May 29, 1928.

1,671,794

D. L. SUMMEY

RESISTOR AND SUPPORT THEREFOR

Original Filed June 5, 1926 3 Sheets-Sheet 1

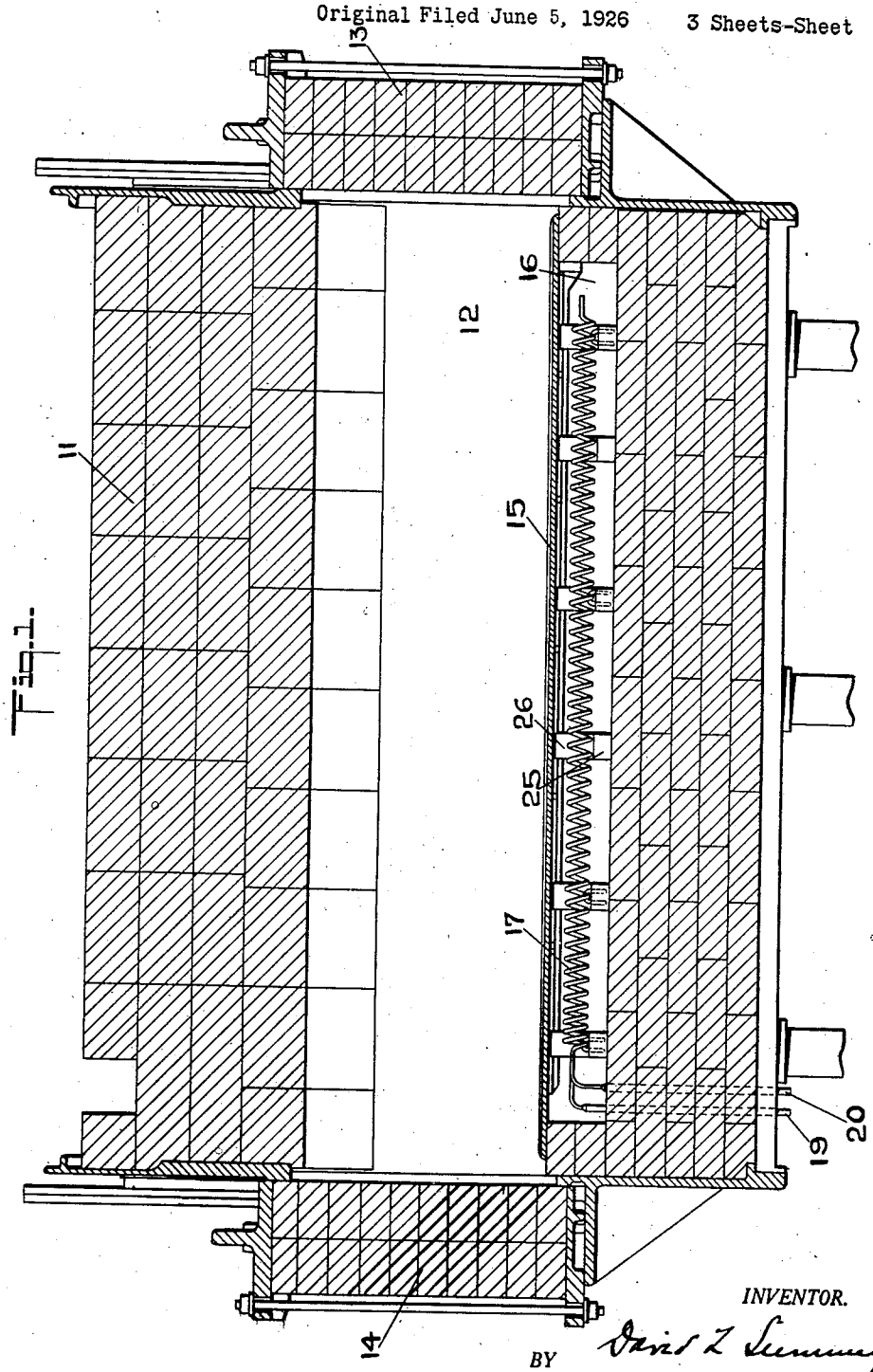


Fig. 1.

