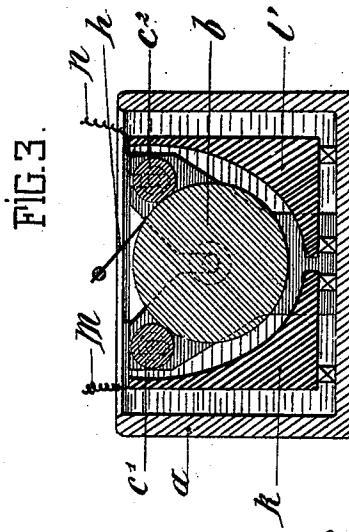
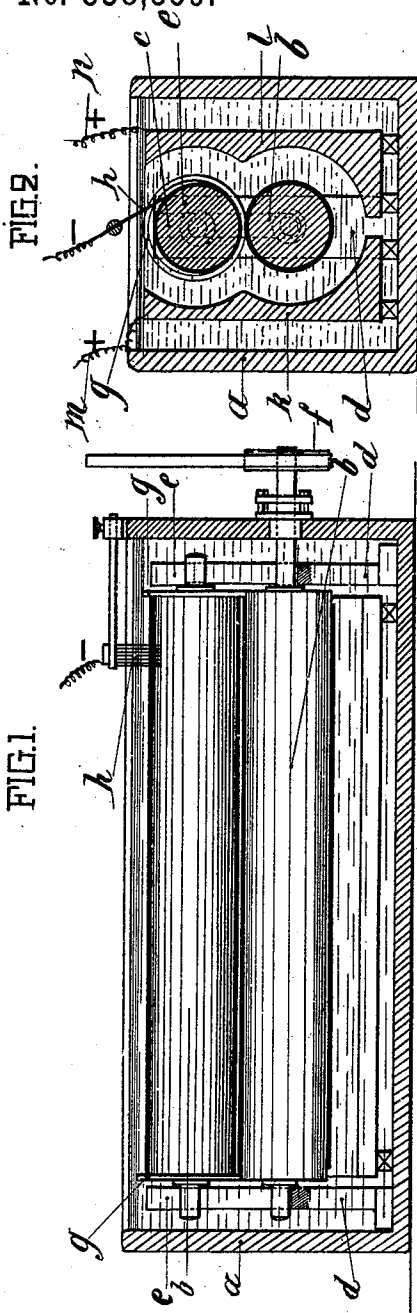


(No Model.)

F. L. M. URRUTY.
PROCESS OF AND APPARATUS FOR MAKING COMPRESSED
ELECTROLYTIC COPPER.

No. 538,359.

Patented Apr. 30, 1895.



Witnesses:
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UNITED STATES PATENT OFFICE.

FRANÇOIS LOUIS MARIE URRUTY, OF PARIS, FRANCE, ASSIGNOR TO LA SOCIÉTÉ DES CUIVRES DE FRANCE.

PROCESS OF AND APPARATUS FOR MAKING COMPRESSED ELECTROLYTIC COPPER.

SPECIFICATION forming part of Letters Patent No. 538,359, dated April 30, 1895.

Application filed May 2, 1894. Serial No. 509,739. (No model.)

To all whom it may concern:

Be it known that I, FRANÇOIS LOUIS MARIE URRUTY, of the city of Paris, France, have invented a Process of and Apparatus for Making Compressed Electrolytic Copper, Applicable to other Metals Capable of Being Deposited by Electrolysis, of which the following is a full, clear, and exact description.

This invention relates to a process of and apparatus for making compressed electrolytic copper, characterized by the employment as a cathode of laminating rollers which compress the metal deposited thereon.

Reference is to be had to the accompanying drawings, forming part of this specification, which illustrate in principle and in an elementary manner the arrangements I employ in carrying out the process.

Figure 1 is a longitudinal section showing the general arrangement of the apparatus; and Fig. 2 is a transverse section of the same. Fig. 3 is a transverse section of a modified arrangement.

The same letters of reference indicate the same parts in all the figures.

My improved process consists as above mentioned in causing the copper to be deposited upon laminating rollers which form the cathodes of the electrolytic cell, the anodes of which are constituted in any suitable manner.

