June 15, 1926. 1,588,641

J. C. WOODSON

ELECTRIC HEAT TREATING FURNACE

Filed July 13, 1923

Fig. 1.

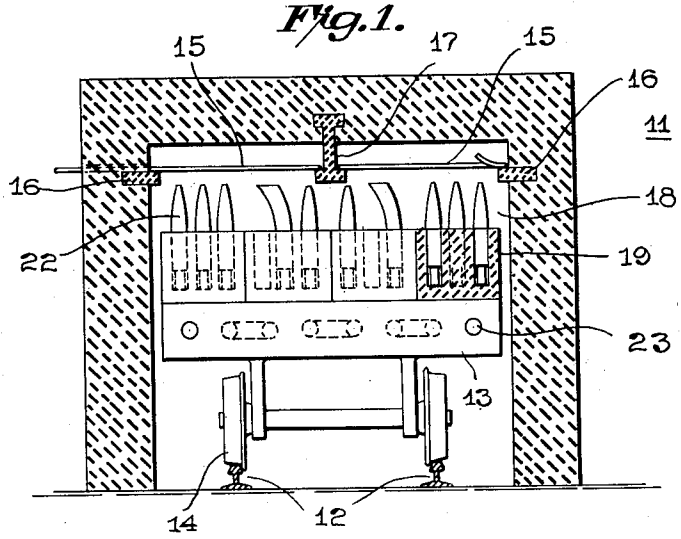
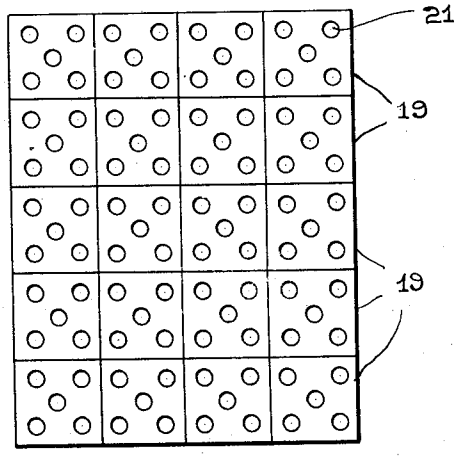


Fig. 2.



WITNESSES:

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UNITED STATES PATENT OFFICE.

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ELECTRIC HEAT-TREATING FURNACE.

Application filed July 13, 1923. Serial No. 651,234.

My invention relates to electric heat treating furnaces and particularly to tunnel-type electric annealing furnaces.

The object of my invention is to provide a relatively simple means for permitting the annealing of portions only of elongated metallic objects in a furnace.

In practicing my invention, I provide a furnace structure of the tunnel type in which heating means, preferably of the electric type, is provided. A car that is movable through said tunnel has provided thereon a plurality of refractory heat-insulating perforated blocks. Metal objects to be heat treated in part or over a part only of their length, are placed in the openings in the blocks so that only that portion thereof that is to be annealed projects beyond the upper surface of the refractory block.

In the single sheet of drawings,

Figure 1 is a view, in vertical lateral section, through a furnace structure embodying my invention, and

Fig. 2 is a top plan view of the assembled refractory heat insulating blocks located on a moving car.

A furnace structure 11 comprises a set of heat insulating side and top walls between which extend a plurality of rails 12 upon which a car 13, having wheels 14, may move. End closure members (not shown) may be provided if found necessary or desirable, but these are not illustrated in detail.

While any type of heating means may be provided, I prefer to employ an electric heating element comprising preformed, relatively heavy, resistor members 15 that may be bent to comprise a plurality of end connected and parallel extending portions of substantially grid form, whose end portions are supported by suitable members 16 and 17 located in spaced relation in, and supported by, the furnace structure 11. The members 16 and 17 are of refractory electric-insulating material and may be of any suitable shape to permit of supporting the resistors 15 in their proper operative positions within a furnace chamber 18 surrounded by the hereinbefore described refractory walls.

Any desired type of electric heating element may be employed, and in fact, any heating means may be used, and I have illustrated a specific embodiment thereof only to show, in general, the type of heating means preferred.

