

UNITED STATES PATENT OFFICE.

ERNEST ARTHUR LE SUEUR, OF OTTAWA, CANADA, ASSIGNOR TO THE
ELECTRO-CHEMICAL COMPANY, OF RUMFORD FALLS, MAINE.

PROCESS OF ELECTROLYSIS.

SPECIFICATION forming part of Letters Patent No. 583,330, dated May 25, 1897.

Application filed April 5, 1892. Serial No. 427,936. (No specimens.) Patented in England September 5, 1891, No. 15,050.

To all whom it may concern:

Be it known that I, ERNEST ARTHUR LE SUEUR, a citizen of the Dominion of Canada, residing at Ottawa, Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in the Process of Electrolysis, (for which I have obtained a patent in Great Britain, No. 15,050, dated September 5, 1891,) of which the following is a specification, reference being had therein to the accompanying drawings.

In order to secure the best results in the use of electrolytic cells for the decomposition of solutions of the chlorids of sodium and potassium, it is necessary that the liquid in contact with the positive electrode or anode be kept free from the hydrate or compounds thereof of the metal. The diaphragm usually employed in such cells is designed to secure this end as far as possible. Frequently, however, it happens that leakage or diffusion of the hydrate takes place through the diaphragm from the negative electrode or cathode side of the diaphragm to the side on which is located the positive electrode or anode. This leakage or diffusion often is sufficient to interfere seriously with the proper electrolytic action, because part of the electric current then is consumed in occasioning objectionable and undesirable decomposition, thus lessening the useful decomposition which the electrolytic action is to effect and reducing the efficiency of the cell.

My invention has for its object to obviate the evil effects of such leakage or diffusion.

To this end the invention consists in maintaining the salt solution in the anode-compartment in the chemical condition in which such solution exists at the commencement of the electrolytic action by adding to the contents of the said compartment hydrochloric acid to combine with the hydrate that leaks or diffuses through the diaphragm from the cathode-compartment and form therewith a solution of chlorid of sodium or potassium, as the case may be.

I will now proceed to explain my said invention and the mode of reducing it to practice more fully in detail.

The following description is based upon the process of producing sodic hydrate and chlorine by the electrolysis of chlorid of sodium.

For efficient work in the electrolysis of chlorid of sodium it is an essential condition that the solution in contact with the positive electrode or anode be as free as possible from sodic hydrate—i. e., caustic soda. It is the office of the diaphragm of the electrolytic cell to effect this as far as possible; but the diaphragm frequently allows the passage of the caustic hydrate from the cathode-compartment of the cell to the anode-compartment. I neutralize the portion of caustic hydrate that leaks or diffuses into the anode-compartment by adding hydrochloric acid to the contents of the said compartment. This acid combines with the said portion of hydrate to form solution of chlorid of sodium, which adds itself to the chlorid of sodium already existing there and which is the only substance properly present in the anode-compartment. The result, obviously, is to maintain the solution in the anode-compartment in the chemical condition in which such solution exists at the commencement of the action.

In the electrolysis of potassium chlorid the treatment is identical with that just described for sodium chlorid.

The value of my improvement resides in the fact that the hydrochloric acid disposes of all caustic hydrate that may find its way into the anode-compartment, and in the further fact that in the mutual decomposition of the said acid and hydrate which takes place as they unite no new compounds are formed to interfere with the efficiency of the cell and lessen the useful decomposition which the electrolytic action is to effect by consuming a portion of the electric energy in undesired and inutile decomposition.

What I claim is—

The improvement in the process of decomposing the chlorids of sodium and potassium by electrolysis, which consists first in establishing electric action through the electrolyte and secondly in maintaining the salt solution in the anode-compartment in the chemical condition in which such solution exists at the

commencement of the action, by adding to
the contents of the said compartment hydro-
chloric acid to combine with the hydrate that
leaks or diffuses through the diaphragm from
5 the cathode-compartment and form therewith
solution of chlorid of sodium or potassium,
substantially as set forth.

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

ERNEST ARTHUR LE SUEUR.

Witnesses:

RICHARD J. SIMS,
L. A. SMITH.