Patented Oct. 21, 1930 1,779,242

# UNITED STATES PATENT OFFICE

OTTO ALFRED LAUBI, OF BREUIL, NEAR CUISE LAMOTTE, FRANCE, ASSIGNOR TO BOZEL MALETRA, SOCIETE INDUSTRIELLE, DE PRODUITS CHIMIQUES, OF PARIS, FRANCE, A CORPORATION OF FRANCE

## PROCESS OF IMPREGNATING CARBON ELECTRODES

No Drawing. Application filed September 10, 1929, Serial No. 391,702, and in France December 21, 1928.

As is known in the art, for impregnating carbon electrodes and in particular those destined to serve for the electrolysis of alkaline salts, higher saturated hydrocarbons having a high fusion point have above all been employed up to the present, such as paraffin (fusion point =70–80°). But it has been proved that electrodes impregnated with such hydrocarbons, in general and paraffin in particular, always undergo a relatively considerable loss in impregnating agent during electrolysis and in spite of the care exercised during impregnation, all of which leads to an appreciable attack on the electrode.

Researches have permitted to take into account, in the case of electrolysis of solutions of alkaline chlorides, that this loss was due to a partial chloridization of the hydrocarbon.

This chloridization leads to the formation of chloride compounds either by substitution or by addition and substitution, depending upon whether a saturated hydrocarbon has been employed or not, and at the same time there is a formation, for each molecule of chlorine absorbed by substitution, a molecule of chlorhydric gas. Said chlorhydric gas by becoming disengaged in the very heart of the hydrocarbon, disaggregates the layer therein and renders it porous. At the same time, due to its relatively large volume, it drives out the hydrocarbon towards the surface of the electrode. This action becomes more facilitated by increasing the volume sustained by the hydrocarbon during its transformation into a halogen compound. There is therefore aided, when the impregnation agent is paraffin, for example, a veritable deparaffination of the electrode, which deparaffination may cause a loss as high as 30% of the quantity of raw paraffin.

The present invention seeks to eliminate this loss of impregnating agent and to thus appreciably increase the life of the electrodes.

In this end I have conceived the idea of employing, for impregnating the electrodes, higher hydrocarbons, saturated or unsaturated, having been partially or totally halogenized either by substitution or by addition and substitution.

For example, I may utilize as an impregnating agent a higher hydrocarbon of the paraffin series, having a number of atoms of carbon equal or superior to 20, for example, and chlorinated up to a content of 20% or more of chlorine.

By proceeding further with the impregnation, as described in the French patent of April 19, 1928, for "Improvements in carbon electrodes", I can practically eliminate completely all loss by sweating of the impregnating agent during the whole time they are in use.

Having described my invention what I claim as new and desire to secure by Letters Patent is:

1. A process of impregnating carbon electrodes destined for use in the electrolysis of alkaline chlorides, which comprises partially halogenizing a hydrocarbon by substitution and utilizing said halogenized hydrocarbon as an impregnating agent.

2. A process of impregnating carbon electrodes destined for use in the electrolysis of alkaline chlorides, which comprises partially halogenizing a saturated hydrocarbon by substitution and utilizing said halogenized hydrocarbon as an impregnating agent.

3. A process of impregnating carbon electrodes destined for use in the electrolysis of alkaline chlorides, which comprises partially halogenizing a hydrocarbon by substitution and addition and utilizing said halogenized hydrocarbon as an impregnating agent.

4. A process of impregnating carbon electrodes destined for use in the electrolysis of alkaline chlorides, which comprises totally halogenizing a hydrocarbon by substitution and utilizing said halogenized hydrocarbon as an impregnating agent.

5. A process of impregnating carbon electrodes destined for use in the electrolysis of alkaline chlorides, which comprises totally halogenizing a saturated hydrocarbon by substitution and utilizing said halogenized hydrocarbon as an impregnating agent.

6. A process of impregnating carbon electrodes destined for use in the electrolysis of

alkaline chlorides, which comprises totally halogenizing a hydrocarbon by substitution and addition and utilizing said halogenized hydrocarbon as an impregnating agent.

7. A process of impregnating carbon electrodes destined for use in the electrolysis of alkaline chlorides, which comprises partially halogenizing a hydrocarbon of the paraffin series containing not less than 20 atoms of carbon to a halogen content of not less than 20% and utilizing said halogenized hydrocarbon as an impregnating agent.

8. A process of impregnating carbon electrodes destined for use in the electrolysis of alkaline chlorides, which comprises partially halogenizing a hydrocarbon of the paraffin series containing not less than 20 atoms of carbon to a halogen content of not less than 20% by substitution and addition and utilizing said halogenized hydrocarbon as an impregnating agent.

9. A process of impregnating carbon electrodes destined for use in the electrolysis of alkaline chlorides, which comprises partially halogenizing paraffin by substitution and addition and utilizing said halogenized paraffin as an impregnating agent.

10. A process of impregnating carbon electrodes destined for use in the electrolysis of alkaline chlorides, which comprises totally halogenizing paraffin by substitution and addition and utilizing said halogenized paraffin as an impregnating agent.

In testimony whereof I have signed this specification.

OTTO ALFRED LAUBI.