April 14, 1925. 1,533,228

O. A. COLBY

ELECTRIC FURNACE RESISTOR SUPPORT

Filed Oct. 24. 1922

Fig. 1.

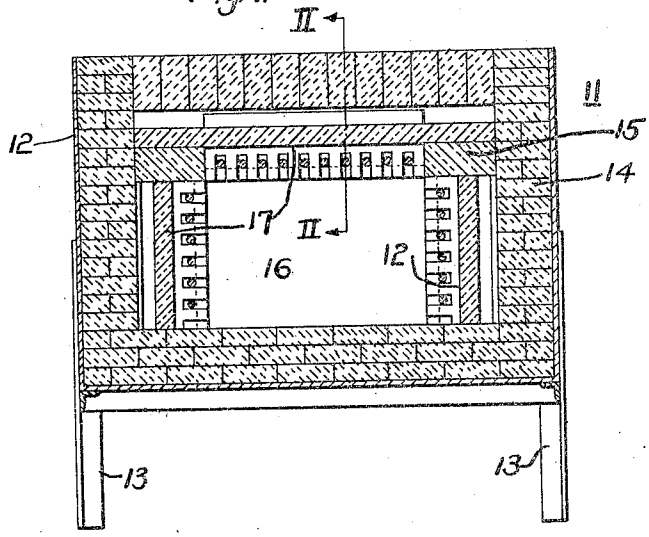


Fig. 2.

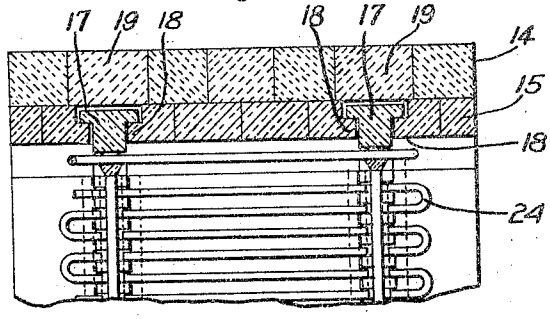


Fig. 4.

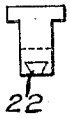


Fig. 3.

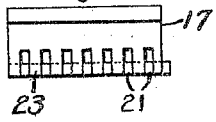
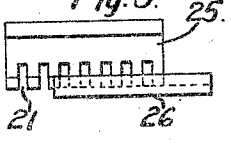


Fig. 6.



Fig. 5.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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ELECTRIC FURNACE RESISTOR SUPPORT.

Application filed October 24, 1922. Serial No. 596,551.

To all whom it may concern:

Be it known that I, ORA A. COLBY, a citizen of the United States, and a resident of Irwin, in the county of Westmoreland and State of Pennsylvania, have invented a new and useful Improvement in Electric Furnace Resistor Supports, of which the following is a specification.

My invention relates to electric furnaces and particularly to electric-resistance furnaces.

The object of my invention is to provide a relatively small, rugged and compact means for supporting a resistor in a furnace chamber.

In practicing my invention, I provide a plurality of relatively narrow and elongated refractory supporting members, of substantially T-shape in lateral section, the inner edge of which is provided with integral laterally extending flanges that are supported by a suitable means integral with the walls of a furnace chamber. Each of the relatively narrow and elongated members is provided with a plurality of laterally extending slots adjacent the outer narrow edge thereof, and a refractory key member, substantially co-extensive with the narrow elongated refractory supporting member, has a dove-tail connection therewith and is movable in a longitudinal direction relatively thereto.

A plurality of the narrow and elongated refractory members are located in spaced relation in a furnace chamber and a preformed, relatively heavy, resistor member extends between the said supporting members and therebeyond, passing through the lateral slots and supported directly by the key members.

In the single sheet of drawings,

Figure 1 is a view, in vertical lateral section, of an electric resistance furnace comprising the device embodying my invention,

Fig. 2 is a view, in vertical longitudinal section, taken on the line II—II of Fig. 1,

Fig. 3 is a view, in side elevation, of a narrow elongated resistor-supporting member and a key member comprising a part of the device embodying my invention,

Fig. 4 is a view in end elevation,

Fig. 5 is a view, in side elevation, of a modified form of a refractory resistor-supporting member, together with a key member, and

Fig. 6 is a view, in end elevation, of the members illustrated in Fig. 5.

An electric-resistance furnace, designated generally by the numeral 11, comprises an outer metallic casing 12 of any suitable or desired contour and dimensions and provided with a plurality of metal supporting members 13 suitably secured thereto. An outer lining 14 comprises a plurality of bricks or blocks of a suitable refractory heat-insulating material. An inner lining 15 comprises a plurality of bricks or blocks of a suitable refractory high-temperature-resisting material, the bricks comprising the two linings being so located as to provide a furnace chamber 16 of any suitable or desired contour and dimensions.

A plurality of relatively narrow and elongated refractory supporting members 17, of substantially T-shape in cross-section, are supported by the bricks or blocks of the inner lining 15, the blocks immediately adjacent the narrow members 17 being provided with projecting shoulder portions 18 to co-operate with the integral lateral flanges of the supporting members 17 to support them in substantially the positions illustrated in Fig. 2 of the drawing.

