(No Model.)

E. ANDREOLI.

APPARATUS FOR ELECTRODEPOSITION OF GOLD AND SILVER.

No. 598,193. Patented Feb. 1, 1898.

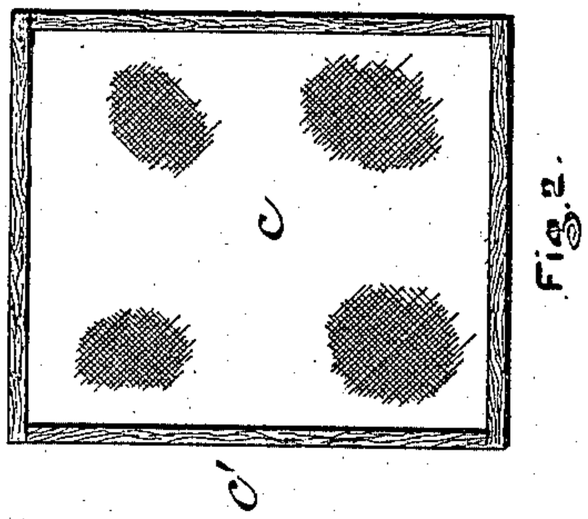

Fig. 2.

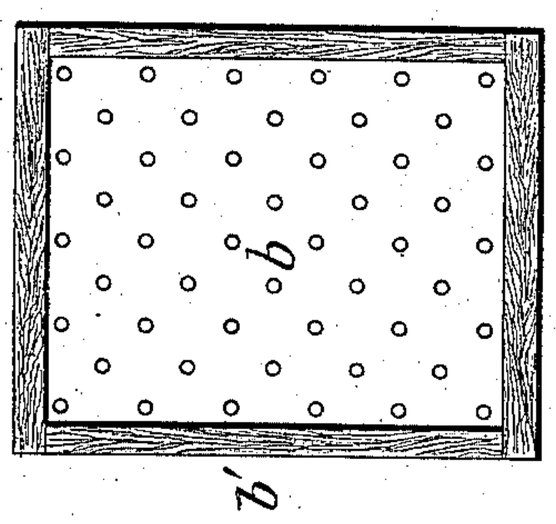

Fig. 3.

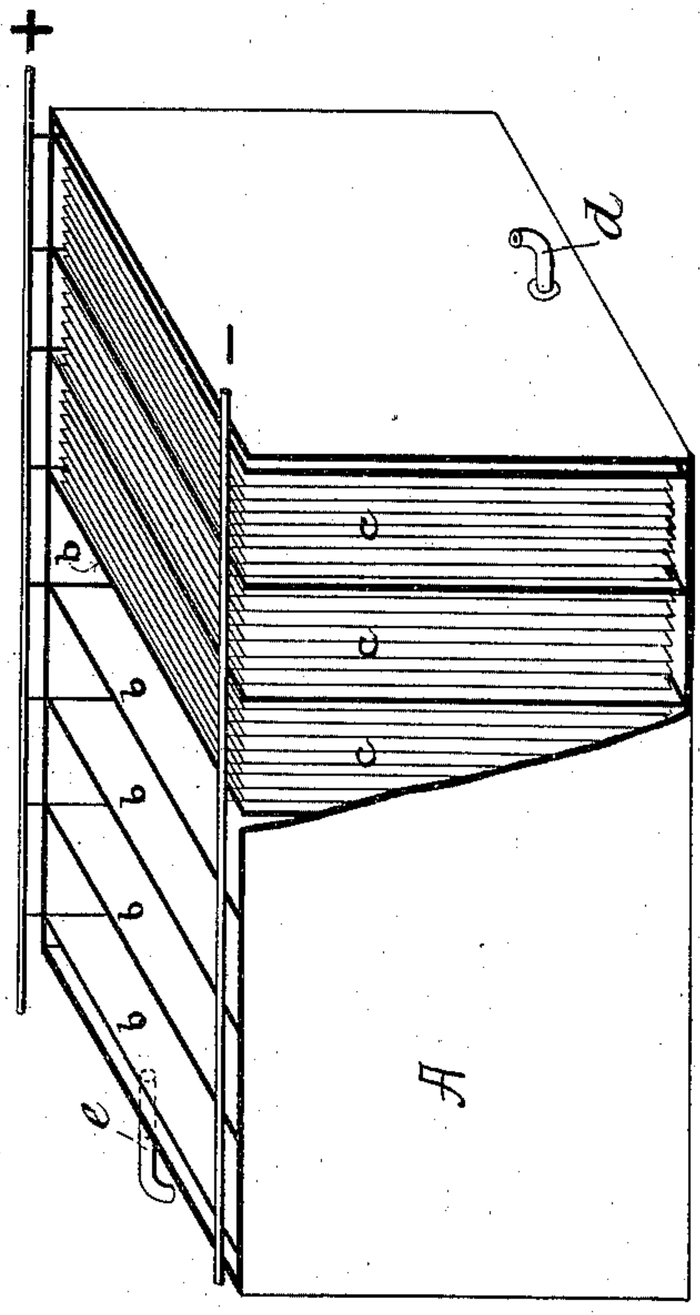

Fig. 1.

