

April 16, 1929.

B. F. P. VEDDER

1,709,505

ELECTRIC RADIATOR

Filed March 5, 1927

2 Sheets-Sheet 1

Fig. 1

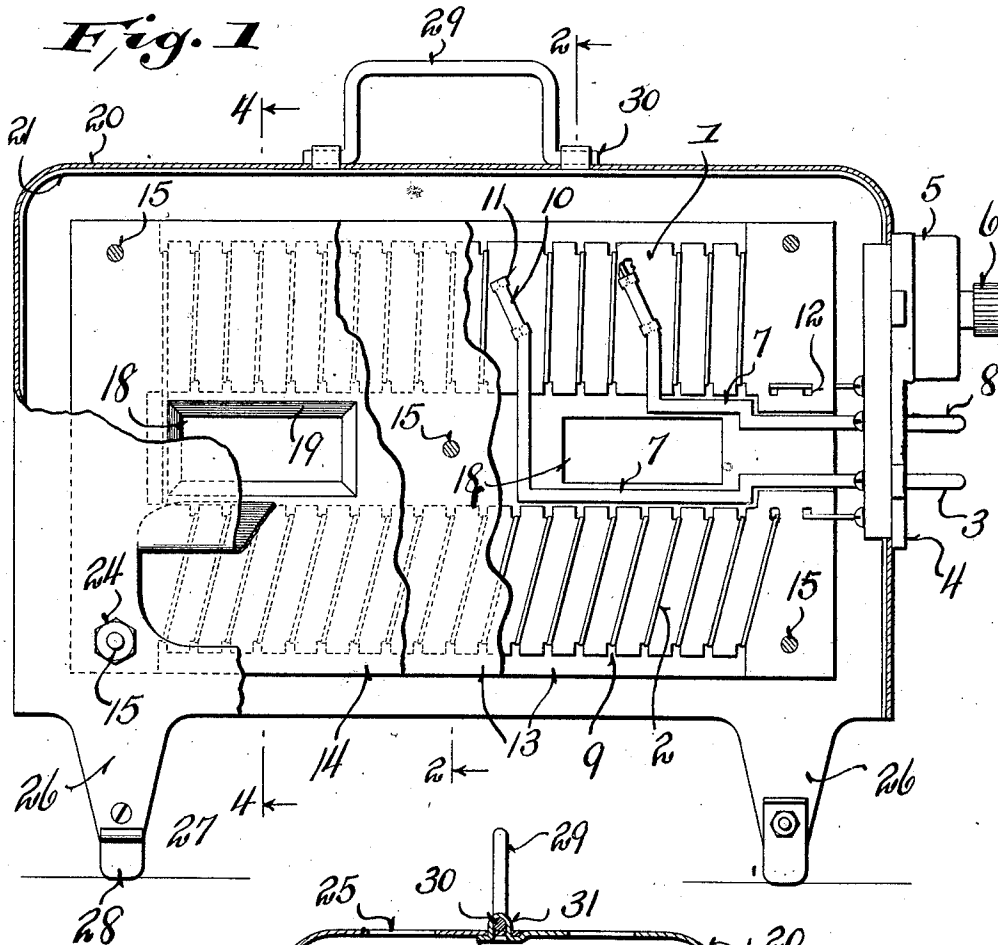
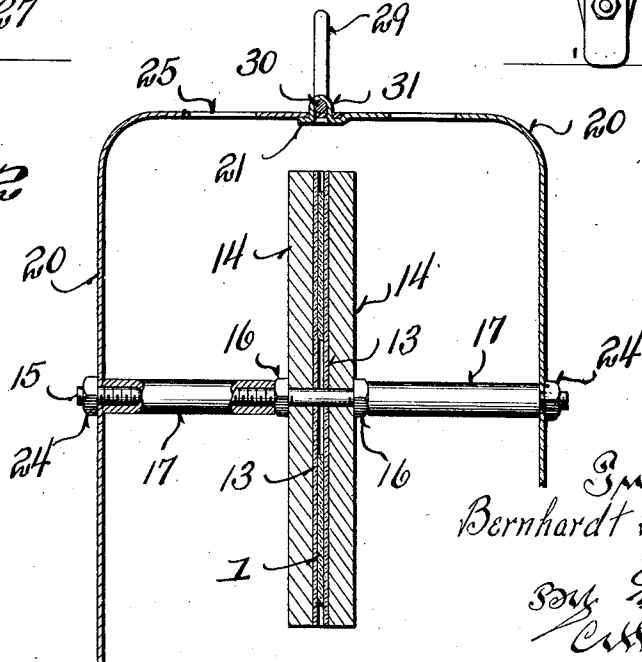


Fig. 2



Inwieweit:
 Bernhard F. P. Vedder
 Schriftf.

