

UNITED STATES PATENT OFFICE.

EMILE EUGÈNE DE LOBSTEIN, OF PARIS, FRANCE.

IMPROVEMENT IN PLATING AND COATING METALS.

Specification forming part of Letters Patent No. 130,362, dated August 13, 1872.

To all whom it may concern:

Be it known that I, EMILE EUGÈNE DE LOBSTEIN, of 2 Place Wagram, in the city of Paris, gentleman, a citizen of the French Republic, have invented or discovered new and useful "Improvements in Coating and Plating Metals, and in ornamenting the same;" and I, the said EMILE EUGÈNE DE LOBSTEIN, do hereby declare the nature of the said invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof—that is to say:

This invention has for its object improvements in coating and plating metals, and in ornamenting the same. The improvements are made with a view to obtain, in the first place, such an adhesion of the covering metal as will permit me subsequently to obtain a metallic deposition upon the underlying metal by the application of heat.

In order to get an electro-chemical covering deposit of such thickness and crystalline structure as to answer to the above-mentioned purpose, I have composed very dilute alkaline and acid baths. The said baths are used cold. My tin bath consists of one thousand parts of water, twenty-two and a half parts of caustic soda, half a part of cyanide of potassium, and one-quarter part of tin-salt. My copper bath consists of one thousand parts of water, twenty-five parts of cyanide of potassium, and twelve parts and a half of carbonate of copper. My zinc bath consists of one thousand parts of the liquid supplied by the renewal of the batteries, or of one thousand parts of water and thirty parts of sulphate of zinc produced from the batteries. My lead bath consists of one thousand parts of water, twenty-two parts and a half of caustic soda, and two parts and a half of the residuum of the batteries. For the rare or precious metals—silver, gold, nickel, bismuth, and cobalt—I use the well-known cold solutions.

My battery or pile for a five-hundred-gallons bath is composed, first, of a lead trough 1.20 millimeter long, 0.80 millimeter wide, and 0.16 millimeter deep; second, a brass sheet of 1.10 millimeter length and 0.70 width. Three wooden cross-pieces of seven centimeters height are placed on the said sheet. A zinc sheet 0.005 thick, and 1.10 millimeter long, and 0.70 wide,

is placed on these wooden pieces. Afterward the trough is filled with sixty liters of water. This pile works at three different stages of power of the electrical current, according to the effect I wish to produce. For the first stage it suffices to pour into the water of the trough four hundred grammes sulphuric acid per day. For the second stage or combination I put under the zinc sheet one kilogramme acetate of lead mixed with three kilogrammes of sea-salt, and I take care that the liquid of the pile overtops the zinc sheet by three or four centimeters. The pile so disposed works during eight consecutive days, without any other ingredient, with a very regular current. For the third stage I add to the action of the acetate of lead that of the sulphuric acid as it is said for the first stage. This pile gives me metallic lead for the residues of acetate, and the zinc consumed in proportion of its work done is used for the zinc baths.

In order to set my pile to work I accordingly want only trifling quantities of acetate of lead, of sea-salt, and of sulphuric acid. The articles to be put in the baths are cleaned, according to the nature of their metal, either by immersing them in potash solution or solutions of sulphuric or muriatic acid. The baths are supplied with anodes of the same metal as the covering to be obtained. As soon as the articles put in the bath are enough covered they are withdrawn, washed with fresh water, and carried to an ordinary stove, where they remain submitted to the degree of heat which is required for the melting of their electro-chemical cover, which varies from five to thirty minutes. By these means I obtain, in consequence of the melting together of the crystalline particles which form the electro-chemical cover in its whole depth, a cover like to that of a melted metal. If I wish to cause the soldering of the cover with the metal underneath, I raise the heat; the metal under the cover dilating and evolving metallic vapor becomes superficially combined with the electro-chemical covering and effects the soldering. If I wish to obtain an alloy of two metals or more, I cover the article with different electro-chemical layers; afterward I submit it to the action of the heat, and the melting of the layers gives me either various alloys or new metals adhering and soldered to the under metal.

The products of my process acquire all the qualities of a melted metal, viz., malleability, ductility, cohesiveness, &c.; can be softened, polished, rolled, and worked in the same manner as if they had been really covered with a melting metal.

I have already stated that my system makes use of heat to alter the former constitution of the electro-chemical metal, which is formed with crystalline deposits, and add to the same the very properties of melted metal, viz., tenacity, ductility, malleability.

I have stated that to attain my end I must have united, in a whole, certain conditions which form together one system—thus, formation of a very small and uniform crystalline coating. To that effect I use cold baths very slightly concentrated, batteries with a great surface, which give a great electric power and a continual and especially regular working.

The chemical formula of the constitution of my baths is therefore of an exceptional importance, as it would be impossible to go materially below that formula, and also to go beyond its small degree of concentration, without obtaining bad metallic deposits that would be injurious to the whole system.

Another part of my invention relates to the production of ornamented metallic articles by means of electricity and heat. This is my way of operating: The object coated (according to my process) with a sufficient coating of metal is placed in the stove and submitted to a temperature more or less inferior to the melting degree of the coating metal. The coated metal, which I call hereafter "subjacent metal," and the coating one, to which I give the name of "electro-chemical metal," oxidize in this state of connexion in a different manner from that in which they would do had each been separately submitted to the same degree of heat. This produces, according to the degree of temperature, a great many different shades in the metals, moreover varying with the metals employed. I take the object thus treated and fasten it to the negative pole in the same bath where it has been coated up. The electric current then gives rise to a double effect: It deoxidizes in a symmetrical way the surface of the object, and afterward causes a second metallic coating to be deposited, which follows the crystallizations already formed and makes them thick-

er. These crystallizations always are different, consistently with the kind of metal being coated. By placing the object under the positive pole I obtain another description of crystallizations which appear hollow and in relievo. Thus, I say, that in order to obtain those two kinds of ornamentation effects, up to the present time quite unknown, which vary with the metals of which I make use, I take the metal to be ornamented, coat it with a metallic deposit, place it in the stove, and then again in the bath, either under the positive or the negative pole, and as soon as there is upon it the desired intensity of crystallization I dry it and deliver it to the trade varnished or not. The object which I take out from the bath may be, at my pleasure, entirely or partly dead or bright.

In order to have some parts dead and others bright, I transfer a design to the surface, immediately after the object has been submitted to the stove, by a similar process to that used by the lithographic printers and the China printers in order to transfer their designs to the stone or China-ware. The designs of said industries being made with fat inks, they protect the metal and do not allow the electric current to deposit on the parts of the design, and consequently those parts may remain dead or bright, at option; also, by setting on the metal a cut-out design sized with varnish, this will form a coating on which no new deposit will be made. In the same way with a metallic pattern open-worked, I apply it and rub in the empty spaces, with a brush or a pencil, a fat ink. This will form a design which I shall be able to repeat indefinitely.

Having thus described the two parts of my invention, I claim—

1. The process of producing a coated metallic article by subjecting the article to be coated to a weak cold solution of the required coating metal and to the action of a galvanic battery, and by subsequently subjecting the said article to the heat required to melt the coating, substantially as before set forth.

2. I also claim the production of ornamented metallic articles, by means substantially as described.

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Witnesses:

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