

E. E. GOLD.
ELECTRIC HEATER.

No. 540,244.

Patented June 4, 1895.

FIG. 1.

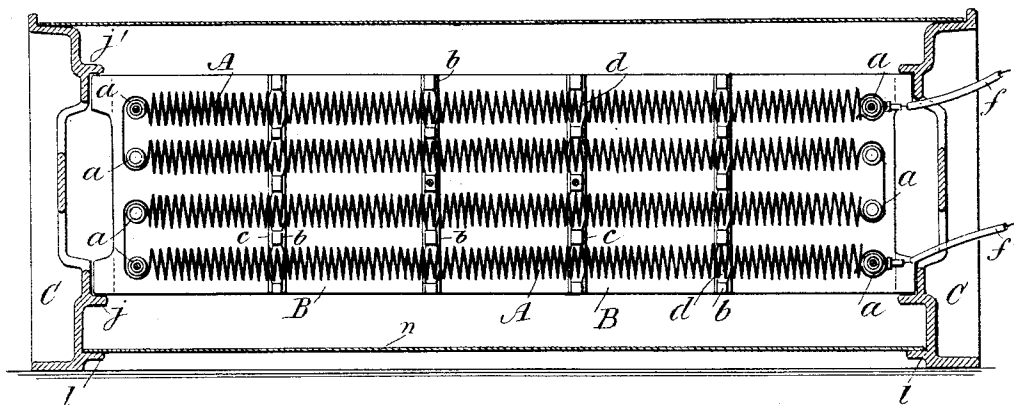


FIG. 2.

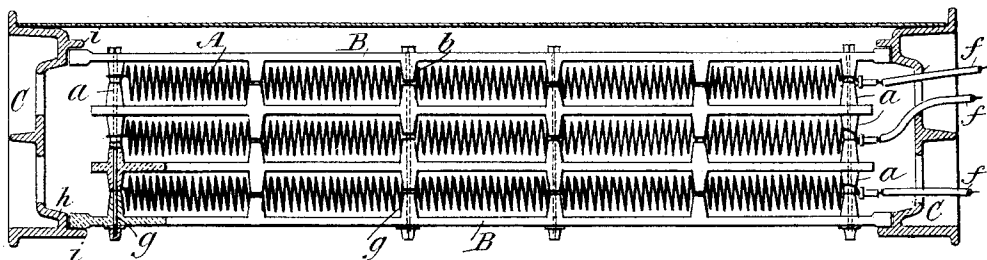
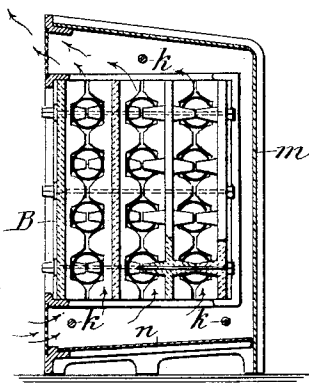


FIG. 3.



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FIG. 4.

