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ELECTRIC HEATER

Original Filed March 10, 1924

FIG. 1.

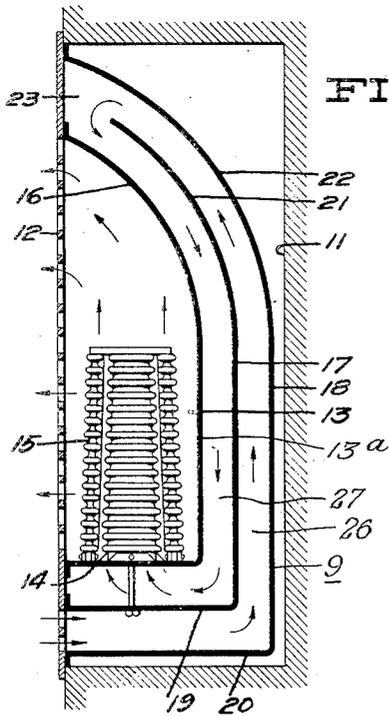
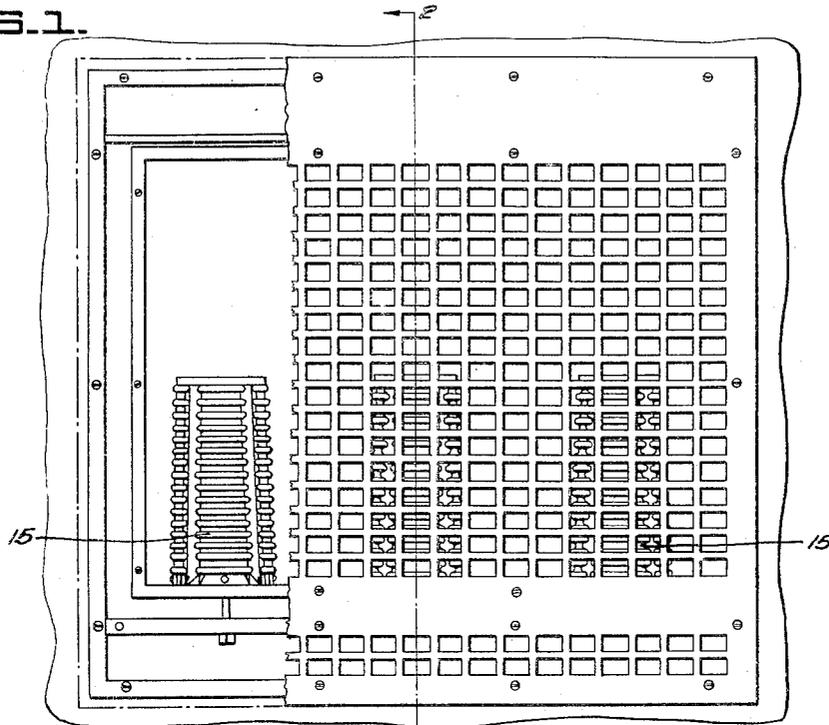
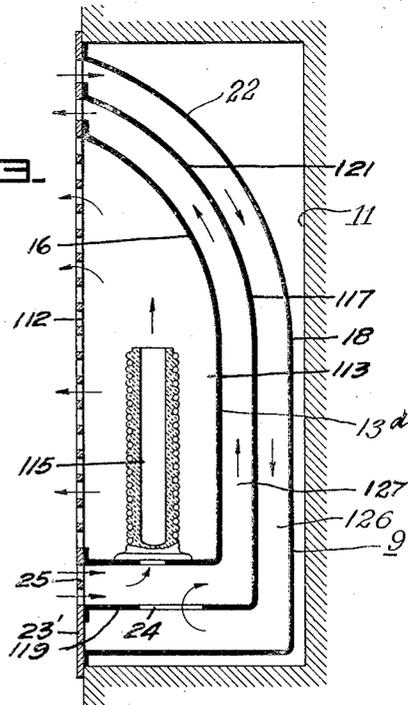


FIG. 2.

FIG. 3.



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## ELECTRIC HEATER.

Original application filed March 10, 1924, Serial No. 698,089. Divided and this application filed August 26, 1925. Serial No. 52,513.

This invention relates to a device operated electrically, for heating a space, such as a room or the like. More particularly, it relates to a heater provided with a hollow heating element and a tortuous air passageway in communication with said element whereby the cold air is drawn through said passageway and passes through said element, heat being imparted to the passageway by radiation, convection and conduction. The present application is a division of our copending application, Serial No. 698,089, filed March 10, 1924, which has matured into Patent No. 1,584,948, granted May 18, 1926.

It is an object of this invention to provide an improved heater of the character referred to.

It is another object of the invention to increase the efficiency of such a heater by providing a comparatively long passageway for the air in the heater, the better to influence the air and to impart a greater quantity of heat thereto.

It is a further object of this invention to devise an electrical air heater of the wall type in which a downward flow of air is utilized for the purpose of maintaining the outer housing relatively cool.

Our invention possesses other advantageous features, some of which with the foregoing will be set forth at length in the following description, where we shall outline in full that form of the invention which we have selected for illustration in the drawings accompanying and forming part of the present invention. Although we have shown in the drawings but several forms of our invention, we do not desire to be limited thereto, since the invention as expressed in the claims may be embodied in other forms also.

Referring to the drawings:

Figure 1 is a front view of one form of heater embodying our invention.

Fig. 2 is a sectional view taken on the line 2-2 of Fig. 1; and

Fig. 3 is a sectional view of a modified form of heater embodying our invention.