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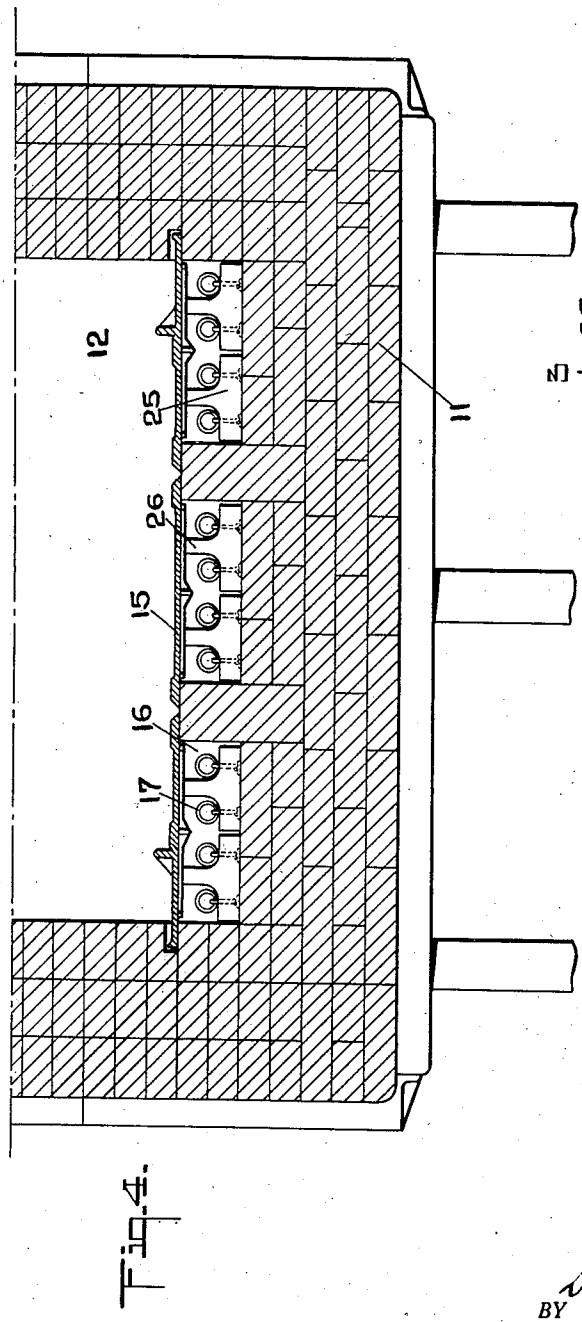


Fig. 4.

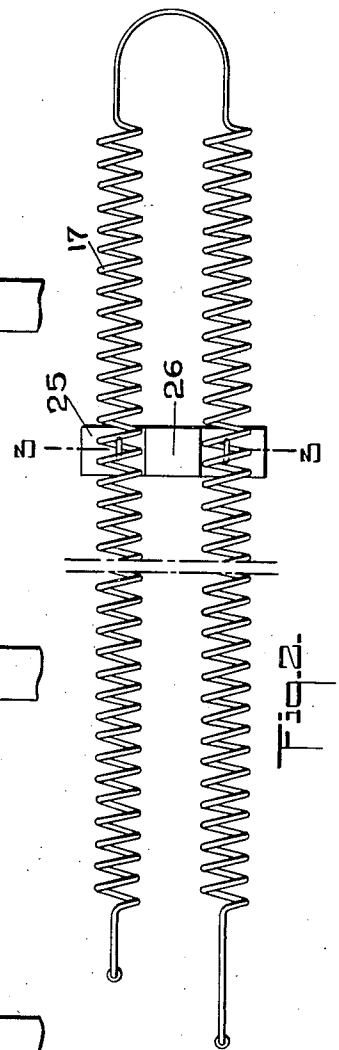


Fig. 2.

