

UNITED STATES PATENT OFFICE.

JEAN PIERRE JOUVIN, OF ROCHEFORT, FRANCE.

IMPROVEMENT IN PRESERVING IRON-PLATED AND OTHER VESSELS.

Specification forming part of Letters Patent No. 39,576, dated August 18, 1863.

To all whom it may concern:

Be it known that I, JEAN PIERRE JOUVIN, chief medical officer of the Imperial Navy and professor of chemistry to the School of Naval Medicine, at Rochefort, of Rochefort, France, have invented an improved process for preserving iron-plated and other ships and metallic articles from oxidation, and preventing ship-bottoms and wood for naval and other constructions from fouling; and I do hereby declare that the following is a full, clear, and exact description of the principle or character which distinguishes it from all other things before known, and of the usual manner of making, modifying, and using the same.

For preserving iron ships from oxidation by the action of sea-water my process consists in lining the interior of ships' sides and bottoms with sheets or laminæ of zinc applied directly against the sheet-iron, and there held fast between the latter and the frames; but as iron ships now afloat present some difficulty to the application of such zinc sheathing in the interior of their holds, I first scour with care the internal sides of the hold, and afterward I apply thereon a double coat of a paint made of powdered metallic zinc, which I spread all over from the keel up to a little above the water-line. As zinc paint, on account of the fatty matter it contains, does not act as an electric protector with the same efficiency as zinc when employed in the form of sheets, it is necessary to increase the area of the protecting-surface. For iron ships on the stocks, as soon as the keel, the stem, the stern-post, and the frame are set up, they receive a thick layer of the aforesaid metallic zinc paint. The boarding of the keel and sides is afterward proceeded with, as usual, care being taken to apply underneath the timber employed a coat of the same paint, or, in lieu thereof, sheets of greasy felt thickly sprinkled with powdered metallic zinc. The zinc sheets are then applied without difficulty, and become bound with the sheets of iron of the streaks; from the keel up to the water-line, and from the stem to the stern-post, so as to form part with them. The sheets of zinc are held between the sheets of iron which form the stem and the keel, and, assuming the shape of the sheets to be protected, form continuous bands extending right and left and from the bottom upward, so as to meet again and join each other between the

sheet-iron forming the stern post, and to have their ends in the vicinity of the helm and the water-line. As the riveting takes place at a temperature higher than that of the melting of zinc, and approaching that at which this metal evaporates, part of the sheets around the heads of the rivets would be destroyed. To avoid this defect, the sheets of zinc must be of a sufficient breadth and length to cover the sheet-iron to within one-third of an inch of the rivets without reaching them, and the covering-bands and the heads of the rivets must receive a thick coat of metallic zinc paint.

In the electro-chemical scale the protecting metal (zinc) coming immediately after the protected metal, (iron,) it will be advantageous to have the protecting-surface as nearly as possible of the same dimensions as those of the surface to be protected. However, having economy in view, I have found that the protecting-bands of zinc, if properly fixed from the keel up to the water-line, may be only about two-thirds at maximum and about one-tenth at minimum of the last surface, provided all the spaces between the zinc bands be covered with the aforesaid metallic zinc paint.

The zinc sheets should measure about one-fourteenth of an inch in thickness for the lower part and about one twenty-eighth of an inch for the sides of the hold.

When the ship is built all the parts of iron composing the hold—such as the ribs, keelsons, clamps, transversal bulk-heads, and others not covered by the zinc bands—are carefully scoured, brushed, or otherwise cleaned and then coated with metallic zinc paint.

