

March 6, 1928.

1,661,842

J. L. McFARLAND

ELECTRIC FURNACE

Filed June 16, 1927

Fig. 1.

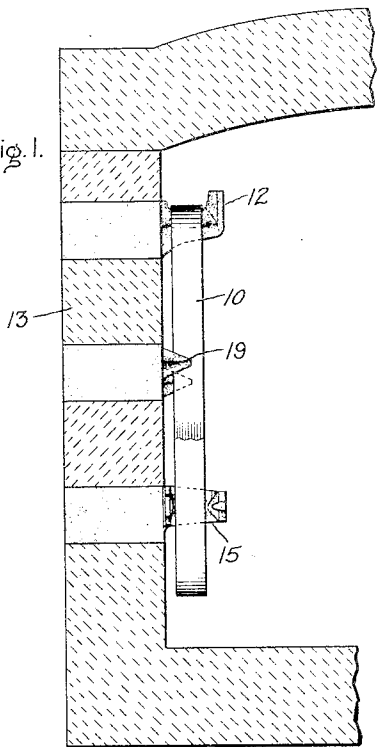


Fig. 2.

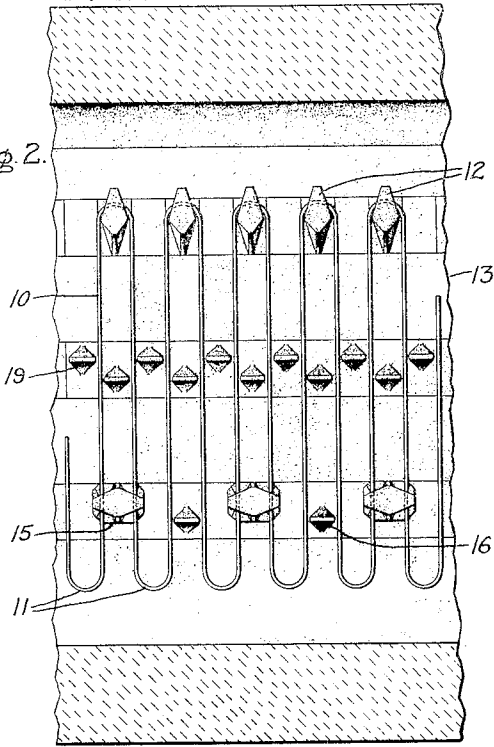


Fig. 3.

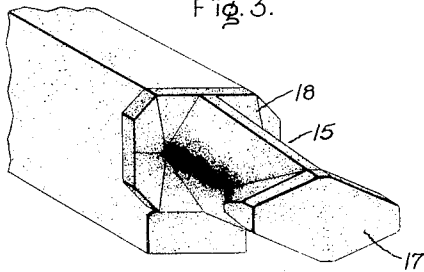


Fig. 4.

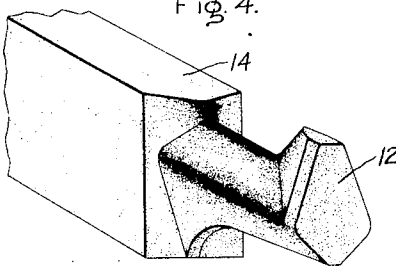
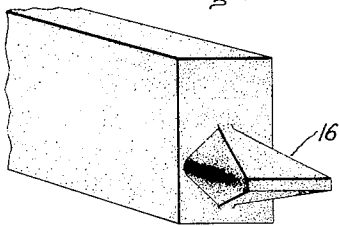


Fig. 5.



Inventor:

James L. McFarland,

by

Wm. L. McFarland
His Attorney.

UNITED STATES PATENT OFFICE.

JAMES L. McFARLAND, OF SCHENECTADY, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

ELECTRIC FURNACE.

Application filed June 16, 1927. Serial No. 199,363.

My invention relates to electric furnaces and has for its object the provision of a simple, reliable and efficient means for supporting and securing the resistor.

More specifically, my invention relates to electric furnaces of the type in which the resistor is hung in a series of loops from supports secured to the furnace wall. These depending loops must be free to expand and contract in a longitudinal direction. By reason of this expansion and contraction, however, and due to the greatly varied temperatures to which the resistor is subjected, the depending loops have a very pronounced tendency to become warped and twisted. This distortion of the resistor causes the loops to engage one another and thereby short circuit sections of the heating resistor. In one of its aspects my invention relates to suitable spacing and securing means for the loops whereby they are held against engagement.