April 16, 1929.

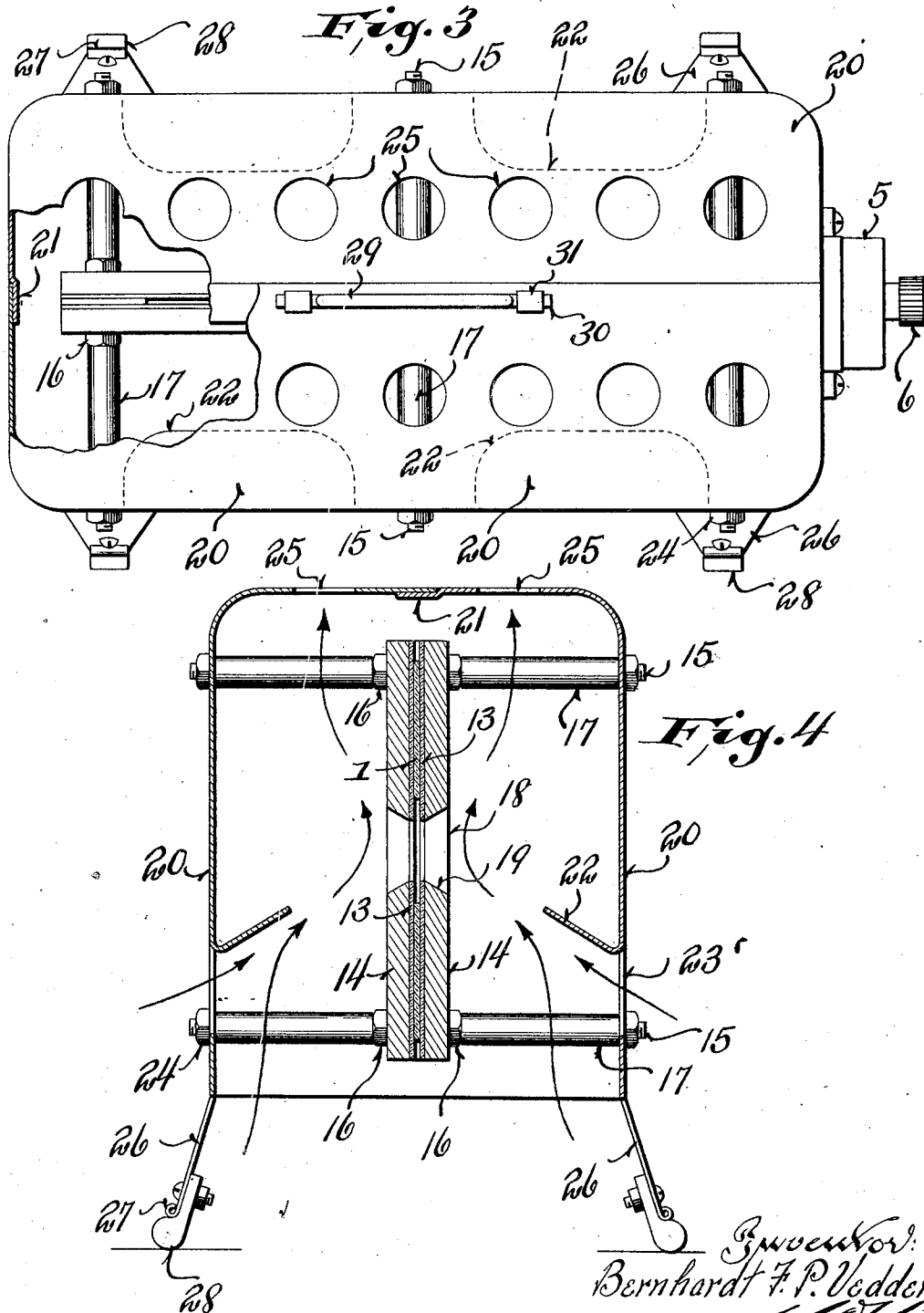
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2 Sheets-Sheet 2



Inventor:
Bernhardt F. P. Vedder
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UNITED STATES PATENT OFFICE.

BERNHARDT F. P. VEDDER, OF MILWAUKEE, WISCONSIN.

ELECTRIC RADIATOR.

Application filed March 5, 1927. Serial No. 173,099.

This invention relates to electric radiators.

