Feb. 16, 1932. A. J. HANSON 1,845,497

ELECTRIC FURNACE

Filed June 17, 1930

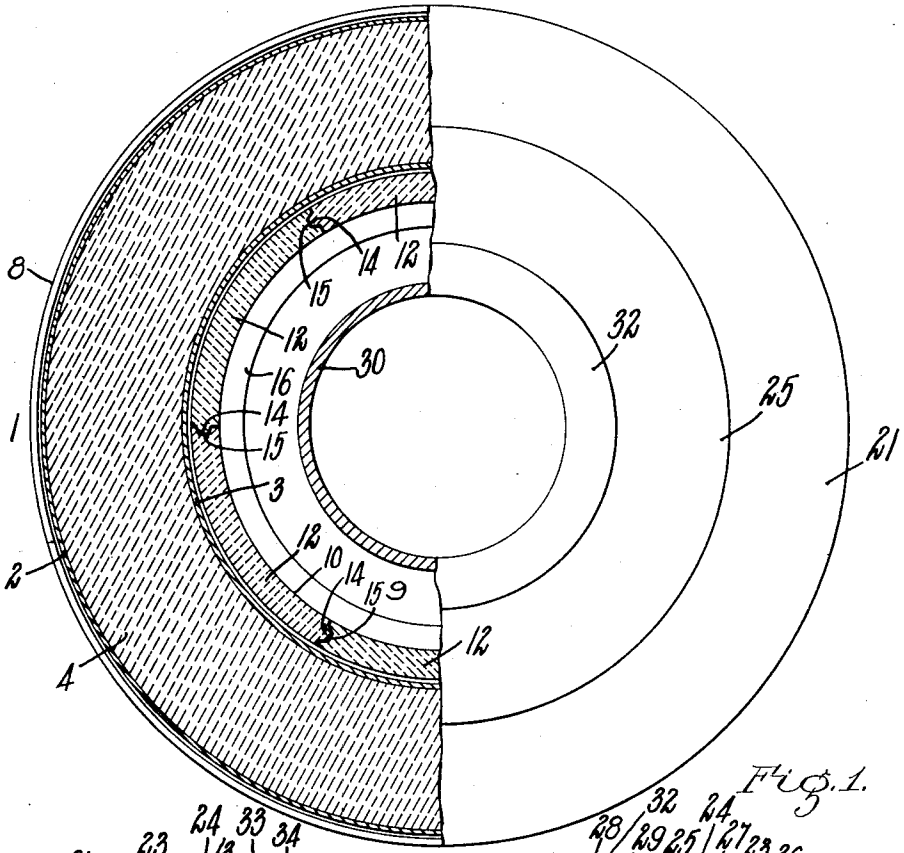


Fig. 1.