In carrying out my invention in one form, I provide suitable spacing and securing means between the loops consisting of relatively short and elongated members arranged alternately between the loops, the longer members being provided with heads which overhang the adjacent loops and hold them in a predetermined relation with the furnace wall.

For a more complete understanding of my invention reference should be had to the accompanying drawing in which Fig. 1 is a fragmentary view in cross section of an electric furnace embodying my invention; Fig. 2 is a fragmentary, longitudinal, sectional view of the furnace shown in Fig. 1; while Figs. 3, 4 and 5 are enlarged perspective views of the supporting and spacing means for the resistor.

Referring to the drawing, I have shown my invention in one form as comprising a ribbon shaped resistor 10 made of a heat resisting material having a suitable high resistance, such as an alloy of nickel and chromium. This resistor is shaped into a plurality of loops 11 which are hung from supporting members 12 secured to the furnace wall 13. As shown in Fig. 4 the supports 12 are constructed so as to be built into the furnace wall and, in fact, are molded as an integral hook-like extension on one end of the brick-shaped body 14. The upper ends of the loops are hung over these supports 12,

which project into the heating chamber, and hang therefrom in substantially vertical positions closely adjacent but in spaced relation with the side wall of the furnace.

Spacing means for the lower ends of the loops are provided comprising elongated members 15 and relatively short members 16, which are arranged alternately in staggered relation between the loops, as shown in Fig. 2. The elongated members 15 shown in Fig. 3 are provided with horizontal cross bars or heads 17 which overhang the adjacent lengths of the loops between which they are placed and thereby secure the loops against outward movement away from the wall of the furnace. Each elongated member is also provided with a base portion 18 which engages the inner edge of the resistor ribbon and secures the resistor in suitable spaced relation from the furnace wall. The shorter spacing members 16, shown in Fig. 5, are wedge-shaped members having their outer edges arranged horizontally and presenting parallel sides forming spacing means for the loops. These members do not extend outward from the furnace wall for a distance equal to the width of the ribbon, but terminate at a point inside the inner edge of the ribbon. As shown the members 16 extend between the lengths of the ribbon for a distance somewhat over one half the width of the ribbon.

The wedge-like shape of the spacing member 16 provides for free radiation of heat from the resistor ribbon and the sides of the members 16 are rounded for the purpose of allowing free radiation. The sides of the spacing member 15 and also the portions of the head 17 and base 18 against which the resistor ribbon may engage are rounded for the same purpose. With this end in view, the upper side of the support 12 on which the ribbon rests is also rounded.

As shown, the spacing members 15 and 16 are formed as integral extensions on brick-shaped bodies which may be built into the wall of the furnace as previously described in connection with the supports 12. These supporting and spacing members are made from a suitable heat refractory electrically insulating material, such as aluminum oxide or alundum.

If desired, spacing members 19, similar in construction to spacing members 16, may be provided between the loops at points mid-

way of their length. These members are formed near one edge of their brick supports and the bricks are arranged with the spacing members alternately at their upper and lower edges so that the spacing members are in staggered relation. This arrangement is also preferably used in connection with the spacing members 15 and 16. As shown the members 15 are secured in the furnace wall so as to be nearer the upper edges of the bricks, whereas the members 16 are near the lower edges of their supporting bricks. The spacing members 16 and 19 are preferably identical in construction.

It will be observed that this arrangement and construction of the spacing and securing means for the lower ends of the loops provides for heat radiation with the least possible obstruction, and at the same time allows the loops to expand and contract in response to changes in temperature.

While I have described my invention as embodied in concrete form and as operating in a specific manner in accordance with the provisions of the patent statutes, it should

be understood that I do not limit my invention thereto since various modifications thereof will suggest themselves to those skilled in the art without departing from the spirit of my invention the scope of which is set forth in the annexed claim.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

An electric furnace comprising a heat refractory wall forming a heating chamber, insulating supports secured to said wall, a ribbon-shaped heating resistor hung from said supports in a series of depending loops, headed spacing members secured to said wall in alternate spaces between said loops near their lower ends, said heads overhanging the lengths of said resistor adjacent thereto, and wedge-shaped spacing members for said loops having parallel sides and projecting from said wall in the remaining spaces between said loops near the lower ends thereof, the edges of said wedge-shaped members extending horizontally.

In witness whereof, I have hereunto set my hand this 15th day of June, 1927.

JAMES L. McFARLAND.