K. A. F. HIORTH.

ELECTRIC MELTING FURNACE.

APPLICATION FILED JULY 28, 1909.

980,781. Patented Jan. 3, 1911.

Fig. 1.

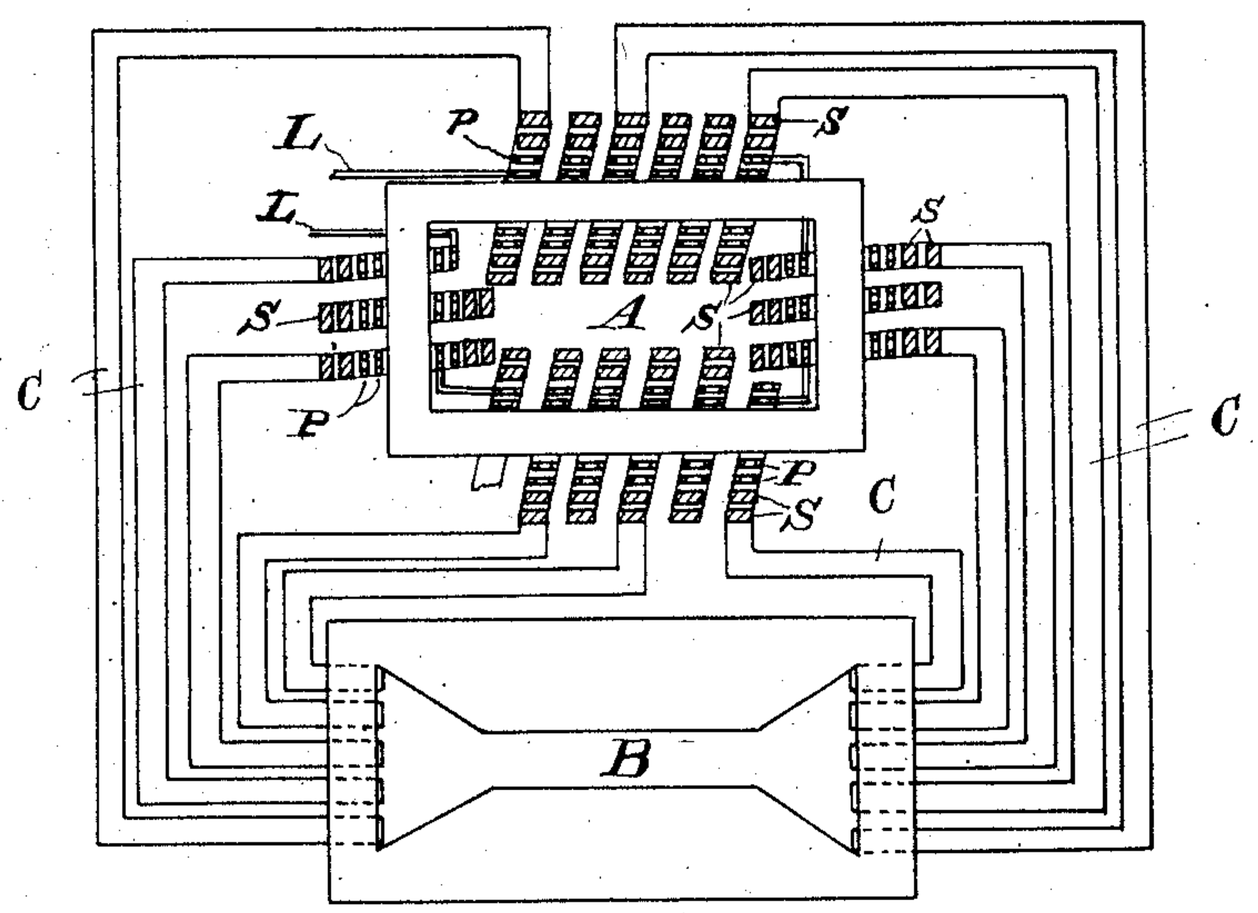
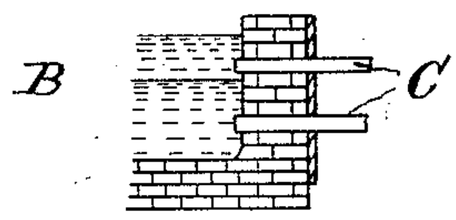


Fig. 2.



