

Nov. 8, 1955

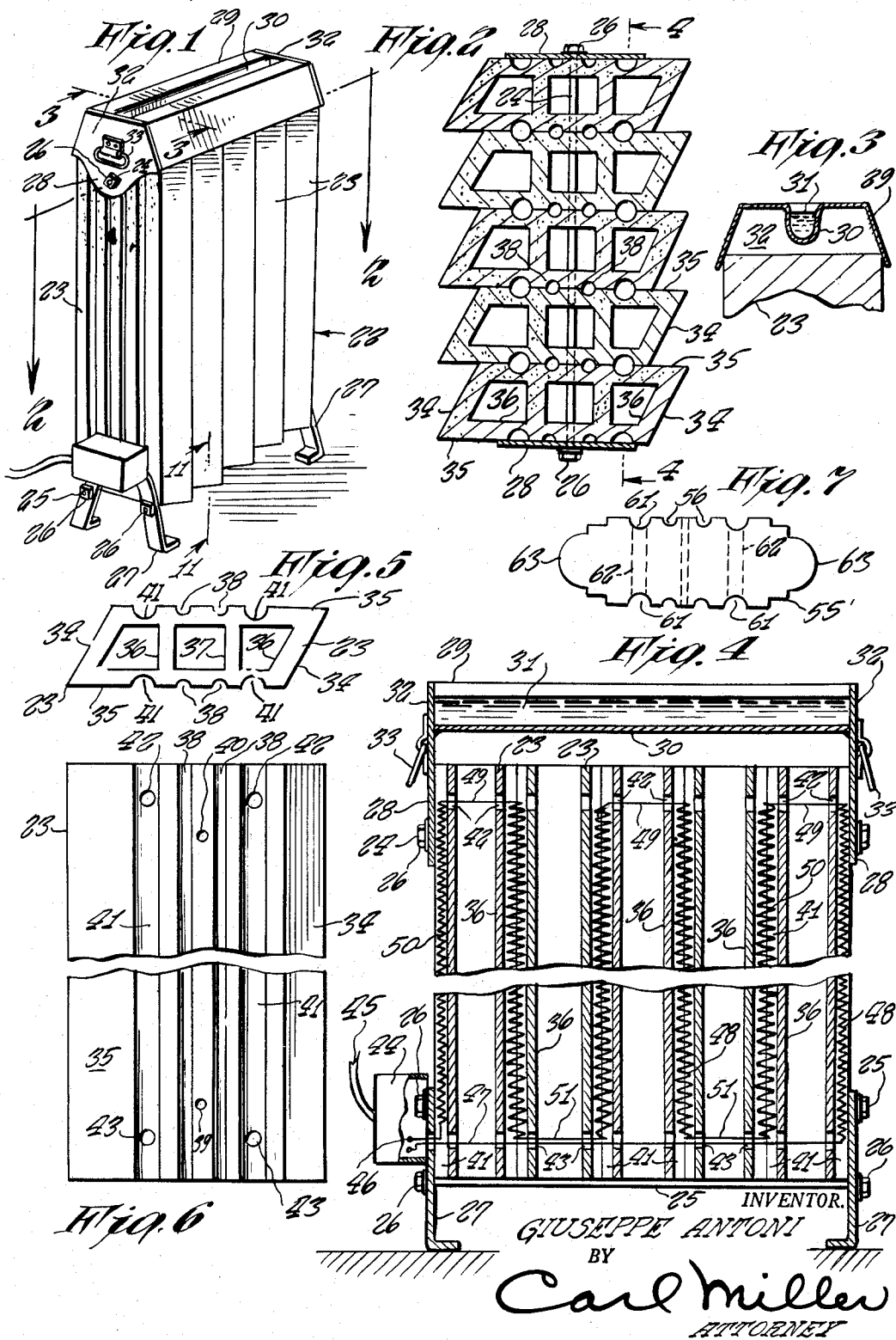
G. ANTONI

2,723,338

ELECTRIC RADIATOR

Filed Dec. 11, 1951

3 Sheets-Sheet 1



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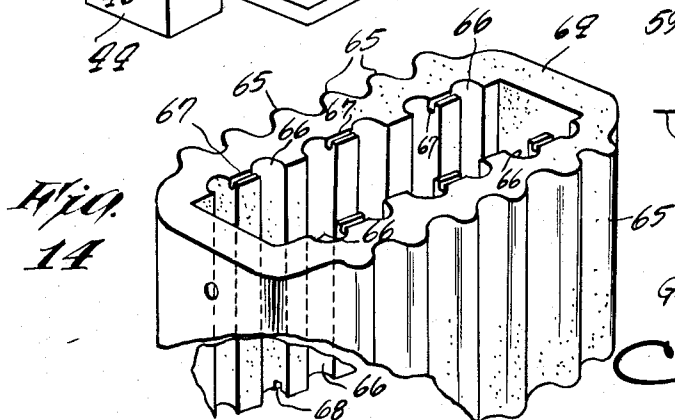
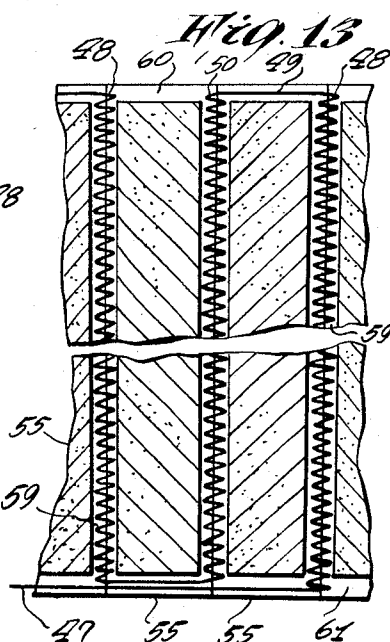
