

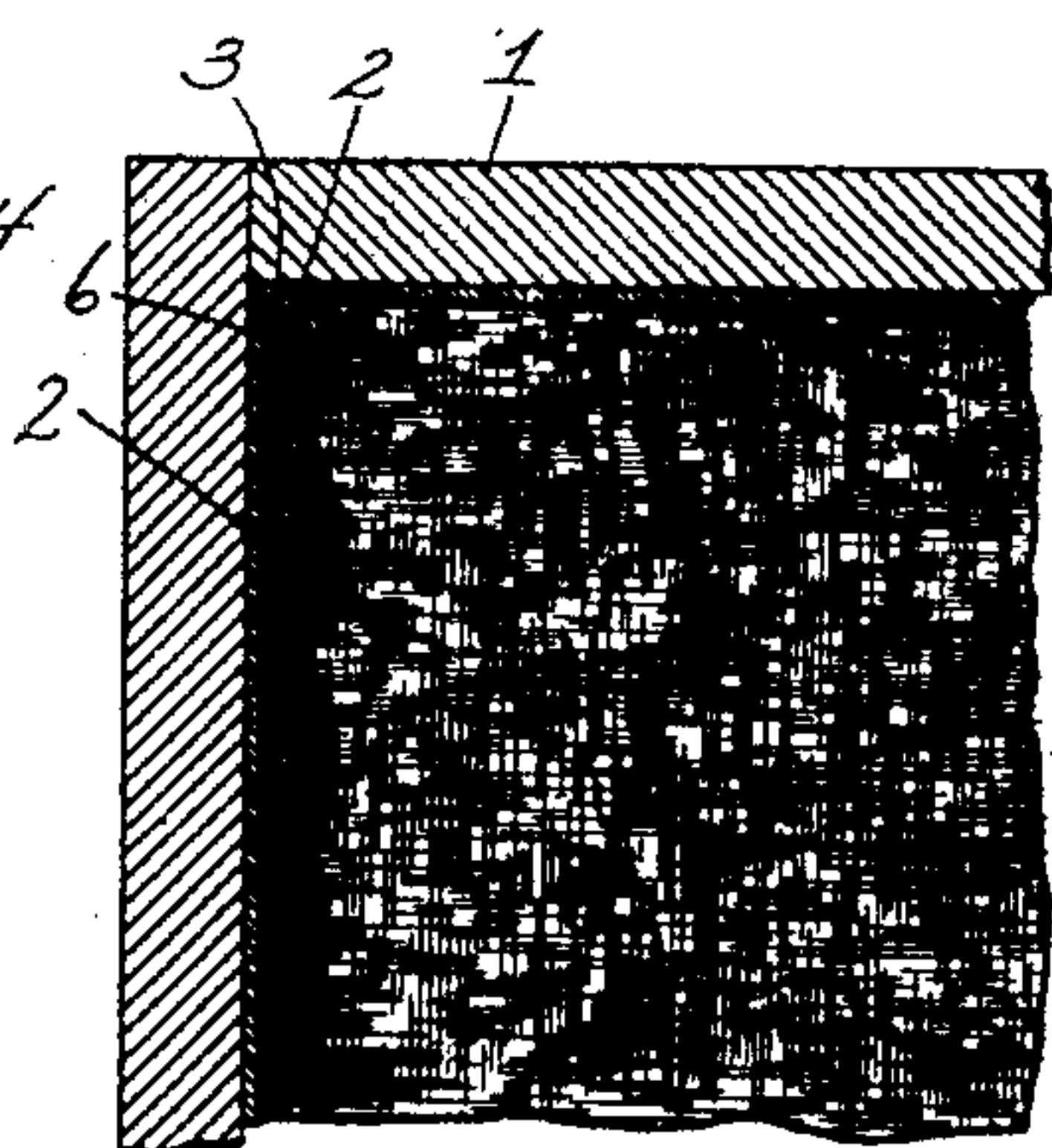