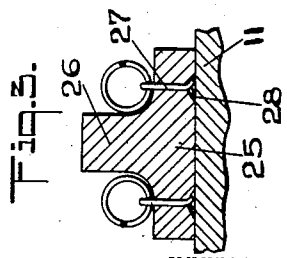


Fig. 3.

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RESISTOR AND SUPPORT THEREFOR

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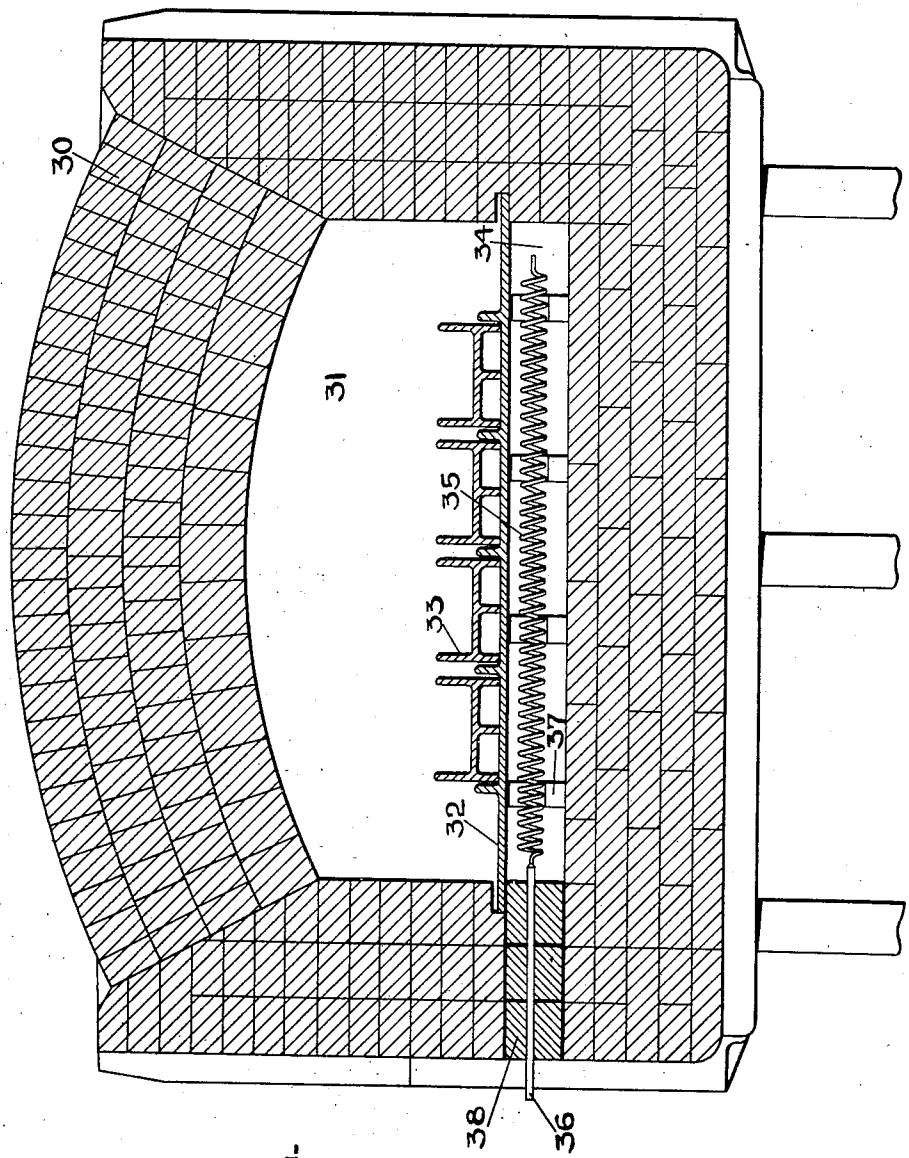


Fig. 6.

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Patented May 29, 1928. 1,671,794

UNITED STATES PATENT OFFICE.

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RESISTOR AND SUPPORT THEREFOR.

Original application filed June 5, 1926, Serial No. 113,852. Divided and this application filed March 26, 1927. Serial No. 178,646.

