UNITED STATES PATENT OFFICE.

CHARLES FRANCIS LEOPOLD OUDRY, OF PARIS, FRANCE.

IMPROVEMENT IN PRESERVING SURFACES OF CAST OR WROUGHT IRON.

Specification forming part of Letters Patent No. **22,132**, dated November 23, 1858.

To all whom it may concern:

Be it known that I, CHARLES FRANCIS LEOPOLD OUDRY, of Paris, in the Empire of France, have invented a certain new and useful Method of Preserving Cast or Wrought Iron and other Metals Against the Destructive Effects of Air and Water; and I hereby declare that the following to be a full, clear, and exact description of the same.

My said invention consists in the employment of a coating of varnish or other intermediary substance, which insulates from the copper the object to be protected and likewise metallizes or secures the adhesion of the copper to the surface of the said object. The employment of such intermediary insulating and metallizing coating has the effect, first, of rendering unnecessary the cleaning of the surface of the objects made of cast or wrought iron, zinc, and other metals, and which consists in washing said objects in acid or otherwise, so as to remove any oxide or foreign matter which would interfere with the perfect and equal adhesion of the copper with which they are to be coated; secondly, of avoiding, consequently, the use of acids, a portion of which is likely to remain on the object to be coated, notwithstanding repeated washings, and thereby frustrate the beneficial result sought for in coating the said object with copper; thirdly, of doing away with the primary bath of cyanide of copper, which is always uncertain in effect and expensive, but which is indispensable in the old methods of coating with copper; fourthly, of protecting in a twofold degree the metallic objects—in the first place by the intermediary protecting and completely-insulating coating, and in the second place by the layer of copper to which any required thickness may be given; fifthly, of diminishing considerably the labor and expense, as well as the net cost of the manufacture, while the operation is conducted with certainty of result, whereas the means employed in the old method never succeeded completely, in spite of all the skill of the operator; sixthly, of enabling the object which is to be subsequently coated with copper to be plunged, when it is covered with its varnish, into a very acidulous solution of sulphates of copper without danger of corrosion, which shows the superiority with which objects coated with copper in this manner will resist the action of moisture, either on sea or on land, said moisture being of a much less corrosive nature than a solution of sulphate of copper.

The varnishes or intermediary insulating substances I use are essentially variable according to the nature of the objects to be coated. They are composed generally of bitumen, tar, or pitch, gum-copal, benzole, essence of turpentine, rectified sulphuric ether, caoutchouc, gutta-percha, litharge, minium, white lead, cinnabar, nut-oil, drying linseed-oil, beeswax, plumbago, bronze-powder, and all other substances possessing the same or similar properties.

To enable others skilled in the arts to use my invention, I shall now proceed to describe the manner in which I operate.

I apply first, either cold or hot, with a brush or by immersion, on the object to protected, whatever it may be, an insulating, impermeable, and metallizing varnish, which dries rapidly, and I apply one or more layers of this varnish, or of different varnishes, until the covering of the object by the said varnish or varnishes is perfect, and leaves no part of the surface unprotected. I then plunge the object so coated with its varnish into a bath saturated with sulphate of copper, and by means of a galvanic battery the copper is precipitated in the usual way to any required thickness. I consider it preferable always to apply a succession of coatings, using first an insulating-varnish, impermeable to strongly-acidulated water and to sea-water, of which I give several coatings, and finish with a coat of metallizing-varnish, or of one which is rendered so by powdered graphite or some other metallic powder.

My process may be used to coat blindages or breast-plates of iron and steel which are intended for protection against the destructive action of bullets and other projectiles, the hulls of vessels of war, and other naval constructions. Each piece of the blind or blindage being pierced with holes which serve to unite them to one another, these holes should be coated on the inside with a layer of galvanic or non-galvanic copper, as may be most convenient. The bolts or rivets used for this purpose may be made of copper or of any other metal; but if these bolts, rivets, &c., for sake of giving them greater strength, are made of iron, it will be preferable to employ iron in that part only of the shank which corresponds to the thickness of the blind and to mount the two extremities with copper, the heads of the rivets being made to be raised

or to project. It may, perhaps, be possible to use bolts of hard wood with internal iron cores, which might be coated with a certain thickness of copper.

Although the deposit of copper be considerable on each piece of blind, and although it cannot be separated from it without great difficulty, nevertheless, as a further precaution, I can pierce here and there through the surface of the pieces already varnished and metallized screw-tap holes a centimeter or more in depth, and then insert in all these holes screw-rivets with spike or roughened heads that project slightly, in order that the deposit of galvanic copper may become consolidated with these rivets, which are to be filed down to a level after being taken out of the bath, and in order that the copper may adhere to them. Other means may also be used before or after the galvanization.

As regards injuries sustained by the blinds of ships of war, whether from cannon-balls or other causes, it will always be possible to make partial or local repairs, either by taking to pieces the parts injured or laid bare or by careening the vessel and providing local baths, not forgetting, however, to coat previously with varnish and to metallize the spots which require repair.

This my invention is applicable to the manufacture of various articles made of cast or wrought iron, zinc, and other metals, or alloys of metals, such as hulls of ships, statues, fountains, vases, railings, balconies, mantle-pieces, fire-fenders, umbrella stands and racks, picture-frames, and others.

Having thus fully described my improvement, what I claim is—

1. The employment of a varnish, or of successive varnishes, insulating, metallizing, and intermediary, between the object to be coated with copper (whether the same be metallic or non-metallic) and the protecting-copper itself, all or part of said varnishes being composed of certain metallic substances united with fat or essential oils, and with gummy, resinous, bituminous or asphaltic substances, substantially as herein described, and for the purposes set forth.

2. The coating of all kinds of objects with copper by the employment of one or several varnishes in succession, previous to the galvanic coppering obtained directly in a bath of sulphate of copper—*i. e.*, without the intervention of a bath of cyanide of copper, substantially as described herein.

In testimony whereof I have signed my name to this specification before two subscribing witnesses.

L. OUDRY.

Witnesses:
C. VALEIN,
EMILE BARRAULT.