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ELECTROLYZING APPARATUS.

APPLICATION FILED MAR. 14, 1911.

1,004,249.

Patented Sept. 26, 1911.

2 SHEETS-SHEET 1.

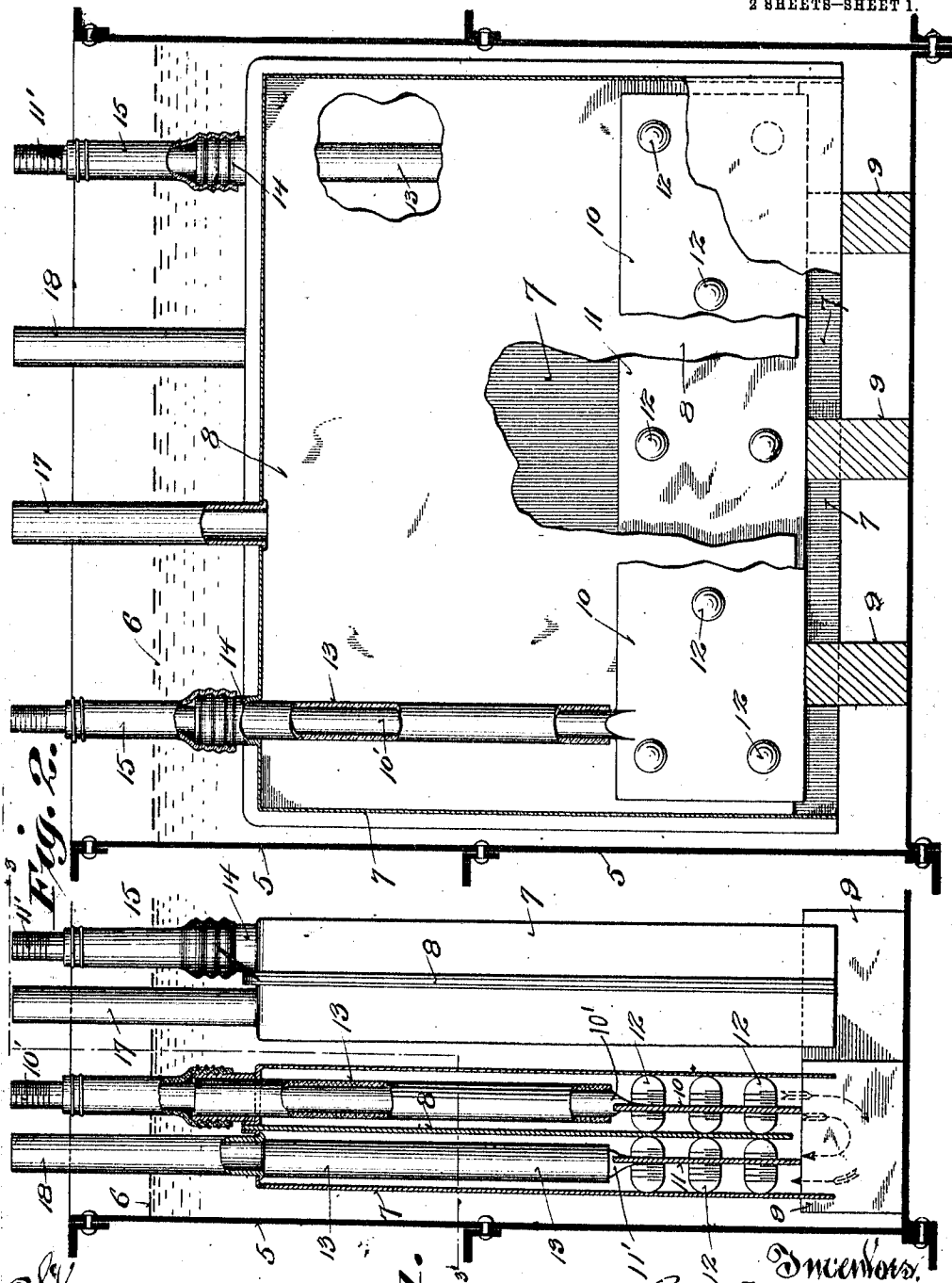


Fig. 2.

