R. E. TALLEY.

HEAT TREATMENT.

APPLICATION FILED DEC. 8, 1919.

1,362,368. Patented Dec. 14, 1920.

2 SHEETS—SHEET 1.

FIG. 1.

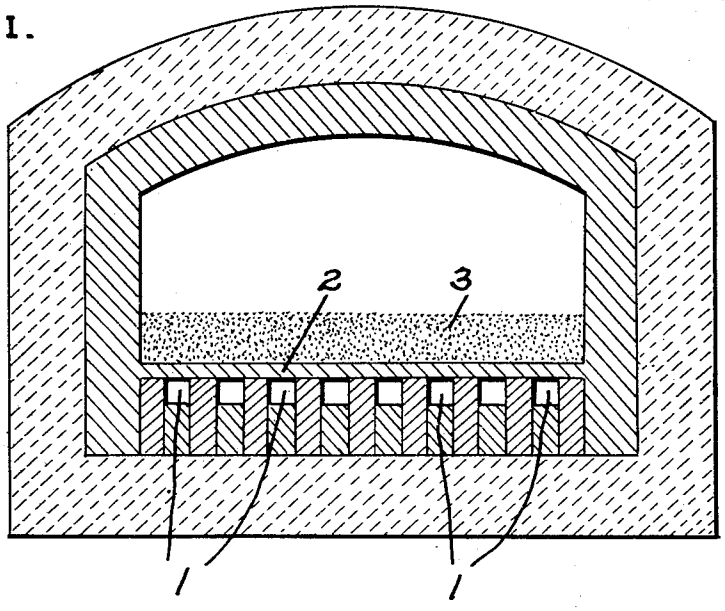


FIG. 2.

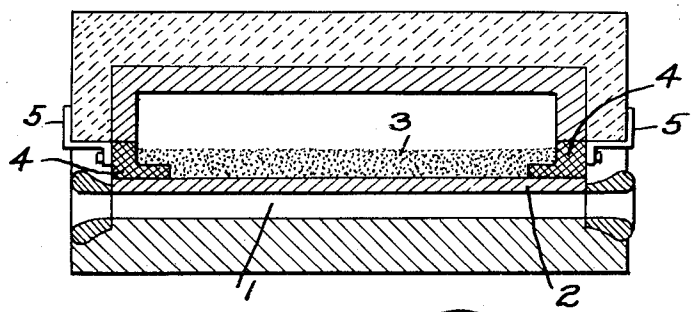
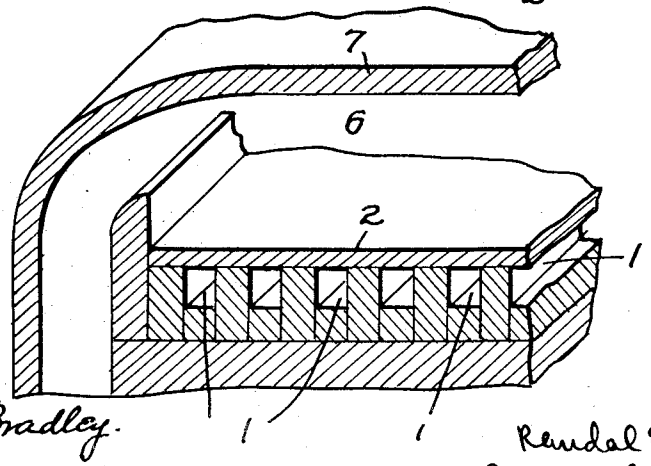


FIG. 3.



WITNESSES

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2 SHEETS—SHEET 2.

FIG. 4.

