No. 683,000. Patented Sept. 17, 1901.

I. L. ROBERTS.

METHOD OF OBTAINING ALUMINIUM HYDRATE BY ELECTROLYSIS.

(Application filed Nov. 28, 1898.)

(No Model.)

Fig. 1,

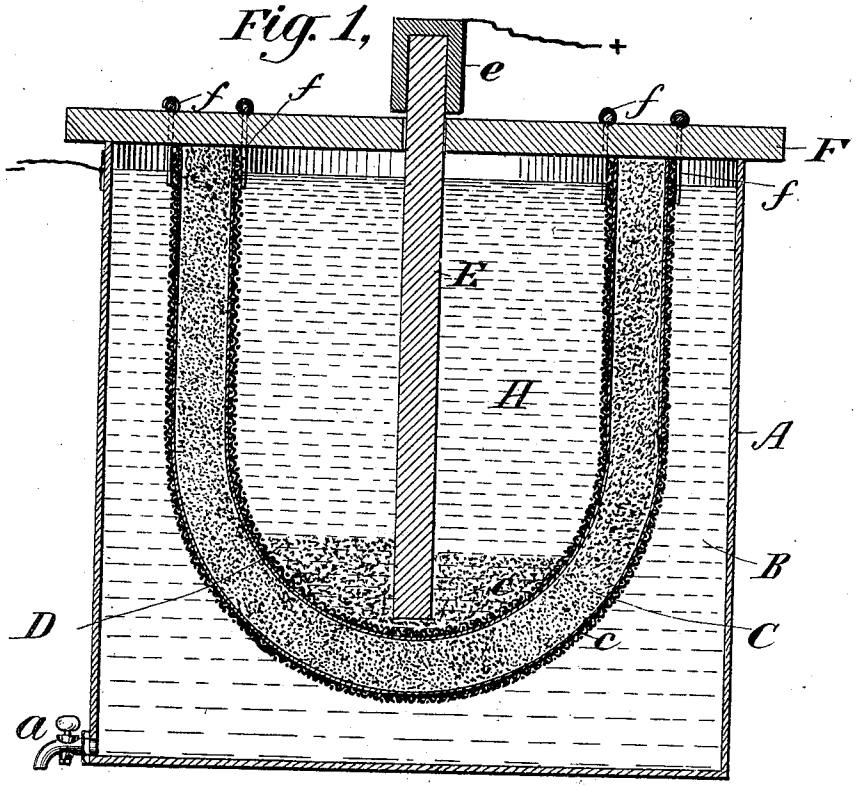
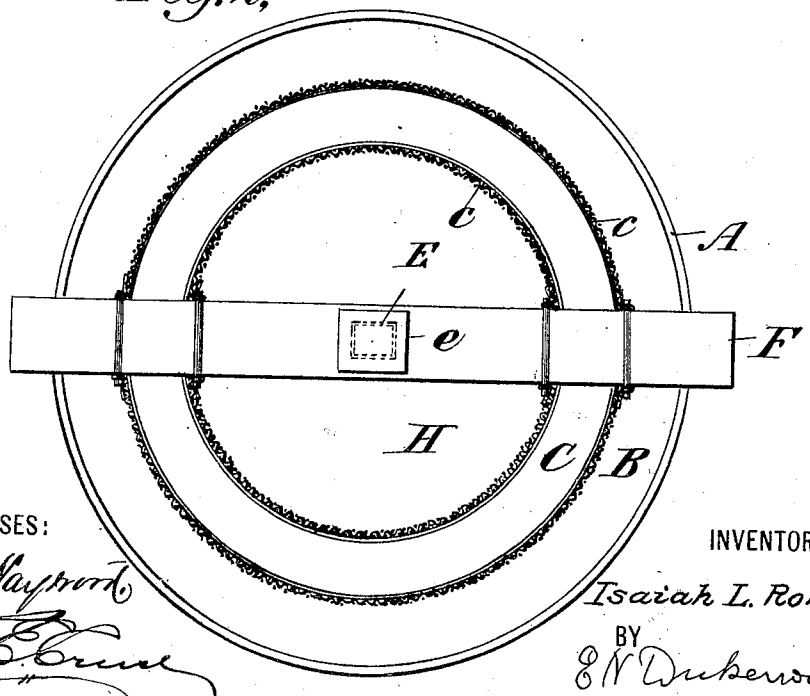


Fig. 2,



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METHOD OF OBTAINING ALUMINIUM HYDRATE BY ELECTROLYSIS.

SPECIFICATION forming part of Letters Patent No. 683,000, dated September 17, 1901.

