J. H. STOVER.

ELECTROLYZER.

APPLICATION FILED JAN. 12, 1917.

1,312,756. Patented Aug. 12, 1919.

Fig: 1.

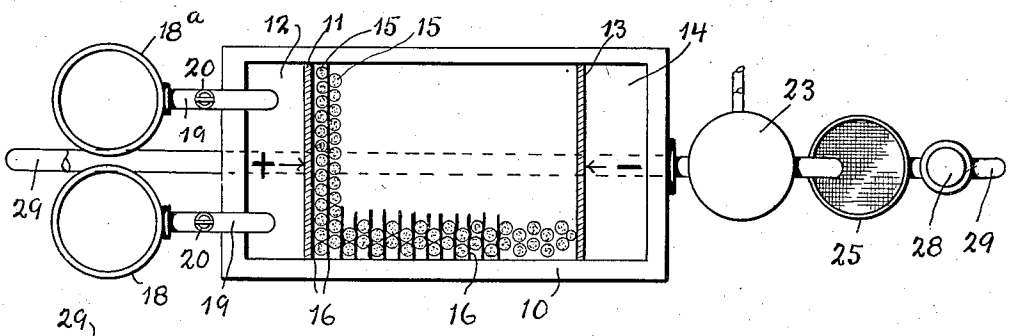


Fig: 2.

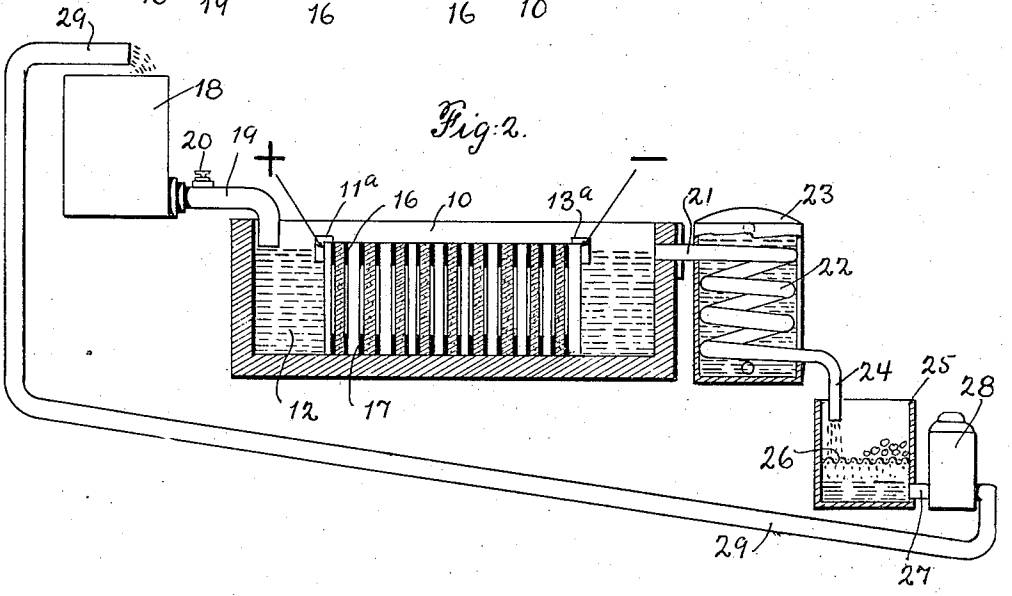
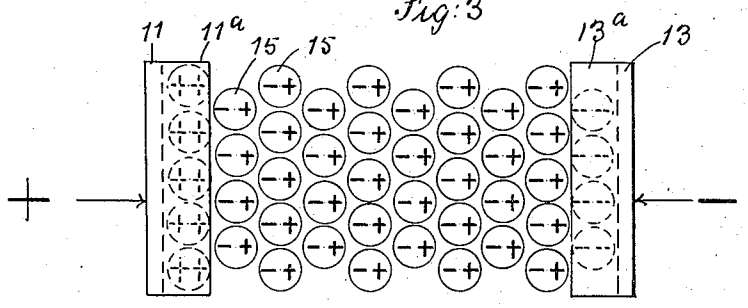


Fig: 3



Jordan H. Stover, Inventor,

By his Attorney,

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UNITED STATES PATENT OFFICE.

JORDAN H. STOVER, OF NUTLEY, NEW JERSEY.

ELECTROLYZER.

1,312,756. Specification of Letters Patent. Patented Aug. 12, 1919.

Application filed January 12, 1917. Serial No. 141,929.

To all whom it may concern:

Be it known that I, JORDAN H. STOVER, a citizen of the United States, and a resident of Nutley, Essex county, New Jersey, have invented a new and useful Improvement in Electrolyzers, of which the following is a full, clear, and exact description.

