E. A. LE SUEUR.

ELECTROLYTIC CELL.

APPLICATION FILED JAN. 25, 1919.

1,331,571. Patented Feb. 24, 1920.

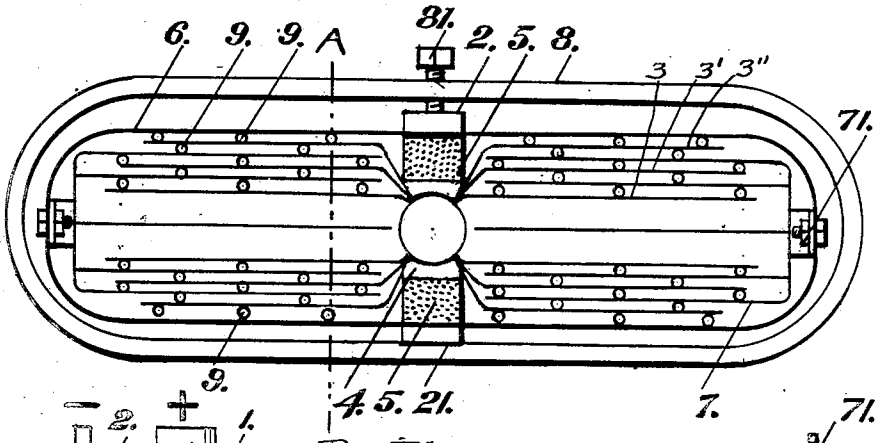


Fig. 1.

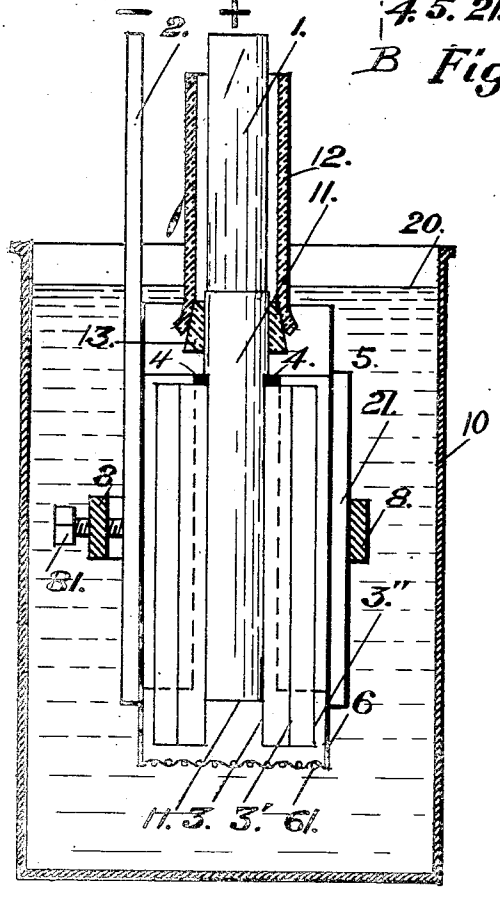


Fig. 2.

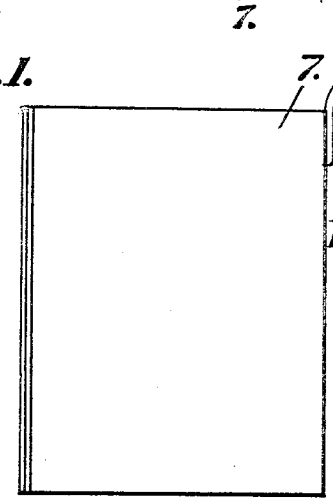
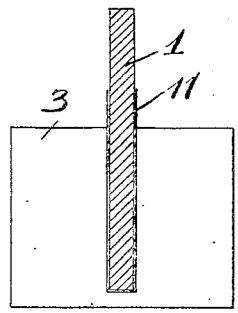


Fig. 3.

Fig. 4.



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To all whom it may concern:

Be it known that I, ERNEST A. LE SUEUR, a subject of the King of Great Britain, residing at Ottawa, in the county of Carleton and Province of Ontario, Canada, have invented certain new and useful Improvements in Electrolytic Cells, of which the following is a specification.

My invention has reference to cells employing thin sheets of platinum or the like for the anodes, and its object is to provide improved means, in the particulars of effectiveness, simplicity and small repair charges, for delivering heavy commercial currents to said sheets beneath the surface of the electrolyte. My said invention will be fully understood by reference to the accompanying drawings in which Figure 1 shows a plan of a set of electrodes and attachments; Fig. 2 an end elevation section, on the line A—B of Fig. 1, of the apparatus of Fig. 1 with the exception of the parts of Figs. 3 and 4, and including a view of the containing vessel and electrolyte and showing in vertical central section a protective sleeve on the anode lead not shown in Fig. 1; Fig. 3 shows a side elevation of a set of inner cathode members; Fig. 4 shows a central side elevation section view of the anode and sheath.