Witnesses.

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UNITED STATES PATENT OFFICE.

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ELECTRIC MELTING-FURNACE.

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Application filed July 28, 1909. Serial No. 510,019.

To all whom it may concern:

Be it known that I, KARL ALBERT FREDRIK HIORTH, a subject of the King of Norway, residing at Christiania, Norway, have invented certain new and useful Improvements in Electric Melting-Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

This invention relates to electric melting furnaces, more particularly of the induction furnace type, with magnet and primary windings arranged in any manner previously known, which furnace is characterized by the arrangement of the secondary winding or the secondary windings, each of which consists of two main parts forming a circuit, and one of which incloses the magnet and has a comparatively large cross section respectively low resistance and which may preferably be largely divided, so that this part obtains a temperature correspondingly lower, the other part consisting of the melting bath being located outside the frame of the magnet and being connected in series with the former part. This second part of the secondary conductor or conductors has a comparatively small cross section respectively a considerably greater resistance and correspondingly higher temperature than the former part of the secondary winding which, as indicated above, consists of one single conductor or preferably of several conductors connected in parallel and wound onto the magnet, and the ends of which meet in the bath at opposite ends of the same.

In the accompanying drawing:—Figure 1 is a diagrammatic view of a melting furnace embodying my invention and Fig. 2 is a detail view of the furnace showing the relation of the conductors to the bath.

A is the transformer, B the melting chamber or furnace proper. The transformer, which can have any form, and, for instance, may be made as a disk, shell or core transformer—single-phase or multi-phase—is provided, as usual, with a primary winding P, with or without cooling, while the secondary winding S is divided into a greater number of sections which, by way of the conductors C, the ends of which extend through or above the masonry of the furnace, communicate with the bath contained in the same, either directly or through suitable intermediary members such as a semi-conductor or the like. The conductors C or their ends may consist of the same metal as the bath.

L are the supply conductors for the primary windings P which are connected to each other in series, while the secondary windings S are connected to the furnace or bath in parallel.

In induction furnaces embodying the present invention the advantage is attained that the melting chamber or chambers will be located entirely outside the transformer, so that the several parts of the same will not be surrounded by melted material. It also affords the possibility of giving to the melting chamber the most advantageous form in metallurgical as well as in electrical respect, thereby enabling a rational treatment of the slag as well as repairs of the furnace during the work to be effected; the arrangement also readily admits of so adapting the furnace that it can be tipped independently of the transformer. Greater losses by spreading are avoided, because masonry does not here intervene between windings and magnet, and the magnet can be utilized rationally all around, while losses through skin effect are avoided, and likewise "pinch" effect virtually excluded. By arranging the ends of the secondary windings at different height in the melting chamber the slag or the metal can be more strongly heated at pleasure, this being controlled for instance by a switch suitably arranged.

Claims:

1. The combination with an electric furnace; of a transformer having primary and secondary windings, said secondary windings of large cross-section and subdivided to reduce their temperature and connected to the furnace located outside the transformer, the bath of said furnace forming a part of the secondary windings and of considerably greater resistance than them.

2. The combination with a transformer having primary windings connected to each other in series and secondary windings closely surrounding the primary windings and of large cross section and sub-divided to reduce their temperature; of an electric furnace to which said secondary windings are connected at different levels and located

outside of the magnet frame of the transformer, the bath of which furnace connects the ends of the secondary windings and is of less cross section than the secondary windings supplying current thereto.

3. The combination with a transformer having primary windings connected in series and subdivided secondary windings of large cross-section closely surrounding the primary windings and having ends made of the same kind of metal as that to be melted; of an electric melting furnace to which the ends of the secondary windings are connected in parallel, the bath of the furnace connecting the ends of the secondary windings and of less cross-section.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

KARL ALBERT FREDRIK HIORTH.

Witnesses:
HENRY BORDEWICH,
M. ALGER.