The members 17 are spaced apart any suitable or desired distance, and the members located in the side walls and in the ceiling may be located in alinement with each other. In order to permit of removing a damaged refractory member 17, provision is made to permit of removing one or more of the bricks or blocks in the outer lining 14, located immediately outside of the narrow members 17, and these quickly removable members are designated by the numeral 19 in Fig. 2 of the drawing. It is to be understood that as many of these removable bricks 19 are provided as may be necessary to permit of easily and quickly removing the members 17 from the roof of the furnace or from the side walls of the furnace.

Each of the members 17 is provided with a plurality of slots 21 which extend laterally therethrough adjacent the inner narrow edge thereof, substantially as illustrated in Fig. 3 of the drawing. A slot 22, of substantially trapezoidal form in lateral section, extends longitudinally of the member 17 immediately adjacent to and below the outer edge portion thereof, as illustrated more particularly in Fig. 4 of the drawing.

A key member 23, of trapezoidal cross-section and of a dimension to fit into the slot 22, is located therein, the member 23 being substantially co-extensive with the member 17. The slots 21 may be made any suitable or desired depth so that a suitable resistor member may be located therein and extend therethrough to be directly supported by the key member 23.

A resistor member 24 comprises a relatively heavy rod or bar of a suitable resistance material, such as nichrome, which is preformed to comprise a plurality of integral parallel-extending and end-connected convolutions, the distance between the adjacent convolutions being substantially the same as the distance between the slots 21 in the members 17. It is, of course, understood that the area of cross-section of the resistor member 24 is such as will permit the resistor member to be substantially self-supporting between the spaced supporting members 17.

In Figs. 5 and 6 of the drawing, I have illustrated a modified form of relatively narrow and elongated refractory supporting member. A member 25, having an inner edge of substantially T-shape, is provided with an outer edge having laterally extending integral portions whereby a thickened outer edge portion is obtained. A plurality of slots 21 extend laterally through the member 25, adjacent to the outer thickened edge portion thereof, and a key member 26 operatively engages the outer edge portion to directly support the resistor member 24. The key member 26 is of substantially channel section and is provided with over-hanging flange portions, substantially as illustrated in Fig. 6 of the drawing to fit over the thickened edge portion of the member 25.

It may be noted that the key members shown in Figs. 3 and 5, respectively, of the drawing, illustrate members which have a dove-tail connection with the member of T-shape which they operatively engage.

In assembling the heating element in the furnace, the members 17 are placed in their proper operative positions, substantially as illustrated in Fig. 1 of the drawing, after which the resistor member 24 is placed in its proper operative position extending through the slots 21. The key members hereinbefore described are then moved, longitudinally of the respective members 17, to their proper operative positions relatively thereto, it being understood, as hereinbefore described, that suitable provision has been made in the walls of the furnace chamber to permit of moving not only the members 17 to their proper operative positions, but also to permit of moving the key members 23 or 26 into their proper operative positions relatively to the members 17 or 25 which they operatively engage.

The lateral thickness of the members 17 and 25 may be made any suitable or desired amount in order that sufficient mechanical strength may be provided to support the resistor member 24, and the relative proportions of the respective key members is such as to obtain the greatest strength in accordance with the lateral thickness of the members 17.

Various changes in detail and arrangement may be made without departing from the spirit and scope of the invention and such modifications are intended to be covered by the appended claims.

I claim as my invention:

1. A resistor-supporting means comprising a refractory electric-insulating member, of substantially T-shape in cross-section and having a plurality of spaced-apart slots in the outer edge thereof, and a refractory key member having a longitudinally extending dovetail connection with said member of T-shape.

2. A heating element for an electric-resistance furnace comprising an elongated refractory electric-insulating member, of substantially T-shape in cross-section and having a plurality of laterally extending slots in the outer edge thereof, a resistor member extending through said slots, and a refractory key member having a dovetail connection with said member of T-shape at the outer edge thereof.

3. In a heating element for an electric resistance furnace, in combination, a plurality of spaced-apart elongated relatively narrow, refractory, electric-insulating members, of substantially T-shape in cross-section and having a plurality of laterally extending slots in the outer edge thereof, a resistor member comprising a relatively heavy and unyeilding conductor preformed to comprise a plurality of parallel-extending and end-connected convolutions having portions of each convolution lying in said slots and extending between and beyond said refractory members, and refractory key members having a dovetail connection with the outer edge portions of said members of T-shape and removable longitudinally thereof.

4. In a resistor supporting means for an electric resistance furnace, in combination, an elongated, relatively narrow, refractory, electric-insulating member of substantially T-shape in cross-section and having a plurality of laterally extending slots in the outer edge thereof, and a refractory key member having a dovetail connection with said elongated refractory member of T-shape and removable lonigtudinally therefrom.

5. A resistor-supporting means comprising a refractory relatively narrow electric-insulating member, of substantially T-shape in cross-section and having a plurality of spaced-apart laterally extending slots in the

outer edge thereof for receiving a resistor member therein, and a refractory key member having a dove-tail connection with said member of T-shape and movable longitudinally thereof to operatively engage the same or be disengaged therefrom.

6. A resistor-supporting means comprising a refractory electric-insulating member, of substantially T-shape in cross-section and having a plurality of laterally extending spaced slots, and a longitudinally-extending slot, of dove-tail form, in the outer edge thereof, and a refractory key member, of dove-tail form in lateral section, located in said longitudinal slot.

In testimony whereof, I have hereunto subscribed my name this 13th day of October 1922.

ORA A. COLBY.