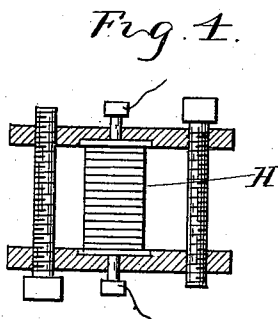
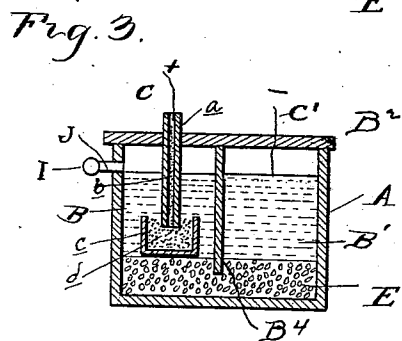
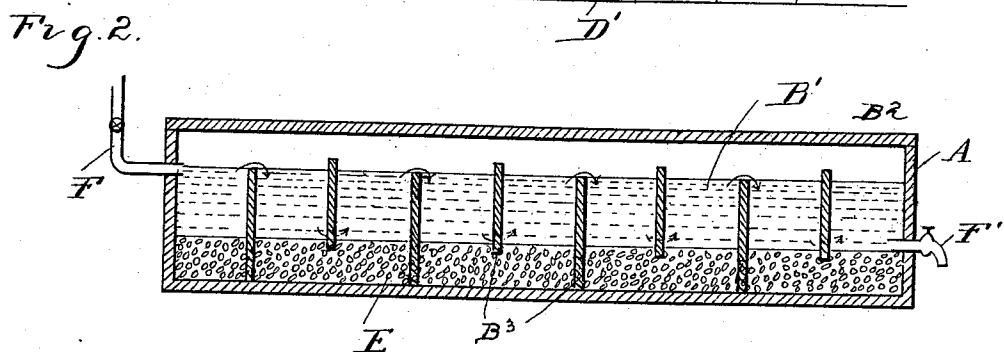
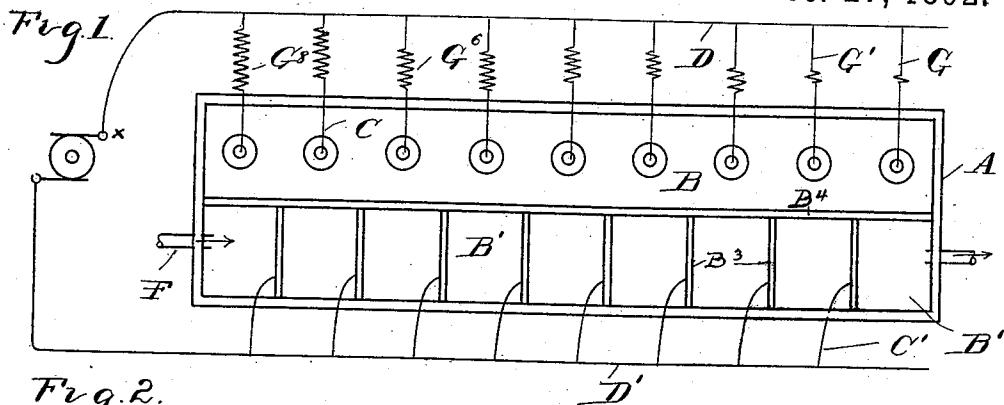


(No Model.)

T. CRANEY.
ELECTROLYTIC APPARATUS.

No. 488,708.

Patented Dec. 27, 1892.



Witnesses
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M. D. O'Gherly

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UNITED STATES PATENT OFFICE.

THOMAS CRANEY, OF BAY CITY, MICHIGAN.

ELECTROLYTIC APPARATUS.

SPECIFICATION forming part of Letters Patent No. 488,708, dated December 27, 1892.

Application filed April 7, 1892. Serial No. 428,222. (No model.)

