(No Model.)

J. T. MORROW.

PLATING APPARATUS.

No. 569,722. Patented Oct. 20, 1896.

Fig. 1.

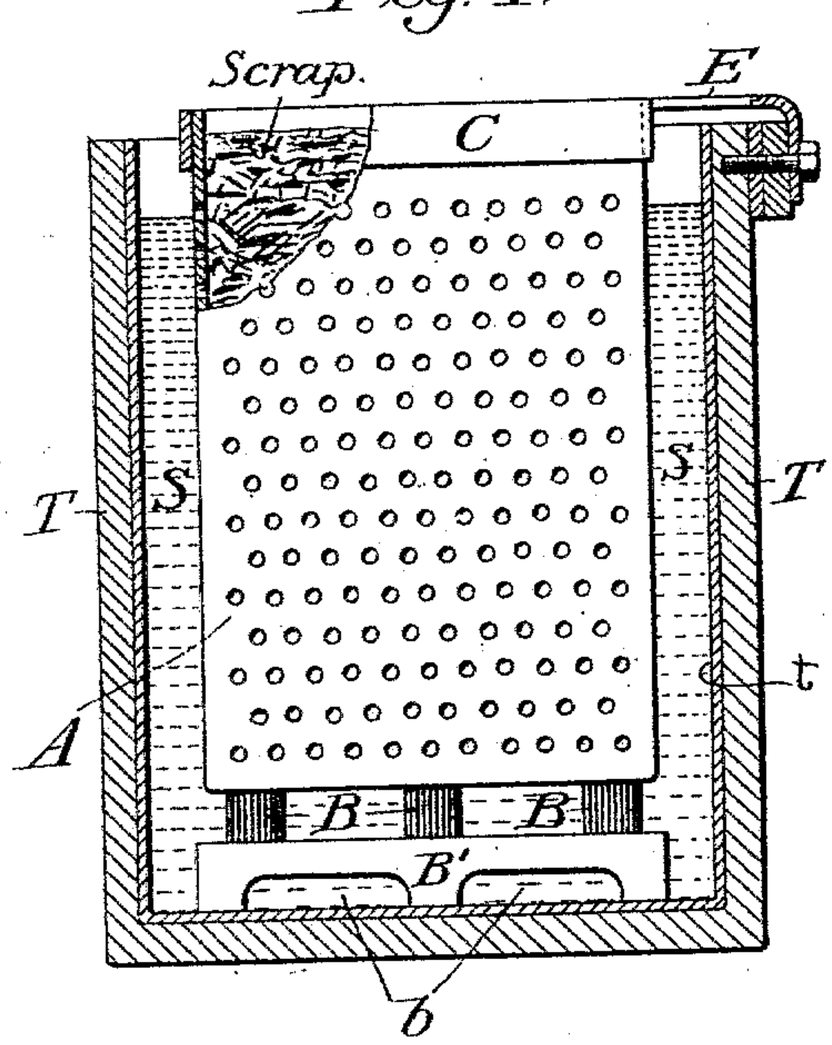


Fig. 3.

