

April 16, 1929.

P. B. CROCKER

1,709,340

ELECTRIC HEATER

Filed May 15, 1928

2 Sheets-Sheet 1

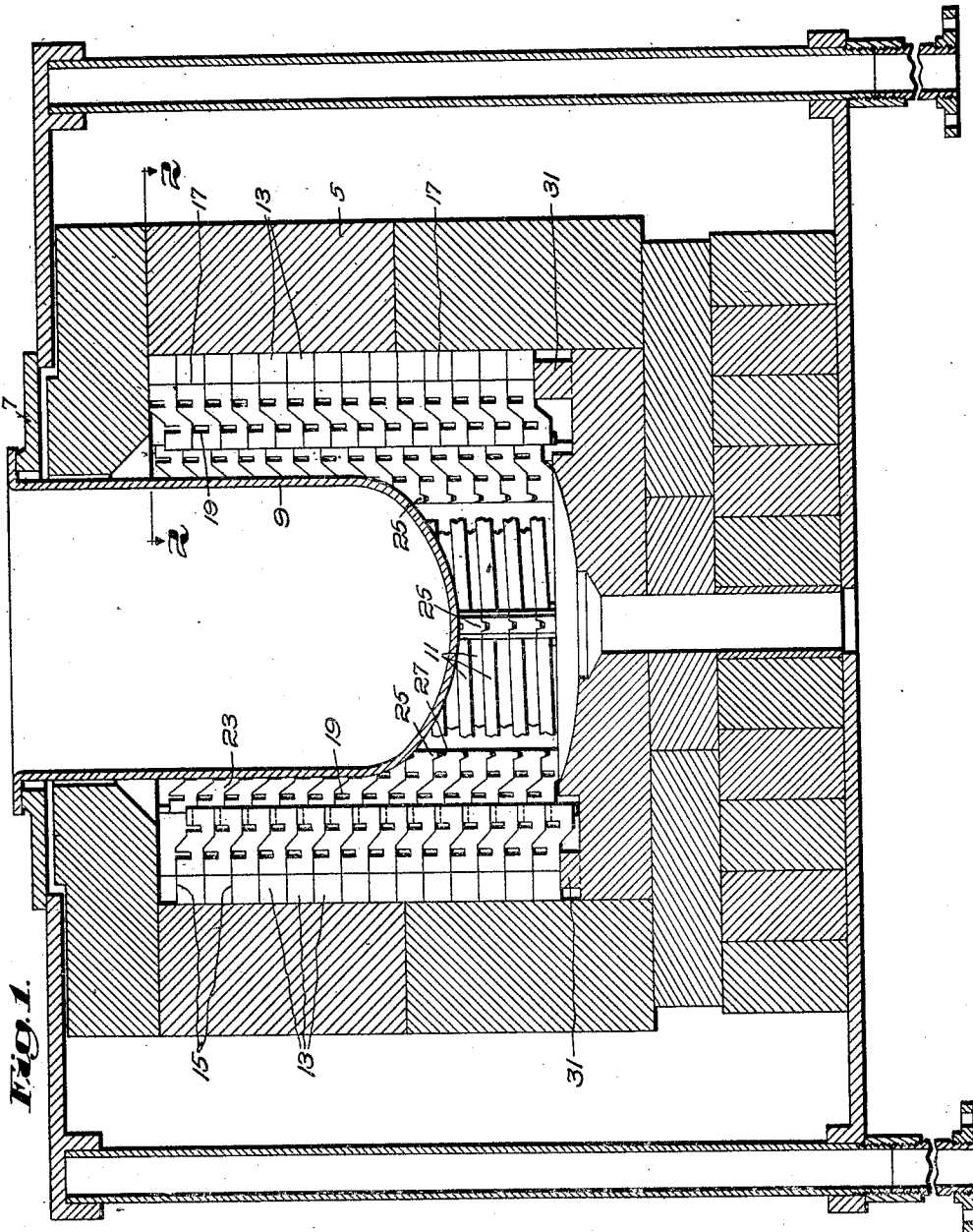


Fig. 1.

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April 16, 1929.