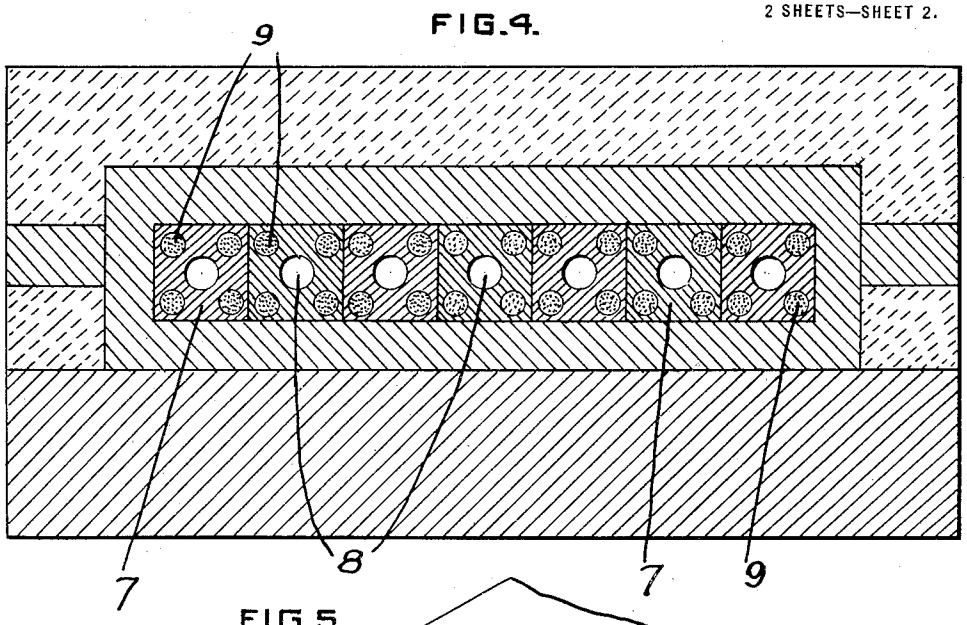


FIG. 5.

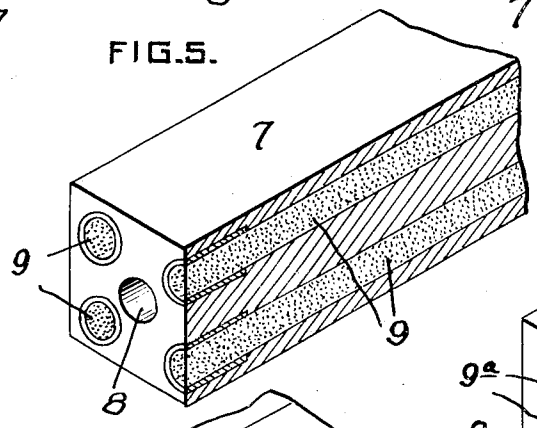


FIG. 7.

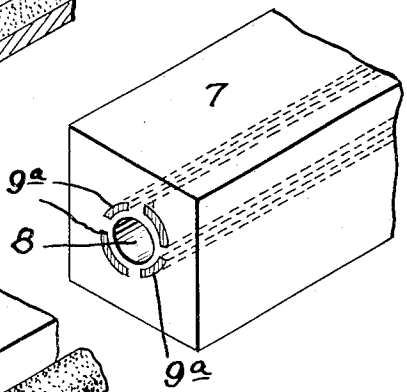
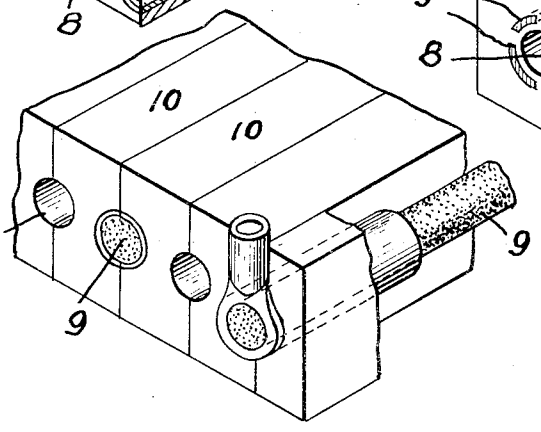


FIG. 6.



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UNITED STATES PATENT OFFICE.

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HEAT TREATMENT.

1,362,368. Specification of Letters Patent. Patented Dec. 14, 1920.

Application filed December 8, 1919. Serial No. 343,275.

To all whom it may concern:

Be it known that I, RANDAL E. TALLEY, residing at Irwin, in the county of Westmoreland and State of Pennsylvania, a citizen of the United States, have invented or discovered certain new and useful Improvements in Heat Treatment, of which improvements the following is a specification.

It has been attempted to effect the continuous annealing of wire and metal sheets by passing them through tubes formed of fire clay or other refractory material and so arranged in a furnace that the heat and flames could circulate around them. In order to insure a sufficiently high temperature within the tubes, the walls of the latter were necessarily made comparatively thin and in order that the surfaces exposed to the heat, etc. might be large, the supports for tubes were spaced considerable distances apart. When these conditions conducive to or necessary for operative efficiency were complied with, it was found that durability had been sacrificed and that in use the tubes would crack and the sections become disjointed and move out of alinement.

The invention described herein has for its object the formation of tunnels or passages through a body of masonry of such character and construction that the alinement of the different portions of the tunnels will not be affected by changes of temperature or other causes arising from the ordinary operation of the furnace and to provide means whereby the tunnels may be heated by externally applied heat, so that the articles passing through the tunnels will not be subjected to injurious gases, etc. The invention is hereinafter more fully described and claimed.