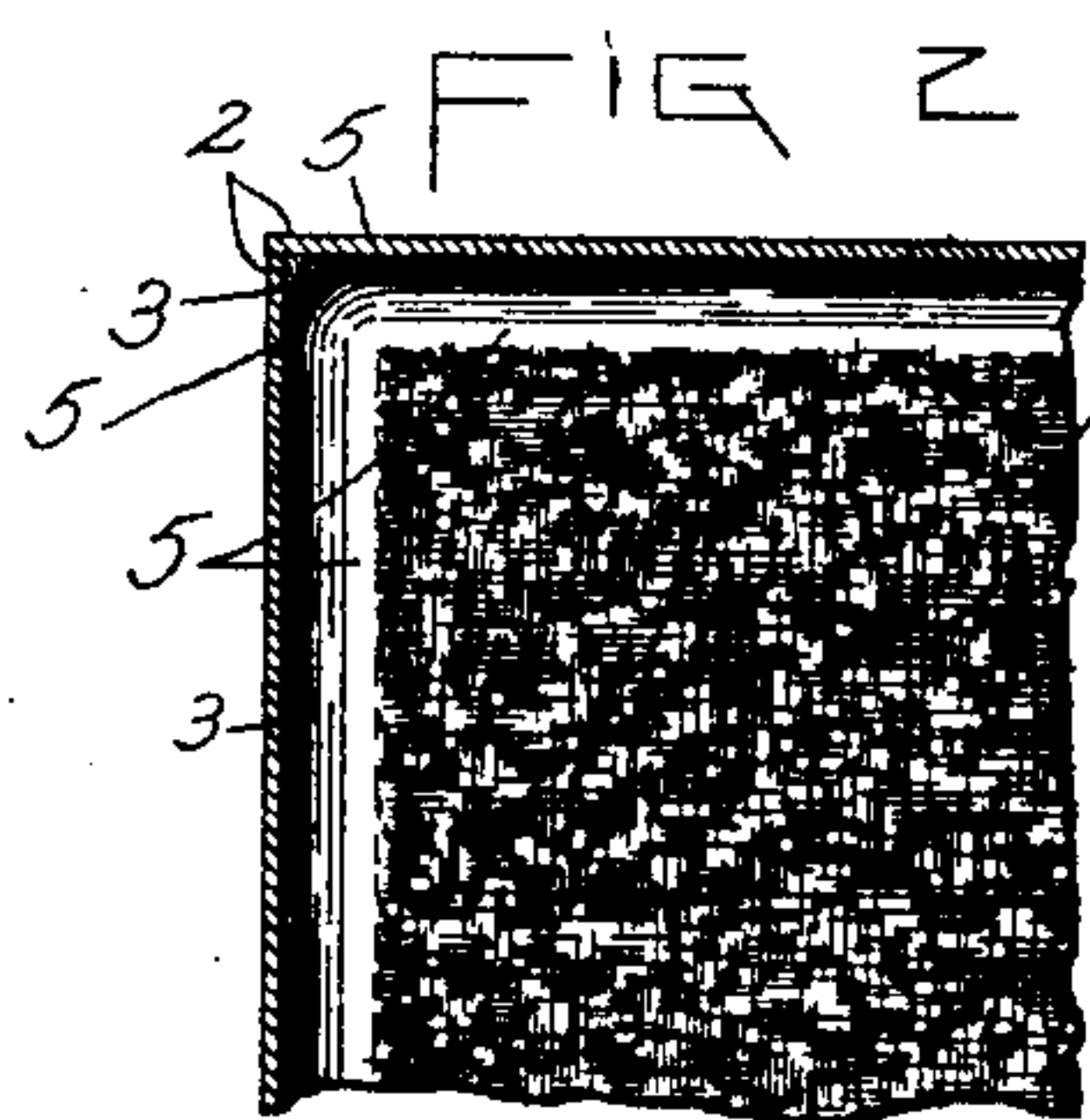