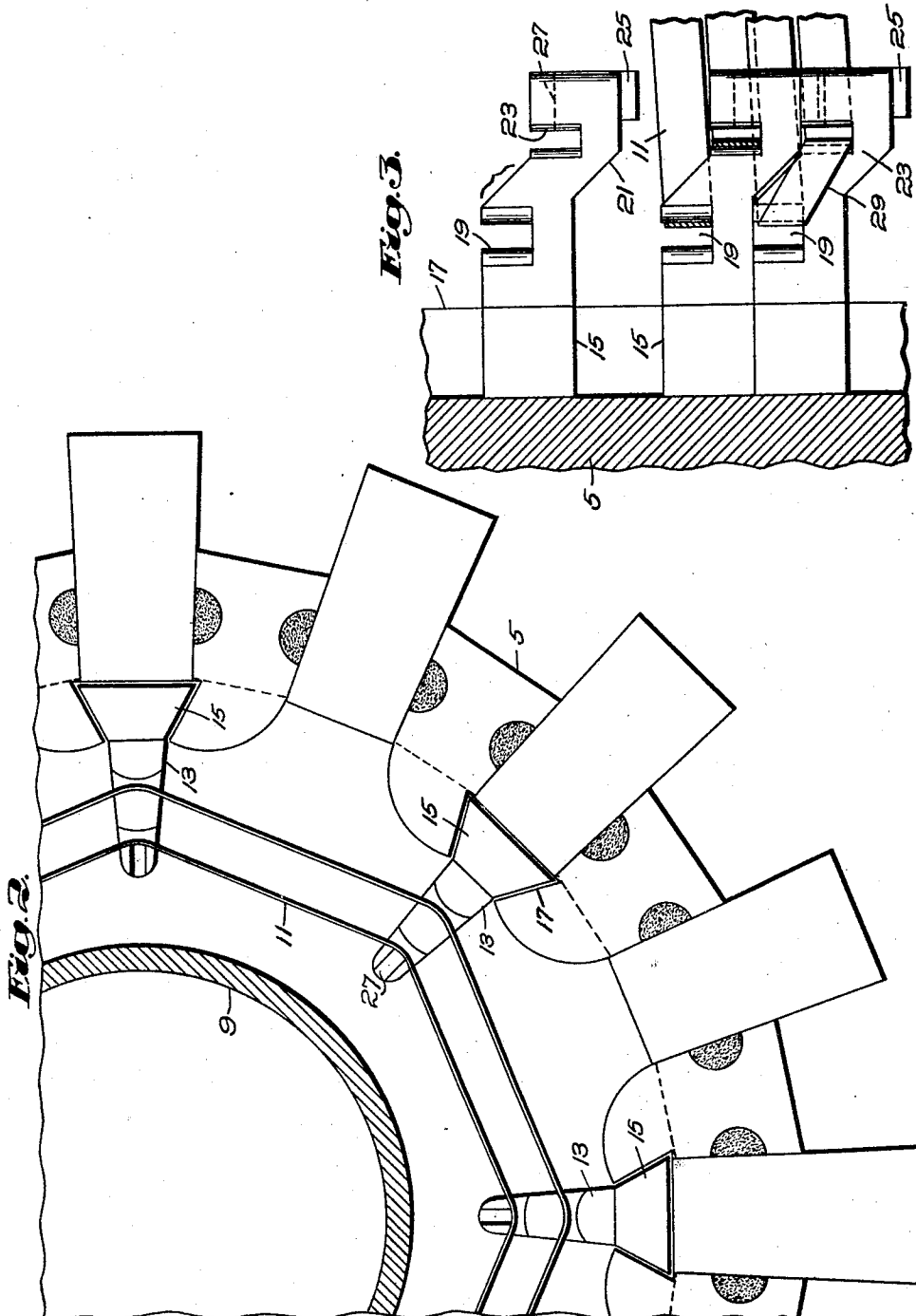
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ELECTRIC HEATER

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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ELECTRIC HEATER.

Application filed May 15, 1928. Serial No. 277,892.

This invention relates to electric heaters, such, for example, as melting pots, and the particular object of the invention is to provide an improved construction for such devices facilitating the installation of the electric resistance or resistances therein. My invention may be understood from the disclosure by way of example in the following description, taken in connection with the accompanying drawings, of a pot furnace illustrative of the principles of the invention. In these drawings:—

Fig. 1 is a central vertical section through a furnace with part of the resistance element broken away;

Fig. 2 is a partial section on the line 2—2 of Fig. 1; and

Fig. 3 is a fragmentary view illustrating in a somewhat diagrammatic manner the method of installing the resistance element.

