UNITED STATES PATENT OFFICE.

EDWARD WESTON, OF NEWARK, ASSIGNOR TO EDWARD E. QUIMBY, OF ORANGE, NEW JERSEY.

IMPROVEMENT IN MANUFACTURE OF METALLIC NICKEL.

Specification forming part of Letters Patent No. **211,070**, dated December 17, 1878; application filed December 4, 1878.

CASE A.

To all whom it may concern:

Be it known that I, EDWARD WESTON, of Newark, New Jersey, have invented a certain Improvement in the Manufacture of Malleable Ductile Nickel, of which the following is a specification:

My invention consists in the production, as a new article of manufacture, of nickel, which, by reason of its toughness, malleability, and ductility may be employed in the arts, substantially in the manner in which brass, copper, and other tough malleable metals are employed.

I am enabled to produce nickel having the qualities which I have described, by reason, first, of my discovery that the addition of borate of nickel (or other compounds of boron) to a nickel-depositing solution prevents the deposit of the sub-salts of nickel upon the cathode, and renders it easy to so regulate the current as to prevent the evolution of hydrogen from the solution; and by reason, secondly, of my discovery that borate of nickel, although insoluble in water, is very soluble in many of the solutions of salts of nickel.

In another pending application, designated as Case B, I have described and claimed, as a new article of manufacture, a soluble salt of nickel and boron; and in another pending application, designated as Case C, I have described and claimed nickel solutions composed of salts of nickel and salts of boron.

I have found that in all cases the addition to a nickel-depositing solution of borate of nickel (or other compounds of boron) greatly improves the character of the deposit and increases the ease with which the solution is managed.

I have found that a solution composed of five parts of chloride of nickel and two parts of borate of nickel affords, by electrolysis, a deposit of nickel which is so tough, malleable, and ductile that it may be worked in much the same way as brass or copper are worked by the operations of rolling, punching, drilling, spinning, drawing, stamping, or cutting.

The rapidity of the deposition from the particular solution which I have described, and the ease with which the solution is managed, facilitate the production, by electrolysis, of solid homogeneous masses of nickel, which may be manufactured into ware of all kinds, cutlery, surgical instruments and appliances, pens, and a variety of other articles. Such articles may be formed either by direct deposition of the nickel in suitable molds, or from sheets or bars of nickel deposited by the process described in my pending application designated Case C, and afterward worked up into the desired shape.

There are other solutions of nickel which, by the addition of the borate of nickel, (or of other compounds of boron,) may be made to yield a deposit of nickel of greater malleability and toughness than any heretofore obtained; but the solution which is herein described I consider the best for the purpose.

In the use of my solution the ordinary methods of management are adopted, and the electric current is easily regulated as to quantity and intensity so as to prevent the evolution of hydrogen at the cathode.

If a solid sheet or mass of nickel be required, it may be deposited upon a black leaded mold or surface, from which it is to be subsequently removed. The malleable nickel may also be deposited in the form of heavy plate upon sheet-copper. The malleability of the deposit and the tenacity with which it adheres to the surface of the copper will permit the heavily-plated sheet to be spun, hammered, stamped, or rolled without danger of stripping off the nickel coating.

My malleable nickel is readily distinguishable from ordinary nickel by its comparatively greater toughness, malleability, and ductility, and when applied as a plate upon another metal it can also be distinguished by the comparatively greater tenacity with which it adheres to the surface upon which it is deposited.

I claim as my invention—

As a new article of manufacture, a malleable ductile electro-deposit of nickel, substantially such as described.

EDWARD WESTON.

Witnesses:
M. L. ADAMS,
GEO. W. MIATT.

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