UNITED STATES PATENT OFFICE.

RICHARD H. MARSHALL, OF SCOTTDALE, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO ALBERT H. KELLEY, OF SCOTTDALE, PENNSYLVANIA.

ELECTROPLATING SOLUTION.

No. 850,944. Specification of Letters Patent. Patented April 23, 1907.

Application filed October 18, 1906. Serial No. 339,504.

To all whom it may concern:

Be it known that I, RICHARD H. MARSHALL, a resident of Scottdale, in the county of Westmoreland and State of Pennsylvania, have invented a new and useful Improvement in Electroplating Solutions; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to a solution for use in electroplating.

In electroplating as ordinarily practiced heretofore it has been customary where either silver or nickel were to be deposited upon the articles to coat the articles with pure silver or pure nickel, as up to the present time no solution had been devised for depositing a composition of both silver and nickel upon such articles. The advantage, however, of a solution containing both silver and nickel can readily be understood, as it not only reduces the cost of a solution composed entirely of silver, but at the same time the nickel when combined with the silver gives an unusual luster and reduces the liability of corrosion or tarnishing.

To produce my improved solution, I prefer to take substantially equal quantities of double cyanid of nickel and a silver salt in the form of double cyanid of silver or chlorid of silver and introduce the same into a suitable vessel containing water. To be more exact as to the proportions, I may take one and one-half ounces of double cyanid of nickel and the same amonnt of double cyanid of silver or chlorid of silver and introduce them into a gallon of water. The double cyanid of nickel may be obtained by a process described and claimed in an application filed by me of even date herewith, Serial No. 339,502. This solution provides the bath to be used in the process of electroplating. The anodes employed are pure silver, and the cyanid of potassium of the double cyanids attacks the silver of the anodes and forms cyanid of silver. This cyanid of silver forms part of the bath and supplies the silver used in the process of electroplating.

The articles to be plated constituting the cathode are introduced into the solution above described, and when the current is applied the electrolytic action takes place in the usual manner, the combination of silver and nickel being deposited upon the article. As stated above, the silver anodes are changed to cyanid of silver and supply the bath with the necessary quantity of silver for the plating. The bath is replenished from time to time with additions of double cyanid of nickel, so as to furnish the necessary quantity of nickel to combine with the silver.

If desired, instead of adding to the solution in the first instance double cyanid of silver the silver may be obtained from the anodes, which are attacked by the cyanid of potassium of the double cyanid and furnish the silver in the form of cyanid of silver into the bath. This will furnish the silver necessary for the process of electroplating, although the method will be slower than where the bath is made up originally of double cyanid of nickel and double cyanid of silver in substantially the proportions above stated.

This combination of silver and nickel when applied to the article by electrolysis gives a finish of unusual luster, and at the same time it produces a surface which is harder and less liable to corrosion or tarnishing.

The amount of current necessary to deposit the nickel and silver may be readily regulated by a suitable switch, and the amount of said current may vary in proportion to the size of the articles to be coated. It will be found, however, that the current may be regulated so as not to burn the silver, while at the same time the nickel is properly deposited so as to form a homogeneous coating.

What I claim as my invention is—

1. A solution for electroplating containing silver and a metal of the nickel group, each of said metals being present in the solution in a quantity in excess of any other metal than the metals mentioned.

2. A solution for electroplating containing double cyanid of a metal of the nickel group and a silver salt, each of said metals being present in the solution in a quantity in excess of any other metal than the metals mentioned.

3. A solution for electroplating containing double cyanid of a metal of the nickel group and double cyanid of silver, each of said

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metals being present in the solution in a quantity in excess of any other metal than the metals mentioned.

4. A solution for electroplating containing substantially equal amounts of double cyanid of a metal of the nickel group and double cyanid of silver.

In testimony whereof I, the said RICHARD H. MARSHALL, have hereunto set my hand.

RICHARD H. MARSHALL.

Witnesses:
GEORGE BARKELL,
ARTHUR W. NOBLE.