Aug. 16, 1927. 1,638,822

H. M. BIEBEL

ELECTRIC RESISTANCE FURNACE

Filed June 30, 1923

Fig. 1.

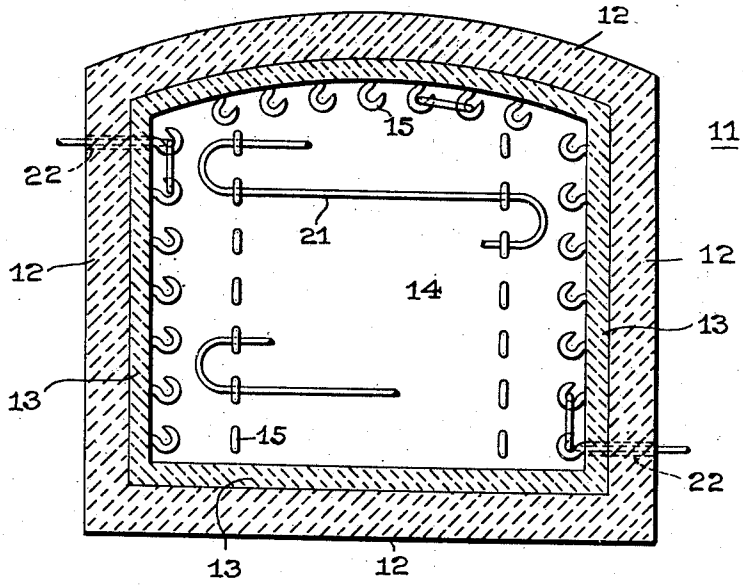


Fig. 2.

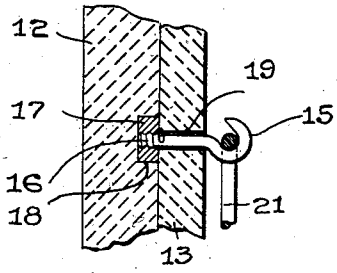


Fig. 3.

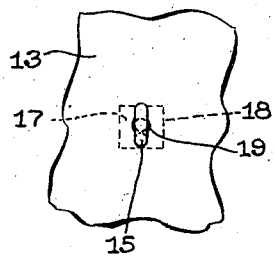


Fig. 4.

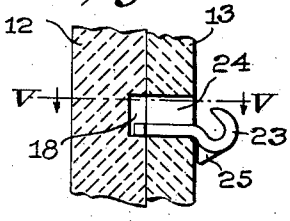


Fig. 5.

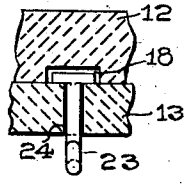
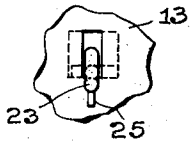


Fig. 6.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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ELECTRIC RESISTANCE FURNACE.

Application filed June 30, 1923. Serial No. 648,717.

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

The object of my invention is to provide relatively small means for supporting a relatively heavy and preformed resistor member adjacent to the walls of a furnace.

In practicing my invention, I provide a plurality of spaced sets of spaced hooks mounted in the refractory wall of the furnace structure to support a relatively heavy resistor member preformed to comprise a plurality of integral, end-connected and substantially parallel-extending, straight convolutions in the furnace chamber adjacent to the wall.

The hooks may be screwed into blocks of metal or other refractory material located in the wall or they may be provided with inner ends of T- or of L-shape and be fitted into slots or openings in the wall. Means integral with the hooks may be provided at the outer ends thereof to prevent tilting of the hooks when carrying the weight of the resistor member.

In the single sheet of drawings,

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

Fig. 2 is an enlarged sectional view of a small part of the furnace structure illustrating the device embodying my invention,

Fig. 3 is a view, in front elevation, of the part shown in Fig. 2,

Fig. 4 is an enlarged sectional view of a small part of a furnace structure and of a modified form of device embodying my invention,

Fig. 5 is a view, in section thereof, taken on the line V—V of Fig. 4, and

Fig. 6 is a view, in front elevation, of the parts shown in Fig. 4.

An electric resistance furnace 11 comprises a plurality of outer walls 12 having an inner lining 13 therein, the outer and the inner walls being so spaced as to provide a furnace chamber 14 of a suitable or desired contour and dimensions. The outer and inner walls are built up of suitable refractory heat and electric insulating and high temperature-resisting materials usually employed in the art.

A plurality of spaced sets of spaced hooks 15 having screw-threaded inner end portions 16, the screw threads being relatively coarse are located in the walls of the furnace structure. A refractory screw-threaded plate 17 which is provided for each of the hooks 15, may be located in a suitable chamber 18 provided in the outer wall 12, a suitable opening 19 permitting of the hook member 15 being inserted therethrough to have screw-threaded engagement with the block 16.

A resistor member 21 comprises a relatively heavy rod or bar of a suitable resistor material that is preformed to comprise a plurality of integral, end-connected, and substantially parallel-extending, straight convolutions.

