

UNITED STATES PATENT OFFICE.

WILLIAM FRISHMUTH AND HERMAN B. VAN TRONK, OF PHILADELPHIA, PA.

IMPROVEMENT IN SOLUTIONS FOR DEPOSITING NICKEL ALLOYS.

Specification forming part of Letters Patent No. **223,210**, dated December 30, 1879; application filed October 16, 1879.

To all whom it may concern:

Be it known that we, WILLIAM FRISHMUTH and HERMAN B. VAN TRONK, both of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Nickel-Plating Solutions, of which the following is a specification.

The object of our invention is to impart to metal objects by electro-deposition a coating of alloyed nickel which will be thicker, whiter, and more malleable than nickel coatings as heretofore applied, and this object we attain by the use of a plating-solution in which are contained a nickel salt, chloride of aluminium, and chloride of sodium, the nickel salt used being either the chloride, nitrate, or sulphate.

In carrying out our invention, we use the usual tank containing water for a plating-bath, the water, by preference, being distilled. A compound of the chlorides of aluminium and sodium is prepared, the compound containing two parts of chloride of aluminium to one part of the chloride of sodium.

To the water in the bath we then add the nickel, aluminium, and sodium salts in the proportion of six ounces of the salt of nickel and two ounces of the compound of chloride of aluminium and chloride of sodium, above mentioned, to each gallon of water in the bath. Through the bath thus prepared we pass a strong electric current, preferably using as poles an anode of pure nickel and a cathode of carbon, this treatment being continued until it is found, on examination, that the solution is in proper condition for plating, when the carbon cathode is removed and the solution worked as usual.

We have found by experiment that the addition of chloride of aluminium and chloride of sodium to the plating-bath renders the deposited coating more malleable and imparts

to said coating a whiter appearance than ordinary nickel-plating, the coating being, in reality, an alloy of nickel and aluminium. A much heavier coating than usual can be applied with our solution without causing what is technically termed a "burst."

The use of chloride of nickel in the bath is preferred, although good results may be attained by using the chlorides of aluminium and sodium, as above set forth, in connection with either sulphate of nickel or nitrate of nickel in making the plating-bath.

We are aware that it has been proposed to use sulphate of nickel and sulphate of alumina in a plating-bath; but it has been found that the working of such a solution on a commercial scale is impracticable, owing to the fact that very close attention must be paid to the strength of the current, and even under the most favorable circumstances the action of the solution is irregular.

By the use of the chlorides of aluminium and sodium, however, we are enabled to produce a solution which can be worked as readily and with as little care as the usual solutions of nickel and ammonium.

We claim as our invention—

The within-described electroplating-bath for depositing an alloy of nickel and aluminium, consisting of a solution of one of the salts of nickel with chloride of aluminium and chloride of sodium, all substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

WILLIAM FRISHMUTH.
HERMAN B. VAN TRONK.

Witnesses:

JOHN A. OWENS,
HARRY SMITH.