To protect the exterior part of the hull immersed from the deposit of marine shells and plants I proceed as follows:

From my chemical researches it is certain that trimercuric sulphate or herbith mineral (SO_3HgO) mixed with Prussian blue ($3\text{FeCy} + 2\text{Fe}^2\text{Cy}^3$) produces by its contact with the alkaline chlorides of sea-water one of the most violent poisons known to mineral chemistry—viz., the mercuric cyanide, (HgCy), in the shape of chloro-cyanide of mercury and sodium. I therefore first mix fifty-five parts of herbith mineral with forty-five parts of Prussian blue of the commonest tint, but not adulterated, so as to obtain a green powder perfectly homogeneous, and I compose the poisonous paint as follows: Of boiled linseed-oil, two hundred

and fifty parts; red lead, (or any other agent which may cover or adhere as well or better than red lead, which is here used as a mere vehicle for the poisonous compound,) six hundred and fifty to six hundred and sixty; the hereinbefore-described mixture, ninety to one hundred parts. These substances must be well ground together, in order to effect a uniform and complete distribution of the poisonous compound throughout the mass of the paint; but, as iron possesses the property of reducing mercurial and leaden compounds, this preparation must not be applied direct on the bare metal. All the parts of the hull—viz., the sheet-iron of the keel, cut-water, rudder, paddle-wheel frames, and every part of iron to be immersed or wetted—must be previously coated with two layers of the metallic zinc paint after being scoured as completely as possible. When these layers of metallic zinc paint are quite dry the poisonous compound or paint is applied thereon. This poisonous compound may prove also very advantageous if applied to wood employed to secure dikes, embankments, and for marine constructions, to protect them from injury by teredos. The smallest particle of the chloro-cyanide of mercury and sodium, produced by its contact with sea-salt, suffices to kill instantaneously animalculæ, plants, and their germs when brought within its influence.

To apply my invention to iron-plated vessels, I place either between the wood-work of the hull and each iron plate a sheet of zinc the surface of which is rather smaller than that of the iron plate, or I first coat this wood-work with a thick layer of metallic zinc paint. Then each iron plate, previously well scoured, is similarly painted on its inner face and adapted to the sides of the ship. The ship being finished, the whole of her bottom to be immersed in water is treated in the manner before described—that is to say, first coated with a double layer of metallic zinc paint and afterward with the poisonous compound paint.

To preserve sheet-iron tanks, marine boilers, steam-engines, and other similar articles from oxidation, I either apply on them—that is to say, externally—zinc sheets, or I coat them with a double layer of the aforementioned metallic zinc paint.

To preserve the parts of cables and chains stored in wells, where they are oxidized very rapidly, I fashion on each of the rings or links a band of zinc fastened by screws. I apply the metallic zinc paint to iron articles in general wherever red-lead paint is now made use of, and as a substitute therefor.

For ships' bottoms with a copper sheathing, before the sheathing is applied I coat the wood-work over with a thick layer of metallic zinc paint; but in the present case it is more economical to employ powdered cast-iron, or, in preference, iron powder, instead of zinc powder, to prepare the metallic protecting-paint, as it will protect copper as effectually. Should it be found, however, that the copper sheathing gets foul with barnacles and sea-weeds, it must be coated with the poisonous compound before mentioned.

And having now described my invention and the best mode I am acquainted with for putting the same into effect, I wish it to be understood that I do not confine myself to the precise details of the various operations nor the proportions herein laid down, as the same may be altered without departing from the principle of my invention; but

What I do claim and wish to be protected is—

1. The applying and the mode of applying on the internal part of the holds of iron ships zinc sheets, either alone or combined with the use of a metallic zinc paint, or of felt sprinkled with metallic zinc powder, to preserve iron-plated and other ships from the destructive action of sea-water, as hereinbefore described.

2. The production of a poisonous compound and its application to iron ships' bottoms and to wood employed to secure dikes, embankments, docks, and for naval and other constructions, in order to prevent for the former the deposit of barnacles and sea-weeds, and to protect the latter from injury from teredos, as hereinbefore described.

3. The application to iron articles of a paint having pulverized metallic zinc for base, to replace the red-lead paint, as hereinbefore described.

J. P. JOUVIN.

Witnesses:

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