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TRANSFORMER FURNACE.

APPLICATION FILED MAR. 29, 1907.

953,030. Patented Mar. 29, 1910.

Fig. 1.

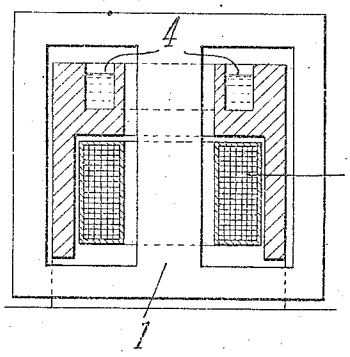


Fig. 2.

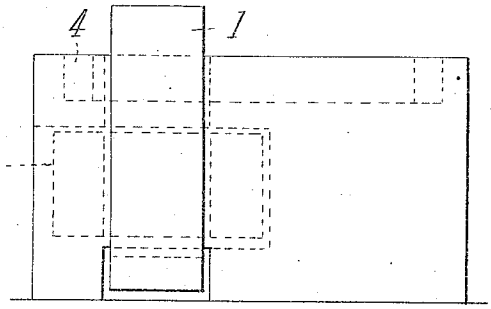


Fig. 3.

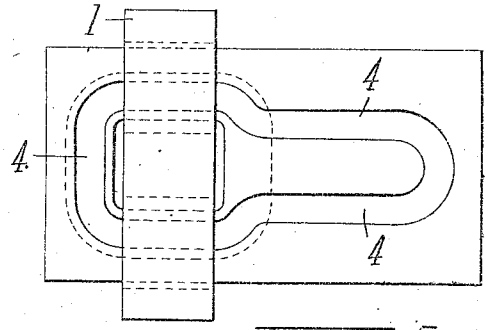


Fig. 4.

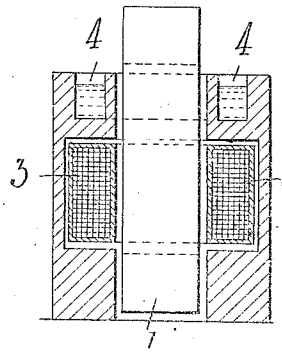


Fig. 5.

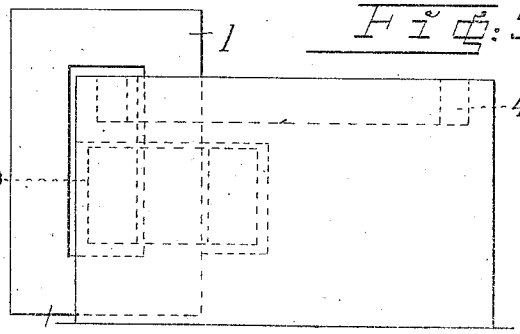
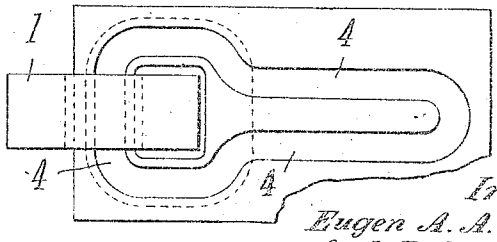


Fig. 6.



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UNITED STATES PATENT OFFICE.

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TRANSFORMER-FURNACE.

953,030. Specification of Letters Patent. Patented Mar. 29, 1910.

Application filed March 29, 1907. Serial No. 365,333.

To all whom it may concern:

Be it known that we, EUGEN ASSAR ALEXIS GRÖNWALL, AXEL RUDOLF LINDBLAD, and OTTO STÅLHANE, engineers, subjects of the King of Sweden, residing in Ludvika, in the Kingdom of Sweden, have invented certain new and useful Improvements in Transformer-Furnaces, of which the following is a specification.

The present invention relates to improvements in such electric furnaces of the transformer type, where the groove intended for the reception of the material to be treated, is partly bent around the leg of the transformer core inclosed by said groove, and partly, in one or more places, is drawn out to form a relatively long projection, which is formed by grooves or channels, extending from the part of the groove bent around the said leg and arranged near each other, said parts being united with each other so as to form an endless groove.

The invention relates especially to the placing of the primary coil in such transformer furnaces.