The heater as disclosed in the drawing comprises a housing 9 adapted to fit into a wall recess 11 and having an open front side to which is secured a grille 12. The housing includes a back wall 18, bottom wall 20 and an upper forwardly extending wall 22.

Supported on the back of grille 12 in spaced relationship with the walls of housing 9, there is an open front housing 13, having a rear wall 13<sup>a</sup>, lower wall or shelf 14 and a forwardly extending upper wall 16. Electrical elements 15 are supported within the housing 13 as by means of shelf 14.

The heating element 15 comprises in this instance, a hollow rectangular column of refractory material, the faces of the column carrying helical coils arranged to be connected to a source of current. The particular heating element here shown is described in our patent above referred to. However the present invention is not limited to the use of this particular type of element since a variety of electrical heating elements may be employed. For example, a heating element of the character shown in Fig. 3 may be employed, this particular type of element being described and claimed in our copending application, Serial No. 698,089, filed March 10, 1924, entitled Electric heater which has matured into Patent No. 1,584,948, May 18, 1926. The details of these units need not be described herein, it being sufficient to note that cool air may enter at the bottom from below the shelf 14, and pass through apertures in this shelf into the hollow space in the column, and out at or near the top, impinging against the forwardly extending portion 16 of the shell 13 and thereby deflected outwardly from the grille.

A tortuous passageway is provided within the housing so that cool convection currents of air are caused to pass downwardly thru the housing between the electrical heating elements and the back wall 18 of the housing 9. This passageway is formed by another wall 17 of sheet metal or other suitable material which is interposed between the walls 13<sup>a</sup> and 18 of inner housing 13 and housing 9. Wall 17 has forwardly extending lower portion 19 and a forwardly extending upper portion 21, which preferably stops short of grille 12 to provide a passageway 23.

In operating a heater such as described above, the heating elements being in the form of flues, induce an upwardly moving draft of air thru the same, and the heated air is discharged thru the grille 12. To supply elements 15 with air from the room, cool air is drawn into the lower portion of the housing and upwardly thru passageway 26, formed

between wall 17 and back wall 18, and downwardly thru passageway 27 formed between wall 17 and housing 13. A cool current of air is therefore interposed between the housing 13 and back wall 18, so that this back wall is kept at a safe temperature. Furthermore heat developed by element 15 which is absorbed by housing 13 and wall 17, is efficiently imparted to convection currents of air, due to the long path thru which the air must pass. Convection currents are also permitted to flow into and out of housing 13 thru grille 12, to be heated by direct contact with the naked resistance conductors and the refractory supports for the same.

A modification is shown in Fig. 3 in which the cool currents of air enter the upper portion of the housing. Thus the upper portion 121 of wall 117 has been extended to the grille 112 and passageways 126 and 127 are in communication thru apertures 24 in wall 119. In this modification we have also shown a refractory core type of heating element 115 having a vertical passageway or flue therethrough for convection currents of air. The lower portion of passageway 127 is open thru the grille by means of apertures 25, so that air may flow through apertures 25 and thus directly upwardly thru the elements 115. Heat radiated from elements 115 is absorbed by the walls of housing 113 and imparted to air in passageway 127. An upwardly moving current of air is thereby induced in passageway 117 which draws cool air downwardly thru passageway 127 and thru apertures 24.

We claim:

1. An electrical heater comprising an electrical heating element, and means defining a passageway extending behind said heating element and extended forwardly over the top thereof, the upper end of said passageway being in communication with a source of relatively cool air, and means for inducing a downward flow of air in said passageway.
2. An electrical heater comprising an electrical heating element, and means defining a passageway extending behind said heating element and extended forwardly over the top thereof, the upper end of said passageway being in communication with a source of relatively cool air, and means for inducing a downward flow of air in said passageway, said means including upwardly moving currents of air heated by said element.
3. An electrical heater comprising a housing having an open front, a grille extending over said front and secured to the housing, electrical heating means disposed within said housing, and means between said heating means and housing defining a plurality of connecting passageways for convection currents of air, the passageway nearest the

housing having one of its ends only open to the atmosphere and its other end communicating with another passageway.

4. An electrical heater of the wall type comprising a housing adapted to be positioned within a wall recess, a grille extending over the front of said housing, a heating element within said housing, means forming a passageway for convection currents of air extending behind said element and extending forwardly over the top thereof, the upper end of said passageway being in communication with a source of relatively cool air, and means for inducing a downward draft in the same, said means including upwardly moving currents of air heated by said element.

5. An electrical heater comprising an electrical heating element, means forming a passageway for upwardly moving relatively hot convection currents, another passageway extending behind said heating element and extending forwardly over the top thereof, said other passageway communicating with a source of relatively cool air adjacent its upper end and with said first named passageway adjacent its lower end whereby a downward draft of air is induced in said other passageway.

6. An electrical heater comprising a housing, an electrical heating element within said housing, a grille extending over the front of said housing, means defining at least two convection current passageways interposed between the heating element and housing, said passageways extending behind said heating element and extending forwardly over the top thereof, the passageway remote from the heating element being open at one end thru said grille and being in communication with the other passageway at its other end whereby convection currents of opposite direction will be induced in said passageways.

7. In an electric heater, a heating element having a substantially vertical passageway therethrough for permitting heated air to rise therein, a front cover for the heater having openings in part of its surface to conduct air to and from the heater, an open front housing having a horizontal extension for supporting the element, and a plurality of walls of progressively larger size, forming with said housing a plurality of connected vertical passageways, closed except at the ends of the series, one end of the series connecting with apertures in the front cover, and the other with the vertical passageway through the heating element.

In testimony whereof, we have hereunto set our hands.

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