With more particular reference to the drawings, 1 is an anodic stem, preferably of copper, cased in the chemically resistant sheath 11, of platinum or the like; 2 is the main cathodic lead, also preferably of copper; 3, 3′ and 3″ are thin anodic sheets of platinum or the like; 4, 4 are pieces of insulating material, preferably plastic, as rubber; 5, 5 are substantially rigid pieces which may be either insulating or conducting; 6 is a flexible metallic casing, of sheet steel or the like; 7, 7 are self-contained sets of inner cathode members; 8 is a yoke, conveniently of cast iron, adapted, by means of the screw 81, to clamp all the preceding parts together; 9, 9 are insulating separating pieces; 10 is an (oblong) containing vessel of any suitable material; 20 is the electrolyte; 12, Fig. 2, is a (preferably insulating) tube; 13, of insulating material, constitutes a tight joint between the parts 11 and 12 and may, for instance, be of rubber or any suitable cement; 12 and 13 may be combined into a single piece, for instance of rubber, and the whole may, if desired, make a close fit on the stem and sheath; 21 is a stiff piece as of steel, adapted to distribute the pressure of the yoke 8 on one side of the assembly the same as the piece 2 does on the other; 61 is wire cloth at the bottom of the piece 6; 71 is a metallic strap adapted to being bolted or otherwise attached to the casing 6. The cathode surfaces as shown herein are constituted by the cathodic lead 2, the flexible metallic casing 6, the two sets of removable members 7, and the parts 8, 21, 61, 71 and 81; also, in case same are made conducting instead of insulating, the pieces 5, 5.

The points of the pieces 9 fit into holes in the wire cloth 61 and are therefore not readily disturbed. The casing 11 is preferably of much thicker metal than are the sheets 3, 3′ and 3″,—convenient thicknesses in the two cases being about 0.002″ and 0.0008″ respectively. The said sheets are illustrated as projecting below the bottom of the stem 1 and sheath 11; this is with a view to economizing on the resistant metal required for said sheath, the latter may, however, be carried to any desired depth. The sheets are shown parallel but they need not be so in order to conform with the spirit of my invention. Said sheets may be bonded to the sheath 11, as, for instance, by welding; but the method I prefer for securing contact between said sheets and said sheath is to press the former against said sheath by superposing upon them the piece 4. I have shown three pairs of double sheets (and the appropriate number of divisions of the parts 7 to correspond) but I do not wish to limit myself to this number either as an upper or a lower limit. The member 1 and the sheath 11 may obviously be of any convenient shape, and the same applies to other portions of the apparatus. I may employ a plurality of stems 1 and sheaths 11 but I much prefer the single stem. The parts 12 and 13 may be omitted and the protective sheath 11 carried higher up on the stem 1; or the said sheath may reach above the surface of the electrolyte and the pieces 12 and 13 be still used if even only to protect the stem 1 from corrosion due to the creeping of solution up over the top of the sheath 11. The bottom 61 may obviously be perforated in other ways than by making it of wire cloth. There is considerable advantage in the use of the self-contained sets of cathode members 7 which can be set into place after the rest of the electrode assembly has been made,

thus greatly simplifying an otherwise troublesome operation.

In speaking in the claims of "resistant" metal I mean resistant to chemical attack.

I claim:

1. In an electrolytic cell an anode having a conducting stem protected by a conducting sheath of resistant metal and sheets of resistant metal in contact with the latter beneath the electrolyte.

2. In an electrolytic cell an anode having a conducting stem protected by a resistant conducting sheath and sheets of resistant metal, in contact with the latter, extending laterally and downwardly from same.

3. In an electrolytic cell an anode having a conducting stem protected by a conducting sheath of resistant metal and sheets of resistant metal clamped against opposite sides of the latter.

4. In an electrolytic cell an anode having a conducting stem protected by a conducting sheath of resistant metal and sheets of resistant metal clamped against opposite sides of the latter and extending laterally and downwardly from same.

5. In an electrolytic cell an anode having a conducting stem protected by a conducting sheath of resistant metal and sheets of resistant metal in electrical contact with the latter, said sheath having a thickness materially greater than said sheets.

6. In an electrolytic cell an anode having a conducting stem protected by a conducting sheath of resistant metal and a plurality of superposed sheets of resistant metal clamped against each of two opposite sides of said sheath.

7. In an electrolytic cell an anode having a conducting stem protected by a conducting sheath of resistant metal and one or more sheets of resistant metal clamped against said sheath by an insulating member.

8. In an electrolytic cell an anode having a conducting stem protected by a conducting sheath of resistant metal and one or more sheets of resistant metal clamped against said sheath by a plastic insulator backed by a substantially rigid member.

9. In an electrolytic cell an anode having a conducting stem protected by a conducting sheath of resistant metal and sheets of resistant metal clamped against opposite sides of same by insulating material.

10. In an electrolytic cell an anode having a conducting stem and metallic sheets pressed into contact with opposite sides of same by insulating pieces held in a flexible casing.

11. In an electrolytic cell an anode having a conducting stem and metallic sheets pressed into contact with opposite sides of same by insulating pieces held in a flexible metallic casing and clamping arrangements applied to said casing.

12. An electrolytic cell having an anode possessing a plurality of anodic sheets contained in a cathodic casing and one or more subsidiary cathode members adapted to be set into place and bonded to said casing after the parts previously mentioned have been assembled.

13. In an electrolytic cell an anode having a conducting stem with its lower portion protected by a resistant conducting sheath in electrical contact with it and a further portion higher up protected by a sleeve, insulated from said stem, or of insulating material.

14. In an electrolytic cell an anode having a conducting stem with its lower portion protected by a resistant conducting sheath and an insulated or insulating sleeve, overlapping the upper portion of said conducting sheath and making a tight joint therewith, which carries the protection of said stem higher than does said sheath.

15. In an electrolytic cell a set of positive and negative electrodes contained in a metallic cathodic casing with perforated bottom.

ERNEST A. LE SUEUR.