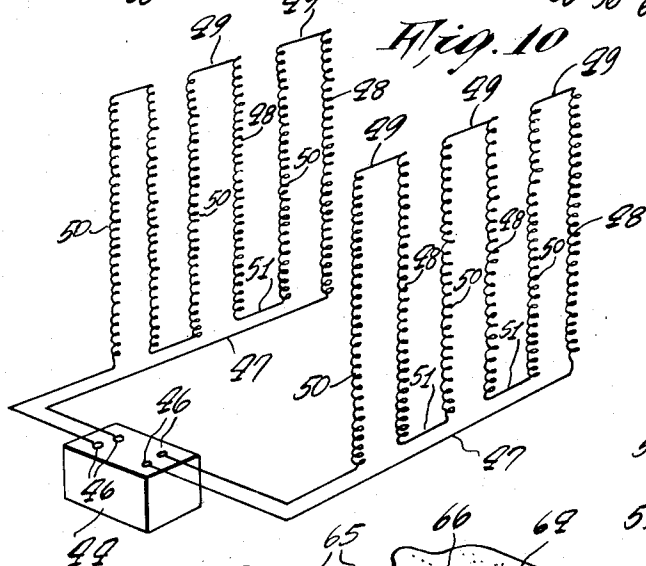
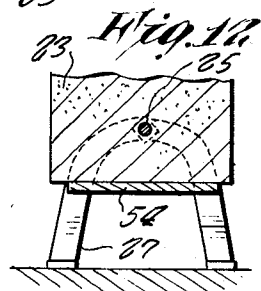
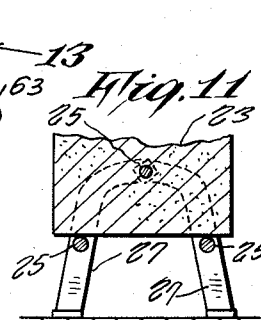
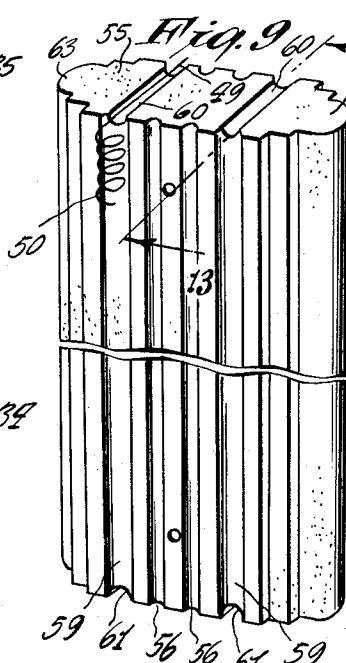
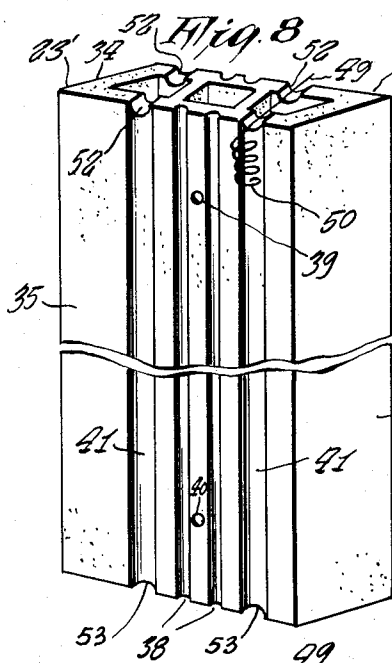
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3 Sheets-Sheet 2



