

UNITED STATES PATENT OFFICE.

SHERARD OSBORN COWPER-COLES, OF LONDON, ENGLAND, ASSIGNOR TO
THE LONDON METALLURGICAL COMPANY, LIMITED, OF SAME PLACE.

ARTICLES COATED WITH METALLIC ALLOYS.

SPECIFICATION forming part of Letters Patent No. 512,160, dated January 2, 1894.

Application filed November 25, 1892. Serial No. 453,134. (No specimens.) Patented in England August 8, 1891, No. 13,460, and January 23, 1892, No. 1,391.

To all whom it may concern:

Be it known that I, SHERARD OSBORN COWPER-COLES, engineer, a subject of the Queen of Great Britain, and a resident of London, England, have invented certain new and useful Articles Coated with New Metallic Alloys by Electro-Deposition, (for which I have obtained patents in Great Britain, No. 13,460, dated August 8, 1891, and No. 1,391, dated January 23, 1892,) of which the following is a specification.

This invention relates to articles of metal or other suitable material coated by electro deposition with new metallic alloys, and its object is to produce such articles with a brilliant coating or plating resembling silver, but which is better adapted than silver to resist wear and the tarnishing influences of the atmosphere, and which is at the same time cheaper than pure silver.

In the specification of Patent No. 487,176 I have described and claimed the method; in the present application I claim the article coated according to this method.

For the purpose of this invention I deposit upon the said articles by electrolysis an alloy of silver and cadmium or silver and zinc, or silver, cadmium and zinc, that is to say, silver and any other known metal or metals other than indium, having a specific gravity between 6.5 and 9.0 at 15° centigrade and boiling at a temperature between 710° centigrade and 1,045° centigrade under the ordinary atmospheric pressure, each of these alloys being employed with or without the further addition of any or all of the following metals, viz: nickel, cobalt, tin and chromium. I find that to protect the silver from being so rapidly tarnished by the atmosphere, about from thirty-five to twenty-five or even less of the baser metal or metals is sufficient. When, however I desire to produce less costly coatings I employ an alloy containing say from forty per cent. to ninety per cent. of the baser metal or metals. I deposit these alloys on metallic or other suitable articles by passing an electric current of suitable strength through a liquid bath the articles to be plated being arranged as the negative electrodes or cathodes.

The anodes or positive electrodes of the electrolytic bath may be formed of any suitable material, such as carbon, lead or platinum, or I may employ anodes consisting of one or any alloy of the metals I wish to deposit, or the anodes may be formed of any of the compounds of these metals or of any mixture of their compounds, and I may employ any other known suitable arrangement of anodes. In cases where the material of which the anodes are composed does not possess sufficient rigidity I may strengthen it by any known method, such as by the admixture of cohesive material or by employing supports of metal or any other suitable material.

The solution or electrolyte which I employ in the electrolytic bath may be composed of any compound or compounds of silver dissolved either in water or in aqueous solutions of the alkaline cyanides or alkalis or other bases, and this solution is mixed in any suitable proportion with any solution or solutions of any compound or compounds of cadmium or zinc, or cadmium and zinc between 6.5 and 9.0 at 15° centigrade, and boiling at a temperature between 710° centigrade and 1,045° centigrade under the ordinary atmospheric pressure. Each of these solutions may be employed either with or without the addition of any compound or compounds of any or all of the following metals, viz: nickel, cobalt, tin and chromium, and I may further add to these solutions, solutions of compounds of any or all of the following metals, viz: potassium, sodium, ammonium, magnesium, barium, strontium, calcium or aluminium provided always that in every case the resulting solution when used for the electroplating shall at the moment when the alloy is deposited contain dissolved in it a compound of silver and any compound or compounds of cadmium or zinc, or cadmium and zinc with or without the addition of compounds of all or any of the following metals, viz: nickel, cobalt, tin and chromium. I may further add to any of the solutions I employ, all or any of the various organic compounds or mixtures which have been hitherto found advantageous in assisting in the satisfactory electrode-

position of metals from liquids. I further wish it to be clearly understood that any of the metallic compounds or other substances above enumerated or being in solution in the electrolytic bath employed may if it is desired, be dissolved therein by the aid of heat or electricity or by any other known suitable method for obtaining solutions.

In order to give an example of the exact solutions I employ for the deposition of these alloys, I here give in fuller detail the solution which I employ usually for the electro deposition of alloys of silver and cadmium. I prepare the solution in the following manner, that is to say: I prepare an electrolytic bath by dissolving in water a suitable quantity of cyanide of potassium and a salt of cadmium so as to form a double salt of cadmium and potassium having a slight excess of cyanide of potassium present. To this solution I add a small quantity of the double salt of the cyanides of potassium and silver, preferably in aqueous solution, and the mixture of these two solutions forms the electrolyte or electrolytic bath. This is introduced into any suitable electroplating or electro-typing apparatus. I employ an anode composed of an alloy of cadmium and silver in the same or approximately the same proportions as are desired in the alloy to be deposited. For example for the deposition of an alloy composed of equal parts by weight of silver and cadmium I use an anode composed of equal or about equal parts of the said metals.

After the cathodes, that is to say, the articles upon which it is desired to form the deposit have been placed in the electrolytic

bath, and the current caused to flow, the metals are deposited thereon as an alloy of the desired composition forming a homogeneous coating; that is to say, a coating which consists throughout of a perfect intermixture of the metals constituting the alloy.

The electrolytic bath may be used either hot or cold, and the hardness of the deposit can be increased or diminished by varying the proportions of the metals in the alloy.

I wish it understood that I do not limit myself to any special proportions of the metals, for such proportions may be varied according to the purpose for which the alloy is required, without departing from the nature of my invention.

What I claim is—

1. As a new manufacture an article of metal or other suitable material electro-plated with an alloy of silver and any other known metal or metals other than the rare metals having a specific gravity between 6.5 and 9.0 at 15° centigrade and boiling at a temperature between 710° centigrade and 1,045° centigrade under the ordinary atmospheric pressure, substantially as described.

2. As a new manufacture an article of metal or other suitable material electro-plated with an alloy of silver and cadmium, substantially as described.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses.

SHERARD OSBORN COWPER-COLES.

Witnesses:

GEORG HARRISON,
ARTHUR HAYNES.