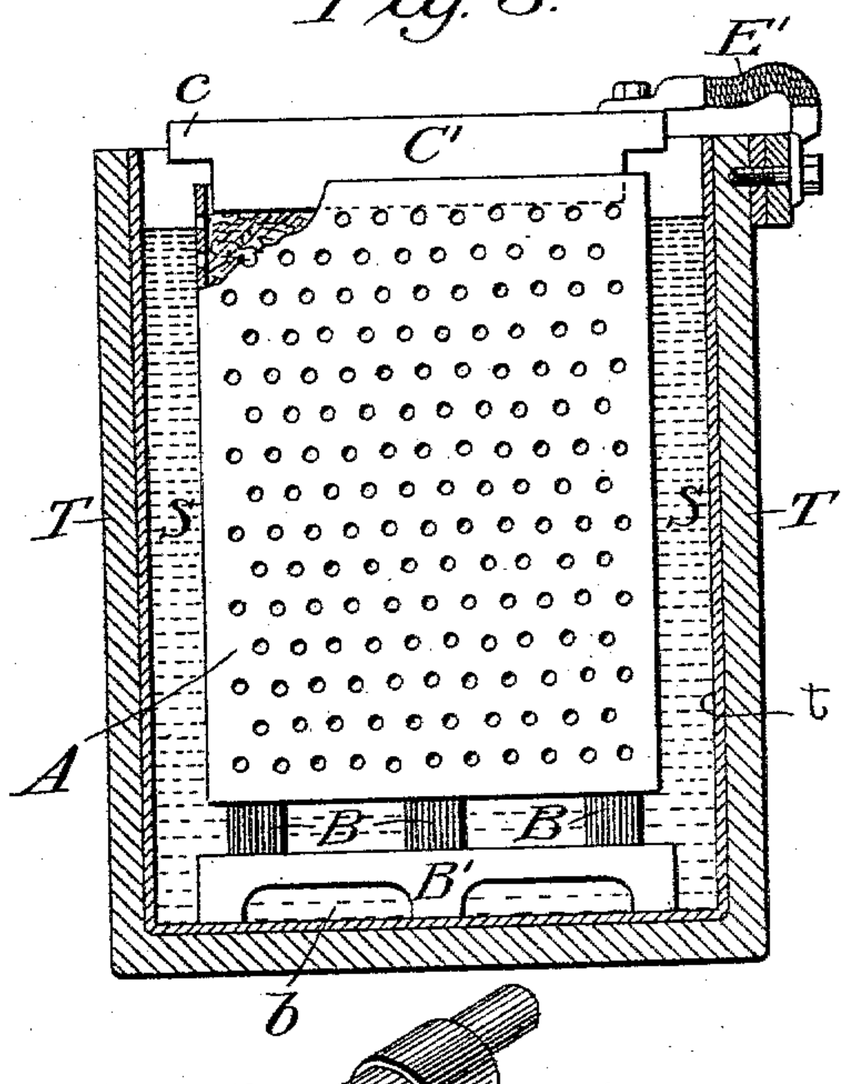


Fig. 4.

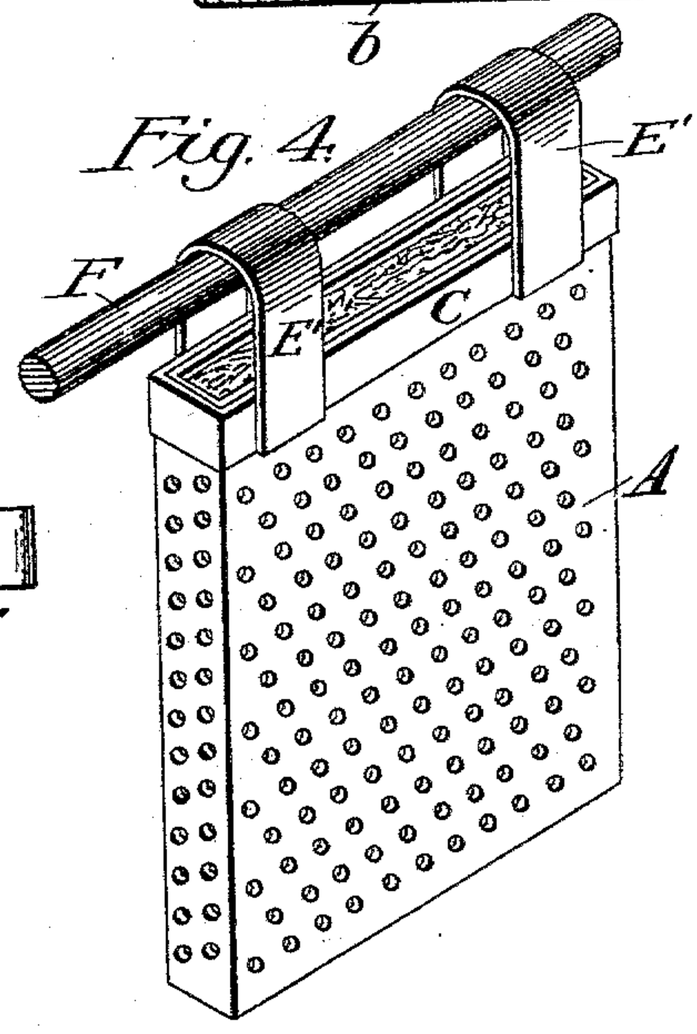
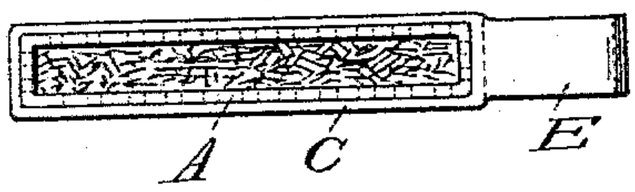


Fig. 2.



Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN T. MORROW, OF GREAT FALLS, MONTANA.

PLATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 569,722, dated October 20, 1896.

Application filed April 5, 1895. Serial No. 544,591. (No model.)

To all whom it may concern:

Be it known that I, JOHN T. MORROW, of Great Falls, Montana, have invented a new and useful Improvement in Plating Apparatus, of which the following is a description, referring to the accompanying drawings, which form a part of this specification.

The purpose of my invention is to improve and cheapen the present prevailing methods of employing anodes in plating-tanks and other apparatus.

A very common method of forming and employing the anodes in copper electrolytic tanks for depositing copper and other metals is to make the anodes in the form of a plate having suspending-ears through which the current is introduced. After such an anode has been in some time it becomes deeply corroded, and in some instances the upper portion is cut through by the corrosion near the surface of the liquid, so that the bottom part falls away; but in any case the entire anode cannot be utilized, owing to the irregularity of the corrosion and to the fact that the upper portion is usually above the surface of the electrolyte. It is customary to take the remaining portions of the corroded anodes, remelt them, and cast new anodes. This remelting, refining, and recasting of the waste portions of anodes is a considerable item in the running expenses of large electrolytic plants.

