(No Model.)

H. R. CASSEL.

PROCESS OF AND APPARATUS FOR SEPARATING METALS.

No. 264,928. Patented Sept. 26, 1882.

Fig. 1.

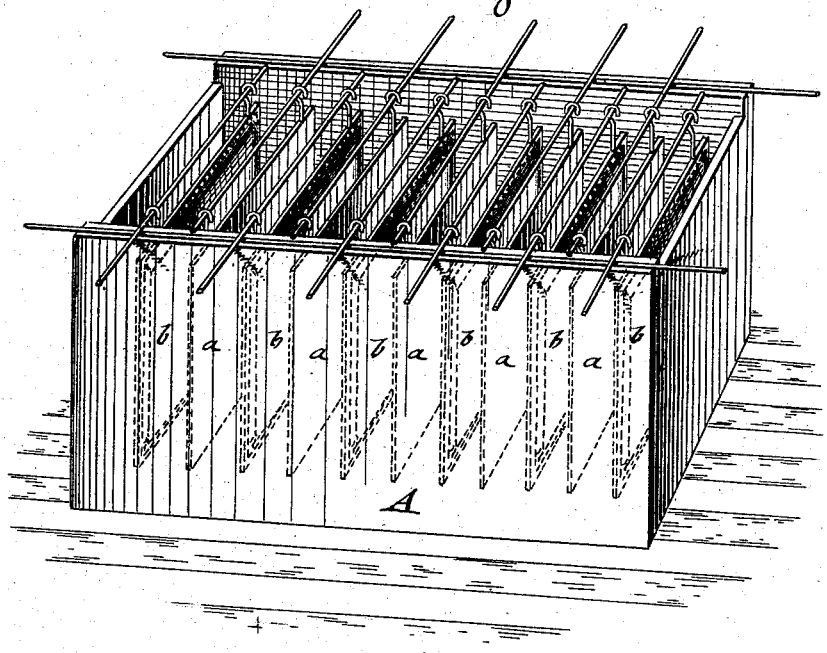


Fig. 2.

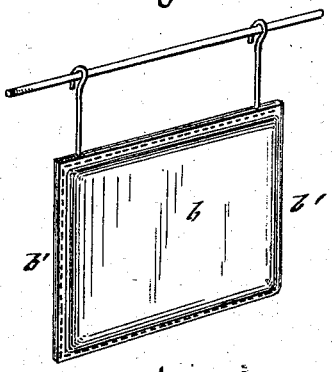
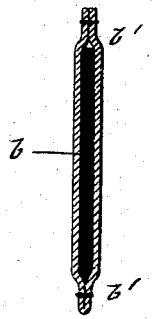


Fig. 3.



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UNITED STATES PATENT OFFICE.

HENRY R. CASSEL, OF NEW YORK, N. Y., ASSIGNOR TO THE UNITED STATES BULLION REFINING COMPANY, OF SAME PLACE.

PROCESS OF AND APPARATUS FOR SEPARATING METALS.

SPECIFICATION forming part of Letters Patent No. 264,928, dated September 26, 1882.

Application filed April 15, 1882. (No model.)

To all whom it may concern:

Be it known that I, HENRY R. CASSEL, of the city, county, and State of New York, have invented certain new and useful Improvements in Processes of and Apparatus for Separating Metals by Electrolysis, of which the following is a specification.

In the separation of the finer metals from alloys or base metals by electrolysis the alloys or metals to be acted upon are usually suspended in the form of plates, or in a granulated state, in an acidulated solution of copper or diluted sulphuric acid. By the action of the electric current the copper and silver will be dissolved, the copper being deposited on the cathodes, and with it a large amount of silver, whereby the object of the process would be frustrated.

This invention is designed to prevent the deposition of the metals upon the cathodes and keep them dissolved in the solution, which from time to time is drawn off for the purpose of precipitating the silver in a fine metallic state therefrom.

The invention consists in covering the cathodes entirely with leather, parchment, or any other animal membrane, or with canvas or any other porous material which admits the electric current to penetrate, but which is dense enough to prevent the settling of the dissolved metals upon the cathodes. When the cathodes are thus covered with the material described it will prevent the deposition of the dissolved metals, which consequently remain in the solution until the same is saturated.

In the accompanying drawings, Figure 1 represents a perspective view of a vat, showing my arrangement of anodes and cathodes. Fig. 2 is a perspective view of the cathode, which is covered with a material that is permeable to the said solution, and yet prevents the deposition of metal; and Fig. 3 is a vertical transverse section of the same.

Similar letters of reference indicate corresponding parts.

In carrying out my improved process, the alloy or metal to be refined is suspended, as anodes *a*, in the form of plates, or in a granulated state, in a vat, A, of the usual size employed by electrotypers. The vat contains an acidulated solution of copper or any other suitable solution. The electric current is conducted in the usual manner to the anodes *a* and cathodes *b* suspended in the vat. The cathodes, however, are each covered entirely by a bag, *b'*, made of leather, parchment, or any other animal membrane, or of a suitable textile fabric that has the quality of being penetrated by the electric current, but which prevents the deposition of the metals dissolved, so that these are kept in the solution until the same is sufficiently saturated to be drawn off. The gold contained in the metal of the anodes falls to the bottom of the vat, and is left there until a sufficient quantity is accumulated, which is then removed and treated in the ordinary manner. The solution which has been drawn off contains sulphate of copper and sulphate of silver, and is treated in any approved manner for precipitating the silver, while the remaining copper solution can then be treated separately.

The advantages of this invention are that all the cathodes remain stationary and occupy but little space, as very thin sheets of metal or carbon can be used. The anodes can consequently be suspended in close proximity to the cathodes, whereby the decomposition of the former is greatly accelerated. No silver is deposited with the copper, and not the slightest loss of gold or silver can take place, for practically the silver contained in the solution is precipitated in a pure metallic state, and the whole process easily carried out, and without expensive appliances.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A cathode provided with a protective covering of a dense, porous, non-conductive material, substantially as described, which covering admits the passage of the current and prevents deposition upon the cathode, substantially as described.

2. The process herein described of separating and refining base alloys or base metals by electrolysis, which consists in subjecting al-

loys, as anodes, to the electrolytic action of a solution within which the cathodes are also suspended, and covering the latter with a material that prevents the deposition of the dissolved metals upon the cathodes, but admits the passage of the current thereto, substantially as set forth.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

HENRY R. CASSEL.

Witnesses:
PAUL GOEPEL,
CARL KARP.