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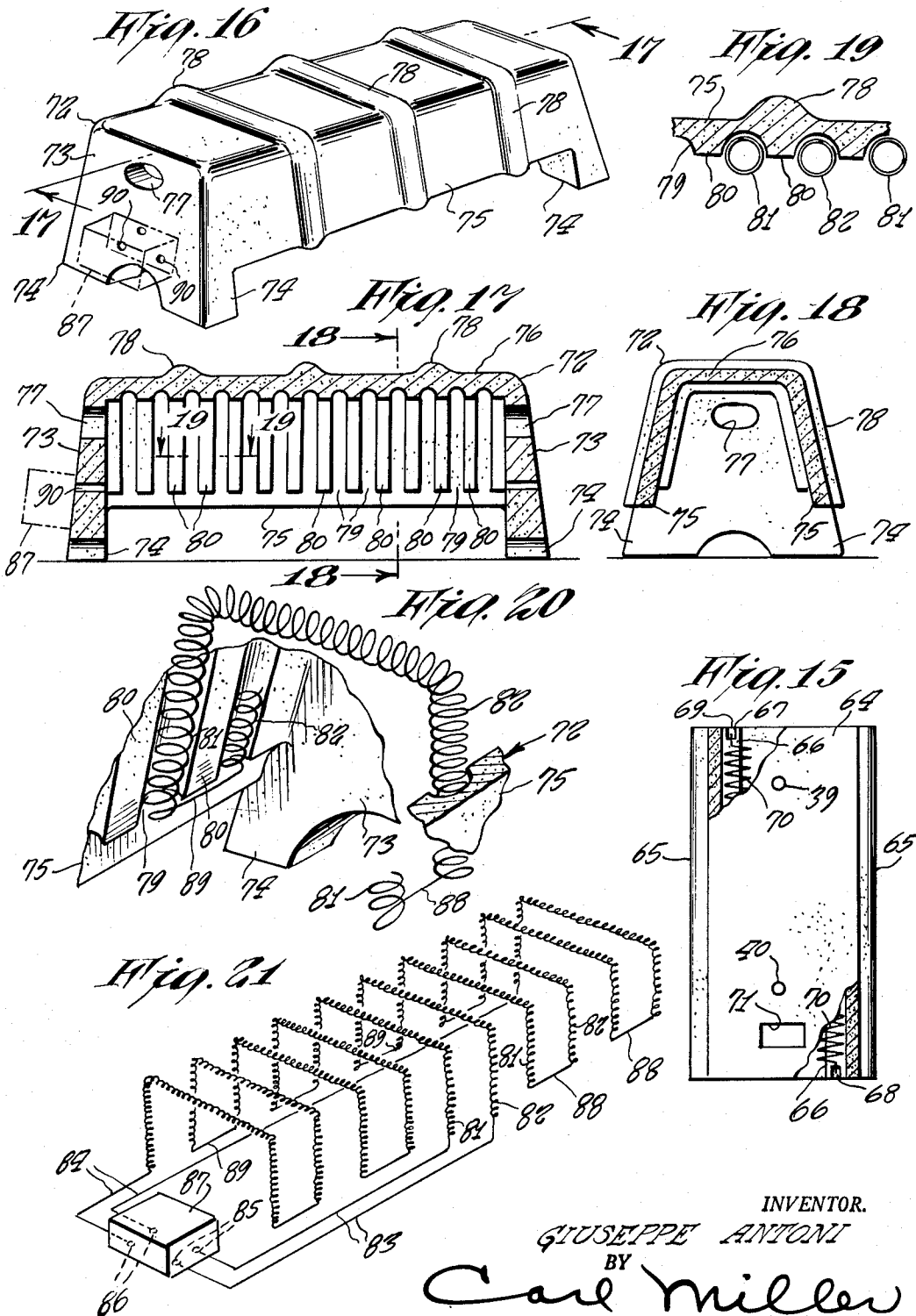
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ELECTRIC RADIATOR