Witnesses:
John Krueger
Frank S. Ober

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by Wm. A. Rosenbaum Atty.

UNITED STATES PATENT OFFICE.

EMILE ANDREOLI, OF LONDON, ENGLAND.

APPARATUS FOR ELECTRODEPOSITION OF GOLD AND SILVER.

SPECIFICATION forming part of Letters Patent No. 598,193, dated February 1, 1898.

Application filed October 1, 1895. Serial No. 564,328. (No model.) Patented in England September 4, 1895, No. 16,557.

To all whom it may concern:

Be it known that I, EMILE ANDREOLI, a citizen of France, residing at London, in the county of Surrey, England, have invented certain new and useful Improvements in Apparatus for the Electrodeposition of Gold and Silver, of which the following is a full, clear, and exact description.

This invention was patented in Great Britain September 4, 1895, No. 16,557.

This invention relates to the electrodeposition of gold or silver or other metals from cyanid or cyanid-compound solutions by means of insoluble anodes. I will take a gold solution as an example.

In my English specification, No. 11,752, 1895, and my United States application, Serial No. 555,502, filed July 10, 1895, I have described how I can effect the electrodeposition of gold and silver from a cyanid solution by peroxidized-lead anodes in presence of mercurial cathodes combined with a layer of mercury acting also as a cathode. I have since found that this layer of mercury is not very efficient and that other metals than mercury may advantageously be used as a substratum for gold, silver, or other metal. The great difficulty in the electrodeposition of gold or of another metal from a cyanid solution has up to the present been to find an insoluble anode in a metal or conducting material which at the positive pole resists the action of a cyanid electrolyte.

In carrying out the electrodeposition of metals from their cyanid solutions I use peroxidized-lead plates as anodes. Peroxid of lead is not disintegrated or attacked in cyanid or cyanid-compound solutions, and such solutions are not decomposed or spoiled in presence of anodes made of peroxidized lead. My anodes and my cathodes may be perforated or not.

As an illustration I will describe the deposition of gold on zinc cathodes; but I may deposit gold on other metals. There is no invention whatever, and consequently there can be no patent, in depositing gold or silver on such and such a metal unless this mode of electrodeposition itself is characterized by something new and original, and the merit of my process as an invention is that to the best of my knowledge I believe I am the first who has found and ascertained that a cyanid of gold and potassium or of silver and potassium solution is not contaminated by metallic salts and remains limpid when electrolyzed with the aid of peroxidized-lead anodes.

I do not confine myself to any metal on which the precious metals may be deposited. I may use any metal or alloy which I find suitable. I can also use as cathodes plates of metal or conducting materials galvanically coated with zinc or another convenient metal in either a hard or pulverulent state.

When the anodes and the cathodes are perforated, they are disposed transversely in the tank, and the gold solution which enters at one end of the electrolyzer passes through the holes of the electrodes and is in perfect contact with the surface of the cathodes on which the gold is deposited. The solution flows out through convenient outlets at the outer end of the tank. When the electrodes are not perforated, they are arranged longitudinally.

Figure 1 shows a tank *a*, to which the gold solution is fed from a supply-cistern through pipe *d* and passes through the perforated anodes *b b b b* and cathodes *c c c c* and flows out through convenient outlets received. Fig. 2 shows a perforated cathode made of perforated zinc. Fig. 3 shows a perforated peroxidized-lead anode.

The peroxid-of-lead anodes are mounted on wooden or other suitable frames *b'* to avoid short circuits. I preferably arrange them transversely, because in this manner the size of the plates is not so large and they are more easily handled and manipulated than when they are placed longitudinally.

The lead anodes can be peroxidized in diluted sulfuric acid, or, according to the Becquerel process, in a hot alkaline solution, or according to any other efficient process. The accompanying drawings show that I have arranged in a vat A more cathodes *c c c* than anodes *b b b*. This arrangement is the one I prefer; but I may have in my electrolyzer as many anodes as cathodes. Each perforated zinc cathode is provided on top and bottom and on each side with a thin wooden lath *c'*, which in two or three places is fixed to the plate. This keeps the plates rigid and allows me to have them all parallel and placed at a

very short distance from each other—say one-quarter inch.

When the thickness of the gold deposited on the cathode is considered sufficient, the zinc plates are withdrawn from the tank and brushed in a diluted acid solution or other convenient solution, or they are scrubbed when dry with metallic cloth and then brushed in a suitable solution. The scrapings and washings are then collected and treated according to the well-known metallurgical means for recovering gold.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

In apparatus for the electrodeposition of gold, silver, or other metals, anodes of peroxidized lead acting in the presence of and in combination with a cyanid or cyanid-compound solution; substantially as set forth.

In testimony whereof I subscribe my signature in presence of two witnesses.

EMILE ANDREOLI.

Witnesses:
JOHN NETHERWAY,
J. F. GRAVES.