Objects of this invention are to provide a novel form of electric heater adapted to heat the air in a room in the manner of a radiator and to provide a device which is of eminently practical and simple construction.

Further objects of this invention are to provide an electric heater in which the air is not heated to an excessive temperature, but in which a large volume of air is heated to a moderate temperature, so that the air does not have the burnt smell which is so objectional with the usual types of heaters.

Further objects are to provide a novel form of heater in which relatively large radiating surfaces are provided against which the rapidly travelling stream of air contacts and to so construct the radiating members that they serve to cool the conductors leading to the heating element and thus burning of the conductors is wholly avoided.

Further objects are to provide an electric heater in which simple types of standard stock parts may be used to construct the heater for its major part, and in which relatively simple stampings are employed for the casings.

An embodiment of the invention is shown in the accompanying drawings in which:—

Figure 1 is a side elevation partly in section to show the successive layers or parts of the device such view corresponding to a longitudinal section:

Figure 2 is a transverse sectional view on the line 2—2 of Figure 1;

Figure 3 is a plan view of the device;

Figure 4 is a sectional view on the line 4—4 of Figure 1.

Referring to the drawings, it will be seen that the heater comprises a mica or similar member 1 upon which the heating wire or member 2 is positioned preferably by winding it spirally in notches. This member is some high heat resisting metal of non-oxidizing characteristics, such, for example, as a nickel chromium compound. This conductor has one of its ends connected to one of the terminal prongs 3 carried by an insulating two-part plate 4 bolted to the front of a casing in an aperture provided therefor. The other terminal goes to a multipoint switch 5 controlled by a suitable knob 6. The intermediate points of the resistance element 2 are connected to the switch by

means of conductors 7 which extend downwardly and then outwardly to the switch, as shown in Figure 1. The switch is adapted to connect any one of the points on the resistance to the other terminal prong 8.

It is to be noted that this mica member is substantially U-shape, as may be seen from Figure 1, to facilitate the winding of the resistance element thereon in the notches 9 provided in the edges of the mica member 1. Further, the inner terminals of the conductors 7 are engaged with the resistance element by means of clips 10 provided with a plurality of arms 11 passing through the mica and clamped to the resistance element, as shown in Figure 1. This provides a very secure mode of attachment for the parts. The extreme ends of the resistance element are passed through apertures 12 formed in the mica member 1 to retain them in position. This mica member is covered on opposite sides with sheets of mica 13 and outside of these mica covering sheets, a pair of relatively thick metal plates, preferably of brass, are provided as indicated by the reference character 14. Bolts 15 extend through the brass plates and the several layers of mica and the parts are clamped together by the clamping nuts 16 located on opposite sides of the plates 14. The bolts extend outwardly and are provided with spacers 17 on opposite sides of the heating unit. The heating unit, it will be seen, is an entirety and may be readily handled in the assembling of the device, and positioned within the casing with the utmost facility.

It is to be particularly noted that the metal plates or radiators 14 are provided with two rectangular apertures 18 at spaced points through its central portion. These rectangular apertures are provided with beveled faces 19 for a purpose hereinafter to appear.

The casing members are substantial duplicates and are indicated by the reference character 20. One of the members is provided with a downwardly depressed lip 21 which fits beneath the inner marginal edge of the other casing member. This construction is followed throughout the sides and top portion of the casing to thus provide a two-part housing for the heating unit. At regular intervals, preferably immediately adjacent the openings 18, fins 22 are struck inwardly from the body of the casing to

provide entrance apertures 23 for air. Further, the air can enter through the bottom of the casing, as indicated by the arrows in Figure 4. The pins 22 direct the
 5 air inwardly and upwardly and cause it to sweep into and past the openings 18 and also to impinge against the sides of the heating unit. Thus, the heating unit is cooled by the air and imparts its heat thereto.
 10 Further, the plates 14 adjacent the openings 18 is materially cooled and, consequently, the conductors 7 (see Figure 1) which parallel one of these openings 18, are prevented from becoming excessively hot
 15 and all danger of the burning out of these conductors is consequently avoided.

The casing members are held in place by means of outer nuts 24 screwed on the bolts 15. Thus, a very rigid structure is provided and one in which the bolts serve not
 20 only the purpose of holding the heating unit elements in place, but also serve to hold the heating unit in its relative position to the casing and the casing parts in their assembled position.

The upper portion of the casing is provided with a plurality of outlet openings 25 through which the air may freely pass.

