

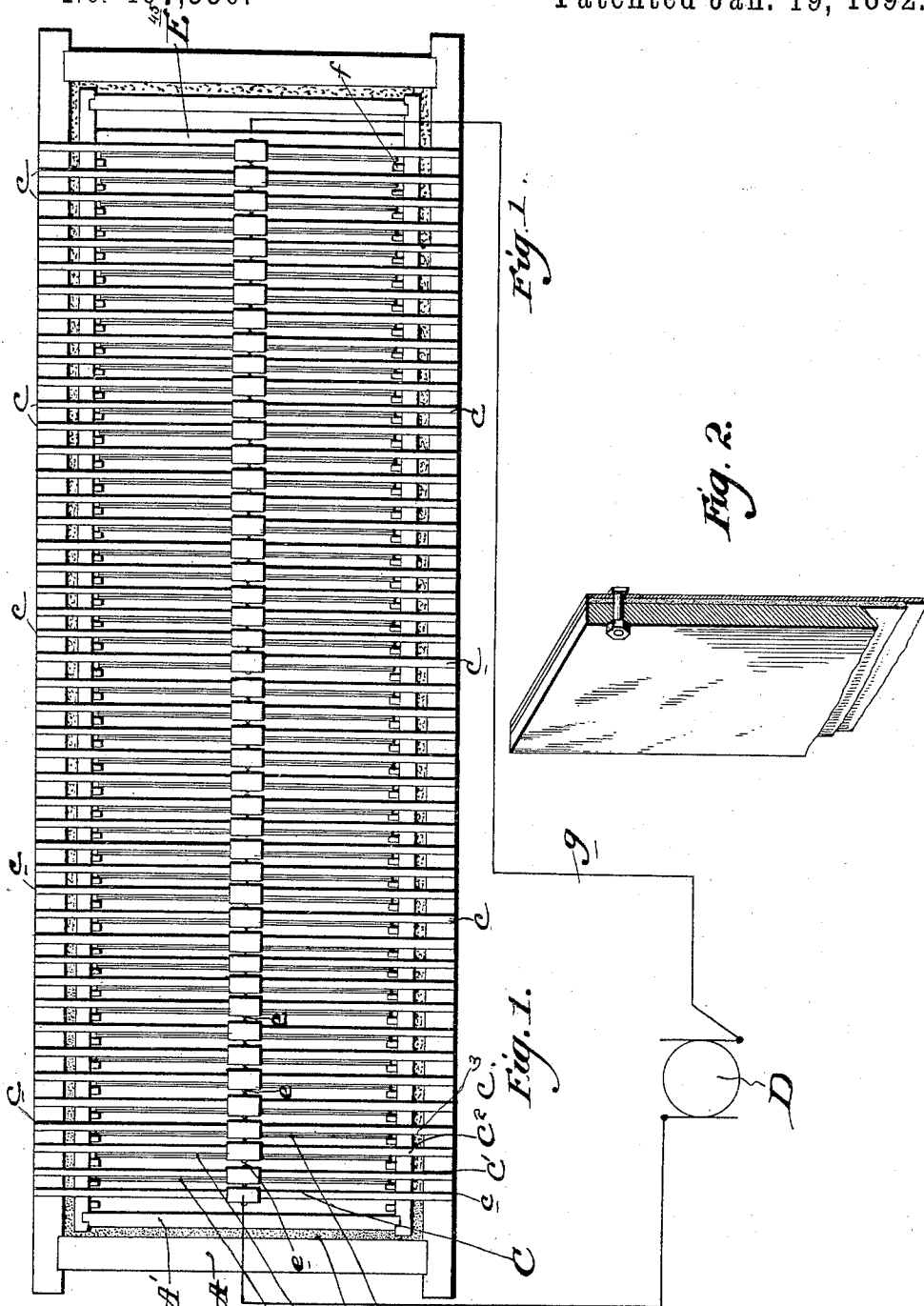
(No Model.)

2 Sheets—Sheet 1.

O. STALMANN.
ELECTROLYTICAL PLANT.

No. 467,350.

Patented Jan. 19, 1892.



WITNESSES:
Frank A. Bissell
J. H. Moore.

INVENTOR:
Otto Stalman
By his atty.
J. H. Harding

(No Model.)

