forward in a substantially horizontal direction. The member 15 is made of the same indented material as the main reflector surfaces 9 and 11 to prevent the heating element 10 from being seen therein by reflection. If desired, the member 15 may be hinged to the trough-shaped reflector to permit of adjustment and also to permit of the opening 14 being closed when the radiator is not in use. In general, however, the member 15 may be integral with the trough portion 9 and be permanently located relatively thereto.

The heating element 10 comprises a plurality of axially disposed tubes 4 of a suitable refractory material upon which the resistor wire 3 may be suitably wound in helical form. The tubes 4 are supported above a metal rod 17 by a plurality of plates 18 of suitable insulating material arranged in substantially vertical planes and provided with perforations through which the rod 17 extends in order to support said plates. An insulating supporting member 19 of star or other suitable shape is secured on each side of each of the plates 18 by bolts and nuts 21, the supporting members 19 fitting snugly within the ends of the respective tubular supporting members 4 and thereby support-

ing the same. The rod 17 is supported at its ends by metal plates 22 and 23 by providing screw threads (not shown) on the ends of said rod and securing the same to the end plates 22 and 23 by means of nuts (not shown). The said rod is secured to the right-hand plate 23 in such manner that it is electrically insulated therefrom for a purpose to be hereinafter set forth. The plates 22 and 23 constitute end clamps for the several tubular heating elements and serve to retain these securely in position upon the rod 17. The right-hand end wall 12 of the radiator is provided with a perforation 24 of sufficient dimensions to permit the heating element, together with its supporting structure, to be entirely withdrawn laterally from the radiator, and the plate 23 is adapted to be secured to the right-hand end plate 12 by means of nuts and bolts or in any other suitable or convenient manner. The left-hand end plate 22 may merely rest upon the bottom of the trough 9 or it may be suitably secured thereagainst. A switch 25 of any suitable or convenient type, but here illustrated as a snap switch, is mounted upon the end plate 23. An electric current is distributed to the various sections of the resistance wire on the tubular members 4 by metal rods 26 and 27 which extend substantially parallel with the heating element through holes in the insulating plates 18 and are so secured to the end plate 23 as to be insulated therefrom. The rods 26 and 27 may be screw threaded over the whole or over parts of their lengths, and the ends of the heating resistances may be electrically connected thereto by means of nuts 28. The main supporting rod 17 may also be similarly employed as a conductor when the plurality of heating elements 10 are to be connected in various relations to each other for obtaining different degrees of heat.

The opening 13 through which the heat is distributed will not ordinarily be provided with a grate since the shape of the radiator and the disposition of the heating element therein are such as to prevent objects from coming into contact with the heating element. However, a suitable grating 29, for example, of wire netting, may be arranged in a substantially horizontal plane within the trough-shaped reflector 9 at the top thereof, if desired. In this position, the grating is invisible from most points of view and if made sufficiently heavy and strong may support material to be cooked or a suitable container in which material to be cooked may be placed.

The radiator is provided with supporting members 31 of suitable strip material secured to the bottom of the trough portion 9. Any desired ornamentation which does not interfere with the use of the trough as above set forth may be provided. For ex-

ample, a perforated or otherwise ornamented frame 32 may be provided around the opening 13.

The device embodying my invention thus provides a radiant reflector heating device effective to permit of translating relatively large amounts of energy into heat and reflecting the same in a diffused manner from the reflecting surface without thereby causing the temperature of the reflecting surface to become unduly high and thereby causing a deterioration of the reflecting surface. The device embodying my invention provides also a radiant reflector heater in which the heating element is not seen, as a whole, by direct reflection.

Various modifications may be made in the device embodying my invention without departing from the spirit and scope thereof and I desire that only such limitations shall be placed thereon as are imposed by the prior art or are specifically set forth in the appended claims.

I claim as my invention:

1. In a luminous radiant electric heater, in combination, a heating element and a reflector therefor, the surface of said reflector being provided with relatively small indentations for diffusing the heat of the heating element.

2. In a luminous radiant electric heater, in combination, a heating element, and a metal reflector therefor, the surface of said reflector being hammered for diffusively reflecting the heat of said heating element.

3. In a luminous radiant electric heater, in combination, a heating element, and a metal reflector therefor, said reflector comprising a plurality of irregularly disposed, integral, relatively small, reflecting surfaces.

4. In a luminous radiant electric heater, in combination, a heating element, and a metal reflector therefor, the surface of said reflector being hammered for diffusively re-

fecting the heat of said heating element and for preventing the heating element from being seen by reflection.

5. In a luminous radiant electric heater, in combination, a heating element, and a metal reflector therefor, the surface of said reflector being hammered for diffusively reflecting the heat of said heating element and so shaped in lateral cross-section as to conceal the heating element from the direction in which the heat is reflected.

6. In a luminous radiant electric heater, in combination, a heating element, and a metal reflector therefor, the surface of said reflector being hammered for diffusively reflecting the heat of said heating element, and said reflector being of substantially scroll shape in lateral cross-section with the heating element disposed in the trough portion thereof.

7. In a luminous radiant heater, in combination, a heating element and a metal reflector therefor, the surface of said reflector being hammered for diffusively reflecting the heat of said heating element and the said reflector being of substantially scroll shape in lateral cross-section with the heating element disposed in the trough portion and having an opening in the lower part thereof for permitting a circulation of air therethrough.

8. In a luminous radiant electric heater, in combination, a metal reflector, of substantially scroll shape in lateral cross-section, the surface thereof being hammered for diffusively reflecting heat radiated thereagainst, and an elongated heating element comprising a plurality of axially alined units located in the lower part of said reflector.

In testimony whereof, I have hereunto subscribed my name this second day of August, 1922.

JOHN ARTHUR ORANGE.