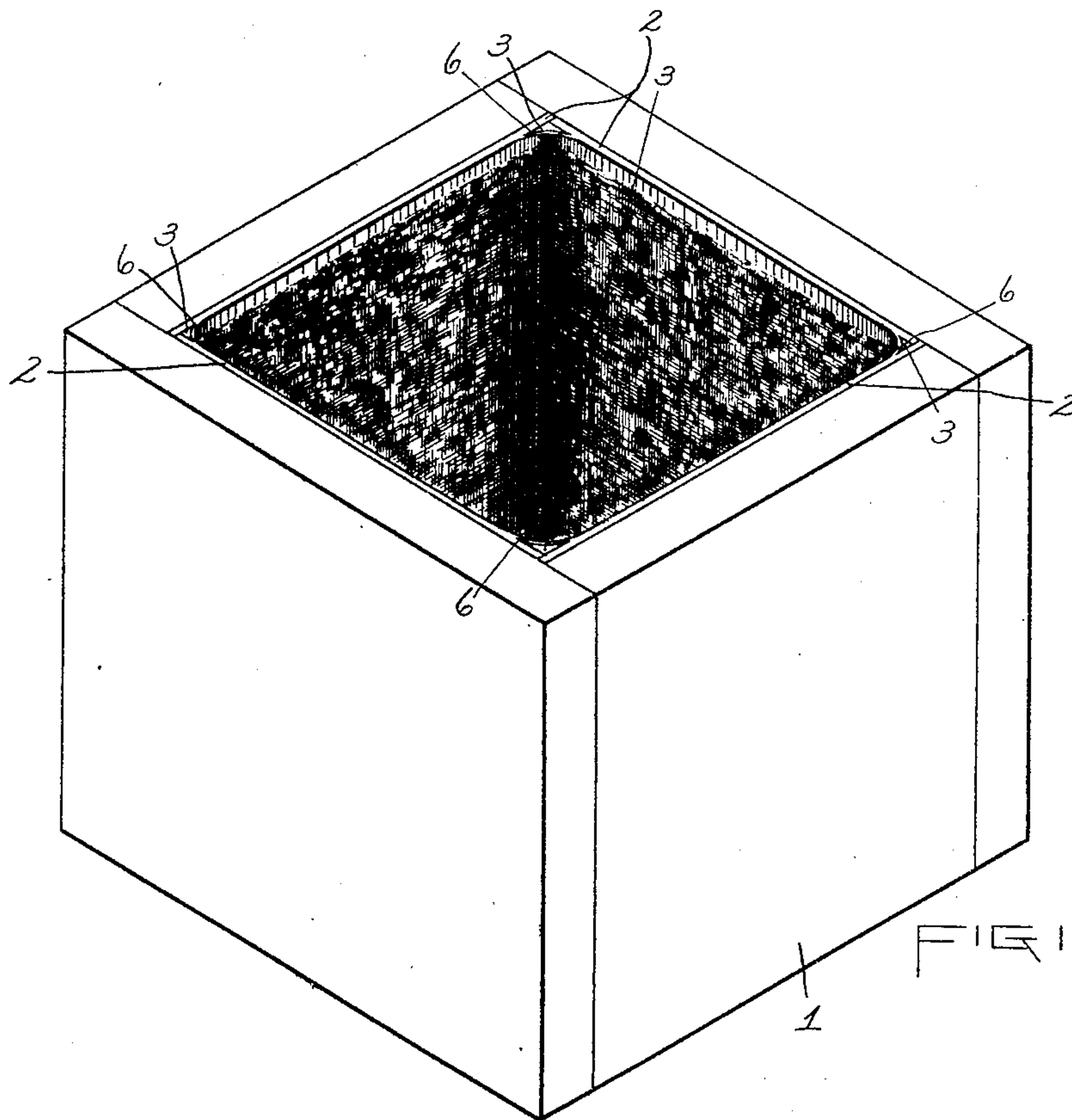
No. 803,544.