The process may be carried out with the aid of the following apparatus: In a tank *a* containing the electrolyte are placed cathodes formed of the laminating rolls *b c*, in any suitable number, disposed either beside or above one another according to circumstances. In the example, a pair of rolls are employed placed vertically one above the other. The lower roll *b* is journaled in insulated standards *d* in the guide slots *e* of which the journals of the upper roll *c* are also received. The lower roll *b* is rotated by means of a band pulley *f*, a crank or other suitable mechanical movement. This motion is transmitted by frictional contact to the upper roll *c* which is capable of rising in proportion as the thickness of the layer of copper deposited upon each of the rolls increases. The rolls are maintained in contact by the weight of the upper roll. At the commencement of the operation, however, the two rolls should not

touch each other otherwise they would mutually remove the layer of plumbago or other suitable material with which they are coated, before any metal is deposited. To prevent this frictional contact a copper ring *g* is placed on each end of the upper roll *c* of slightly larger diameter than the roll and of a few millimeters thickness whereby to give passage to the electric current from one roll to the other without permitting contact of the rolls at any other part. After the action has been in progress for some minutes and when the entire surface of the two rolls has become coated with copper the rings *g* are removed by sliding them off the ends of the roll. Any other suitable means may, however be adopted for preventing the contact of the rolls at starting. *h* is a brush which rubs upon the surface of roll *c* to insure the transmission of the current. As before mentioned the axes of the rolls may also be placed in the same horizontal plane, the arrangement being similar to that before described—that is to say motion is transmitted to the one roll while the other roll is capable of shifting in a horizontal direction as the thickness of the deposit of copper increases, the two rolls being pressed into contact as above mentioned. The anodes *k, l*, may be made of any suitable form, depending on the arrangement of the cathodes *b, c*, and they may be of any suitable material. The current entering by the conducting wires *m, n*, causes the copper to become deposited upon the rolls *b, c*, in a uniform manner and when the desired thickness of metal has been obtained the separation of the deposit from the roll is effected by any suitable means.

For tubes of large diameter it might be convenient to employ tanks of great depth, and in this case two or more small rolls *c' c''* may be employed in connection with a roll *b* of large diameter, as shown in Fig. 3, the current being supplied by means of brushes to one of the rolls and transmitted therefrom to the remaining rolls. This arrangement permits of obtaining one tube of large diameter and two or more tubes of small diameter simultaneously.

The process which may be applied to all metals susceptible of being deposited by elec-

trolysis, permits of obtaining deposits of superior quality without waste, by the employment of apparatus of a simple and economical character. The progress of the operation
 5 requires no overlooking and the deposit of the metal is effected with regularity over the whole surface of the rolls. The deposits may be employed either as tubes capable of being drawn, or may be formed into rolled plates
 10 or sheets, or as wires, rods or bars, &c.

I claim—

1. The herein described process of producing compressed metals by electro-deposition the same consisting in electrically depositing
 15 metal upon rolls, revolving the said rolls during such deposition, maintaining the said rolls separated until a surface coating of metal is deposited upon each roll and in thereafter maintaining the revolving rolls pressed to-
 20 gether with their coated surfaces in contact, the flow of current through the rolls and coating being maintained during the described operations as specified.

2. In apparatus for compressing electrolytic copper deposited by electrolysis, the combination of a tank adapted to contain an electrolyte, a cathode consisting of rollers, insulated supports for the rollers, guides in the
 25 supports in which the rollers are adapted to slide to press the one on the other and means for so pressing the same and an anode conforming approximately to the form of the

cathode all contained within the tank, substantially as described.

3. In apparatus for compressing electrolytic copper deposited by electrolysis the combination of a tank adapted to contain an electrolyte, a cathode consisting of rollers, insulated supports for the rollers, guides in the
 35 supports in which the rollers are adapted to slide to press the one on the other and means for so pressing the same, an anode conforming approximately to the form of the cathode, and means whereby the collecting surfaces of
 40 the rollers may be maintained separated, all contained within the tank, and a brush for supplying current to the cathode, substantially as described.

4. In an apparatus of the character described the combination with a suitable tank
 45 of an anode, a cathode consisting of rolls in contact, arranged one above the other, the upper roll being freely suspended and bearing its weight upon the lower roll, and circuit connections, substantially as described.

The foregoing specification of my process of making compressed electrolytic copper, applicable to other metals capable of being deposited by electrolysis, signed by me this 6th
 55 day of April, 1894.

FRANÇOIS LOUIS MARIE URRUTY.

Witnesses:

CLYDE SHROPSHIRE,
 ALBERT MOREAU.