March 24, 1931. J. N. SMITH 1,797,375

ELECTRODE FOR ELECTROLYTIC APPARATUS

Filed Aug. 21, 1928

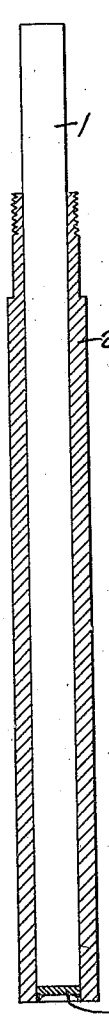

Fig 1

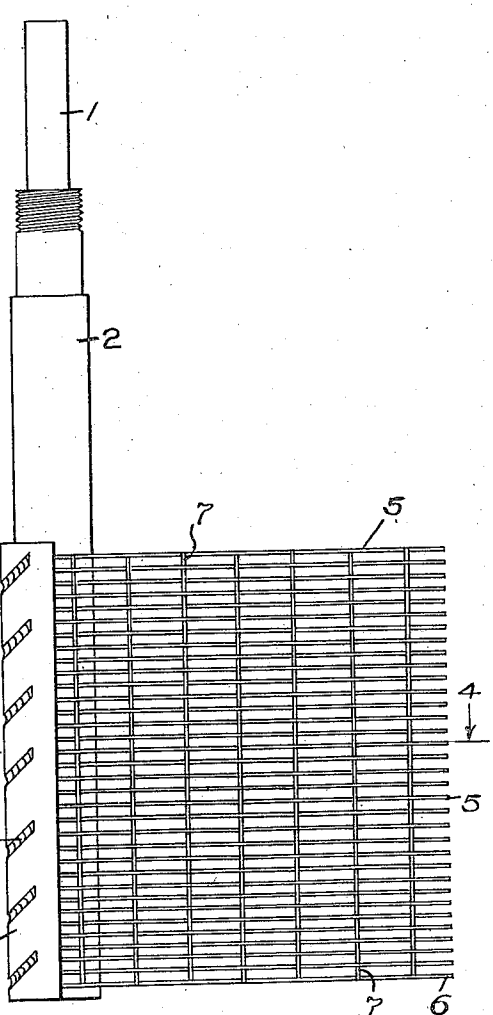

Fig 2

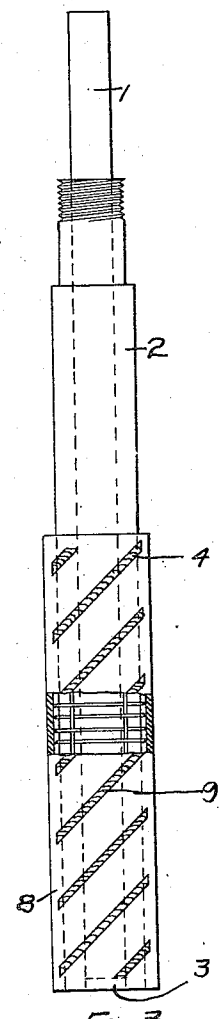

Fig 3

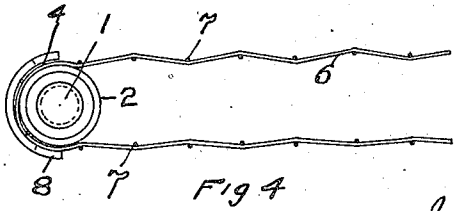

Fig 4

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By Lewis J. Doolittle,
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Patented Mar. 24, 1931

1,797,375

UNITED STATES PATENT OFFICE

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ELECTRODE FOR ELECTROLYTIC APPARATUS

Application filed August 21, 1928. Serial No. 301,145.

This invention relates to electrodes for use in electrolytic cells, more particularly cells of the tank type for the electrolysis of water.

The object of this invention is to provide an electrode which shall be simple to construct and very efficient. To this end, my invention comprises, broadly, an electrode having a conducting member of high electrical conductivity, protected by a covering sleeve from the action of the electrolyte, and having firmly attached to the covering sleeve suitable electrolyzing elements.

The accompanying drawings disclose one embodiment illustrative of this invention, wherein:

Fig. 1 is a vertical cross-section of one portion of the electrode;

Fig. 2 is a side elevation of the complete electrode;

Fig. 3 is an end elevation of the complete electrode, and

Fig. 4 is horizontal cross-section on the line 4—4 of Fig. 2.

The electrode comprises a main conducting member or rod 1, of copper or other metal of high electrical conductivity, having a sleeve or shell 2 of a metal passive to the electrolyte and gas within the cell, such metal being preferably iron or steel, and preferably nickel plated when used as an anode.

The rod 1 is adapted to be slid into said shell 2 and to be soldered or braised or otherwise fused thereto. The bottom of said sleeve is provided with a plug 3 of similarly protective metal welded or tightly secured therein so as to prevent the electrolyte from coming in contact with the bottom end of the rod 1.

The sleeve and rod, which will, for convenience be called the stud portion of the electrode, is disposed within the bend of the foraminous electrolyzing element 5, preferably consisting of wire mesh cloth having a relatively large number of horizontal conducting wires 6 and relatively few vertical supporting wires 7 interwoven therewith. A cover plate 8 encloses the portion of the electrolyzing element 5 bent about the stud 2 and holds said element in position on the stud.

The electrolyzing element 5 is shown as "U-shaped", but it will be obvious that it may be of any other desired shape or construction, in two or more parts joined or held together at the bent-over portion, more or less approximating such form and partially bent or wrapped around the electrode stud and secured thereto by suitable means. It will also be apparent that, in order to further simplify the construction, especially in case very large current is not used, the cover plate may be omitted and the element welded or otherwise firmly attached to the stud to provide a good electrical and mechanical joint.

The bent portion 4 of the electrolyzing element 5 is welded, soldered, clamped or otherwise attached to the cover plate 8 partially covering the bend of the electrolyzing element 5, the cover being provided with openings or slots 9 where the element may be readily welded or clamped to the plate, and also welded or clamped to the sleeve 2 of the stud. The cover plate may be provided with holes for bolting or riveting to the stud.

Where the electrolyzing elements are to be used as anodes, they are preferably of reasonably pure nickel, or nickel plated iron or steel, and where used as cathodes, of reasonably pure iron.

Having described my invention, what I claim is:

1. An electrode adapted for use in an electrolytic cell, comprising a stud having a main highly electrically conducting member and a sleeve of metal of lesser conductivity and passive to the action of electrolyte and gas in the cell, and a bent-over electrolyzing element electrically and mechanically connected to the lower end portion of the sleeve at the bend of said element.

2. An electrode comprising a stud having a main highly electrically conducting member, a protective sleeve thereon, a cover plate conforming to the perimeter of said sleeve, and an electrolyzing element disposed between said plate and sleeve and electrically and mechanically connected thereto.

3. An electrode comprising a stud having a copper conducting rod, a protective sleeve thereon, a cover plate conforming to the perimeter of said sleeve, and a bent-over fo-

raminous electrolyzing element disposed between said plate and sleeve and electrically and mechanically connected thereto.

4. An electrode comprising a stud having a copper rod and a protective sleeve thereon, a protective plug disposed in the bottom of said sleeve, a cover plate conforming to the perimeter of said sleeve, and a foraminous electrolyzing element having a portion thereof conforming to and disposed between said plate and sleeve, said sleeve, cover and electrolyizing element being secured together to form a good electrically conducting joint.

Signed at Toronto, Province of Ontario, in the county of York and Dominion of Canada, this 16th day of Aug., A. D. 1928.

JAMES NORMAN SMITH.