

# UNITED STATES PATENT OFFICE.

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## ELECTRODE FOR ELECTROLYTIC DECOMPOSITION.

SPECIFICATION forming part of Letters Patent No. 568,230, dated September 22, 1896.

Application filed May 9, 1895. Serial No. 548,722. (No specimens.)

To all whom it may concern:

Be it known that I, HENRY BLACKMAN, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Electrodes for Electrolytic Decomposition, of which the following is a specification.

This invention relates to electrodes, and particularly to anodes, for use in the electrolytic decomposition of liquids and solutions, such, for example, as chlorid solutions, of which an aqueous solution of sodium chlorid is a type. In the electrolysis of such solutions great difficulty has been experienced to secure a suitable anode. The substances with which most success has been attained are refractory retort carbon and platinum. The carbon, however, has the disadvantage of disintegrating and disengaging particles or specks in the solution, which greatly impairs it for many purposes, as, for example, for the bleaching of paper-pulp. Platinum plates are free from this objection, but are excessively expensive, and in course of time become corroded or dissolved by the electrolytic action. The desirable properties for an electrolytic anode for such uses are, first, that it shall be unacted upon by the electrolyte or the products of electrolysis; second, that it shall be a good electric conductor; third, that it shall be reasonably cheap, and, fourth, that it shall be of reasonably light weight.

My present invention provides an electrode which fully answers these requirements. The material for this electrode is the mineral ilmenite or titanium iron oxid. Its formula is given by *Watts's Dictionary of Chemistry* as  $\text{FeTiO}_3$ , and by Roscoe and Schorlemmer as  $(\text{FeTi})_2\text{O}_3$ . This substance is a good electric conductor, and is so dense and so impermeable to chlorin and chlorin compounds that I have found it to be almost wholly unacted upon by the electrolyte or the products of electrolysis in the decomposition of sodium chlorid. It can at very moderate cost be brought to the required form or shape for anode-plates, for example, by sawing it out in the same manner that slabs of granite are sawed out, or it is even possible to shape it by casting.

It is within my invention to cast the electrode-plates, and to facilitate the casting a small proportion of fluxing materials may be added to the ilmenite, such as silica, lime, and magnesia, but the total of such fluxing ingredients should be of very small proportion, say, for example, within three or four per cent. of the entire mass, in order not to reduce too much the electric conductivity.

In another application filed by me May 21, 1895, Serial No. 550,104, I have claimed generically—

"1. An anode for use in electrolytic decomposition consisting of electro conductive oxid of iron in a dense impermeable mass, substantially as set forth.

"3. The combination in an electrolytic apparatus, with a receptacle for the electrolyte and a cathode, of an anode consisting of dense impermeable magnetic iron oxid."

These claims constitute the issues in an interference No. 17,641, in which my said application is involved. I hereby disclaim in and for this present application the invention defined by said claims, and limit the claims of my present application specifically to the material called "ilmenite," hereinbefore described.

I claim as my invention the following-defined novel features, substantially as hereinbefore specified, namely:

1. An anode for use in electrolytic decomposition consisting of electroconductive ilmenite in a dense impermeable mass.

2. An anode for use in electrolytic decompositions composed of a casting of ilmenite with a small proportion of fluxing material adapted to facilitate the fusing of the ilmenite.

3. The combination in an electrolytic apparatus with a receptacle for the electrolyte and a cathode, of an anode the exposed surface of which is of dense impermeable ilmenite.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

HENRY BLACKMAN.

Witnesses:

ARTHUR C. FRASER,  
GEORGE H. FRASER.