Upon the top portion or platform of the car 13 are mounted a plurality of bricks or blocks 19 of suitable refractory heat-insulating material, that are severally provided with a plurality of openings 21 in their upper surface. The openings 21 are of such depth and lateral dimensions and are so located as to permit of placing therein the lower ends of a plurality of elongated metal objects 22, the upper ends of which are to be annealed by being subjected to the heat of the resistor members 15, while the car 13 carrying them is moved through the furnace structure.

The metal objects 22 may, for instance, be harrow teeth or similar objects employed in ordinary agricultural machinery. The metal objects 22 are placed in the openings 21 with the refractory blocks relatively cool, and the car is then moved through the heated furnace chamber 18. During the movement of the car through the furnace chamber, the upper ends of the metal objects 22 subjected to the heat from the resistors 15 are heat treated and the temperature of the furnace chamber and the time of travel through the furnace chamber are selected in accordance with the size of the individual metal objects and the particular type of heat treatment to which they are to be subjected, so that at the end of the travel through the furnace, they will be properly heat treated. As the refractory blocks 19 are of heat-insulating material and have a relatively high heat storage capacity in addition, the temperature of the embedded portion of the objects 22 will not be raised appreciably so that the condition of that part of the metal objects remains substantially unchanged. If the length of time of travel of the car through the furnace chamber is relatively long and the temperature of the chamber is relatively high, it may be necessary to permit the car and the blocks 19 to cool before using them again. If necessary, a coiled pipe 23 may be provided in the top of the car structure to permit a cooling fluid to be employed to assist in cooling the refractory blocks 19. The cooling fluid may flow through the conduit 23 when the car is out of the furnace or even when it is in the furnace.

The furnace embodying my invention thus

provides a relatively simple means for heat treating predetermined parts only of elongated metal objects with ease and dispatch.

Various modifications and 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. In a furnace, in combination, a plurality of walls enclosing a furnace chamber, heating means in said chamber, and means having a cooling means integral therewith for moving material to be heat-treated through said chamber and for permitting only a part thereof to be subjected to the heat of said heating means.

2. In a furnace, in combination, a furnace chamber, electric heating means in said chamber, means for moving material to be heat treated through said chamber, refractory means carried by said material-moving means for supporting the articles to be heat-treated adjacent to the heating means and for permitting only a part thereof to be heat treated thereby, and means associated with said material moving means for cooling said material supporting means.

3. In a furnace, in combination, a furnace chamber, electric heating means in said chamber, means for moving material to be heat treated through said chamber, a block of refractory material located on said material-moving means and having a plurality of openings therein for receiving articles to be heat-treated and exposing a part thereof to the action of said heating means, and cooling means associated with said material moving means for cooling said refractory material.

4. In a heat-treating furnace, in combination, a plurality of walls enclosing a furnace chamber, an electric heating means in the upper part of said chamber, means for moving material to be heat-treated through said chamber, a mass of refractory heat-insulating material on said material moving means for directly supporting said articles and for exposing only predetermined portions thereof to the action of said heating element, and cooling means associated with said material moving means for cooling said refractory material.

5. In a heat-treating furnace, in combination, a plurality of walls enclosing a furnace chamber, an electric heating means in said chamber, and means having a cooling means integral therewith for supporting and moving objects to be heat-treated in said chamber and for heat-insulating a predetermined part of each object to prevent heat treatment thereof while in said chamber.

6. In a furnace, in combination, a plurality of walls enclosing a furnace chamber, heating means in said chamber, means for moving material to be heat treated through said chamber, means for supporting said material on said moving means and means for cooling a portion of said material.

7. In a furnace, in combination, a plurality of walls enclosing a furnace chamber, heating means in said chamber, means for moving material to be heat treated through said chamber, means for supporting said material on said moving means and means integral with said moving means for cooling said supporting means whereby a portion of said material is maintained at a relatively lower temperature than the remaining portion thereof.

In testimony whereof, I have hereunto subscribed my name this 2nd day of July 1923.

JAMES C. WOODSON.