R. PECHKRANZ.

ELECTROLYZER.

APPLICATION FILED JUNE 1, 1920.

1,415,466. Patented May 9, 1922.

Fig.1.

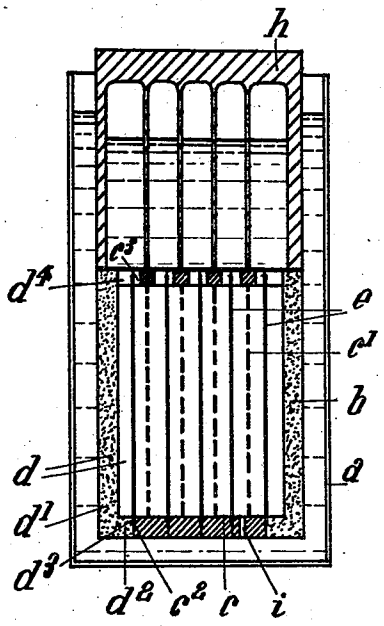


Fig.2.

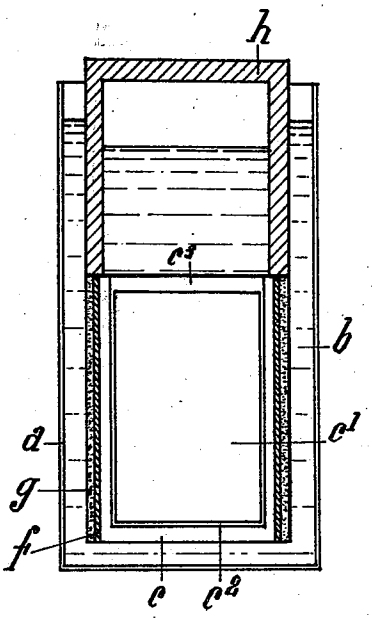
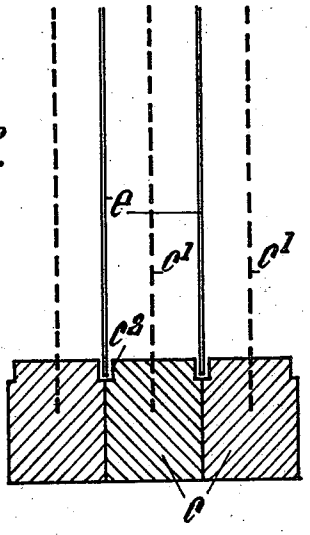


Fig.3.



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ELECTROLYZER.

1,415,466. Specification of Letters Patent. Patented May 9, 1922.

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To all whom it may concern:

Be it known that I, RODOLPHE PECHKRANZ, a citizen of Switzerland, residing at Carouge-Geneva, Canton of Geneva, in the Confederation of Switzerland, have invented certain new and useful Improvements in Electrolyzers, of which the following is a specification.

The present invention relates two electrolyzers and especially to the electrolyzers of the tank type that is to say of the type in which the surface of the electrolyte is open to the outer air.

The improved electrolyzer has, like other known electrolyzers of the tank type, vertical electrodes which alternate with vertical diaphragms provided with frames of some insulating material and forming a block with the electrodes, but is distinguished therefrom by the fact that the electrodes, which are slightly smaller, do not reach to the outer edges of the said frames, thus excluding all evolution of gas outside the parallelepiped block formed by the juxtaposition of the frames and consequently permitting of the immersion of the block in the tank.

In the drawings:

Figures 1 and 2 are two vertical sections taken at an angle of 90° to each other.

Figure 3 is a detail section thereof on a larger scale.

This constructional form has a single tank *a* of sheet iron which contains the electrolyte *b*. In this latter is sunk a block composed of different parts: at the centre of the block four vertical frames *c* made of some insulating material (cement) and of rectangular form, each carrying a diaphragm c^1 of asbestos or perforated metal plate: at the two ends of the block are mounted pieces *d* of insulating material each having an end d^1 and a frame d^2 of cement, which bears against the adjacent frame *c*. The frames *c*, *d* have on their side and lower inner edges grooves c^2, d^3 which are situated opposite each other two by two and receive the monopolar electrodes *e*, of rectangular form. To the side faces of these frames *c*, d^2 are applied two sheets *f* of "eternite", a mixture of asbestos and cement, constituting a fully tight covering and are held in place on them by rigid plates *g* made of asbestos and cement. The different parts of the block thus constituted are pressed one against the other by means not shown in the drawing, stirrups or bolts for example. The upper portions of the frames *c*, d^2 are made thinner so that the passages c^3, d^4 are obtained, by which the gases from the cathodes or anodes escape and which are evolved on both faces of each electrode *e:* this latter is provided with an upright piece not shown and serving to connect it to an inward or an outward conductor for the current.