Fig. 1.

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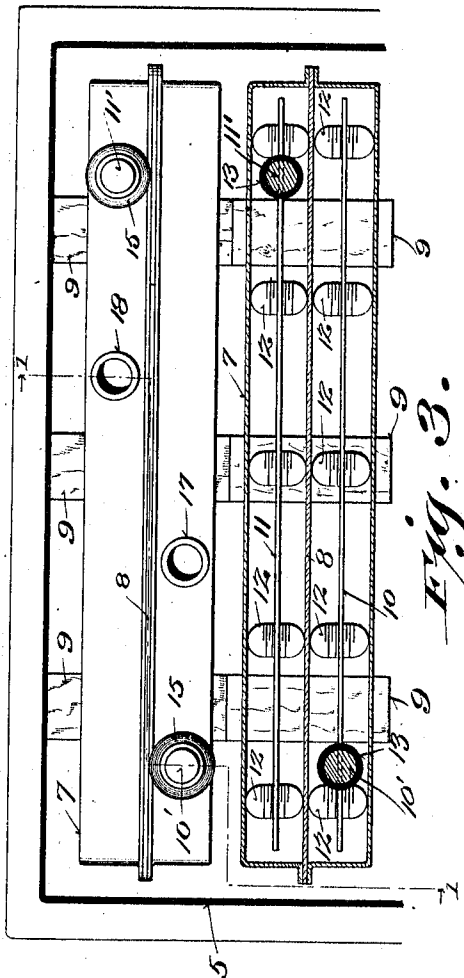


Fig. 3.

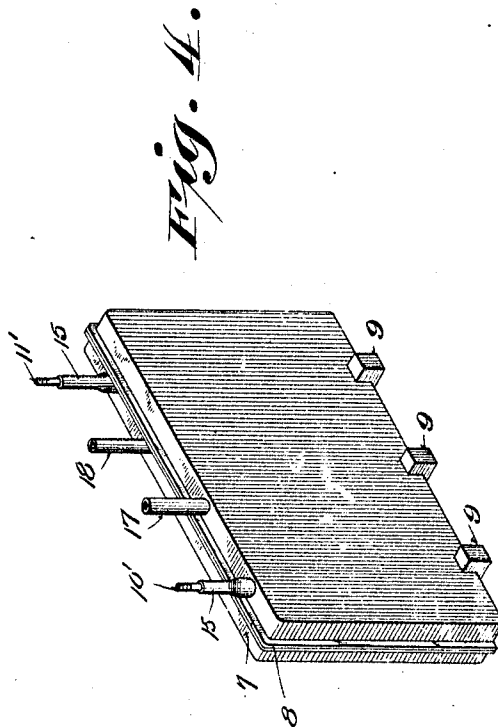


Fig. 4.

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# UNITED STATES PATENT OFFICE.

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## ELECTROLYZING APPARATUS

1,004,249.

Specification of Letters Patent. Patented Sept. 26, 1911.

Application filed March 14, 1911. Serial No. 614,398.

*To all whom it may concern:*

Be it known that we, JOSEPH H. FISCHER, EUGENE G. LUENING, and ARTHUR W. COLLINS, citizens of the United States, and residents of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Electrolyzing Apparatus; and we do hereby declare that the following is a full, clear, and exact description thereof.

Our invention consists in what is herein particularly set forth with reference to the accompanying drawings and pointed out in the claims of this specification, its object being to provide simple, economical and efficient apparatus by which to decrease the cost of production, by electrolysis, of oxygen and hydrogen and to obtain the same for commercial purposes in a purer state than is possible with electrolytic apparatus such as is ordinarily employed, an important feature of our improved apparatus being each independent two-cell unit of the same.