Application filed November 28, 1898. Serial No. 697,590. (No specimens.)

To all whom it may concern:

Be it known that I, ISAIAH L. ROBERTS, of the city, county, and State of New York, have invented a certain new and useful Method of Obtaining Aluminium Hydrate by Electrolysis, of which the following is a specification.

This invention relates to a method of separating and obtaining aluminium hydrate or similar electrodeposited substances from minerals containing them.

Heretofore aluminium hydrate has been obtained by dissolving it with other substances contained in the mineral compound accompanying it and afterward precipitating it out by various reagents; but all those methods are tedious and expensive, especially when it is desired to obtain a pure article.

In carrying out my process I proceed as follows: I take an ore containing aluminium hydrate, preferably the substance known in the arts as "bauxite," which is mostly aluminium hydrate, but containing many other substances. I first heat this to near the boiling-point with an aqueous solution of sodium or potassium hydrate, preferably the former, owing to its cheapness, for several hours until most of the aluminium hydrate is dissolved out. I then pass the liquor, which is a solution of sodium aluminate, through a filter to remove all undissolved substances. I next place this solution in an electrolytic tank, said tank being hereinafter described in this specification, and separate, by passing a continuous current of electricity through the said solution, the aluminium hydrate from the sodium hydrate and recover both of these substances, after which I use the sodium hydrate again on a new lot of bauxite, and so on continuously.

The apparatus in which the above-described process is worked is made as follows.

Figure 1 is a vertical cross-section of my electrolytic apparatus. Fig. 2 is a plan view, in which A is an iron tank; B, a solution of sodium hydrate; C, a substantially impervious partition; *c c*, rubber-covered wire baskets; C′ C′, cloth linings; D, deposited aluminium hydrate; E, an anode, and *e* the head of the anode. F is a wooden bar, and *f f f f* suspenders for partition.

To construct the above apparatus, I build an iron tank A of the size desired and suspend two wire baskets or nets *c c*, made with large meshes of rubber-covered wire. Each basket has a cloth lining on the side next to the partition C. The partition C is composed of anthracite coal pulverized as fine as possible and made into a stiff paste and filled in the space between the said cloth-lined baskets. The said paste is made with a solution of sodium hydrate of about fifteen to twenty per cent. strength. When this partition-wall is finished, which should be about two to two and one-half inches thick, I suspend the whole to the wooden bar F and by clamps *f f f f* to the rings around the top of the baskets, so that the outer basket will not touch the bottom of the tank. I then place a glass-cemented carbon anode E in the center of the tank through the bar F and fill the outer space next to the tank with a weak solution of sodium hydrate and the inner portion next to the anode with a strong solution. I then start a current of electricity through the tank, making its walls the cathode. The action of the current is to send the sodium in the direction of the cathode and deposit the aluminium hydrate on the anode, from which it falls to the bottom of the anode-chamber at D. Thus the solution in the anode-chamber loses its aluminium hydrate, while the solution in the cathode-chamber becomes rich in sodium hydrate. I then siphon off the inner solution H from the anode-chamber and draw off the outer solution from the cock *a*. The outer solution B is then used on a fresh lot of bauxite to make more sodium aluminate, which is put in the anode-chamber H, while the inner solution is put on the outer side B to receive more sodium hydrate, and the precipitated aluminium hydrate may be removed with a dipper when it has accumulated in sufficient quantity.

The partition B, made as above described, is so impervious to the liquids that it prevents the sodium-hydrate solution from getting back to the precipitated aluminium hydrate, which if it did would redissolve it.

It is obvious that the form of the tank may be changed or the strength of the solutions varied at will without departing from the spirit of this invention. It is obvious also

that this invention is adapted for the electrolysis of any solution in which the substance set free on the anode is insoluble. Either a glass-cemented carbon or platinum anode may be used. If a glass-cemented carbon anode is used, I prefer the anode that is described in my Patent No. 638,278, dated December 5, 1899.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The process of making pure aluminium hydrate, which consists in treating impure aluminium oxid with a hydrate of an alkali capable of dissolving said oxid, and then subjecting the solution to electrolysis and removing the pure aluminium hydrate therefrom.

2. The process of making aluminium hydrate, which consists in treating aluminium compounds or ores with a solution of an alkali capable of dissolving said compound, then subjecting the said solution to an electrolysis on the anode side of a wall or partition sufficiently porous to allow the passage of bodies under the action of the electric current, thereby precipitating aluminium hydrate and then removing said aluminium hydrate from said solution.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ISAIAH L. ROBERTS.

Witnesses:
LADISLAUS MODARATZ,
JOHN E. MARSHALL.