Patented Dec. 8, 1931 1,835,636

# UNITED STATES PATENT OFFICE

JOHN CORBIT, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY, A CORPORATION OF PENNSYLVANIA

## CHROMIUM PLATED ARTICLE

No Drawing. Application filed December 17, 1925. Serial No. 76,119.

My invention relates to chromium-plated articles and specifically to metal articles comprising a foundation metal and a composite coating of metals, one of which is chromium.

It is among the objects of my invention to provide means for producing an electro-plated article having an outer coating of chromium and a under coating of a metal that provides a smooth foundation for the chromium and also has reflective properties and color similar to that of chromium.

Another object of my invention is to provide a composite article having a chromium outer coating and an under coating of a metal, the electrolytic potential of which is intermediate chromium and copper.

My invention is useful in making chromium-plated articles for general use, such as ornamental hardware, and is particularly useful in the manufacture of reflectors for lighting devices and other highly polished articles that are subjected to rather high temperatures.

Metallic chromium is useful as a reflective or protective coating instead of nickel or silver. In some respects, it is preferable to nickel or silver, as it is hard and resistant to abrasion and as it has a reflectivity only slightly lower than silver. Chromium is particularly resistant to heat and to the attack of corrosive agencies existing in the atmosphere. However, it is difficult to polish chromium on account of its extreme hardness.

When an article is plated with chromium, any of the scratches or imperfections in the foundation metal appear in the chromium plate. Consequently, when scratched, the finished chromium plating is imperfect wherever a perfectly polished foundation surface is not provided. I, therefore, provide a coating of a metal over the foundation metal that is similar in color to chromium, will conceal inperfections in the foundation metal and is susceptible of being easily polished; so that when the chromium plate is deposited, a perfectly smooth reflective coating is obtained.

The intermediate metal used in conjunction with chromium and the foundation metal has an electrolytic potential between chromium and copper or tin and in one modification an electrolytic potential between iron and chromium so that when either copper or a metal between copper and the intermediate metal in the electro-chemical series and copper is used as a foundation metal, the tendency for the chromium to corrode by reason of electrolytic action is decreased.

I may provide an article comprising a foundation metal of a non-ferrous metal such as copper or an alloy thereof such as brass. I first produce a coating of cadmium or nickel on the foundation metal, preferably by electro-plating the nickel or cadmium thereon. However, I may form a nickel or cadmium blank and build up the foundation metal on the blank by electro-plating or other well known means.

The coated foundation metal is prepared for the chromium plating by carefully polishing it in order to remove all imperfections and scratches and then cleaning in order to remove all foreign matter.

The chromium is next deposited on the polished surface by any of the well known chromium plating processes. The chromium may be deposited as a lustrous coating or may be deposited in the gray form and afterwards polished, if a lustrous coating is desired. In all instances, the composite coating produced is homogeneous, resistant to corrosion and free from markings and scratches existing in the foundation metal.

The nickel or cadmium also provides a reflective coating that serves as a silver-like backing for the chromium in case the chromium plating is thin or becomes worn through. The composite coating therefore provides an article resistant to corrosion and to the effects of heat and at the same time provides a surface having high reflective properties and great hardness.

Although I have described specific embodiments of my invention, I do not wish to be limited thereto, as various changes in the details of my process and structure may be made without departing from the spirit of my invention as defined in the annexed claims.

I claim as my invention:

1. An article comprising successive contacting layers of copper, nickel and chromium, the chromium forming the outer layer and being electrodeposited directly upon the nickel.

2. The process of providing a smooth protective surface which comprises electroplating nickel on a copper foundation metal, polishing the nickel and then electroplating chromium directly on the polished nickel.

3. An article of manufacture comprising successive contacting layers of a metal selected from a group of metals consisting of copper and those metals or alloys having an electrolytic potential below nickel and above copper in the electrochemical series, a layer of nickel, and an outer layer of chromium.

4. The process of providing a smooth protective surface which comprises providing a layer of metal selected from a group of metals consisting of copper and those metals or alloys having an electrolytical potential below nickel and above copper, polishing the layer of metal, electrodepositing a layer of nickel on the polished metal and finally electrodepositing a layer of chromium on the layer of nickel.

In testimony whereof, I have hereunto subscribed my name this 8th day of December, 1925.

JOHN CORBIT.