The distance between the spaced sets of hook members 15 is in accordance with the thickness of the rod comprising the resistor member 21 to the effect that the resistor member may be substantially self-supporting between the hook members 15, each convolution of the resistor member being supported by two or more hook members located in spaced relation relatively to each other. If it is found desirable or necessary to prevent longitudinal movement of the resistor member 21, during the operation of the furnace when it is subjected to repeated heating and cooling, the hook members 15 may be located relatively close to the arcuate end connections, thereby preventing any shifting of the heating element relatively to the hooks when the resistor member expands and contracts.

Substantially the same construction, as described for the particularly extending walls may be employed for the roof or ceiling of the furnace structure. The end portions of the resistor member 21 may be bent at substantially right angles to the general plane of the individual resistor member and extend through suitable openings 22 in the wall of the furnace, as illustrated more particularly in Fig. 1 of the drawing.

The resistor member may be placed in its proper operative position in the hook members 15 by successively causing the convolutions to rest in the hook members, the preformed resistor member possessing enough resiliency to permit of moving the individual convolutions sufficiently laterally of each other to permit of causing them to engage the co-operating hook members 15. The resistor member may be removed by substantially the reverse operation of that described for the assembly thereof.

Figs. 4 to 6 illustrate a modified form of device embodying my invention comprising hook members 23, the inner ends of which are of either T or of L-shape. A relatively narrow and elongated opening 24 is provided in the inner lining 13 and a chamber 18 is provided adjacent thereto, and substantially registering therewith, in the outer lining 12. The hook member 23 is inserted in the opening 25 with the inner end of T or of L-shape in alinement with the opening and is then given a turning movement of substantially 90° to cause it to be interlocked with the walls of the hereinbefore described chamber substantially as illustrated in Fig. 5 of the drawing.

As sufficient clearance must be allowed between the hook member and the walls of the furnace, there would be a tendency for the hook member 23 to tilt slightly when carrying the weight of the resistor member and to overcome this, I provide an integral and downwardly extending lug portion 25 at the front end of the hook member which is effective to prevent substantially all such tilting movement.

The openings 24 and the chambers 18 may be provided during the construction of the furnace structure and it is a relatively small matter to place a plurality of hook members 23 in their proper operative positions and then mount the resistor member therein or, if found desirable, the individual convolutions of the resistor member may be held in their proper operative positions against the wall of the furnace and the hook members inserted successively in their proper locations and positions, whereby one convolution after the other will be properly supported.

The device embodying my invention thus provides a relatively small device that is easily installed in, and removed from, a furnace structure to permit of supporting a relatively heavy and preformed resistor member therein in such manner that substantially all of the length of the resistor member shall be in heat radiating relation to the furnace chamber and shall not be covered to any extent by the supporting means.

Various modifications and changes may be made without departing from the spirit and scope of the invention and I desire, therefore, that only such limitations shall be placed thereon as are imposed by the prior art or are set forth in the appended claims.

I claim as my invention:

1. In an electric furnace, in combination, a preformed, relatively heavy resistor member comprising a plurality of end-connected substantially parallel-extending straight convolutions, and a plurality of spaced hook members removably mounted in and interlocked with a wall of said furnace for supporting said resistor member.

2. In an electric furnace, in combination, a plurality of refractory walls enclosing a furnace chamber, a plurality of spaced sets of hooks supported in spaced relation relatively to each other in one of said walls, said hooks being removably mounted in and interlocked with one of said walls, and a relatively heavy resistor member preformed to comprise a plurality of substantially parallel-extending straight convolutions, each of said convolutions being supported by at least two of said hooks.

3. In an electric furnace, in combination, a plurality of refractory walls enclosing a furnace chamber, a relatively heavy resistor member preformed to comprise a plurality of end-connected, integral, substantially parallel-extending, straight convolutions, and a plurality of spaced sets of spaced hooks, one hook in each set operatively engaging a convolution between the end-connections to support the same free of, but adjacent to, the wall.

4. In an electric furnace, in combination, a plurality of refractory walls enclosing a furnace-chamber, a relatively heavy resistor member preformed to comprise a plurality of integral, end-connected substantially parallel-extending, straight convolutions, and a plurality of spaced hooks for releasably supporting said resistor member, said hooks being so mounted in one of said walls as to be removable therefrom by a turning movement relatively thereto.

5. In an electric furnace, in combination, a plurality of refractory walls enclosing a furnace chamber, a relatively heavy resistor member preformed to comprise a plurality of end-connected, integral, substantially parallel-extending, straight, convolutions and a plurality of hook members, removably supported by one of said walls and interlocked therewith, for operatively engaging said convolutions at spaced points to support said resistor in its operative position in said furnace chamber.

6. In an electric furnace, in combination, a plurality of refractory walls enclosing a furnace chamber, a relatively heavy resistor member preformed to comprise a plurality of integral, end-connected, substantially parallel-extending, straight convolutions, and a plurality of spaced hooks projecting outwardly from one of said walls to operatively engage and support said resistor member, said hooks having inner ends of substantially T-shape to fit into openings in said wall to support said hooks therein, and having also integral means to prevent tilting thereof when supporting said resistor member.

In testimony whereof, I have hereunto subscribed my name this 27th day of June, 1923.

HERMAN M. BIEBEL.