

UNITED STATES PATENT OFFICE.

THEODORE G. BUCKLIN, OF TROY, NEW YORK.

IMPROVEMENT IN COATING IRON WITH COPPER.

Specification forming part of Letters Patent No. 9,270, dated September 21, 1852.

To all whom it may concern:

Be it known that I, THEODORE G. BUCKLIN, of the city of Troy and county of Rensselaer, in the State of New York, have invented certain new and useful Improvements in the Coating of Iron with Copper or any Copper Alloys; and I do hereby declare that the following is a full, clear, and exact description of the same.

First. The nature of my invention consists in preparing the iron—either cast, malleable, or wrought iron—with a coating of metal which has a great affinity for iron, as a medium on which to deposit and make copper or its alloys unite with and form a coating for the iron.

Second. It also consists in employing an infusible material to cover the molten copper or alloy to serve the purpose of a wiper, so as to render the surface of the coating-metal smooth; also, for retaining the heat of the molten copper in the crucible for a longer period than any of the substances heretofore used for such purposes.

To enable others skilled in the art to make and use my invention, I will proceed to describe it fully and clearly.

I take iron castings or plate-iron of any kind and remove the sand and oxide scale from it or them by means of diluted sulphuric acid, being in the proportions of twenty parts of water to one of the sulphuric acid of commerce, in any of the usual modes for cleaning iron, after which I dip the said cleaned cast or wrought iron in a solution of the muriate of ammonia, dissolved in a suitable vessel of iron or wood, in the proportion of about eight parts, by weight, of water to one of sal-ammoniac, and then take it out, when it is ready for the next process.

I have in a crucible or iron vessel a quantity of melted zinc (or zinc and tin) sufficient for immersing the iron materials in it. Into this molten zinc I dip the iron prepared with the sal-ammoniac solution, when the zinc will adhere to the iron, forming a coating called "galvanized iron." This zinc metal is the medium positive metal for the copper. I then have at hand a crucible of molten copper or any copper alloy, into which I dip the zinced iron, and hold it in the copper until it ceases sissing, and then withdraw it, when it (the iron) is found to be covered with a complete and durable coating of copper. By dipping the iron thus cop-

pered or bronzed into the sal-ammoniac solution, then into the zinc, repeating the processes described, finishing always in the molten copper, coat upon coat of the copper will adhere until a full coating of any thickness of copper or brass is obtained; but the coats of copper thus obtained would be very rough, and would not be of so much advantage in the arts as if they were smooth. I therefore, to remedy this evil, have discovered that by covering the surface of the molten copper, or any alloy of which copper forms a part, with an infusible, or partially infusible, material when on the surface of the melted metal—such as ground glass, but especially the fluoride of calcium—it acts as a wiper, and the iron, when drawn out of the molten copper or brass through the said infusible or partially infusible material, which floats on the surface, is found quite smooth and beautiful.

To render the union of the copper or alloy more intimate with the iron, I partially oxidize the iron before zinging it. This is done by exposing the iron for a few days in the atmosphere, after being dipped in a weak acidulous solution, until it (the iron) is partially honey-combed in minute cells on the surface. The iron is then fit to be dipped in the zinc and treated, as described, with the copper or its alloys afterward. This process of previous oxidizing the iron makes the copper enter into more intimate union with the iron. After the iron is thus copperized the black oxide is liable to form on its surface (the copper) as it is cooling. This I prevent by dipping the articles, whatever they may be, which are thus coppered into the sal-ammoniac solution after or when they have fallen to a low cherry-red heat. Wrought-iron articles may be dipped in the sal-ammoniac solution at a higher temperature than cast-iron, and the artisan will obtain by experience a knowledge of the proper dipping-heat for all articles, according to their thickness.

I am aware that various processes have been tried for coating iron with copper, all of which have failed of being perfectly successful, and none of which have had any success for coating cast-iron.

I am aware that Mr. Pomeroy has a patent for coating iron with copper by preparing the iron with clay; but my process is entirely different, and, besides, my process coats cast and

wrought iron very evenly, which no other process does. Cast-iron articles are rendered more ductile by coating them with copper. Iron articles by my process can be coated with brass or any of the alloys of which copper forms a part. The infusible covering for the copper acts as a wiper, also as a non-conductor of heat, and thereby a great saving of fuel is effected, as copper requires a high degree of heat to melt and keep it in a molten state. My invention is thereby of great value in the arts; for the copper adheres more firmly to the iron than by plating the iron or depositing the copper by a battery. It can therefore be most usefully applied to copperize boiler-plates of iron for sea-steamers to prevent incrustations, and it also can be applied to a thousand useful and economical purposes in the arts.

Having thus described my invention, I do

not claim the preparation of iron with zinc in the manner described; but

I claim—

1. Coating cast, malleable, or wrought iron with copper, or any of the alloys of which copper forms a part, by employing a coating of zinc (or zinc and tin) to cover the iron, as a positive medium to make the molten copper or its alloy adhere to the iron, in the manner substantially as described.

2. The employment of an infusible, or partially infusible, substance or substances, especially the fluoride of calcium, as a wiper and non-conductor, as herein set forth.

THEODORE G. BUCKLIN.

Witnesses:

O. D. MUNN,

D. A. MORRIS.