PATENTED NOV. 7, 1905.

A. G. BETTS.  
APPARATUS FOR REFINING LEAD BY ELECTROLYSIS.

APPLICATION FILED MAR. 18, 1904.

2 SHEETS—SHEET 1.



WITNESSES  
*S. C. Booth*  
*E. M. O'Reilly.*

INVENTOR  
*Anson G. Betts*  
*By Mosher & Curtis*  
*Attys*

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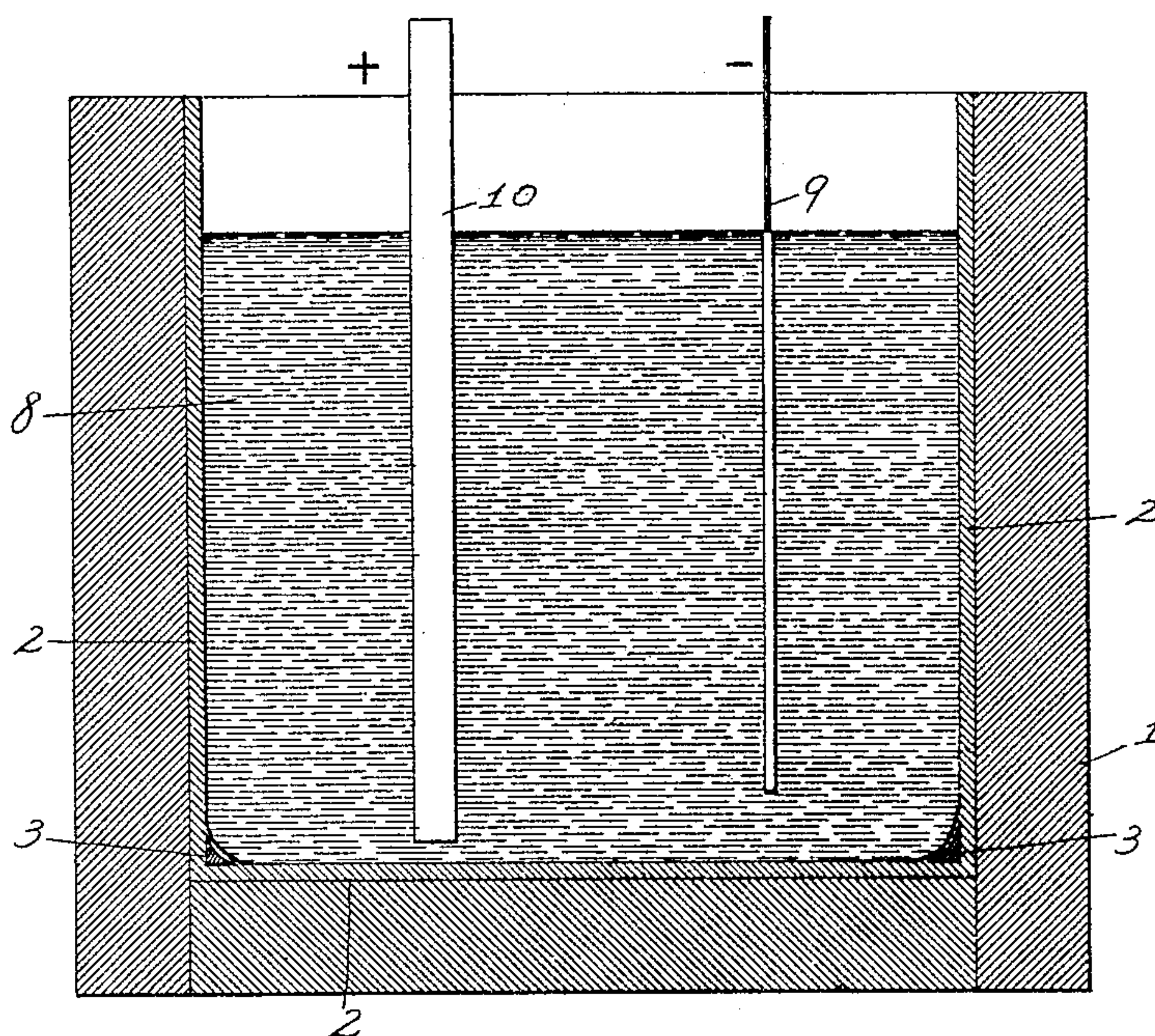
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2 SHEETS—SHEET 2.

FIG 4



WITNESSES

*A. C. Smith.*  
*E. M. O'Reilly.*

INVENTOR

*Amos G. Betts*  
*By Mosher & Curtis*  
*Attys.*



# UNITED STATES PATENT OFFICE.

ANSON G. BETTS, OF TROY, NEW YORK.

## APPARATUS FOR REFINING LEAD BY ELECTROLYSIS.

No. 803,544.

Specification of Letters Patent.

Patented Nov. 7, 1905.

Application filed March 18, 1904. Serial No. 198,770.

*To all whom it may concern:*

Be it known that I, ANSON G. BETTS, a citizen of the United States, residing at Troy, county of Rensselaer, and State of New York, have invented certain new and useful Improvements in Apparatus for Refining Lead by Electrolysis, of which the following is a specification.

The invention relates to such improvements; and it consists of the novel construction and combination of parts hereinafter described and subsequently claimed.

Reference may be had to the accompanying drawings, and the reference characters marked thereon, which form a part of this specification.

Similar characters refer to similar parts in the several figures.

Figure 1 of the drawings is a view in isometrical perspective of an electrolytic tank made in accordance with my invention. Fig. 2 is a horizontal cross-section of a corner portion of the same in a preliminary stage of the manufacture of the tank. Fig. 3 is a similar view after the manufacture of the tank has been completed. Fig. 4 is a vertical cross-section of the apparatus for refining lead by electrolysis, comprising in part a tank constructed in accordance with said invention.

The principal object of the invention is to secure greater economy, uniformity, and purity of product in refining lead by electrolysis.