To all whom it may concern:

Be it known that I, THOMAS CRANEY, a citizen of the United States, residing at Bay City, in the county of Bay and State of Michigan, have invented certain new and useful Improvements in Electrolytic Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to new and useful improvements in electrolytic apparatus for the decomposition of metallic salts, such as chloride of sodium, used in the manufacture of commercial sodic hydrate. In this class of apparatus when there is a number of electrolytic cells connected in series through which the liquid to be decomposed is passed from one to the other so as to be gradually decomposed, the resistance to the passage of the current gradually increases as the liquid becomes more and more decomposed, and it is at its maximum height at or near the limit of decomposition. In using for such an apparatus a single dynamo generator it becomes obviously necessary to take the different resistances in the cells into consideration, in arranging a system of distribution of the current in which each cell shall receive a proper amount of current necessary to produce a proportionate decomposition through the whole series until the desired limit of decomposition is obtained, when the liquid flows off from the last cell. To this end I have devised in connection with such electrolytic apparatus, a system of distribution, by means of which the amount of current passing through each cell is in proportion to the requirements for producing a corresponding gradual decomposition in each cell of the series, all as more fully hereinafter described and shown in the drawings, in which

Figure 1 shows a diagram plan of an electrolytic apparatus containing a plurality of cells connected in series for the decomposition of a solution of a metallic salt, such as chloride of sodium and to which my system of distribution is applied. Fig. 2 is a longitudinal section through the cells in which the liquid is circulated from the inlet in the first cell to the outlet from the last cell. Fig. 3 is a cross section of the apparatus. Fig. 4 is a detail of a resistance which may be used.

A represents a hermetically closed tank having cover B^2 and divided by partition B^4 into a separate anode compartment B and cathode compartments B' , each provided with suitable anodes and cathodes connected by feeders $C C'$ in multiple with the main conductors $D D'$ of the dynamo, and electrolytically communicating with each other through a porous medium E such as sand, asbestos or any other suitable material on the bottom of the tank. The anodes may be of any suitable construction preferably as shown, wherein a is a tubular support containing a body of carbon into which the terminal of a circuit is connected. The lower end of the tube projects into a cup c which is also filled with carbon d having a surface exposure with the liquid in the cell.

The compartments B' which contain the cathodes B^3 are arranged and connected in series in any suitable manner, preferably by arranging the cathodes which serve also as partitions in such a manner as to alternately conduct the solution over and under the partition from one cell to the other, the solution being supposed to be supplied by the valve-controlled supply pipe F and carried off after the electric decomposition has taken place through the valved outlet F' , whereby a continuous flow from one end of the tank to the other is obtained in series through all the cells.

The specific construction of apparatus herein shown is one which I have more specifically described and shown in connection with another pending application Serial No. 428,221 and for which I do not make any claim herein.

My invention consists in placing in the feeders the graduated resistances G, G', G^2 &c., one for each feeder, and which resistances are so graduated that they about equalize the respective resistances formed by the cells in their normal condition of operation, therefore, the greatest resistance is provided for the first cell of the series, gradually lesser resistances for the succeeding cells, and a minimum resistance for the last cell.

The pipe I, shown in Fig. 3, is connected into the tank by branch J, and serves as an escape for the chlorine gas generated in the anode chamber.

I do not confine myself to any specific construction of resistances, but may avail myself of any of the constructions in present use and which may have movable contacts for adjusting each resistance. A simple resistance for the purpose is shown in Fig. 4 and is composed merely of a number of carbon plates. H clamped together. In such resistance I can easily proportion the number of carbon plates required and by the variation of the clamping force I get an adjustment within suitable limits. Of course the arrangement and location of the resistance may be varied.

What I claim as my invention is:

15 The combination with an electrolytic appa-

ratus comprising a plurality of electrolytic cells connected to permit the solution to pass successively from one to the other for the fractional decomposition of the solution passing from one into the other, of an electric genera- 20 tor, anodes and cathodes connected in multiple arc in the circuit of said generator and a graduated resistance in the circuit of each electrolytic cell, substantially as described.

In testimony whereof I affix my signature in 25 presence of two witnesses.

THOMAS CRANEY.

Witnesses:

M. B. O'DOGHERTY,

N. L. LINDOP.