In electric furnaces of the type here in question it is of great importance that the smelting bath be of a great length, while, at the same time, the area inclosed by the same is as small as possible. For this reason, then, that part of the smelting bath which lies nearest around the transformer core, should be placed as near to this latter as, with regard to the heat of the smelting bath, is possible. It is also of importance that the primary coil be placed as near to the smelting bath as possible, in order to make that space as little as possible through which the leaking lines of force can unite. In furnaces of the kind here in question the primary coil should, therefore, be placed in such a position that it does not prevent the smelting bath from being placed close around the iron core, while at the same time it should have such a position relatively to the smelting bath, that the space through which the leaking lines of force can unite, will be the least possible.

In the British Patent No. 700 of the year 1887, to Ziani de Ferranti, a method is described for the placing of the primary coil in a transformer furnace of the kind stated in said patent, which method, if it is combined with the special form of the furnace groove stated above and invented by us, fulfils in an especially great degree both of these conditions named above, and the present invention consists in just that combination.

In the accompanying drawing there is shown, schematically, as an example, a transformer furnace constructed in accordance with the present invention, in which—

Figure 1 is a vertical transverse section, Fig. 2 is a side view and Fig. 3 a plan view of the furnace. In Figs. 4–6 there is shown in an analogous way, another form of construction of a transformer furnace embodying the present invention.

1 is the transformer core, 3 is the primary coil, and 4 the crucible or furnace groove, which is provided with a comparatively long projection and is arranged in the manner, above stated, which furnace groove on account of this projection, differs essentially in form from the furnace groove described and illustrated by Ferranti in his said British patent.

From Figs. 1, 2 and 3, the important advantages may be easily seen, which are gained by the present combination. The smelting bath can be placed as near to the iron core as with regard to the heat, from a technical point of view, is possible without any risk of damage, to the insulation of the primary coil, which however would happen, if the primary coil is placed within the smelting bath. Further, the space, through which the leaking lines of force can unite can be reduced to the least imaginable, as the primary coil and that part of the smelting bath that lies around the iron core receive diameters of about the same size. A transformer furnace constructed in accordance with the present invention will therefore, from an electrical point of view, be more advantageous than any such furnace hitherto used, without any special devices being provided for reducing the difference of phases. It is also clear, that these advantages can only be gained by the combination described here. In furnaces with circular or rectangular furnace grooves, the distance between the smelting bath and the iron core must become relatively great, for the length of the bath must not be too little, if the charge is to be of a sufficient quantity. If, in such furnaces, the primary coil is placed under the smelting bath close around the iron core, that space

through which the leaking lines of force can unite, will become large. If this disadvantageous space is reduced, by giving the primary coil a greater diameter the amount of copper required for the primary coil will, on the other hand, become unpractically large.

According to the Figs. 1, 2 and 3, the iron core is provided with three legs of which two are placed symmetrically outside the smelting bath and serve as return conductors for the magnetic lines of force. Obviously the iron core may also, as shown in the Figs. 4–6, be formed with only two such legs, of which the one is placed within, and the other outside the smelting bath.

Having thus described our invention, we declare, that what we claim is:—

1. In transformer furnaces the combination of a furnace groove formed in such a way that one part thereof is placed near to and bent around one leg of the transformer core in such a way as to nearly completely inclose the same and the other part of the furnace groove is drawn out to form a comparatively long projection or arm, formed of grooves or channels, arranged near each other and united with each other and with the part of the groove bent around the leg of the transformer core in such a way that all the said parts together form an endless groove, with a primary coil placed around the leg of the transformer core, which is inclosed by the furnace groove and under the said groove.

2. In an electric transformer furnace, an electric transformer having a core composed of a frame having a transverse leg; the furnace having an endless groove for the material to be treated that is formed partly of a channel or groove arranged close around the said leg of the transformer forming a nearly closed circuit and partly formed by a projection extending from the ends of said part and composed of grooves or channels arranged adjacent and connected with each other and with the said part whereby all such parts form a continuous endless groove or channel.

In witness whereof we have hereunto set our hands in presence of two witnesses.

EUGEN ASSAR ALEXIS GRÖNWALL.
AXEL RUDOLF LINDBLAD.
OTTO STÅLHANE.

Witnesses:
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