The lower portion of each half of the casing is provided with downwardly and outwardly extending legs 26 which preferably have beaded lower ends 27 to provide a finished end therefor. In addition to this, it is preferable to bolt porcelain or other heat
 30 insulating feet 28 to the lower ends of these legs 26, as shown particularly in Figures 1 and 4.

The entire heater can be readily carried by means of a handle 29 having outwardly
 40 turned trunnions or hinged parts 30. This handle may lie flat upon the top of the casing or extend upwardly therefrom into the position shown in Figure 1, if desired. It is to be noted particularly from Figure 2, that the trunnion portions 30 of the handle project through upturned clips 31 struck upwardly from the portion 21 of one of the casing members. These upturned clips pass
 45 through apertures formed in the other casing member, as shown in Figure 2, and thus serve to lock the top of the casing members together in addition to the secure manner in which the bolts 15 hold such members.

It will thus be seen than an electric air
 55 heater has been provided which heats the air by a direct contact of the flowing stream of air against relatively massive radiating members and, it will be seen further, that these radiating members provide an extensive surface in contact with the air and, consequently, do not heat the air to a point at which it will have a burnt smell, ordinarily occasioned by electric heaters.

Further, it will be seen that this heater is
 65 a convenient type of heater and may be used

as an ordinary radiator in a room, such heater being placed upon the floor and thus heating the coolest air and causing a continuous circulation of air in the room.

If desired, a shield plate may be placed
 70 on the bottom of the heater to guard the floor against direct radiation from the heating unit. This plate, however, has not been shown, as it is not ordinarily necessary to use such plate.

Although the invention has been described in considerable detail, such description is intended as illustrative rather than limiting as the invention may be variously embodied and as the scope of such invention
 80 is to be determined as claimed.

I claim:

1. An electric heater comprising a heating unit having a centrally located heating
 85 element, means for attachment to a source of electric energy, insulating sheets on opposite sides of said heating element, a pair of relatively thick metal plates clamped tightly on opposite sides of said heating element and acting as heating surfaces for the air, a sheet
 90 metal casing positioned around said heating unit and in spaced relation thereto, bolts passing through said heating unit, clamping nuts for binding the parts of said heating unit together, said bolts extending out-
 95 wardly, and means attaching said bolts to said casing to hold said heating unit freely suspended and spaced from said casing.

2. An electric heater comprising a heating
 100 unit having a centrally located heating element, means for attachment to a source of electric energy, insulating sheets on opposite sides of said heating element, a pair of relatively thick metal plates clamped tightly on
 105 opposite sides of said heating element and acting as heating surfaces for the air, a sheet metal casing positioned around said heating unit and in spaced relation thereto, bolts passing through said heating unit, clamping
 110 nuts for binding the parts of said heating unit together, said bolts extending outwardly, and means attaching said bolts to said casing to hold said heating unit freely
 115 suspended and spaced from said casing, said casing having inwardly turned fins for directing the air against the heating faces and having an opening immediately adjacent each fin.

3. An electric heater comprising a heating
 120 unit having a heating element positioned between two metal plates of material thickness relative to the thickness of said heating element, said heating element being of extensive length, conductors leading from
 125 spaced points on said heating element and arranged in close proximity to said metal plates, said metal plates having apertures formed therethrough adjacent said conductors, a casing surrounding said heating unit
 130 and having inwardly directed fins for pro-

jecting air into contact with said plates adjacent said openings, whereby the plates adjacent said openings are prevented from excessive heating and thereby protect said conductors against excessive temperatures.

4. A heating unit for an electric air heater consisting of a pair of metal plates, means for forcing said plates towards each other, insulating sheets positioned on opposed faces of said plates, a heating element wound about an insulating member and located between said insulating sheets, said heating element having conductors leading therefrom and joined to spaced points of such element, said plates having apertures therethrough arranged adjacent said conductors.

5. An electric heater for heating air comprising a heating element having spaced members, a pair of plates positioned on opposite sides of said element, electrical insulation interposed between said metal plates and said element, a plurality of bolts passing

through said plates and having nuts thereon binding said plates tightly against said electrical insulation to secure good heat conduction, said plates having apertures opening completely through from one plate to the other plate to provide air passages, conductors extending from said heating elements and located adjacent said air passages, whereby said conductors are at a lower temperature than said heating element, said bolts projecting outwardly from opposite sides of said plates, and a casing having side walls to which the ends of said bolts are secured, whereby said plates and the tightly gripped, enclosed heating element are freely suspended in air and spaced from said casing.

In testimony that I claim the foregoing I have hereunto set my hand at Milwaukee, in the county of Milwaukee and State of Wisconsin.

BERNHARDT F. P. VEDDER.