

UNITED STATES PATENT OFFICE.

DUNCAN SINCLAIR, OF COALBROOKDALE, ENGLAND.

IRIDESCENT COATING OF COPPER, BRONZE, OR LIKE SURFACES.

SPECIFICATION forming part of Letters Patent No. 705,456, dated July 22, 1902.

Application filed December 31, 1900. Serial No. 41,649. (No specimens.)

To all whom it may concern:

Be it known that I, DUNCAN SINCLAIR, manager, a subject of the Queen of Great Britain, residing at Coalbrookdale, R. S. O., county of Salop, England, (whose post-office address is Woodbury, Coalbrookdale, aforesaid,) have invented certain new and useful Improvements in Iridescent Coating of Copper, Bronze, or the Like Surfaces, (for which application for patent has been made in England, where provisional protection has been obtained under No. 10,977, 1900,) of which the following is a specification.

This invention has for its object a process of coating, coloring, or ornamenting metals whereby a beautifully iridescent effect is produced. It is applicable more especially to brass, bronze, copper, and iron, but can also be applied to stone articles, encaustic or other tiles, china, porcelain, or other fictile ware by covering these preliminarily with a thin metal facing, preferably of copper.

The article to be treated is first thoroughly cleansed by being dipped in dilute nitric or other acid or by polishing or in any other manner, whereby it shall be entirely clear of grease or scale, and if the article be of iron it is first coated electrically with a thin coating of copper or brass. It is then placed in the manner described below in a bath made of the following constituents: fourteen ounces caustic soda, ten ounces litharge, and one-half gallon water, boiled for an hour, and then diluted with water to a gallon. In place of caustic soda caustic potash and to a less extent other alkalis having the same effect on litharge can be used; but I prefer caustic soda. The proportions given above may be considerably varied; but the above formula I have found good in practice. I prefer to add, however, to the above solution a small proportion of the copper solution used in electroplating—say to the extent of one-half pint or thereabout.

The electrocoppering solution referred to above is made as follows: dissolve one pound of potassium cyanid, ninety-five-per-cent. strength, in one gallon of water, suspend a pure copper sheet in the same, and pass an electric current through until the solution

contains three ounces of copper to the gallon. The copper sheet is weighed before being put in and after immersion to determine this. Other well-known modes of adding copper to the cyanid solution can be adopted, but they are not as convenient.

The tank in which the solution or bath is placed is made of marble, glass, slate, or other insulating material and is supplied with the usual fittings for passing an electric current through the solution. From the wire or rod of the negative pole or cathode is suspended a copper sheet of dimensions suitable to the size of the tank and immersed in the solution, while from the wire or rod of the positive pole or anode is suspended the article to be treated by means of a wire or other conductor. The electric current is then turned on and regulated to suit the varying quality, density, and character of the article treated. The duration of the exposure of the article to the action in the bath while the current is turned on depends on the strength of the current and the graduations of color desired. The coloring varies according to the length of the exposure in the bath and the strength of the current, and by protecting parts of the article from the action in the bath by coating temporarily with varnish or other protecting material a variegated scheme of coloring can be carried out and achieved. When the process is completed, the article is taken out of the bath, thoroughly dried, and may then be subjected to heat varying, according to the effect required to be produced, from 150° to 500° Fahrenheit, so that all moisture remaining thereon may be rapidly evaporated. By this heating the color is intensified. The dynamo supplying the current in my experiments was eight to ten volts; but this may be varied, care being taken that the coloring is not spoiled by too long exposure in a strong current. The quantities of the ingredients in the bath may also be varied within considerable limits. By this process a suitable iridescent effect is obtained on the metal articles. Further, the coating thus added is a good preservative from oxidation and acts as a substitute for lacquer.

I declare that what I claim is—

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1. As a new article of manufacture, an article having a metallic surface of copper, bronze or brass, coated with an iridescent layer of oxid of lead containing copper, substantially as described. 5
2. As a new article of manufacture, an article of metal having an electrodeposited film of copper deposited thereon and an iridescent coating over this consisting of oxygen, lead and copper. 10
3. As a new article of manufacture, a metallic surface coated with an iridescent coating of oxid of lead and copper of different thicknesses in different parts arranged in a pattern, substantially as described. 15
4. The process of coating articles having a surface of copper or of its alloys which consists in thoroughly cleaning the surface, immersing it in an electrolytic tank containing 20 alkali, litharge and water, and covering certain portions of the plate with a varnish resist during portions of the period of immersion, afterward removing the resist and polishing, whereby a variegated iridescent pattern is formed on the surface. 25
5. The process of coating articles having a surface of copper or its alloys which consists in thoroughly cleaning the surface, immersing it in an electrolytic tank containing alkali, 30 oxid of lead, water and a little electrocoppering solution, and passing an electric cur-

rent through, and then quickly drying and heating, substantially as described.

6. The process of coating articles having a surface of copper or its alloys, which consists in thoroughly cleaning the surface, immersing it in an electrolytic tank containing alkali, oxid of lead, water, and electrocoppering solution, passing an electric current through, and during part of the time protecting those parts of the surface with a resist of varnish, drying and rapidly heating, substantially as described. 35 40

7. In a process for coating articles with an iridescent coating by electrolysis, exposing the article at the anode in the solution to an electric current, and during portions of the time during which the article is so exposed, covering portions of the pattern with a varnish resist not acted upon by the solution whereby the depth of coating, and consequently the color is varied according to the time that the various parts have been exposed unprotected in the solution to the current. 45 50

In witness whereof I have hereunto signed my name, this 14th day of December, 1900, in the presence of two subscribing witnesses. 55

DUNCAN SINCLAIR.

Witnesses:

ROBERT HENRY STEWART,
ARCHIBALD GEORGE BARLOW.