UNITED STATES PATENT OFFICE.

WILLIAM FRISHMUTH, OF PHILADELPHIA, PENNSYLVANIA.

PROCESS OF COATING METALS WITH LEAD, ZINC, OR TIN.

SPECIFICATION forming part of Letters Patent No. 242,624, dated June 7, 1881.

Application filed March 5, 1881. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM FRISHMUTH, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Process of Coating Metals with Lead, Zinc, or Tin, of which the following is a specification.

Heretofore alloys in which lead forms a component part have been used for coating cast and wrought iron to protect the same against oxidation, and zinc and tin alone are in common use for this purpose; but several objections and difficulties attend the use of these materials when applied by the methods now known—as, for instance, when zinc or tin is used and applied directly upon the iron the zinc attacks the iron in such manner as to injure its durability and tenacity, and this is also true of such alloys as antimony, bismuth, and lead, and nickel, tin, zinc, and lead; and, besides, in applying these alloys or the zinc a dross is formed in the molten baths, which is troublesome to remove, and results in a loss of metal, and wrought or cast iron has never been successfully coated with unalloyed lead.

The object of my invention is to thoroughly and effectively coat cast-iron or sheets of wrought or cast iron or other metals with pure lead, or with zinc or tin, in such manner that the metal coated will be protected against oxidation and its durability and tenacity preserved, and in such manner that there will be no formation of dross in the molten baths; and to this end my invention consists, essentially, in protecting or preparing the surfaces to be coated by depositing upon them, by electroplating or otherwise, a thin coating of nickel, or an alloy of nickel and aluminium.

In carrying my invention into effect I first clean the surfaces to be coated by immersing them in acid and neutralizing baths, and then coat them with a thin coating of an alloy of aluminium and nickel by electroplating the same in my solution for depositing nickel alloy, which was patented to me December 30, 1879, or with a thin coating of nickel. After this I heat the plated surfaces to a cherry-red heat, and then immerse them, while hot, in a molten bath of pure lead or zinc or tin, which has been previously fluxed on the surface of the bath with either powdered chloride of ammonia or other suitable fluxes, leaving them in the bath only for a short time, when it will be found that the surfaces are thoroughly and perfectly coated.

Instead of heating the surfaces to be coated as above stated, they may be immersed in the molten bath directly from the plating solution.

Metals coated in this manner are perfectly protected against oxidation, and the durability and tenacity thereof are not injured, as when coated in the ordinary manner with zinc or tin, or with the alloys above mentioned, and no dross whatever will be formed in the heated baths of lead or zinc, as neither the lead nor zinc attacks the iron surfaces as heretofore. Besides, when the surfaces are previously coated with the alloyed aluminium and nickel, or with the nickel alone, the zinc will present finer crystals and the ductility of the zinc will be improved to such an extent that it will not scale off or break when bent or formed up in dies, as is the case with ordinary galvanized iron.

I am aware that a thin coating of copper has been deposited on an iron surface before it was treated in a bath of molten tin, zinc, or alloy; but my object is to cover iron sheets or castings with pure lead by first electro-nickel-plating the iron, and then placing it in the molten lead, tin, or zinc bath. I have ascertained by careful experiment that a copper coating will come off in the bath, while the nickel coating is not affected at all, and, being a much harder metal, will not alloy, like copper, with the other metals.

What I claim as new and of my invention is—

A process of coating iron sheets and castings with pure lead, tin, or zinc, which consists in first electroplating the iron surfaces with nickel and then immersing them in the molten metal, as described.

WILLIAM FRISHMUTH.

Witnesses:

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