The furnace herein shown as embodying my invention comprises a suitable heating chamber having walls 5 of suitable heat-resisting material, in which chamber is suspended from the top plate 7 a suitable melting pot or crucible 9. About the walls of the chamber is disposed the resistance element 11 which herein forms an inner and an outer helix wound of flat tape, the spires of the two helices being staggered so that the turns of one are exposed between those of the other when viewed from the side, as indicated in Fig. 1, to provide a practically continuous radiating surface presented toward the pot 9. To support the resistance element adjacent the vertical or circumferential wall of the furnace chamber I employ suitable supporting devices, preferably in the form of porcelain blocks 13, adapted to be brought serially into position and to engage part of the resistance element. In the present embodiment of the invention these blocks are interengaged directly with the wall 5 of the furnace, being provided with suitable enlarged heads 15 (Figs. 2 and 3) adapted to be moved behind suitable shoulders formed on the wall of the furnace, and thus interlocked therewith. I shall herein disclose a preferred arrangement for use in connection with a helically applied resistance element as illustrated.

To support such a resistance element I may provide at intervals about the wall of the furnace vertical ways 17, each adapted to receive a pile of the blocks 13, and these ways

are herein shown as taking the form of a dovetailed groove in the furnace wall extending vertically therealong and adapted to receive the enlarged heads 15 which form a corresponding dovetailed tenon. These grooves 17 open at the top of the furnace, thus permitting the blocks to be freely slid into position from above. As best seen in Fig. 3, the body of the block 13 may be provided with a slot 19 opening at one side thereof and defining at its outer side a hook to engage a turn of the resistance element. Herein to support a double helix as disclosed the body is provided with an offset extension 21 having a similar slot 23 opening in the same direction as the slot 19, the offsetting of this slot providing for the staggering of the turns of the inner and outer helices, as illustrated at the lower part of Fig. 3. To preserve the alignment of the blocks in a vertical pile, especially since the dovetailed connection at 15—17 is necessarily a somewhat loose one, they may be provided with means remote from the head 15 for interlocking them, herein shown as a projection 25 from the bottom of each block adapted to enter a corresponding recess 27 in the top of the adjacent block.

The assembly of the parts, by means of which the installation of the resistance element 11 is effected, may be clearly understood from Fig. 3. In the example illustrated the resistance element forms a double helix and it is desirable to bring both terminals out at the top. A bight central of the length of resistance material is therefore initially secured adjacent the bottom of the furnace conveniently by means of the blocks 13. Thus a block, such as the lowermost one illustrated in Fig. 3, is slid into a selected guideway 17 and a bight 29 of the resistance element is looped thereover, the two sides of the bight lying in the slots 19 and 23. A second block may then be dropped into the way 17 and it will fit over these slots, closing the mouths of the hooks and confining the element therein. The leads of the resistance element are then laid circumferentially, a block is dropped in an adjacent way and the leads are placed in the slots therein and held in position by a second block overlying the first. This is continued serially until the resistance element reaches the initial position, as illustrated in Fig. 3, where its leads are engaged with the second block already

there and which confines the bight 29 and a third block of the pile, shown in the figure in a somewhat raised position, is added to confine these turns in the hooks or slots of the second block. This proceeding is continued and the terminals brought out together at the top of the chamber. The resistance element is held by the blocks and this in turn serves to hold them in position in the grooves in which they have been placed. To provide a suitable helical pitch the successive piles of blocks may rest upon suitable spacers or spacing projections 31 (see Fig. 1) of progressively increasing height about the circumference of the chamber.

Not only is the construction secure, simple and rugged, but it will be seen that the assembly of the parts and the installation of the heating element in the furnace are very expeditiously effected. In this description and the appended claims I have referred to the ways which are provided in the example shown by the dovetailed grooves 17 as being vertical since in the example illustrated the heating element encircles the sides of a vertically disposed pot. Obviously this word is relative although convenient to retain for the purpose of clarity in the description.

I am aware that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive; reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

Claims—

1. In an electric heater a chamber having at intervals about its periphery vertically extending guiding and supporting ways, each receiving freely from above a pile of discrete refractory blocks defining at meeting faces thereof transverse openings, the totality of said openings forming a helical series, and a coiled resistance element received in said openings.

2. In an electric heater a chamber having at intervals about its periphery vertically extending guiding and supporting ways, each receiving freely from above a pile of discrete refractory blocks defining at meeting faces thereof transverse openings providing an inner set and an outer set relatively staggered, the totality of said openings forming inner and outer helical series, and a resistance element having a bight and its ends coiled into said inner and outer openings respectively.