This invention relates to resistors and supports therefor. The present application is a division from an application filed June 5, 1926, Serial No. 113,852.

It is an object of the invention to provide a resistor and resistor supporting means such that the resistors, and particularly those for the bottom of a furnace, may be readily assembled and disassembled with the furnace structure in situ, and such that the furnace walls give the necessary insulation.

With these general objects, and others, in view, the invention consists in the features, combinations, details of construction, and arrangements of parts which will first be described in connection with the accompanying drawings and then more particularly pointed out.

In the drawings—

Figure 1 is a view in longitudinal vertical section of a furnace embodying a resistor and resistor supporting means constructed in accordance with the invention;

Figure 2 is a top plan view of a resistor;

Figure 3 is a sectional view taken on the line 3—3 of Fig. 2;

Figure 4 is a transverse sectional view of the furnace; and,

Figure 5 is a transverse sectional view of a modified construction.

Referring to the drawings, the furnace illustrated, more or less conventionally, in Figs. 1 and 4 comprises a furnace housing 11, of firebrick or other suitable material, enclosing a long heating chamber 12. At the ends of the furnace are suitable doors 13, 14. At the bottom of the furnace chamber is a removable metal floor 15 for supporting the articles to be heated, e. g. trays of small articles, which may be slid across the floor.

The furnace chamber may be heated by top, side and bottom resistor units. Top and side units are disclosed in the parent application above referred to. As the present application relates to so-called bottom resistor units, the top and side units have been omitted for simplicity of description and illustration.

Below floor 15 are a number of longitudinal recesses or chambers 16 for receiving the resistor units. As here illustrated as an example, there are three of these recesses, each accommodating the units.

Each resistor, as shown, comprises a substantially rigid wire 17 pre-formed into a hairpin bend, the legs of which are helically coiled. The resistors have their legs parallel with floor 15 and extend substantially the length of the furnace chamber.

Resistor 17 has conductor leads rigidly connected with the resistor wire and located at right angles to the axes of the resistor legs. To this end, the two legs of the hairpin loop are extended somewhat beyond the coiled portion and the ends are bent downward as appears in Fig. 1. Welded to one bent-down end of the resistor wire is a conductor lead 19 in the form of a rigid rod which passes downwardly through a suitable hole or passage in the bottom wall of the furnace. The other end of the resistor wire has a similar lead 20. The leads 19, 20, are of larger diameter than the wire 17 to avoid undue heating effect in the wall. Beyond the furnace wall the leads are connected in a suitable electric circuit by being attached to bus bars (not shown).

There is provided a plurality of individual resistors insulated and supported from the bottom wall. In structures embodying the invention to the best advantage, the supports will be such that the resistor can be assembled and disassembled independently of the furnace structure. This may be accomplished, for example, by supports resting freely on the bottom wall and movable as a unit with the resistor. To this end, in the embodiment illustrated in Figs. 1 and 2, the resistor 17 is supported by a row of spaced, duplex pillow blocks 25. The blocks have central partitions 26 for separating the legs of the resistor loop and each side provides a seat for one leg of the coiled resistor, as more clearly appears in Figs. 3 and 4. Blocks 25 are made of firebrick or other suitable material and seat freely on the bottom wall of the furnace structure.

The supporting means includes, in the present embodiment, means for fastening the

resistor in position on its supports so that resistor and blocks form a movable unit. To this end, as here shown as an example, each side of each block 25 has a pair of bores for receiving the legs of a wire loop or staple 27 which embraces one turn of the resistor coil. At the bottom of the blocks, the bores open into countersunk recesses 28. After the staples are in place, their ends are bent over to prevent withdrawal, the bent ends lying in recesses 28 to provide a flush bottom surface.

In normal position the resistor rests on the pillow blocks 25 which are supported from and insulated by the bottom wall of the furnace chamber. The resistor is held in place by the staples which cannot come out because of their bent ends. The resistor, its leads, and its supports, form a unit which may be removed or inserted independently of the furnace walls.