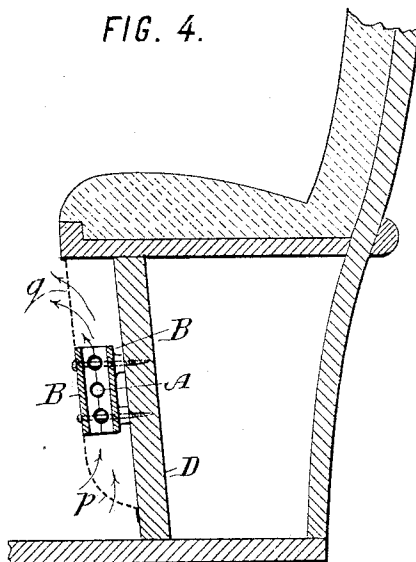


FIG 5

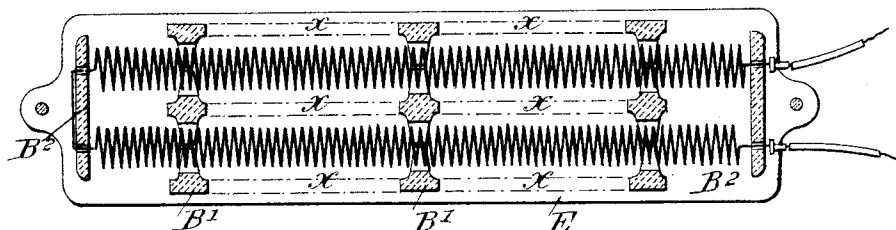
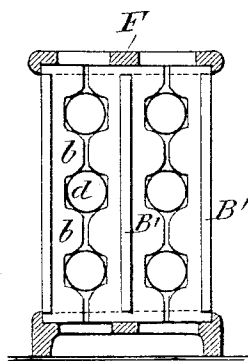


FIG. 6.



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EDWARD E. GOLD, OF NEW YORK, N. Y.

ELECTRIC HEATER.

SPECIFICATION forming part of Letters Patent No. 540,244, dated June 4, 1895.

Application filed January 29, 1895. Serial No. 536,515. (No model.)

To all whom it may concern:

Be it known that I, EDWARD E. GOLD, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Electric Heaters, of which the following is a specification.

This invention relates to electric heaters, and especially to such as are designed for heating cars. Its object is to provide a neat, simple and workmanlike heater, in which there shall be secured a thorough and effective circulation of air past the resistant conductors by which the heat is generated, and in which also there shall be an effective radiation of heat.

Figure 1 is a vertical longitudinal section of my improved heater between the earthenware plates. Fig. 2 is a plan of the heater, the outer case being in section and the plates being partly broken away. Fig. 3 is a vertical transverse section of the heater, the plates and coils being shown partly in end view. Fig. 4 is a vertical transverse section showing a modified construction of heater. Fig. 5 is a horizontal section, and Fig. 6 a vertical transverse section, showing a modified construction of heater.

In my improved electric heater, the resistant conductor which is heated by the passage of the electric current, consists of a wire of suitable size wound into a spiral coil or helix. Any desirable number of such coils are arranged between plates of earthenware or other insulating material, which plates have projections constituting supports for the coils. The plates are spaced apart sufficiently to admit the coils freely between them, and so as to form an air passage for the circulation of air between the plates through the coils to take up the heat therefrom.

In the drawings, let A A designate the coils of resistant wire, preferably galvanized or tinned iron. In the arrangement shown, these coils are extended horizontally back and forth between earthenware plates B B, being supported by projections *b b* from the several plates. These projections are preferably constructed in the form of ribs *c c* extending perpendicularly to the coils, these ribs being formed with notches *d d*, each notch receiving one-half of the coil and coinciding with

a like notch in the rib on the adjoining plate, so that by the coincidence of the two notches a complete recess or socket is formed for supporting the coil. The portions between the notches *d* constitute the projections *b*. The supporting projections are arranged close enough together to afford the required support for each coil, so as to leave between them a portion of coil so short that it will not materially sag or deflect under its own weight. The coils are stretched or drawn out sufficiently to bring their successive convolutions out of contact with one another, and also to put them under sufficient tension to contribute to the stiffness of the coils, and reduce any liability to sag between the supports. The coils are thus stretched between opposite end supports *a a* consisting of projections from the plates B B, the end portions of wire of the coils being carried around these projections in the manner shown. This construction admits of readily connecting the coils serially as shown, or in any other desired manner. For a serial connection, one end of one coil is connected to an insulated conducting wire *f* (Fig. 1), while at its other end the wire of the coil is simply carried around the projection *a*, and then around the projection *a* below, where it joins the end of the next coil integrally or otherwise, and at the opposite end of this second coil the wire is in similar manner carried around projections *a* connecting to the third coil, and at the opposite end of this the wire is carried around projections *a* connecting with the fourth or bottom coil, at the opposite end of which it is connected to the conducting wire *f'*. These wires *f f'* may be connected to any suitable switch or commutator, or be otherwise connected to the source of electric energy.

