

UNITED STATES PATENT OFFICE.

ISAAC ADAMS, JR., OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN NICKEL-PLATING.

Specification forming part of Letters Patent No. **154,435**, dated August 25, 1874; application filed October 21, 1872.

To all whom it may concern:

Be it known that I, ISAAC ADAMS, Jr., of Boston, in the State of Massachusetts, have invented a new and useful Improvement in Nickel-Plating; and I do hereby declare the following to be a full and correct description of the same.

The nature of the metallic deposit from solutions used for nickel-plating is such as to produce a state of tension in them, whereby the adhesion which naturally exists between surfaces chemically clean, and exactly applied to one another, as in the galvanic deposit, is materially lessened. This peculiarity of nickel deposits appears to exist whether the metal is thrown down by a very weak galvanic current, or whether it is produced at the maximum rate of speed. All galvanic deposits of nickel are crystalline, and the distribution of crystals over the surface of the article to be plated is far from being perfectly regular and even, the deposited metal accumulating on the edges or prominent parts of the object. The deposit, when taken from the plating-bath, is apparently somewhat in the condition of a plate of metal which has been hammered along the middle, the edges remaining untouched—a process which, by producing an unequal strain, forces the hammered plate to turn or curl upon itself. From this apparent tension, or from some such cause, there is a tendency of the electro deposits of nickel to “strip” or peel up, and this tendency has been found to be so great when applied to plain surfaces, and when the metal is required to be of a thickness exceeding about one two-thousandths of an inch, as practically to limit, and in some cases preclude, its application to certain classes of articles, more particularly cutlery and articles which are liable to be forcibly bent or twisted, or subjected to heavy blows or shocks. The object of this invention is to remedy this defect; and this I accomplish by subjecting the plated articles to a degree of heat, in any suitable apparatus, sufficient to neutralize

the tension, or to allow the particles of metal to rearrange themselves in such a manner as to relieve any unequal strain there may be, from whatever cause.

A very low red heat, visible in the dark, does this to the best advantage, the nickel oxidizing too rapidly at a higher temperature, and the required effect not being produced in the least at a temperature considerably lower. Articles made from metals or alloys whose melting-point is below 500° Fahrenheit cannot be treated by this method.

This invention is not only a remedy for stripping, but by its use the toughness and pliability of the deposited metal are enhanced. Many articles of steel or iron which could not otherwise be economically handled may by this method be plated and polished in a semi-finished state, and afterward formed and tempered (in the case of steel) if need be.

It is true that by this process the deposited metal is, to some degree, softer than the original before treatment; but, on the other hand, the method allows of a much heavier plate, and, consequently, more efficient protection to the metal underneath, not to mention the reduced price at which some articles may be finished.

Sheet brass or copper may be cut into blanks, plated, and spun or struck up into various shapes, and even burnished, if necessary; and by this process short lengths of iron, steel, or other rod can be heavily plated, and drawn with proper precaution to a considerable degree of fineness.

I claim—

The process or method of treating metallic articles coated with nickel by subjecting the same to heat, substantially in the manner and for the purpose specified.

ISAAC ADAMS, JR.

Witnesses:

SAML. W. BATES,
WILLIAM W. SWAN.