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3 Sheets-Sheet 3



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1

2,723,338

ELECTRIC RADIATOR

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Application December 11, 1951, Serial No. 261,085

2 Claims. (Cl. 219—34)

The present invention relates to radiators and heaters of the dry type, and particularly to an electric radiator.

The main object of my invention is to provide a radiator that is capable of radiating a large amount of clean dry heat and being operated by electric current.

Another object of the invention is to have an electric radiator that is capable of accumulating heat from the electric current and operating so that the heat will be distributed to best advantage.

A further object of this invention is to provide a special electric radiator that is mainly built up of ceramic parts so as to be economical to make and also effective in use.

It is also an object to have such a radiator in which the various parts when assembled provide intermediate channels or passages for electric heating coils in properly distributed positions and also effectively supported for permanent installation if desired.

A practical object is to have a radiator of the character indicated that may be made in various forms and sizes according to requirements and the taste of the purchasers intending to use the same.

Yet another object is to have such an electric radiator that is capable of being made into a conveniently portable device which may be shifted from one room to another and from part of a room to another position therein at will.

It is even an object so to construct an electric radiator of the mentioned kind that may have solid or hollow ceramic parts or be made of a single ceramic block of special form.

An object is also to include in the construction of the radiator special means for containing water to humidify the air as it is heated by the apparatus.

Other objects and advantages of the invention will appear in greater detail as the specification proceeds.

In order to facilitate ready comprehension of this invention for a proper appreciation of the salient features thereof, the invention is illustrated on the accompanying drawings forming part hereof, and in which:

Figure 1 is a perspective view of a radiator made according to the invention and embodying the same in a practical form;

Figure 2 is a transverse section of the same radiator as taken on line 2—2 in Figure 1;

Figure 3 is a fragmentary vertical section as taken on line 3—3 in the same Figure 1;

Figure 4 is a longitudinal section as taken on line 4—4 in Figure 2;

Figure 5 is a top plan view of one of the ceramic radiator elements of the radiator of Figures 1 to 4;

Figure 6 is a front elevation of the same element of Figure 5;

Figure 7 is a plan view similar to Figure 5 showing a modification of the ceramic block or element;

Figure 8 is a perspective view of another modification of the ceramic element;

Figure 9 is also a perspective view of a further modification of ceramic element;

2

Figure 10 is a typical wiring diagram of the radiator of Figures 1 to 9;

Figure 11 is a fragmentary vertical section of the radiator of Figure 1 as taken on line 11—11 therein;

Figure 12 is a similar fragmentary section showing a modification of the construction of Figure 11;

Figure 13 is a vertical section of the radiator element of Figure 9 as taken on line 13—13 therein;

Figure 14 is a fragmentary perspective view of the upper portion of a further modification of the ceramic element;

Figure 15 is a side elevation of the element of Figure 14 with parts broken away to disclose interior details of construction;

Figure 16 is a perspective view of a modification of the radiator of Figure 1 as a whole still embodying the features of the invention;

Figure 17 is a longitudinal section of the radiator of Figure 16 as taken on line 17—17 therein;

Figure 18 is a vertical section taken on line 18—18 in Figure 17;

Figure 19 is a fragmentary horizontal section taken on line 19—19 in Figure 17;

Figure 20 is a fragmentary perspective view of a portion of the heating coils and wiring of the radiator of Figures 16 to 19;

Figure 21 is a more complete perspective diagram of the entire heating coil and wiring system of the radiator of Figure 16.

