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ELECTROLYTIC CELL FOR DECOMPOSING WATER

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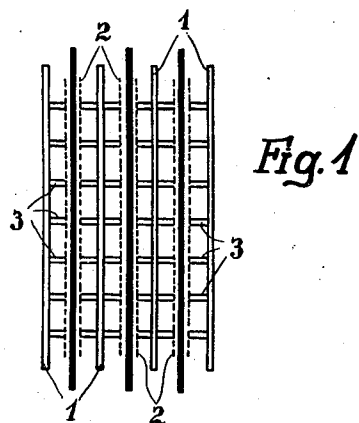


Fig. 1

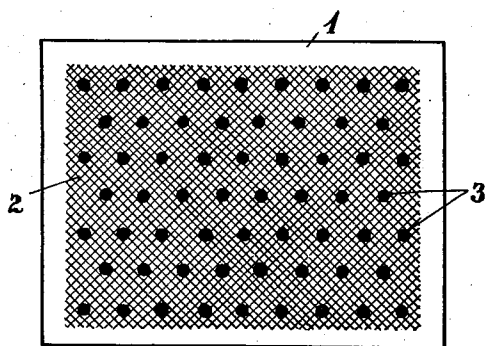


Fig. 2

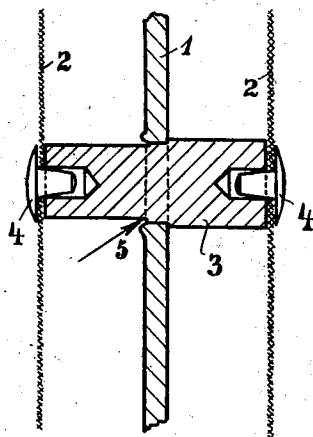


Fig. 3

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ELECTROLYTIC CELL FOR DECOMPOSING WATER

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In electrolytic cells for the decomposition of water, it is endeavoured to employ a low cell voltage in order that the consumption of current may be as small as possible in relation to the gas produced. This effect can be obtained by taking care that the resulting gas bubbles are removed as quickly as possible from the zone situated between the cathode and the anode, since otherwise they form a resistance and thereby increase the voltage for a given load. The cell voltage may also be reduced by making the surface of the electrode larger than its appurtenant projection surface, which can be done, inter alia by disposing in front of the basal electrode, electrodes consisting, for example, of perforated sheet iron. By this means the gas bubbles pass out of the zone between the cathode and the anode sooner than in the case of solid electrodes, in which the gas bubbles travel to the outermost edges of the electrode and set up considerable resistance. However, the surface is not substantially increased in comparison with the appurtenant projection surface.

It is also known to employ fore-electrodes, consisting of packets of fine wire gauze. In this case the effective surface is greater, but the passage of the gas towards the side facing the basal electrode is impeded, since the superimposition of the several layers of gauze obstructs the fine meshes of same.

The present invention combines the advantages of said arrangements whilst obviating their defects, and consists in that the fore-electrode employed is composed of only a single wire gauze, of wide mesh and strong wire, for example, wire with a diameter of 0.6-1.4 mm. with 3-6 meshes per centimetre.

The use of such a woven electrode enables the liberated gas bubbles to pass directly and immediately towards the side facing the basal electrode, so that they cannot offer any resistance to the passage of the current. In the fore-electrode, the entire superficial area of the wires composing the fabric acts as electrode surface.

For example, the ratio between the total superficial area of a fabric according to the

invention and the projection surface thereof is about 1.4 to 1.

In order, when such a woven fabric is used as fore-electrode, to prevent the undesirable voltage drop which occurs, for example, when the gauze is secured merely at the upper and lower ends and results from the resistance of the wires, a further development of the invention consists in securing the gauze by means of a number of studs distributed over its entire surface. Since each stud has only to supply a small zone of the gauze with current, the voltage drop is naturally quite small, and it can be reduced practically to zero by employing a suitably large number of bolts. The method of attaching the studs to the gauze is, of course, an important matter and it has been found particularly advantageous to secure the gauze by means of pins driven into bores in the studs.

The employment of the fore-electrode according to the invention affords the great advantage that, owing to the absence of resistance, and to the increased surface obtained, a higher electrical loading can be applied to the surface than in the case of other fore-electrodes, without thereby increasing the consumption of current.

With the novel woven electrode, the dimensions of the apparatus for a given output are considerably smaller than heretofore, and the manufacture is simpler and cheaper inasmuch as only a single gauze is provided instead of the packets previously employed. Of course, several layers of gauze may also be employed, in which case a wider mesh is used.

The drawing illustrates a typical embodiment of the invention, Fig. 1 being a plan and Fig. 2 a side elevation of the electrode, whilst Fig. 3 shows one of the fixing studs on a larger scale.

The fore-electrode gauze 2 is secured to the basal electrode 1 by means of studs 3 and headed pins 4 driven into the latter.

In order to attach the gauze firmly to the studs 3, the pins 4 are tapered and are simply driven into bores in said studs. Since the studs, which are passed through and fixed in the basal electrode, are intended to carry gauze on both sides, they must form a liquid-

tight joint. A particularly advantageous method of fixing the studs in the basal electrode consists in providing each stud with a shoulder 5, which is used for tamping or caulking the stud on to the electrode (see the arrow in Fig. 3).

I claim:—

1. In or for an electrolytic cell for the decomposition of water, the combination of a basal electrode, a fore-electrode consisting of a stout wire gauze of wide mesh, a plurality of bored studs distributed over the surface of the basal electrode, and pins driven through the gauze into the bores of the studs to secure the fore-electrode.

2. In or for an electrolytic cell for the decomposition of water, the combination of a basal electrode, a fore-electrode consisting of a stout wire gauze of wide mesh, a plurality of shouldered and bored studs distributed over the surface of the basal electrode and secured in holes therein by tamping, and pins driven through the gauze with the bores of the studs to secure the fore-electrode.

In testimony whereof I affix my signature.

ARNO EWALD ZDANSKI.