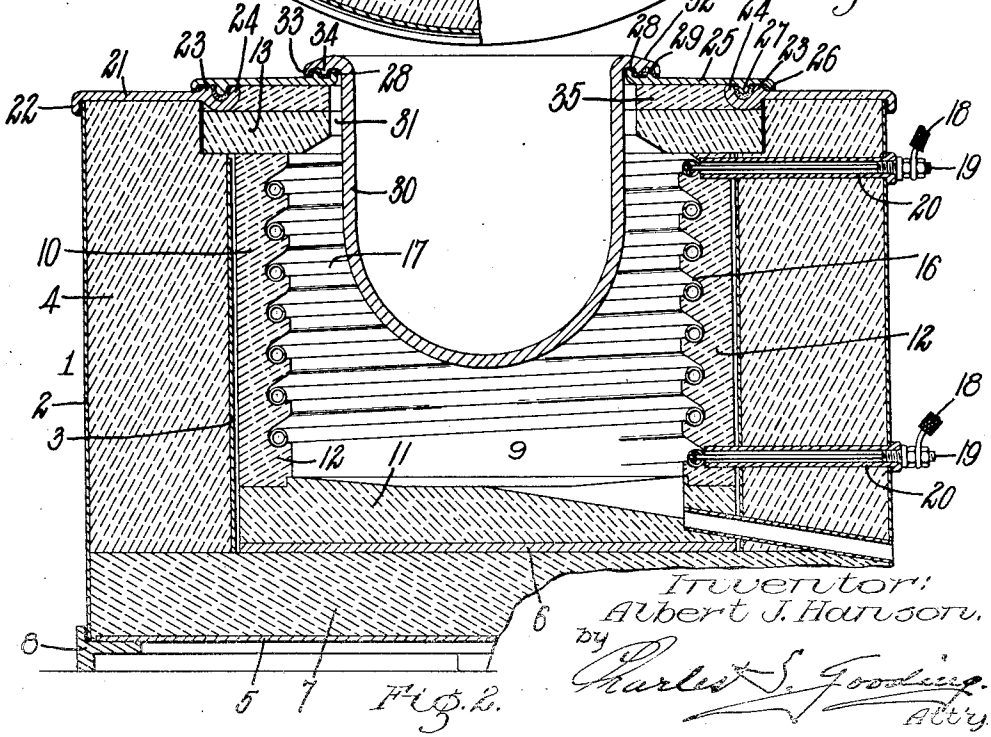


Fig. 2.

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UNITED STATES PATENT OFFICE

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ELECTRIC FURNACE

Application filed June 17, 1930. Serial No. 461,695.

This invention relates to a furnace and particularly to a type of furnace that is electrically heated.

Certain types of electric furnaces that are electrically heated are subjected to heat of such an intense degree that it becomes necessary occasionally to replace the lining and it often happens that in so doing it becomes necessary to remove portions of the interior of the furnace adjacent to the lining, and which usually contact therewith, because of the fact that these parts have become fused together and the lining cannot be removed without removing the parts that have become attached thereto. Furthermore, in the case of pot furnaces the molten bath in which the articles to be treated are immersed often drips upon the rim of the pot and top of the furnace and works its way into the heating compartment around the pot, causing serious injury to the electric heating elements with which it comes in contact.

The object of this invention is to provide an electrically heated pot furnace so constructed that if for any reason it is necessary to have access to the interior of the heating compartment for the purpose of making repairs to either the lining or the electric heating elements which are mounted upon the lining, that these repairs may be made easily and quickly without necessitating a prolonged shut down of the furnace.

The furnace of this invention is an improvement over a similar type of furnace for which I have obtained Letters Patent of the United States No. 1,694,416, dated December 11, 1928 to which reference may be made if it is so desired.

The invention consists in a furnace as set forth in the following specification and particularly as pointed out in the claims thereof.

Referring to the drawings:

Fig. 1 represents a partial top plan view and partial horizontal section of an electric pot furnace embodying my invention.

Fig. 2 represents a central vertical section of the furnace.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, 1 represents a cylindrical casing embodying therein an outer vertical wall 2 of sheet metal and an inner vertical wall 3 constructed of a sheet of heat-resistant alloy metal, and the space between these walls is filled with a suitable heat-insulating material 4. At the bottom of the furnace is an outer metallic bottom plate 5 and an inner metallic bottom plate 6 between which is a suitable heat-insulating material 7. The casing 1 rests upon and is supported by a base plate 8.

Located within the interior of the casing 1 is a heating compartment 9 which is provided with a refractory lining 10 consisting of a bottom lining member 11 which rests upon the inner bottom plate 6, and a hollow cylindrical side lining which consists of a plurality of segmental sections 12 which are located adjacent to the inner vertical wall 3. Resting upon the cylindrical lining is an annular top lining 13. The segmental lining sections 12 are each provided upon their opposite side edges with a tongue 14 and groove 15 respectively, and the tongue 14 of one section interlocks with the groove 15 of the adjacent section and effectively holds these sections together and, preferably, there is a narrow space provided separating the outer periphery of the lining 10 and the inner surface of the inner wall 3. Each of the segmental lining sections 12 has a plurality of parallel grooves formed upon its inner surface, and these grooves are so formed upon the various segmental sections that when they are assembled they will align with each other and combine to form one continuous helical groove 16 having a plurality of convolutions which extend around the inner surface of the cylindrical lining from top to bottom thereof. The groove 16, furthermore, slopes downwardly at an angle to the inner vertical face of the lining sections 12 thereby forming a continuous helical declivity in said wall which is utilized as a support for an electric heating element 17 of well-known form which extends around the interior of the vertical side lining from the top to the bottom thereof.

