

UNITED STATES PATENT OFFICE.

MOSES G. FARMER, OF NEW YORK, N. Y.

PROCESS OF ELECTRO-DEPOSITING COPPER.

SPECIFICATION forming part of Letters Patent No. 319,687, dated June 9, 1885.

Application filed November 12, 1884. (No specimens.)

To all whom it may concern:

Be it known that I, MOSES G. FARMER, a citizen of the United States, and a resident of the city of New York, in the county and State of New York, have invented certain new and useful Improvements in Electro-Depositing Copper, of which the following is a specification.

My invention relates to a process of electro-depositing copper.

In electroplating with metals it is customary to employ as a bath or solvent for the metals a sulphate or a double sulphate of ammonium or else a cyanide. In some instances the nitrate and sulphate of ammonium have been employed in connection with a cyanide. The sulphates are poor conductors, and consequently offer considerable resistance to the current employed for electroplating, and the cyanides are objectionable for the reason that injurious gases are evolved therefrom.

My invention consists in employing nitrate of ammonium as the solvent.

The invention is especially of value in connection with electroplating with copper; and in carrying out the invention I first place in a quantity of the nitrate of ammonium two plates of copper. These plates are then respectively connected with the positive and the negative poles of a battery and a current is caused to traverse from one plate to the other in the usual manner, thus rendering the one plate the anode and the other the cathode. The liquid is gradually converted into the double nitrate of ammonium and copper, and ultimately metal is deposited upon one of the plates, the cathode, as rapidly as it is removed from the anode.

The first-named plate—that is to say, the cathode—may, it is evident, be of carbon or of some other metal than that which it is desired to deposit, provided only that it will not be chemically acted upon by the nitrate of ammonium.

In practice good results have been obtained from a solution formed by immersing the electrodes in a solution consisting of the proportions one-half pound of the nitrate of ammonium to a gallon of water, for a period of from thirty minutes to an hour, the current being about twelve or fifteen ampères per square foot of cathode. From the solution thus obtained a good deposit is given. The temperature at which the solution is formed may of course be varied, but from 75° to 85° Fahrenheit will give good results. The proportion of nitrate of ammonium per gallon of water may be varied between one-quarter and one-half a pound, or even wider limits, and likewise the current may be varied from, say, nine to twenty ampères per square foot of cathode.

When a sufficient quantity of the double nitrate of ammonium and copper has been in this manner formed, the article which it is desired to electroplate or upon which it is desired that the electro-deposition shall be made, is substituted for the cathode and the operation is carried on in the manner commonly employed in electro-deposition.

It is not necessary that the baths be prepared in the first instance by electrolysis; but they may be chemically prepared if found more convenient.

I claim as my invention—

The hereinbefore-described process of electro-deposition of copper, which consists in maintaining by electric action a bath consisting of the double nitrate of ammonium and copper, and in depositing from such bath, by electrolysis, pure copper.

In testimony whereof I have hereunto subscribed my name this 13th day of September, A. D. 1884.

MOSES G. FARMER.

Witnesses:

DANL. W. EDGECOMB,
CHARLES A. TERRY.