The object of the present invention is to save this expense. Moreover, anodes such as I have just described frequently corrode at the surface of the solution and permit the main part to break off and fall into the tank, short-circuiting part of the tank and very often cutting a hole in the lead bottom or lining, damaging the apparatus and necessitating stoppage and repairs. By my invention this defect and consequent expense is also remedied.

My invention is of such a nature that it will be readily understood from the accompanying drawings, wherein—

Figure 1 is a sectional view looking endwise and showing a plating-tank containing my anode-cage. Fig. 2 is a plan view of my anode-cage and its leading-in strap or terminal connection for the current. Fig. 3 is a view similar to Fig. 1, showing a modification; and Fig. 4 shows a further modification.

Throughout the drawings like letters of reference indicate like parts.

The tank is shown at T, containing the electrolytic solution S. The leaden lining of the tank is indicated at *t*. My anode A is a basket, box, cage, or other receptacle, resting upon insulators B, which in turn rest on lead-covered supports B′, preferably provided with passages or channels *b* to facilitate the washing out of the tank. My cage, as illustrated in the drawings, has quarter-inch perforations through its surface to permit the free circulation of the electrolyte and the passage of current through it. Into this cage or receptacle I throw the small pieces of metal or scraps from the partially-corroded anode-plates, filling it well up, and I connect this mass with the positive conductor of the plant by means of a copper rim or strap C, running around the upper edge of the tank, as shown in Figs. 1 and 2, and provided with the ear or terminal projection E, which is secured directly to the positive conductor.

When the plant is in operation, the current is led in through the ear E and strap C, passing directly through the walls of the anode-cage A into the scrap-copper, and passing from the surface of the scrap-copper into the electrolyte, causing the oxidation of the copper and the enrichment of the electrolyte. It is clear that so long as the material of the cage is less oxidizable than the scrap-copper in the electrolyte only the scrap-copper will be attacked by the solution, and, with the copper solution used, no local electrolytic action will take place, the scrap-copper serving, therefore, only to enrich the solution as the copper is taken from it and deposited upon the cathode.

The anode shown in Figs. 1 and 2 is preferably of lead and forms the conductor between the strap C and the scrap-copper. In Fig. 3, however, I show a modification in which the current is led directly from a copper shoe C′ into the scrap-copper. In this case the cage may be of either conducting or non-conducting material, though if of non-conducting material enough copper-scrap must always be kept in the cage to insure the contact

of the shoe C′ with the scrap. If the anode is of conducting material, however, the copper-scrap need not necessarily touch the copper shoe C′, as, when the scrap has been eaten away beneath the shoe, the shoe descends until it rests upon the upper edge of the anode, and after that the action is identical with Fig. 1, the current passing first into the wall of the cage and thence to the copper-scrap within the cage. The shoe C′ is provided with the ears *c*, which project or rest upon the edge of the cage when the scrap has been eaten away, allowing the shoe to descend. By this means the shoe is prevented from sinking into the electrolyte and being corroded; but the cage should be kept so full of scrap that the shoes at no time come in contact with the edge of the tank, as the purpose of this construction is to transmit the current directly from the shoe C′ to the scrap-copper. The shoe C′ is connected with the positive conductor by means of short flexible connection E′, which permits the fall of the shoe as the scrap is eaten away, and also facilitates the refilling, it being only necessary to lift up the shoe and throw in some more scrap and then replace the shoe.

In Fig. 4 my most preferred construction is shown. The cage A is in the form of a hollow plate, and the copper strap or band C is provided with copper bails E′, by which the cage is suspended from the combined support and conducting-bar F. This bar may either rest upon or be secured to the common terminal connection which supplies current to all the anodes. To refill this form of my cage, the bar F is raised, lifting the anode from the bath and permitting it to be conveniently filled and replaced.

From the foregoing it is clear that by my invention I may utilize the scrap-copper directly without necessitating the remelting, refining, and recasting into electrodes. It is also clear that, so far as my invention is concerned, in the place of a perforated cage or receptacle any open-work construction or other form having passages permitting the ready access of the electrolyte may be employed.

I will not attempt to enumerate the various modifications which may be made without departing from the principles of my invention, because so to do would obscure rather than make clear the more essential features.

I claim, however, and desire to secure by these Letters Patent, with such limitations as are expressed or by law implied in view of the related arts, as follows:

In combination, the anode consisting of a perforated receptacle A filled with broken or scrap metal, the conducting-shoe C′ resting upon and above the said scrap metal, and the flexible conductor leading to the said shoe, whereby, as the scrap metal is corroded, the said shoe may descend by its own weight, substantially as set forth.

In testimony whereof I have hereunto set my hand, at Great Falls, Montana, this 14th day of March, A. D. 1895.

JOHN T. MORROW.

Witnesses:
W. H. GOODWYN,
M. S. BURNS.