S. F. HALL.

ELECTRIC FURNACE.

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914,489.

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Fig. 1.

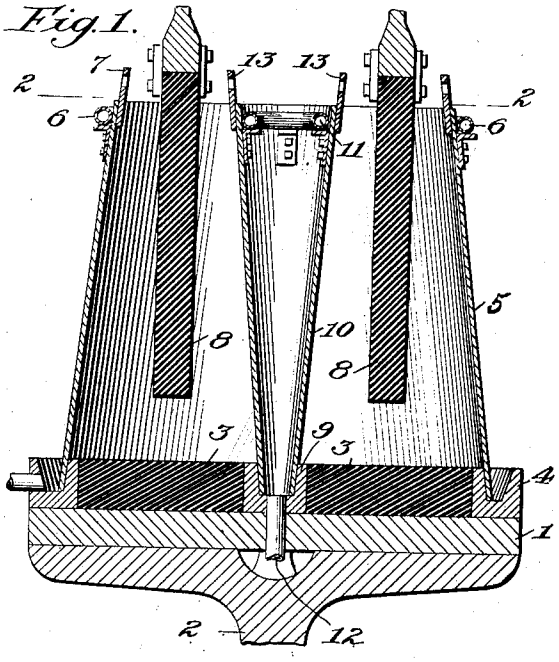
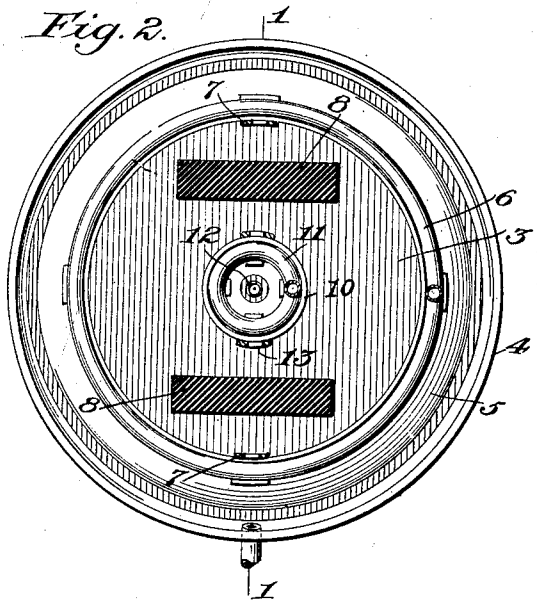


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

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ELECTRIC FURNACE.

No. 914,489. Specification of Letters Patent. Patented March 9, 1909.

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To all whom it may concern:

Be it known that I, SAMUEL F. HALL, a citizen of the United States, residing at Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Electric Furnaces, of which the following is a specification.

The object of this invention is to provide an electric furnace having a smelting chamber wherein the charge or product may be subjected to more nearly uniform temperature conditions than are obtainable in the usual constructions. In electric furnaces of the type wherein one or more electrodes depend or project into a crucible or smelting chamber, and more particularly when the walls of the smelting chamber are water-cooled, the region around and between the electrodes, or the interior portion of the charge, is subjected to a considerably higher temperature than the external or surrounding portions; and this results in certain cases in objectionable inequalities in the rate of conversion or in the character of the product.

According to the present invention means are provided for abstracting heat from those portions of the charge or product which are normally subjected to the highest temperature, whereby an equalizing effect is secured.

A preferred form of apparatus embodying the invention is shown in the accompanying drawings wherein:

Figure 1 is a central vertical section of one form of electric furnace on line 1—1 of Fig. 2; and Fig. 2 is a horizontal section on line 2—2 of Fig. 1.

Referring to the drawings, 1 represents a hearth which may be vertically movable, being carried by the plunger 2 of a hydraulic or other elevator. The hearth 1 is surmounted by a refractory bed or lining 3, usually of carbon. This bed is surrounded by a peripheral metal channel 4 adapted to receive the metallic shell 5 forming the exterior wall of the furnace casing and to collect and discharge the cooling water flowing from perforated pipes 6 mounted on and surrounding the upper portion of the shell. The water-cooled shell 5 is removable, and may be lifted from the hearth or held during the descent of the hearth, as is well understood in the art, and is provided with lugs 7 for convenience in handling.

8, 8 represent carbon or graphite electrodes of opposite polarity depending into the furnace chamber.

In the central portion of the bed 3 is a metallic cup or basin 9 adapted to receive the lower open end of a tubular metal shell 10 which constitutes the interior wall of the furnace casing and which in the form illustrated converges downwardly. The inner wall-faces of the shell 10 are adapted to be cooled by water supplied from perforated pipes 11 suitably supported at the upper portion of the casing, the basin 9 collecting the water and discharging the same through a pipe 12. The walls of the inner shell 10 are preferably so inclined as to facilitate the separation of the product when the hearth is lowered. The inner shell 10 may be provided with lugs 13.

In operation the material to be treated, which may be hydrated or anhydrous alumina, is charged into the furnace casing between the exterior and interior walls thereof, and is fused by the electric current passing between the electrodes in the manner commonly practiced in this art, both exterior and interior walls being adequately water-cooled. At the close of the operation the hearth is lowered to expose the product which may then be removed and treated in the usual manner.

I claim:

1. An electric furnace comprising a hearth, a casing separable therefrom and having inclined exterior and interior walls, and means for cooling said walls, substantially as described.

2. An electric furnace comprising a furnace chamber having exterior walls, electrodes of opposite polarity within said chamber, a plurality of interior walls between said electrodes, and means for cooling said interior walls, substantially as described.

3. An electric furnace comprising a furnace chamber, spaced electrodes of opposite polarity therein providing an intermediate heating zone, an open well between said electrodes, and means for cooling the walls of said well, whereby a comparatively uniform temperature is obtained throughout the furnace chamber, substantially as described.

4. An electric furnace comprising a fur-

nace chamber having exterior and interior walls, said walls being exposed on one side to the charge and on the other side to the atmosphere, substantially as described.

5. An electric furnace comprising a furnace chamber having exterior and interior walls, said walls being exposed on one side to the charge and on the other side to the atmosphere, and means for cooling said interior walls, substantially as described.

6. An electric furnace comprising a furnace chamber having exterior and interior walls, said walls being exposed on one side to the charge and on the other side to the atmosphere, electrodes oppositely disposed with respect to said interior walls, and means for cooling said interior walls, substantially as described.

7. An electric furnace comprising a furnace chamber having exterior and interior walls, said walls being exposed on one side to the charge and on the other side to the atmosphere, and means for cooling said exterior and interior walls.

In testimony whereof, I affix my signature in presence of two witnesses.

SAMUEL F. HALL.

Witnesses:

KATHRYN CALDWELL,

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