

H. I. ALLEN AND K. R. FOX.
ELECTROLYTIC CELL.
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1,374,976.

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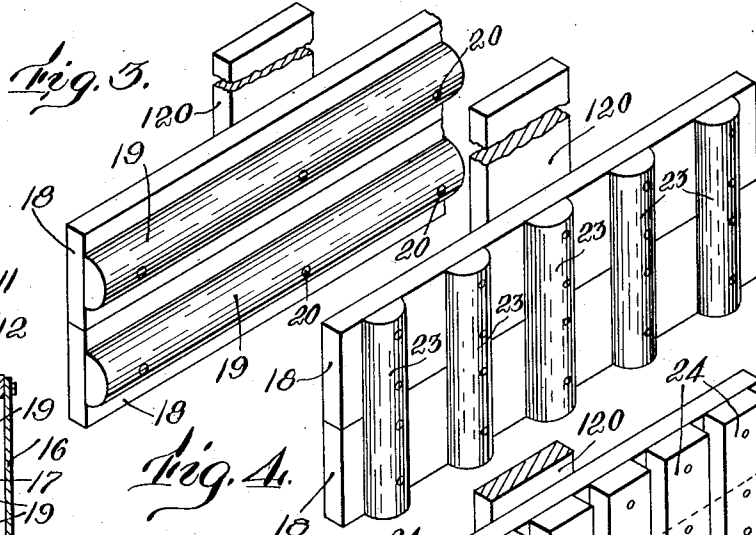
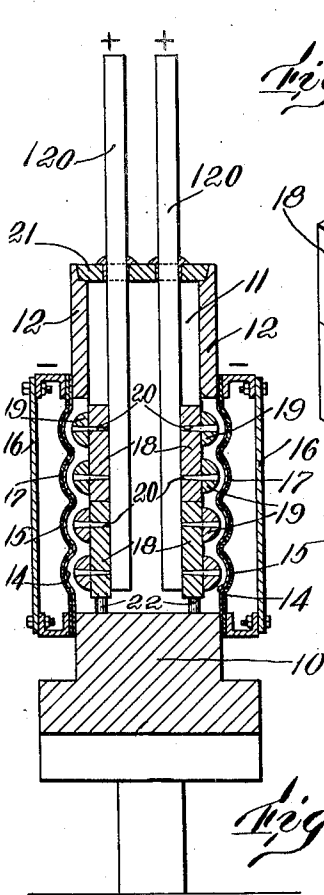
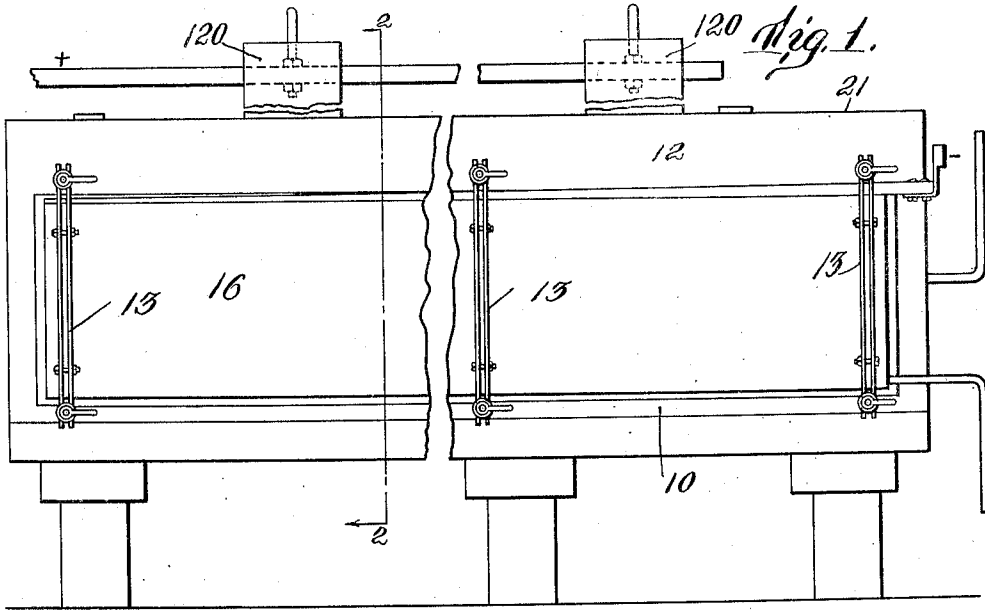
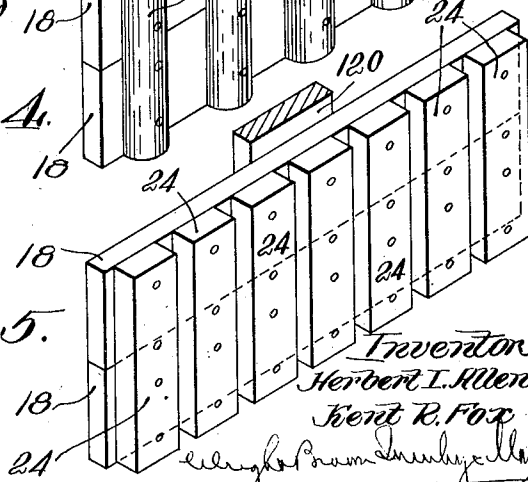


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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ELECTROLYTIC CELL.

