

UNITED STATES PATENT OFFICE.

GEORGE W. BEARDSLEE, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN ELECTROPLATING WITH COBALT.

Specification forming part of Letters Patent No. **149,974**, dated April 21, 1874; application filed March 24, 1870.

To all whom it may concern:

Be it known that I, GEORGE WASHINGTON BEARDSLEE, of Brooklyn, State of New York, have made a new and useful Discovery and Invention in Electro-Metallurgy, of which the following is a specification:

My discovery relates to electroplating articles of manufacture with the metal denominated "cobalt."

I have ascertained that cobalt, when separated from all impurities, may be readily dissolved and deposited on metallic surfaces and other conductors of electricity, so as to form a thick and useful covering, which will very perfectly protect the plated surface from the action of the elements, and forms a most beautiful plating, very white, exceedingly hard and durable, tenaciously adherent, and not liable to tarnish.

To usefully electroplate metals, and other substances that are conductors of electricity, with cobalt, by the action of the galvanic current, the solution may be made and prepared in the following manner: Dissolve the pure metal cobalt in boiling muriatic acid, and evaporate this solution to dryness. Then dissolve from four to six ounces of the salt thus obtained in a gallon of distilled water, to which add ammonia sufficient to show on test-paper the solution just slightly alkaline.

Then prepare an anode of the metal cobalt, in granular form or broken into small pieces, freed from impurities, as follows: Take a plate of carbon or of some other material—that is, a conductor of electricity, but not susceptible of being attacked by the plating solution, and place it within a sack or envelope made of some material that is neither a conductor of electricity, nor attackable by the solution, formed with open meshes or interstices through which the solution may freely circulate. This envelope should be made to conform in shape to the carbon plate, and large enough to leave a space between it and the plate of, say, one-half an inch to one inch, then fill this space with the granules of cobalt, which will, as is evident, surround the plate and be in contact with it.

By an anode thus constructed, a large surface of the cobalt is readily and conveniently exposed to the action of the solvent, and the

steady flow of the entire battery current through the cobalt is secured, thereby rendering the dissolving and deposition of the metal steady, uniform, and very perfect.

I do not intend to claim here the anode thus constructed, that being the subject of a separate application, and for which a patent was issued to me on the 30th day of July, 1872, numbered 129,881.

This anode is to be connected with the copper pole of the battery by connecting the wire to the carbon plate and suspended in the plating solution before described, and the article to be plated is connected in the solution with the zinc pole in the usual way.

A battery power of from two to five cells (Smee's battery) will be sufficient to do good work.

Care should be taken not to permit the solution to lose its slightly alkaline character, as if this is not maintained the plating operation will be rendered imperfect, the tenacity, adherency, or uniformity of the deposit becoming thereby impaired.

I have thus described a method of electroplating with cobalt, which will accomplish the deposit of this metal in regular form upon the surface of other metals and conductors of electricity, so as to form a covering of any desired thickness, that is solid, compact, adherent, tenacious, and constituting a very perfect protection to the plated surface—a result which, I believe, has not been hitherto attained.

I do not, however, limit myself to the precise method or agents above described; but employ any others which will produce similar results in substantially the same manner.

What I claim, and desire to secure by Letters Patent, is—

Electroplating with the metal cobalt, so as to form a useful coating of this metal, that is tenacious, compact, adherent, and flexible, and of sufficient thickness to protect the surface upon which it is deposited, substantially as specified.

GEO. W. BEARDSLEE.

Witnesses:

J. P. FITCH,

THOS. A. MASTERSON.