In the accompanying drawings forming a part of this specification, Figure 1 is a sectional elevation of a furnace embodying my improved means for the heat treatment of wire, etc.; Fig. 2 is a sectional elevation on a plane indicated by the line II—II, Fig. 1; Fig. 3 is a view partly in perspective and partly in section showing a modification in the heating means; Fig. 4 is a sectional view illustrating a further modification; Fig. 5 is a perspective view partly in section of one of the blocks used in the construction shown in Fig. 4; Fig. 6 is a perspective of a modification of the construction shown in Figs. 4 and 5, and Fig. 7 is a perspective view of a further modification of the construction shown in Fig. 5.

In the construction shown in Figs. 1 and 2 a hearth is constructed of refractory material as fire brick so as to form in the upper portion of the hearth a plurality of troughs 1, the depth and width of which will be determined by the shape and transverse dimensions of the articles to be treated. As for example, if wire or wire rods are to be heat-treated, the depth and width of the troughs need not be greatly in excess of the diameter of the article, but if strips or sheets are to be treated, the dimensions of the tunnel should be adapted thereto. These troughs are covered thus completing the tunnels by tiles or slabs of refractory material of such thickness as to be readily permeable by heat applied to the upper surfaces of the covering slabs or tiles. This cover 2 may be heated in various ways, as for example, electrically by placing on the cover a layer or bed 3 formed of granulated electric resisting material as carbon, as shown in Figs. 1 and 2. Opposite sides or ends of the bed or lay are connected to a suitable electric generator in any suitable manner. In the construction shown, the connections to the generators consist of carbon blocks 4 in contact with the granulated beds and connected to metal conductors 5 leading to the generators.

In lieu of employing electric means for heating the tunnels, the hearth or bed of masonry in which the tunnels are formed may be constructed in a heating chamber 6 of a furnace employing fuel either solid, liquid or gaseous. The heating chamber is preferably constructed with a reverberating roof 7 designed to reflect heat down into the covers of the tunnels.

In lieu of forming the tunnels by the arrangement of the bricks composing the hearth or bed, they may be formed by blocks 7 of refractory material and having holes or passages 8 therethrough, said blocks being arranged end to end and solidly embedded in the brickwork of the hearth as shown in Fig. 4.

This manner of forming the tunnels lends itself to the employment of a plurality of resistors arranged in passages formed in the blocks 7 parallel with the tunnel. These

resistors may be made of any suitable material as for example of granulated carbon as shown at 9 in Figs. 4 and 5, or of metal strips as shown at 9^a in Fig. 7. These resistors may be made of any desired cross-sectional shape. When employing metal strips, they may be curved transversely and so arranged as to inclose or surround the tunnel to any desired extent.

In lieu of forming the tunnels and the passages for the resistors by the use of perforated blocks, as shown in Fig. 4, they may be formed of blocks 10 having grooves in opposite sides as shown in Fig. 5. In such a construction alternate passages formed in the grooves in adjacent blocks would be used as tunnels through which the article to be treated would be passed, and the other passages charged with granulated resisting material as carbon.

While the terminals for the resistors may be of any suitable construction, it is preferred to use the tubular construction substantially as shown in Fig. 5. The barrels of these terminals are forced into the ends of the passages and the granulated material forced through such barrels into the passages.

It is characteristic of the improvement described and shown herein that the tunnels are incorporated in beds or solid masses of masonry and hence are not liable to injury and in this respect differ radically from constructions in which the wires, etc., are passed through tubes formed in sections and supported at intervals.

In order that the heat may penetrate efficiently into the tunnels, the portions of the walls along which heat is applied are reduced in thickness but on account of the solidity of the structure in which the tunnels are formed, such reduction in thickness of the walls will not render the tunnels liable to injury while in use.

I claim herein as my invention:

1. Means for the continuous heat treatment of wire, sheets, etc., having in combination a bed or mass of masonry provided with an opening or tunnel therethrough for the passage of the articles to be treated, a portion of the wall of the tunnel being reduced in thickness and means for applying heat to the exterior of such reduced portion for heating the tunnel.

2. Means for the continuous heat treatment of wire, sheets, etc., consisting of a bed or mass of masonry provided with an opening or tunnel therethrough for the passage of the articles to be treated and with a resistor adapted to be included in a suitable electric circuit, arranged adjacent to but exterior of said tunnel.

In testimony whereof, I have hereunto set my hand.

RANDAL E. TALLEY.