1,374,976.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, HERBERT I. ALLEN and KENT R. FOX, both citizens of the United States, residing at Portland, in the county of Cumberland and State of Maine, have invented new and useful Improvements in Electrolytic Cells, of which the following is a specification.

This invention relates to electrolytic cells for use in the decomposition of saline solutions, and has for its object to provide certain improvements therein for increasing the active area of the cathodes and anodes in a cell occupying a given floor space.

On the accompanying drawings,—

Figure 1 shows in side elevation a cell embodying the present improvements.

Fig. 2 represents a vertical cross section through the same.

Fig. 3 represents an anode.

Figs. 4 and 5 represent other anodes embodying the present invention.

The cell, which we have selected for illustration as embodying the invention, is of the familiar Allen-Moore type, in which the cathodes are unsubmerged in the electrolyte, in which diaphragms of sufficient porosity are employed to permit a relatively free percolation of the electrolyte therethrough from the anode compartment into contact with the cathodes, and in which the cathodes are confined within cathode chambers clamped to the cell body.

The cell body has the usual bottom 10, end walls 11, and freeboards 12, all formed of suitable inert material. The sides of the cell body, below the freeboards, are open, and the diaphragms 14, cathodes 15 and frames 16 (which form the cathode chambers) are clamped over the openings by suitable clamps 13.

The cathode is formed with a plurality of corrugations 17 between its marginal flanges, and these corrugations may extend either horizontally as shown, or vertically. This construction of the cathodes, *per se*, we do not claim as of our invention. The corrugations may be arcuate or angular, and they lie preferably only within the walls defining the openings in the sides of the cell body. The cathodes are provided with numerous slots or perforations as ordinarily. The diaphragms 14 cover and are in contact with the inner active faces of the cathodes, and their margins are clamped against the sides

of the cell body by the unperforated marginal portions or flanges of the cathodes, thereby forming gaskets. Any suitable conduits are employed for conducting away from the cathode compartments the effluent, which usually consists of a mixture of brine and caustic soda, and also the hydrogen which is evolved by the electrochemical reaction.

The concave faces of the corrugations in the cathodes are next the anode compartment, and, as stated, are covered by the porous diaphragms.

Each anode consists of a plate having ribs which are complementary to the corrugations in the associated cathode, not only the surfaces of the ribs but also the exposed surfaces of the plates being active. In case the corrugations in the cathodes are arranged horizontally, the anodes may be formed as illustrated in Figs. 2 and 3. In this case, each anode consists of a plurality of plates 18, 18, having ribs 19, 19, secured thereto by pins 20. The plates 18, the ribs 19 and the pins 20 are all formed of Atcheson graphite or equivalent material. Each plate 18 is shown in Fig. 2 as having two ribs 19, but, if desired, each plate may have a single rib as shown in Fig. 3. The plates and ribs extend substantially from end to end of the cell body, and the plates are secured to upright bars 120 which project through the cover 21 of the cell body. The lowermost anode plates may rest upon insulators 22, which in turn rest upon the bottom of the cell body.

By virtue of this construction, it will be seen that the active area of the anodes is greatly increased, since the surfaces of the plates which are exposed between the ribs are active. Instead of having the ribs arranged horizontally, they may be arranged vertically, as illustrated in Fig. 4, in which case the plates 18, 18, are provided with the upright ribs 23 pinned thereto. Each member may be attached to two plates as shown. This anode is utilized in case the corrugations of the cathodes are vertical. It is quite apparent, of course, that, instead of having semi-cylindrical ribs, we may employ angular ribs, such for example as shown at 24 in Fig. 5.

Having thus explained the nature of our said invention and described a way of making and using the same, although without

attempting to set forth all of the forms in which it may be made or all of the modes of its use, what we claim is:—

5 1. An electrolytic cell comprising a cell body, a corrugated perforated cathode, a porous diaphragm covering and in contact with the active face of the cathode, and an anode consisting of one or more plates hav-
10 ing ribs complementary to the corrugations in the cathode, the exposed faces of the plates and the ribs being active.

2. In an electrolytic cell for the electrolysis of saline solutions, an anode consisting of one or more flat carbon plates, and spaced parallel carbon ribs thereon, the faces of the ribs and the faces of the plates between the ribs being active. 15

In testimony whereof we have affixed our signatures.

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