To remove this unit, floor 15 is removed and the resistor unit lifted upwardly with a right line movement, thus withdrawing leads 19, 20, from the furnace wall. The unit may then be removed through an end door. To assemble the unit, the resistor is stapled to its pillow blocks and the complete unit is lowered with a right line movement until the pillow blocks seat on the bottom of recess 18, the leads being pushed home in their passages. Both operations are carried out with the furnace walls in situ.

Figure 5 illustrates a modification in which bottom resistors may be removed and inserted without the necessity of removing the furnace floor. As here shown as an example, the furnace 30 has a heating chamber 31. Near the bottom of this chamber is a metal floor 32, supporting a plurality of metal channels or troughs 33. These troughs serve as guides for articles to be heated, e. g. billets, as they move through the furnace. Below floor 32 is a recess 34 extending transversely of the furnace. The bottom resistor 35 is like that above described except that its leads, one of which is indicated by 36, are coaxial with the resistor coils instead of at right angles. The resistor is supported by pillow blocks 37 such as those described and these blocks are supported from the bottom wall by seating freely thereon. The resistor is stapled to the blocks as above described, the securing means being omitted from the showing of Fig. 5 for simplicity of illustration.

The leads of resistor 35 pass through alining bores formed in a number of removable bricks 38 which are laid on brickwork of the side wall flush with the bottom of recess 34. These bricks may be luted with fireclay or the like.

To remove the unit comprising resistor 35, its pillow blocks 37, and its leads, bricks 38 are removed and the unit is withdrawn through the opening in the side wall thus formed, the pillow blocks sliding along the bottom wall. The unit is assembled in position by stapling the resistor to its pillow blocks outside the furnace, sliding the unit into recess 34, and replacing bricks 38.

The unit described may be duplicated along the length of the furnace as may be desired.

The metal parts in the furnace, such as the staples, floors and troughs are formed from a metal having substantially the same heat-resisting characteristics as the resistors themselves. For this purpose, nickel chromium alloy has been found suitable.

What is claimed is:

1. In combination with a furnace housing enclosing a furnace chamber, a resistor comprising a substantially rigid wire pre-formed into a hair-pin bend with the legs thereof helically coiled, a plurality of pillow blocks freely seated on the bottom furnace wall, a central partition on each block providing two separated seats for the legs of the resistor, and a plurality of loop-like staples for taking over one turn each of the resistor coils, the blocks having bores for receiving said staples.

2. In combination with a furnace housing enclosing a furnace chamber, a resistor comprising a substantially rigid wire preformed into a hair-pin bend with the legs thereof helically coiled, a plurality of pillow blocks freely seated on the bottom furnace wall, a central partition on each block providing two separated seats for the legs of the resistor, and a plurality of loop-like staples for taking over one turn each of the resistor coils, the blocks having bores for receiving said staples and having recesses in their bottom faces for receiving the bent over ends of said staples.

3. In combination with a furnace housing enclosing a furnace chamber, a floor spaced from the bottom furnace wall to provide a resistor chamber, a resistor in said chamber comprising a substantially rigid wire formed into a hair-pin bend, leads connected to the end of said resistor, the wall of the furnace housing having a passage in line with said resistor chamber, a plurality of bricks removably inserted in said passage and having alined perforations for said leads, a plurality of pillow blocks freely and slidably seated on said bottom furnace wall for supporting the resistor, and means for securing the resistor to said blocks, whereby upon removal of said bricks the resistor and its supports may be removed as a unit by sliding the blocks along the bottom furnace wall.

4. In combination with a furnace housing enclosing a furnace chamber, article supporting means spaced from the bottom of the furnace chamber to leave a resistor chamber below said means, a normally plugged open-

ing in a furnace wall in line with said resistor chamber, a resistor unit in said resistor chamber comprising a resistor element and a plurality of supporting elements freely and slidably seated on the bottom of the furnace chamber and to which the resistor is secured, whereby upon removal of the plug for said opening the resistor unit may be removed therethrough by sliding said supports along the bottom of the furnace chamber.

In testimony whereof, I have hereunto set my hand.

DAVID L. SUMMEY