

UNITED STATES PATENT OFFICE.

WILLIAM H. STERLING, OF NEW YORK, N. Y.

IMPROVEMENT IN PROCESSES FOR PRESERVING IRON.

Specification forming part of Letters Patent No. 126,909, dated May 21, 1872.

SPECIFICATION.

To all whom it may concern:

Be it known that I, WILLIAM H. STERLING, M. D., of the city and county of New York, State of New York, have invented or discovered a Process for Preserving Iron and other oxidizable metals; and I do hereby declare the following description and accompanying drawing are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention without further invention or experiment.

The nature of my invention consists in the impregnation and saturation of the structure of the metal iron with a non-oxidizing or non-oxidizable substance or substances by means of forcing these non-oxidizing or non-oxidizable substances into the inter-cellular or interstitial spaces of the metal by suitable pressure while the iron is in a properly-heated and expanded condition.

In order that my invention may be fully comprehended and thereby made useful, I give the following as one of the methods by which my invention may be successfully applied to the preservation of iron as aforesaid, and which I recommend as being eminently practical and useful.

A vessel of iron or any suitable material of sufficient strength, and of the form and size best adapted to the shape and dimensions of the iron article to be treated, is constructed with a lining of copper, zinc, or tin, or any suitable metal of a greater density or closeness of structure than iron. This vessel is so constructed that it may be closed hermetically by the tops being screwed or clamped firmly down. At the bottom suitable pipes are arranged for conveying steam and water alternately, as hereinafter described. Connected with this vessel is a pipe or pipes connecting with a power-pump or forcing apparatus for producing the necessary pressure. Into the above vessel a proper quantity of pure paraffine is placed and heated to the required degree of heat necessary to render it in that fluid condition and temperature best adapted to penetrate the inter-cellular or interstitial spaces of the iron. This heat is obtained by passing steam through the pipes arranged for that purpose, as above mentioned. The iron to be treated, having been previously heated to a de-

gree slightly above that given to the paraffine, is now placed into the vessel containing the latter, the lid closed hermetically, and pressure applied to the liquid or heated paraffine by means of the power-pump or forcing apparatus, before mentioned, which forces the paraffine into the spaces of the iron; the heat being kept up at the same time in order that the iron may be in as expanded and porous condition as possible to receive the paraffine into its inter-cellular or interstitial spaces. After allowing the heated iron to remain a suitable length of time in contact with and under pressure of the liquid paraffine the heat is withdrawn by turning off the steam from the steam-pipes, and water of the proper temperature is passed through them to gradually cool the iron, which, upon cooling, will be found to have retained within its structure a sufficient quantity of the paraffine to render it completely impervious to the action of oxidizing, corroding, or decomposing substances.

It is desirable that the iron plates, pipes, castings, and other pieces of metal to be treated should be thus saturated with a non-oxidizing or non-oxidizable substance at the same time or immediately after their manufacture before the iron has cooled, and before the usual scale or oxidation has formed; but this is not absolutely necessary as they can be treated at any time by reheating and removing the scale. If this be done, then the scale or oxidation will be prevented, and thus much greater value be given to the iron by reason of its non-oxidizable qualities, imparted to it by the saturation of its structure by a non-oxidizable substance. After the saturation of the iron with paraffine under pressure, and the cooling of the metal, it is desirable that the surface be coated with one or more of the ordinary saturated solutions of resin, paraffine, rubber in benzine, or a solution of India rubber or gutta-percha in melted paraffine, applied in a heated condition.

I have found that a pressure of about one hundred and fifty or two hundred pounds to the square inch with a temperature of 300° to 350° with the above-described apparatus will produce these desirable results; but I do not confine myself to the above-described apparatus; or to the above-named article of paraffine; nor to any particular form of apparatus; nor to any one special non-oxidizing or non-oxidiza-

ble substance or substances; nor to any definite degree of temperature; nor definite amount of pressure, as the requirements may vary with the different form of article or quality of iron to be treated.

I have found that many other non-oxidizing and non-oxidizable substances, (among which, the hydrocarbons are pre-eminent,) will produce the result or afford the protection desired.

I have experimented with many of them, thus: I have found that a solution of paraffine in benzine, a solution of resin in benzine, India rubber in paraffine, gutta-percha in paraffine, a solution of wax in paraffine and their combinations—also stearine and the animal oils—will, under the various degrees of heat and pressure, protect iron from oxidation; but the heated paraffine under pressure with the iron in a heated and expanded condition at the time of application answers the best purpose and completely protects the iron from oxidation and consequent deterioration.

Among the many useful purposes to which this method of protecting iron from oxidation and corrosion can be most successfully applied, and for which I claim especial adaptability and usefulness, is in the preparation of the iron plates, beams, and bolts used in the building of iron ships. By saturating, as aforesaid, the plates and beams before placing them into position, and then after they are in place coating them with a saturated solution of paraffine, resin, and India rubber in benzine, or a solution of India rubber and resin in melted paraffine, a complete and durable protection is afforded against oxidation, rust, or corrosion from the outside by salt or fresh water, and the inside is protected against the action of bilge water and condensations of moisture; thus one of the great objections to iron ships

is removed and an important branch of American industry promoted and encouraged.

To the iron columns, beams, and roofs used in house building the above-described process or method of protection from oxidation is admirably adapted. In short, this method of protecting iron from rust, oxidation, and corrosion is adapted for application to all articles which are exposed from any reason to the action of moisture of the atmosphere or to the direct action of water, as in water-pipes, or corroding gases, as paraffine is not affected by water nor any of the mineral acids.

I am aware that a solution of paraffine in combination with other materials in benzine has been occasionally used with temporary benefit; but in these cases the solution has been applied upon the surface as any other varnish or paint; but my invention is of a radically different character, looking to the permanent preservation of the iron.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. Paraffine, either separate or in combination with any non-oxidizing or non-oxidizable substance or substances, when subjected to heat and applied to the iron under pressure, for the purpose specified.

2. The process of saturating or impregnating iron with a non-oxidizing or non-oxidizable substance or substances while the iron is expanded by heat.

In witness whereof I have hereunto set my hand and seal.

WILLIAM H. STERLING. [L. S.]

Witnesses:

J. L. BOONE,
A. T. DEWEY.