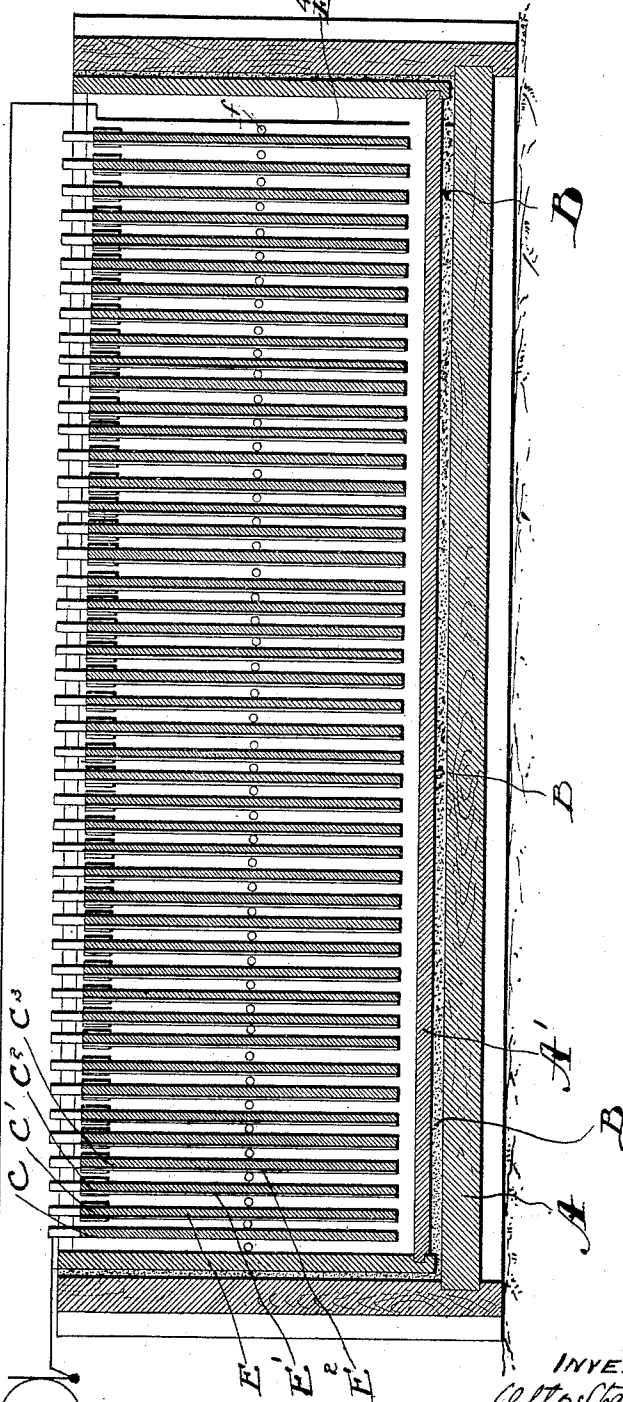
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Fig. 3.



WITNESSES:

Frank S. Busch
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INVENTOR:

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by his Atty.
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UNITED STATES PATENT OFFICE.

OTTO STALMANN, OF ANACONDA, MONTANA.

ELECTROLYTICAL PLANT.

SPECIFICATION forming part of Letters Patent No. 467,350, dated January 19, 1892.

Application filed June 8, 1891. Serial No. 395,568. (No model.)

To all whom it may concern:

Be it known that I, OTTO STALMANN, a citizen of the United States, residing at Anaconda, county of Deer Lodge, and State of Montana, have invented a new and useful Improvement in Electrolytical Plants, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My improvements consist in using an initial anode connected to the positive pole of the source of current-supply and a terminal cathode connected to the negative pole of the source of current-supply, and intermediate are a series of pairs of cathode and anode plates, coupled in pairs by a vertical connection. These two plates of each pair are brought in close contact with each other, being only separable by a thin sheet of non-conducting material, as glass or asbestos. The anode-plates are formed of the crude material to be refined, while the cathode-plates are formed of pure copper or some other pure metal.

I will now describe one embodiment of my invention.

In the drawings, Figure 1 is a plan view of electrolytic vat with plates in position. Fig. 2 is a perspective view of a method of connecting plates. Fig. 3 is a sectional view of electrolytic vat with plates in position.

A A' are two wooden tanks, the tank A' being smaller and placed within the tank A. The space between the tanks A and A' is filled with material B, which is of such character as to prevent leaking, such as asphaltum cement or hydraulic cement. It is preferable that this material should be an insulating material.

C C' C², &c., are the anode-plates, which are cast in molds, preferably iron molds, and are provided with ears c. A solution of sulphate of copper is placed in the vat or tank A', and the anode-plates are suspended in the solution by means of the ears c, which rest either directly on the sides of the vat or on a piece of rubber or wood or on any non-conducting material.

E E' E² are the cathode-plates, formed of thin plates of copper or other metal, and these

cathode-plates are also suspended in the liquid in the tank.

With the exception of the initial anode and terminal cathode, the anode and cathode plates are connected in pairs by bringing the two plates together with a non-conducting surface between them and connecting them by one or more bolts or rivets e, so that between a pair of anode and cathode plates there is no electrolytic solution.

f are spacing-pins, which are inserted between each pair of plates to keep them from contact with each other and to cause the pairs of plates to retain proper position.

D is the dynamo, and the first anode-plate is connected to the positive conductor H of said dynamo. The last cathode-plate is connected with the negative conductor g from the dynamo.

As may be seen, the first anode-plate and the last cathode-plate stand by themselves, while the intermediate cathode and anode plates are connected together so as to form pairs. The object in connecting these plates in pairs in the manner herein described is to prevent any action between the cathode and anode of a pair through the medium of the electrolytic solution.

The operation in refining copper is as follows: The anode-plates are composed of crude copper to be refined and the cathode-plates of pure copper or other metal. The current passes from the dynamo along the positive conductor to the first anode-plate, with which said conductor is directly connected and decomposes the solution between the first anode and cathode plate which said current has to traverse, and deposits the copper upon the cathode-plate, while sulphuric acid set free dissolves an equal amount of copper from the anode-plate as has been deposited upon the cathode-plate. The current thus travels from the anode-plate through the solution of sulphate of copper to the cathode-plate along the cathode-plate and along the connection of the same with the anode-plate to this anode-plate, and thence through the solution to the next cathode-plate, and so on until the last cathode-plate is reached, which plate is connected with the negative conductor from the

dynamo. The copper to be refined may contain gold and silver, and this falls to the bottom of the tank or vat in a highly concentrated state and may be collected as a by-product without extra expense.

Having now fully described my invention, what I claim as new, and desire to protect by Letters Patent, is—

An electrode consisting of a plate of refined material and a plate of crude material

with insulating material interposed between said plates and metallic connection between said plates.

In testimony of which invention I have hereunto set my hand.

OTTO STALMANN.

Witnesses:

THOMAS D. SIMPSON,
FRANK S. BUSSER.