My invention relates to improvements in electrolyzers, and especially such as are adapted for use in producing oxy-salts. The object of my invention is to produce a simple and comparatively inexpensive apparatus by which the process of producing oxy-salts from their source can be more economically carried on than by the usual method, and in which an electrolytic cell is provided with electrodes placed close together but insulated row-wise from each other so that brine or solution flowing through the electrolyte tank passes rapidly alternating zones or areas charged respectively with positive and negative electricity. By this arrangement I eliminate much of the resistance usually obtained in electrolytic apparatus of this class, because the electrodes are in such close connection and are arranged to intersect the flow of brine thereby eleminating the excessive polarization which occurs in apparatus in which the electrolytic brine is caused to flow between the positive and negative electrodes instead of having the latter intersect them as in my case. A further object of my invention is to produce an apparatus in which a comparatively small voltage answers the purpose and in which a continuous process can be conveniently carried on.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar reference characters indicate corresponding parts in all the views.

Figure 1 is a plan view of the apparatus with the parts in section.

Fig. 2 is a sectional elevation, and

Fig. 3 is a diagram of the bank of electrodes.

The electrolyte tank 10 can be of any suitable shape or size or material, and can be conveniently made of cement. Stretching across it near the top and preferably near one end is a connector 11 having a lip 11^a which overlaps the adjacent row of electrodes 15, and spaced apart from the connector 11 and preferably parallel therewith is another connector 13 having a lip 13^a overlapping the adjacent electrodes 15. The end rows of electrodes should be slightly longer than the others. When placed near the tank ends as in the drawing the arrangement described forms an inlet chamber 12 at one end of the tank 10 and an outlet chamber 14 at the opposite end. Between the connectors 11 and 13 are arranged banks or rows of electrodes 15 which are placed in close connection in the row, but the rows are separated by strips 16 and 17 of insulation placed near the top and bottom of the electrodes. The electrodes are also placed so that the central part of an electrode in one row will come opposite the space between two electrodes in the next. In other words they are staggered so as to pack snugly and cut down the amount of liquor the current has to pass through and hence lower the resistance of the electrolytic apparatus. The electrodes can be conveniently made of artificial graphite which is suitable for the purpose, and the interstices are filled with some material which resists the electrolyte, such for instance as ceresin, halowax or Montan wax. This is an important matter as it prevents the rapid disintegration of the electrodes which would otherwise take place. In fact it cheapens the apparatus very much as the electrodes in most apparatus of this kind are very expensive.

By reference to Fig. 3 it will be noticed that the electrodes intervening between the connectors 11 and 13 will be minus on one side and plus on the other, that is, each electrode will have this characteristic as indicated in the diagram, with the result that numerous and alternating zones or areas will be produced which are charged respectively with plus and minus charges of electricity. This greatly hastens the electrolytic decomposition of the salt, as pointed out more particularly in an application 141,930 for patent on the method, which I have filed simultaneously herewith.

The solution or electrolyte is supplied from the tank 18 or 18^a, there being preferably two of these tanks, so that one can be used while the other is being filled, and each is provided with a spout 19 controlled by a cock 20. The electrolyte is withdrawn from the outlet end of the electrolyzer tank near the top of the solution through the pipe 21 which discharges through the coil 22, the latter being contained in the cold water tank 23, and the coil discharges

through the pipe 24 into the crystal filter 25 which is provided with a screen 26. The impoverished liquor below the screen passes out through a pipe 27 to the pump 28 by which it is returned through the pipe 29 to the supply tank 18 and 18ª as the case may be, the pipe 29 being at its discharge end flexible or stationary with two branches provided with a two-way cock so as to supply either tank 18 or 18ª. In these tanks the salt under treatment can be kept so as to form a solution sufficiently rich for the electrolytic process.

In practice the electrolyte consisting of a solution of the salt under treatment, is passed through the apparatus, traversing the rapidly alternating zones of plus and minus current, and the chemical transformations take place so that when the electrolyte is cooled the crystals readily filter out. I do not here go into the steps of this process, as it is described in the application 141,930 for patent on the method above referred to.

I claim:—

1. An apparatus of the kind described comprising a bank of electrodes arranged in rows, the rows being separated from each other by insulation for a part of the length of the electrodes, the electrodes of each row being also in close relation but independent of each other, and electric connections for the end rows of the bank.

2. An apparatus of the kind described comprising a bank of electrodes arranged in parallel relation and in rows, with the rows separated from each other by insulation for a part of the length of the electrodes, the electrodes of each row being independent but in close relation, and the electrodes of adjacent rows being in staggered relation, and electrical connections for the end rows of the bank.

3. In an apparatus of the kind described, the electrolyzer comprising a tank, a bank of electrodes arranged within the tank in close parallel relation and in rows, the rows being also in close relation but separated from each other for a part of the length of the electrodes by insulation, the electrodes of adjacent rows being in staggered relation, and the electrodes of each row being independent but in close relation, electric connections for the end rows of electrodes, and means for causing a flow of electrolyte through the tank and through the said bank of electrodes.

4. In an apparatus of the kind described, the electrolyzer comprising a tank, a bank of electrodes arranged within the tank in rows, the rows being separated from each other by insulation for a part of the length of the electrodes, electrical connectors extending across the tank and connecting with the end rows of electrodes, electric connections for said connectors, and means for causing a flow of electrolyte through the bank of electrodes.

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Witnesses:
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