Throughout the views the same reference numerals indicate the same or like or even corresponding parts.

It is well known that in modern life the matter of maintaining houses and buildings and even individual rooms and chambers in the same properly heated in cold weather has received a great deal of attention. The use of steam radiators has often been the answer to the problem because this appeared to be the most economical way of providing the heat required. In some instances, electric heaters of conventional type have been employed, but they have been more or less expensive and all too often rather inefficient. Certainly, no effective electric radiator of any consequence has ever been generally adopted, especially any radiator of large capacity and of portable construction.

Upon considering this problem, it has occurred to me that an electric radiator of standard radiator capacity should be available that is reasonable in cost, highly efficient in use and also portable in form, so that any room may be heated without expensive installations in a whole house being necessary. As a result, I have succeeded in producing an electric radiator of special advantage as already outlined, which I shall now proceed to describe in detail in the following.

Hence, in the practice of my invention, and referring also again to the drawings, an electric radiator, generally indicated at 22 primarily includes a series of vertically disposed radiator elements 23, 23, etc., held together in more or less conventional manner of machine assembly by means of one or more tie rods or assembly bolts 24, 25, the same extending horizontally through the entire series and having end nuts 26 screwed upon the extremities thereof. At the lower portions of the two outer elements are mounted two end supports or legs 27, 27 held in assembled relation with the series of radiator elements by the lower assembly bolts 25 and serving to support the radiator as a whole. At the top, the single assembly bolt 24 secures not only the upper ends of the elements 23 together, but also extends through a pair of depending end lugs 28, 28 of a sheet metal cap 29 for the radiator that has an intermediate downward fold 30 forming a water trough for a quantity of water 31 for

humidifying the air heated by the elements beneath the same.

Upon the ends 32 of the cap 29 are hinged a pair of bails 33 by which the apparatus may be picked up and moved to desired location. However, the elements 23 are preferably of non-metallic material such as ceramic, porcelain or the like, as such material has a special capacity for absorbing and then generally radiating heat in a useful manner. Each element has two inclined upright narrow side faces 34, 34 that are increased in area by being inclined so that portions also of the relatively wider sides 35, 35 of the element is also exposed to the atmosphere for radiating heat. Within, these elements have vertical flues 36, 36, 37 through which the air may freely rise when the element is heated, while upon the two outer and inner sides 35, 35, there are formed pairs of grooves 38, 38, etc., to encourage circulation of air when the elements are brought together by forming air passages between the elements. The uppermost bolt 25 of the lower three and the top bolt 24 pass through holes 39, 40 in the elements as best seen in Figure 6, while the lower two of bolts 25 may simply extend beneath the elements as shown in Figure 4 to directly support the series upon the U-shaped feet 27, 27.

Upon the two wider sides 35 of each element are also provided two relatively larger parallel grooves 41, 41 communicating near the top with the inside flues 36, 36 by means of holes 42, 42 and near the bottom also with the same flues through holes 43, 43 for a purpose now to be described. Upon one end of the device is mounted an electrical inlet box 44 for plugging in or leading off a cable 45 to which a pair of terminals 46 are connected. From one of these terminals extends a conductor 47 through lower holes 43 to the end of the radiator and then continues upwardly in one of the grooves 41 in the form of a resistance heating coil 48, and from the top of this extends a horizontal conductor 49 through upper holes 42 in the element 23 to the groove 41 on the other side of the same element. From this top point, a second heating resistance coil 50 extends down through the last mentioned groove 41 to the bottom holes 43 in the next adjacent element 23 and thence the coil 48 again rises up in the next groove 41, and so on through the series. At the left end the conductors and coils are repeated in the far side of the elements so that a system of heating coils in duplicate is formed as shown in the diagram of Figure 10. The result is that the coils in the mutually facing grooves forming enclosed passages as well as the open end grooves 41 heat the elements and the latter radiate this heat uniformly to the room containing the apparatus.

While in the elements 23 the holes 42 and 43 are provided for the horizontal conductors between elements, it is evident that top and bottom grooves 52 and 53 can well serve in the element 23' of Figure 8 so that no holes for this purpose are used, the other features of the element being exactly the same as in elements 23. The net result is the same, for the elements, conductors and coils are otherwise the same as already described. Whether in the first form or in the last mentioned form, the elements may be supported by the lower pair of bolts 25, but, as shown in Figure 12, this lower pair may be dispensed with altogether and a flat plate or strip 54 of metal may be welded or brazed to the U-shaped feet 27 to support the ceramic elements, if desired.