Owing to the fact that these electrodes do not reach to the side and lower faces of the block, this latter may be completely sunk in the same tank without a parasitic electrolysis being produced along the edges of the electrodes which would be situated without that on these faces: what is called parasitic electrolysis is that kind of electrolysis the gaseous products of which are evolved at a point of the electrolyzer which is not arranged to collect them.

The block is completely sunk in the electrolyte and is surmounted by a cover *h* made in a single block and containing a number of cells which serve to collect the gases from the cathodes and anodes: it is made of some insulating material being moulded for example in pottery, cement, eternite which is a mixture of asbestos and cement material, or a cement composition. The outer walls and the internal partitions of the cover *h* rest on the pieces and the frames *c*. Such a cover is not only economical, but possesses also the advantage of not having any joints and of not having any metal parts, such as sheet iron, which are liable to become perforated by oxidation. The pieces which serve to connect the electrodes to the inward and outward conductors for the current pass through the top of the cover *h:* they group them in parallel. In the head of the cover are arranged two tubes not shown with multiple openings leading into the different cells and each collecting one of the two gases, which is simpler than having a special outlet for each cell. The supply of fresh liquid in place of that part of the electrolyte decomposed by the current is made through one or more openings of very small dimensions such as *i*, made in the frames *c*.

This illustrated electrolyzer has no organized circulation of the electrolyte for bringing it into a chamber where clarification is effected of the emulsion produced by the mixture of the electroyte and the bubbles

of gas due to electrolysis. The result of the tranquility of the said electrolyte is that very porous diaphragms may be employed without compromising the purity of the gases.

The numbers of the diaphragms and of the electrodes may differ from those indicated in the drawing.

The electrodes may be bipolar instead of being monopolar, that is to say a different gas is evolved on each face of one and the same electrode. They are then mounted in series and only the two extreme electrodes are connected to the inward and outward conductors for the current. The partitions of the cover, the number of which is equal to the sum of the numbers of the electrodes and of the diaphragms, rest in this case on the frames of the diaphragms and on the upper edge of the different electrodes which reach to the height of the top of these frames.

I claim:

1. In an electrolyzer of the tank type in combination vertical diaphragms, a plurality of frames of insulating material, vertical electrodes of slightly smaller size than said diaphragms, said electrodes being arranged in alternation with said diaphragms and so dimensioned that when inserted into said frames they do not reach to the outer edges of the latter, substantially as described.

2. In an electrolyzer of the tank type in combination vertical diaphragms, a plurality of frames of insulating material, vertical electrodes of slightly smaller size than said diaphragms, one of said diaphragms being inserted in each one of said frames, said electrodes being arranged in alternation with said diaphragms and so dimensioned that when inserted into said frames they do not reach to the outer edges of the latter, a hermetic covering applied to the faces of said frames, rigid plates for holding said coverings in place, means for pressing the individual constituents together to form a single block, substantially as described.

3. In an electrolyzer of the tank type in combination, vertical diaphragms, a plurality of frames of insulating material, vertical electrodes of slightly smaller size than said diaphragms, one of said diaphragms being inserted in each one of said frames, said electrodes being arranged in alternation with said diaphragms and so dimensioned that when inserted into said frames they do not reach to the outer edges of the latter, a hermetic covering applied to the faces of said frames, rigid plates for holding said coverings in place, means for pressing the individual constituents together to form a single block, a multicellular cover moulded of insulating material surmounting the said block for collecting the gases which are produced by electrolysis, substantially as set forth.

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

RODOLPHE PECHKRANZ.

Witnesses:

DR. ROD. DE WURTEMBURG,
ECHN. EMMANNS.