Figure 1 of the drawings represents a cross-section view of apparatus in accordance with our invention, and is illustrated by line 1—1 in Fig. 3; Fig. 2, a vertical longitudinal section view of the apparatus having parts thereof broken away; Fig. 3, a plan view of the apparatus partly in horizontal section, this view being indicated by line 3—3 in Fig. 1, and Fig. 4, a perspective view of a cell-case of the apparatus.

Referring by numerals to the drawings indicates a suitable tank containing an electrolyte 6 in which an indefinite number of independent, preferably oblong, metallic cases 7 are submerged, each case being open at the bottom to said electrolyte and divided into a pair of cells by a metallic diaphragm 8. Each cell case is preferably in two sections having rigid fluid-tight unions at their top and ends with the dividing diaphragm, the sides of the case being preferably set in grooves of insulating supporting blocks 9 that rest upon the bottom of the aforesaid tank.

Supported on the blocks 9 to occupy one cell of each case 7 is an anode 10, and likewise supported in the other cell of the case is a cathode 11, these elements of each independent unit of the apparatus being shown provided with insulators 12 between the sides and diaphragm of said case. Electric current conductor-posts 10' and 11' in con-

nection with the anode and cathode, respectively, are provided with insulating covering 13 within the case-cells and upper outer nipples 14 of said cells. A similar covering 15 on each conductor-post is put in gas-tight connection with the corresponding nipple by wire-wrapping or otherwise as may be most convenient or desirable in practice.

From the foregoing it will be understood that provision is had for insulating a plurality of cell-cases from one another in the electrolyte, but as these cell-cases are electrically joined, the production of gas takes place in all simultaneously, oxygen in the anode cell and hydrogen in the cathode cell of each case, the flow of the electric-current being indicated by arrows in Fig. 1. The gases find their way from the cells of each case through upper tubes 17, 18 with which said case is provided, and these tubes are designed for connection with service pipes or containers.

Because of the peculiar construction of the individual units and decrease of internal resistance in the herein described apparatus, a greater volume of each gas is obtained with less expenditure of electric-current than is possible with any other apparatus with which we are familiar. A greater purity of the gases also results, because of said individual units, and the general construction of our improved apparatus is such as to insure a better circulation and more uniform density of the electrolyte than in apparatus heretofore employed for the production of oxygen and hydrogen by electrolysis. The cost of maintenance of our apparatus is less than any other for the same purpose within our knowledge, because of its independent separately removable cell-cases and parts therewith.

We claim:

1. An electrolyzing apparatus unit consisting of a single open bottom metallic case having a metallic diaphragm therein dividing the same into two cells each of which is provided with an upper gas-outlet tube, an anode insulated in one of the cells, and a cathode insulated in the other of said cells, the case and its contents being adapted to be submerged in an electrolyte.

2. An electrolyzing apparatus unit consisting of a single open bottom metallic case having a metallic diaphragm therein dividing the same into two cells each of which is

provided with an upper nipple and an upper gas-outlet tube, an anode in one of the cells insulated from the diaphragm and the case, a cathode similarly insulated in the other cell, conductor posts extending from the anode and the cathode through the nipples with which said case is provided, insulating covering on each post within a cell-case and nipple, and similar covering on said posts in gas-tight connection with said nipples.

3. An electrolyzing apparatus consisting of a tank, an electrolyte in the tank, a plurality of independent open bottom metallic cases, insulated from one another in the electrolyte and severally provided with upper outer nipples and gas-outlet tubes, a metallic diaphragm in each case dividing the same into two cells from each of which one of said nipples and one of said tubes extend, an anode in one cell of each case insulated

from said case and the diaphragm therein, a cathode similarly insulated in the other cell of the same case, conductor-posts extending from the anodes and cathodes through the nipples of the aforesaid cases, insulating covering on the posts within the cells and nipples, and similar covering on the said posts in gas-tight connection with said nipples.

In testimony that we claim the foregoing we have hereunto set our hands at Milwaukee in the county of Milwaukee and State of Wisconsin in the presence of two witnesses.

JOSEPH H. FISCHER.  
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Witnesses:

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