While the elements 23 and 23' are shown hollow with flues 36 and 37, I may also make an element 55 solid, and provided with the ventilation grooves 56, 56 on both wider sides corresponding to the former grooves 38, while the larger grooves 59, 59 serve to enclose the heating coils 48 and 50. In this case also, the top and bottom conductor grooves 60, 61 may serve to pass the horizontal conductors from coil to coil instead of using holes for this purpose, as for example indicated at 62, 62 in element 55' in Figure 7. Both elements 55 and

55' have opposite heat radiating ridges or ribs 63, 63 and are in all other respects the same except for the conductor grooves on top and bottom of one and the conductor holes in the other.

As will be seen in Figures 14 and 15, it is not essential that the radiator be built up of a series of distinct ceramic elements, for the entire ceramic portion may be made of a single hollow block or element 64 that has a plurality of vertical external radiating ribs 65, 65, while within, this element has a series of vertical heating coil grooves 66, 66, etc., and is provided with top and bottom conductor grooves 67 and 68 for passing conductor 69 from one coil 70 to the next in the neighboring groove 66. The holes 39, 40 serve to receive the assembly bolts, while the large aperture 71 is adapted to receive a bar or plate similar to 54 to support the device. This form of radiator may also be provided with a long cap 29 as in the other forms of radiator and elements described.

It is also feasible to make the unitary form of ceramic radiator complete with top as shown in Figures 16 to 21, wherein the element 72 has the ends 73, 73 thereof provided below with integral feet 74, 74, while long sides 75, 75 connect these ends and an integral top 76 completes the whole externally. In the ends are provided hand holes 77, 77 for lifting and moving the heater at will, while externally, the sides and top are provided with a few transverse radiating ribs 78, 78. Within the top 76 and side walls 75 are a plurality of transverse coil grooves 79, 79 separated by ribs 80, 80 that terminate short of the lower edges of the side walls to provide a bottom clearance margin for conductors between heating coils 81, 82 connected together solely at the lower ends thereof. Each coil is shaped like an inverted U and is housed between a pair of ribs 80, 80 in the groove 79 formed therebetween. As shown in the perspective circuit diagram in Figure 21, the coils are connected by conductors 83, 84 to terminals 85, 86 in box 87 to which current may be supplied from an outside source in conventional manner, the mutually adjacent coils being interconnected by short conductors 88, 89 passing beneath the lower ends of ribs 80, 80 within the radiator. The device is thus self-contained and at one end has the leads 83 and 84 extending in through holes 90 from the box 87, and otherwise has no projecting portion thereon other than the radiating ribs 78.

In the forms of the invention, the same principles hold throughout, and the electric current is effectively transformed into heat and the radiator serves to distribute the heat developed to the ambient atmosphere.

Manifestly, variations may be resorted to, and parts and features may be modified or used without others within the scope of the appended claims.

Having now fully described my invention, I claim:

1. An electric radiator comprising a rectangular ceramic element having vertically extending walls and a hollow rectangular core coextensive with said element, two of said walls facing each other and having a plurality of longitudinal grooves on the inside surfaces of the walls and heat radiating ribs on the outside surfaces of the walls, said ribs and grooves extending parallel to the longitudinal axis of the element, electric resistance heating coils suitably recessed within said inside grooves and connected together in spaced relation, means for supporting the element a suitable distance above a horizontal surface in an operative position, and a cover member enclosing the top end of the hollow core, said cover member having an intermediate trough for receiving a suitable liquid for evaporation during radiator operation.

2. For use with an electric radiator space heater, an elongated ceramic element having walls forming a rectangular cross-section with a rectangular central core, at least two opposing walls being provided with elongated grooves on the inner side of each opposing wall,

5

each of said grooves to receive a reach of a resistor heating coil therein, and protruding elongated heat radiating ribs on the outer surface of each of said opposing walls, said grooves and ribs extending parallel to the longitudinal axis of the element.

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