

UNITED STATES PATENT OFFICE.

HEINRICH SPECKETER, OF GRIESHEIM, GERMANY, ASSIGNOR TO CHEMISCHE FABRIK GRIESHEIM ELECTRON, OF FRANKFORT-ON-THE-MAIN, GERMANY, A CORPORATION OF GERMANY.

ELECTRODE.

No. 931,513.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed March 21, 1907. Serial No. 363,671.

To all whom it may concern:

Be it known that I, HEINRICH SPECKETER, a subject of the German Empire, and a resident of Griesheim-on-the-Main, Germany, have invented certain new and useful Improvements in Electrodes, of which the following is a specification.

This invention relates to the manufacture of electrodes for electrolytic purposes from molten magnetic oxid of iron (Fe_3O_4) or of molten peroxid of iron (Fe_2O_3) that has become magnetic.

I have found that when Fe_2O_3 is melted, oxygen escapes and Fe_3O_4 , together with a small proportion of FeO are formed. The presence of this FeO is objectionable for two reasons,—first, it causes the electrodes to break on the setting of the melt for the reason that the protoxid does not crystallize uniformly with the magnetic oxid; second, the product will not resist chlorin or other anodic actions during electrolysis, and is dissolved by them so that after a certain time the electrodes become ineffective. To obviate these defects and to convert the FeO , formed during the melting of the Fe_2O_3 as aforesaid, into Fe_3O_4 I add to the mixture, while in a molten state, a small quantity of unmelted, finely pulverized Fe_2O_3 which unites with the FeO to form Fe_3O_4 , so that the entire mixture will be of the same composition. The proportion of pulverized iron oxid must be at least sufficient to convert the whole of the existing protoxid into magnetic iron oxid, but an excess of the Fe_2O_3 is not objectionable because it dissolves in the melt in a uniform manner and crystallizes homogeneously. The oxid of iron (Fe_2O_3) added to the molten mixture being in an unmelted condition, and such addition preferably occurring when the mixture is removed from the furnace, is not heated sufficiently to form the objectionable FeO . In lieu of iron oxid, other oxids which combine with ferrous oxid of iron (FeO) to form a compound which dissolves in magnetic oxid (Fe_3O_4) to form a homogeneous crystallizing melt, such, for instance, as sesquioxid of chromium (Cr_2O_3) which combines with FeO to form iron chromite ($\text{FeO} \cdot \text{Cr}_2\text{O}_3$), or sesquioxid of manganese (Mn_2O_3) which combines to form iron manganite ($\text{FeO} \cdot \text{Mn}_2\text{O}_3$), may be used. The homogeneous crystallizing melt thus produced is poured into molds, closed at the

bottom, which may be of the usual kind. The mass solidifies gradually from the outside so that a rigid layer is first formed on the exterior which layer gradually increases in thickness toward the center of the mass. When such layer has reached the desired thickness, the remainder of the fluid contents of the mold is returned to the melted vessel to be used for a new charge. The mold is then opened and the electrode, which is closed at its lower end, is removed and allowed to cool slowly. The cooled electrode may for the purpose of increasing its conductivity be provided on its inside with a coating of metal applied by electro-deposition or otherwise, or a bar or rod of good conducting metal, such, for instance, as copper, nickel, or the like, may be introduced into the central part of the mass, while it is still liquid, so that the bar or rod will form an integral part of the electrode when the mass is completely solidified.

Electrodes prepared in the manner described meet the most stringent requirements of electrolysis as they are not injuriously affected by mechanical or chemical action while in use, and possess good conductivity.

Having thus described the invention, what is claimed is:

1. The herein described process of manufacturing electrodes for electrolytical purposes which consists in adding to molten magnetic iron-oxid (Fe_3O_4) while it is still in a liquid state, such metal oxid as will combine with the ferrous oxid of iron (FeO) present in the molten mass and produced by the melting operation, to form a compound which dissolves in the molten magnetic iron oxid, producing with the latter a homogeneous crystallizing melt, and pouring the mixture into suitable molds.

2. The herein described process of manufacturing electrodes for electrolytical purposes which consists in adding to molten magnetic iron-oxid (Fe_3O_4) while it is in a liquid state such metal oxid as will combine with the ferrous oxid of iron (FeO) present in the molten mass to form a compound which dissolves in the molten magnetic iron oxid, forming with the latter a homogeneous crystallizing melt, and pouring the mixture into suitable molds, allowing the mass to cool and solidify superficially, and then pouring out the central molten part of the liquid mass.

3. The herein described process of manufacturing electrodes for electrolytic purposes which consists in adding to molten magnetic iron-oxid (Fe_3O_4) while it is still
5 in a liquid state, such metal oxid as will result in forming a homogeneous crystallizing melt, and pouring the mixture into suitable molds, allowing it to cool and solidify superficially, inserting in the center molten
10 portion of the mass a rod of good conduct-

ing material and then permitting the mass to harden.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HEINRICH SPECKETER.

Witnesses:

FRANZ HASSLACHER,
ERWIN DIPPEL.