The electric wires 18 of an electric circuit are connected to terminals 19 and the latter

extend through tubular insulators 20 that are mounted in the casing 1 and are electrically connected with the opposite extremities of the electric heating element 17 in a well-known manner.

The top of the casing 1 is closed by an outer annular cover plate 21 which rests upon the top edge of the outer wall 2 and upper surface of the insulating material 4, and said cover plate is provided with a downwardly turned flange 22 which embraces the outer wall of said casing. Projecting upwardly from the cover plate 21, adjacent to the opening therein, are concentric annular flanges 23 and 24 which serve as supports for an inner annular cover plate 25 and, furthermore, the flanges 23 and 24 co-operate in nesting relation with concentric annular flanges 26 and 27 which project downwardly from the under surface of the cover plate 25. Projecting upwardly from the upper surface of the plate 25, adjacent to the opening therein, are concentric annular flanges 28 and 29 and the innermost flange 28 serves as a support for a pot 30 which extends downwardly into the heating compartment 9 through an opening 31 which is provided in the top lining member 13. The pot 30 is provided with an outwardly extending marginal rim portion 32 upon the underside of which are downwardly projecting concentric annular flanges 33 and 34 which co-operate in nesting relation with the flanges 28 and 29 of the cover plate 25.

The spaces between the adjacent surfaces of the co-operating flanges of the cover plates 21 and 25 and rim portion 32 of the pot 30 are sealed by means of a suitable heat-resistant cementitious material, so that if any of the molten material which is located in the pot 30 happens to drip on the rim 32 or either of the cover plates 25 and 21, the various joints are so effectively sealed that the molten bath will be prevented from gaining access to the interior of the heating compartment and injury to the electric heating element is therefore effectively prevented. The space between the under surface of the inner cover plate 25 and the top surface of the top lining member 13 is filled with a suitable insulating material 35.

If after prolonged use, or because of excessive heat, it becomes necessary to replace the lining 10, all that is necessary is to break the seal between the pot 30 and cover plate 25 and the seal between the cover plate 25 and cover plate 21. The pot may then be lifted from the cover plate 25 and the latter and the cover plate 21 may be lifted from the casing 1. After removing the insulating material 35 and top lining member 13, the electric heating element 17 is disconnected from its terminal members 19 and removed from the helical groove 16. The segmental sections 12 that comprise the hollow cylindrical portion of the lining 10 may then be removed from within the inner wall 3 of the casing 1 without it being necessary to disturb in any way the various members that comprise said casing and the old lining may be easily and quickly replaced by a new lining, the heating element replaced in position and connected to its terminals and the cover members 21 and 25 and the pot 30 quickly replaced in position and sealed.

I claim:

1. A furnace having, in combination, an outer metallic wall, an inner wall of heat-resistance alloy, a heat-insuating material interposed between said walls, and a refractory lining for a heating compartment within the inner wall embodying therein a plurality of segmental sections each provided with a vertical tongue upon one side edge thereof and a vertical groove upon the opposite side edge thereof adapted to interlock with a groove and tongue respectively of an adjacent section, all of said sections combining to form a hollow cylinder.

2. A furnace having, in combination, a casing embodying therein an outer metallic wall, an inner wall of heat-resistance alloy, and a heat-insulating material interposed between said walls, a refractory lining for a heating compartment within the inner wall embodying therein a plurality of segmental sections provided with a vertical tongue upon one side edge thereof and a vertical groove upon the opposite side edge thereof adapted to interlock with a groove and tongue respectively of an adjacent section, all of said sections combining to form a hollow cylinder, each of the sections also being provided with grooves upon the inner surface thereof, the last-named grooves of all of the sections combining to form a continuous helical groove, a heating element within said helical groove, and a pot supported upon the top of said casing and projecting into said heating compartment.

In testimony whereof I have hereunto set my hand.

ALBERT J. HANSON.