Referring to Figs. 1, 2, and 3 of the drawings, wherein is shown a preferred construction of tank, 1 represents the wooden body of the tank, which may be of any desired form and dimensions. The wooden body of the tank is lined with copper plates 2 upon its bottom and sides, which plates are joined together along their contiguous edges by solder 3. To the central portions of the copper plates thus soldered together is applied a coating of insulating-paint 4, which extends to within a short distance of the line of solder which lies along the joint of the lining, leaving a narrow strip of bare copper exposed along the opposite sides of the lines of solder, as shown at 5. The tank is then filled with a clear acid copper-sulfate solution and is connected in an electric circuit as a cathode, while anodes of pure copper or impure copper covered with cloth or other similar material to keep the solution clear are immersed in said solution, causing the electrodeposition of copper upon all portions of the surface of the lining of the tank which are not covered

and protected by the insulating-paint. By omitting said coating of insulating-paint the whole interior of the tank can be thus electroplated with copper. By this process the soldered surfaces become covered by a plating 6 of pure copper deposited thereupon and also upon the exposed copper surface intervening between the solder and insulating-paint, said electroplated copper forming a substantially integral continuation of the copper-lining plates over the soldered surface. The tank is thus given an unbroken copper lining well adapted for the purpose intended. After the copper has been thus electrodeposited in sufficient thickness the tank is emptied, washed, and dried, and as a preferred final step substantially the whole interior of the tank is covered with insulating-paint. Insulating-paints adapted for this purpose are well known and are on the market under various names, such as rubber-paint.

The tank above described is proof against leakage or absorption, having a continuous copper inner surface without joint or seam.

Any other means may be employed for providing the tank with a copper interior surface.

Within the copper-lined tank prepared as above described is placed the electrolyte 8 and electrodes 9 and 10, any desired number of which may be employed. The electrolyte and electrodes may be any such as are known to be adapted for refining lead by electrolysis by dissolving lead from the anode and electrodepositing the same upon the cathode. An electrolyte and electrodes suitable for such purpose are fully shown and described in Letters Patent of the United States No. 713,277, dated November 11, 1902, granted to me for refining lead by electrolysis.

In the operation of the apparatus with the electrodes suitably connected in an electric circuit refined lead is electrodeposited upon the cathode 9; but the copper lining of the tank, although capable of being dissolved by the electrolyte, is protected from attack by the same by reason of its potential relatively to that of the anode.

It is advisable that neither the cathode 9 nor the anode 10 be allowed to make electrical connection with the copper lining by contact therewith.

I have demonstrated by experiment with an apparatus like that above described, using an anode from which lead was dissolved by the electrolyte, that the copper lining of the tank assumes a potential intermediate between the



anodes and cathodes and is not in the slightest degree attacked or dissolved by the electrolyte, and by the use of which apparatus I have electrodeposited lead which contains less than  
5 one part of copper to one million parts of lead. If any copper were dissolved, some would be sure to find its way into the electrodeposit on the cathodes.

What I claim as new, and desire to secure  
10 by Letters Patent, is—

1. In an apparatus for refining metal by electrolysis the combination with a cathode, an anode and an electrolyte adapted to dissolve metal from the anode and electrodeposit  
15 the same; of a containing-vat having its inner surface formed of a metal capable of being dissolved in said electrolyte and of a potential intermediate between that of the cathode and that of the anode.

20 2. In an apparatus for refining lead by electrolysis, the combination with a copper-lined tank; of an anode of lead to be refined, a cathode, and an electrolyte adapted to dissolve lead from said anode and to electrodeposit the  
25 same upon the cathode.

3. In an apparatus for refining lead by electrolysis, the combination with an electrolytic tank having an interior continuous copper

surface formed in whole or in part of electrodeposited copper; of an anode of lead to be  
30 refined, a cathode, and an electrolyte adapted to dissolve lead from said anode and to electrodeposit the same upon the cathode.

4. In an apparatus for refining lead by electrolysis, the combination with an electrolytic  
35 tank having a lining of copper plates soldered together along their contiguous edges with their soldered connections electroplated with copper; of an anode of lead to be refined, a  
40 cathode, and an electrolyte adapted to dissolve lead from said anode and to electrodeposit the same upon the cathode.

5. In an apparatus for refining lead by electrolysis, the combination with an electrolytic  
45 tank having a copper lining painted with insulating material; of an anode of lead to be refined, a cathode, and an electrolyte adapted to dissolve lead from said anode and to electrodeposit the same upon the cathode.

In testimony whereof I have hereunto set  
50 my hand this 16th day of March, 1904.

ANSON G. BETTS.

Witnesses:

FRANK C. CURTIS,  
E. M. O'REILLY.