

UNITED STATES PATENT OFFICE.

CAMILLO MAGGIO AND GIUSEPPE MAFFIOLA, OF SAN FRANCISCO, CAL.

IMPROVEMENT IN NICKEL-PLATING.

Specification forming part of Letters Patent No. **174,691**, dated March 14, 1876; application filed December 2, 1875.

To all whom it may concern:

Be it known that we, CAMILLO MAGGIO and GIUSEPPE MAFFIOLA, of San Francisco city and county, State of California, have invented Improvements in Nickel-Plating; and we do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use our said invention or improvement without further invention or experiment.

Our invention relates to certain improvements in the art of plating with nickel upon other metals; and it consists, first, in a novel preparation of the base metals to be plated, so as to prevent rust or oxidation beneath the nickel-plating; and in a new solution by which we are enabled to deposit the metal more perfectly, and upon metals which it has hitherto been impossible to protect with nickel.

It is well known that in the process of electroplating the metal is deposited in the form of minute grains, and when the metal is malleable, as in the case of gold and silver, these grains are welded or united in the process of burnishing, so as to completely cover and protect the whole surface, but when nickel is deposited in this manner it cannot be made to protect the surface any more completely than is done by a simple deposition of the particles on account of its brittleness, which does not allow of burnishing and proper protection successfully. The surface beneath is therefore more or less exposed to the action of air, acids, or other substances, and will in time become oxidized or corroded in spots, especially in the case of iron, steel, lead, copper, and other base metals.

In order to prepare such metals for receiving an electro-deposit of nickel, we first deposit upon the surface, in any suitable manner, gold, silver, platina, zinc, (when deposited on iron,) or any non-oxidizable metal, or a metal which tarnishes slightly or does not discolor by such tarnishing.

Of the metals which are cheap enough, we have found that zinc is the best for the pur-

pose. Zinc, in its pure state, is very little liable to become corroded or tarnished, and from its malleability will form a complete protecting coat. This coat may be put upon the article to be plated in the same manner that is employed for tinning iron sheets for the purpose of making commercial sheet tin, and the article is then ready for the nickel solution. The other non-oxidizable metals might be employed but they are too expensive to be available.

Attempts to deposit nickel upon zinc directly have hitherto failed because when the zinc is plunged into any bath usually employed, it becomes blackened and will not receive the nickel.

In completing our process, therefore, we employ a bath composed of chloride of nickel and ammonium, together with chloride of iron, by means of which we deposit the nickel upon iron, steel, and copper, and upon zinc. We also employ an iron anode or pole instead of nickel to connect the battery with the solution, and by this and the iron in the solution we are enabled to preserve the surface of the article to be coated in a condition suitable to receive the deposit of nickel directly and without other preparation or coating.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The solution, composed of chloride of nickel and ammonium, and chloride of iron, for the purpose of plating directly upon zinc, substantially as described.

2. The method of preparing base metals to receive an electroplating of nickel, the same consisting in applying a surface of zinc previous to the nickel-plating, substantially as described.

3. As new articles of manufacture, metal goods having a nickel-plating deposited directly on a zinc surface, as set forth.

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Witnesses:

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