Two or more plates B may be employed according to the number of series of coils that is desired. In Fig. 2 I have shown four plates having three intervening spaces for holding three series of coils. The plates are held together by screw rods *g* passing through any suitably arranged lugs *a* or *b* of the earthenware plates, such lugs being made tubular for this purpose. For supporting the series of plates, end frames or castings C C may be provided having faces *h h* for coming against the ends of the plates, lugs or flanges *i i* for

embracing the outer and inner faces of the plates, and lugs *j* and *j'* for projecting beneath the bottom and over the top edges of the plates. These end frames are drawn together by bolts *k k* so as to clamp the plates endwise between them, thus making a firm structure. For suitably incasing the heater, a plate of sheet metal *m* is carried around the top and back of the end plates *C C*, as shown in Fig. 3, while another sheet *n* is carried beneath the earthenware plates, being supported between the end plates on ledges *l l*. The entire heater thus constructed is adapted to be placed under the seat of a street car, or in any other convenient location. The hood *m* described, is especially adapted for inclosing the heater when it is to be placed under a car seat, since it leaves space for the air to enter beneath the plates *B B*, and to pass out from above the plates, being directed forwardly by the hood, as shown by the arrows in Fig. 3. In the construction shown the front plate *B* is exposed at the front of the heater, so that a portion of the heat generated by the coils is directly radiated by this plate.

In the modification shown in Fig. 4, only two plates *B B* are employed, only three coils *A A* being shown between them. This makes a shallow heater well adapted to be placed against a panel board *D* when the latter is used. In such case wire-gauze screens *p* and *q* should be provided to keep the clothes of the passengers away from the heating coils.

In the modification shown in Figs. 5 and 6, the earthenware plates *B B* are modified by having the unessential portions thereof between the supporting projections removed, so as to form mere sectional plates or uprights *B'* of earthenware, on which are formed the projections *b* having recesses *d* between them, essentially as in the plates first described. These segregated parts *B'* require some support additional to that illustrated in the preceding figures, and to this end bottom and top plates *E* and *F* may be provided, with any suitable provision for connecting them together, these plates having suitable sockets for receiving the ends of the uprights. For making connection with the ends of the coils and holding them distended, earthenware plates *B²* may be provided, as shown in Fig.

5. In Fig. 5 the portions of the earthenware plates shown in the preceding figures that are cut away, are indicated by dotted lines at *x x*. In a heater of this last construction, the air can either circulate in direction parallel with the upright earthenware supports *B'*, or by laying the heater upon its side the air can circulate transversely thereto by passing through the spaces or openings *x x*.

I claim as my invention the following-defined novel features, substantially as hereinbefore specified, namely:

1. The combination with horizontally-extended coils of resistant wire, of vertical insulating supporting plates, having end projections between which the coils are stretched and lateral projections embracing the coils at intervals on opposite sides, and constructed to leave air-spaces between the plates and free openings at top and bottom for the circulation of air through the coils.

2. The combination with coils *A A* of plates *B B* of insulating material having end projections *a a*, between which to stretch the coils, and intermediate projections *b b* for supporting the coils between their ends, means for fastening the plates together, to constitute a group or block of plates, and a supporting frame for such group of plates.

3. The combination with coils *A A* of plates *B B* of insulating material having projections *b b*, and end projections *a a*, rods *g g* passing through the projections to unite the plates, whereby they are protected from contact with the coils, and end frames for supporting the plates.

4. The combination with coils *A A* of plates *B B* of resistant material having projections *b b*, and end projections *a a*, rods *g g* passing through the plates to unite them, and frames *C C* having seats for the ends of said plates, fastening bolts *k k*, and an insulating sheet around said plates between the end frames.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

EDWARD E. GOLD.

Witnesses:

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