3. In an electric heater a chamber having vertical channels along its walls having restricted mouths, a series of blocks having heads received in said channels, some at least of said blocks having inwardly projecting hook-like portions, and a resistance element

comprising circumferential turns engaged and supported by said portions.

4. In an electric heater a chamber having vertical channels along its walls having restricted mouths, a series of blocks having heads received in said channels, some at least of said blocks having inwardly projecting hook-like portions, and a resistance element comprising circumferential turns engaged and supported by said portions with adjacent blocks closing the mouths of the hooks to confine the turns therein.

5. A supporting block for a resistance element having an enlarged head and a body provided with a lateral slot, and a projection and a recess on opposite sides of said body respectively to provide for interengagement of superposed blocks remote from said head whereby to align the same.

6. A supporting block for a resistance element having an enlarged head and a body provided with a lateral slot, an offset extension having a similar slot opening in the same direction, and a projection and a recess on opposite sides of said body respectively to provide for interengagement of superposed blocks remote from said head whereby to align the same.

7. In an electric heater a chamber having channels along its walls, a series of blocks received in each channel and held thereby against inward movement, and a circumferential resistance element engaged between adjacent blocks.

8. In an electric heater a chamber having at intervals around its periphery vertically extending guiding and supporting ways, refractory blocks adapted to be slid vertically into cooperation with said ways and having at their inner ends means for engaging a resistance element and a resistance element comprising circumferentially arranged turns engaged and supported by said blocks.

9. In an electric heater a chamber having at intervals around its periphery vertically extending guiding and supporting ways, refractory blocks adapted to be slid vertically into cooperation with said ways and having at their inner ends open slots forming hooks to receive therein a resistance element and adapted to be closed by an overlying block, and a resistance element comprising circumferentially arranged turns passing through said slots.

10. In an electric heater a chamber having a refractory inner wall provided at intervals therearound with undercut grooves opening at the top of the chamber, blocks adapted to be slid into said grooves from the top having heads to be retained therein, at least certain of said blocks having open hooks in which a resistance element may be laid, and a resistance element having turns engaged by said hooks.

11. In an electric heater a chamber having

a refractory inner wall provided at intervals therearound with undercut grooves opening at the top of the chamber, blocks adapted to be slid into said grooves from the top having heads to be retained therein, at least certain of said blocks having open hooks in which a resistance element may be laid, a resistance element having turns engaged by said hooks with adjacent blocks closing the mouths of said hooks.

12. An electric heater having an open-topped chamber, a linear resistance element therein having a bight adjacent the bottom of the chamber and its ends coiled helically around the walls thereof, the terminals lying adjacent the top of said chamber, and means for positioning said element comprising open-topped ways at the sides of the chamber, a pile of blocks entered into each way from above and retained thereby against inward movement, pairs of adjacent blocks having projecting portions engaging spires of said helices between them.

13. In an electric heater a chamber having a refractory inner wall having undercut recesses at intervals thereabout, supporting members having enlarged heads adapted to be presented to said wall and moved to interlock in said recesses, said members provided with hooks, a resistance element engaged with said hooks, and cooperating headed members

similarly engaged with the wall overlying the mouths of said hooks to retain the element therein.

14. In an electric heater a chamber having a refractory inner wall having undercut recesses at intervals thereabout, a helical resistance element adjacent said wall, and means for supporting it therefrom comprising members clasping between them the spires of the helix and having enlarged integral heads locked in said recesses and thereby retained in clasping position.

15. A method of installing a resistance element in the cavity of a heating chamber which comprises providing open-topped channels at intervals along the sides of such chamber, securing the element adjacent the bottom of the chamber and directing it circumferentially thereof at a suitable pitch, sliding into a channel from above to interlock therewith against inward movement a refractory block having a hook, engaging the element in said hook, sliding in another block to overlie said hook to retain the element therein and thence proceeding in like manner to provide a helix about the wall of the chamber.

In testimony whereof, I have signed my name to this specification.

PERCIVAL B. CROCKER.

CERTIFICATE OF CORRECTION.

Patent No. 1,709,340.

Granted April 16, 1929, to

PERCIVAL B. CROCKER.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 2, line 71, claim 4, for the word "heals" read "heads"; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 21st day of May, A. D. 1929.

(Seal)

**M. J. Moore,
Acting Commissioner of Patents.**

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