

# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN PRESERVING IRON FROM CORROSION.

Specification forming part of Letters Patent No. 43,630, dated July 19, 1864.

*To all whom it may concern:*

Be it known that I, CHARLES DE BUSSY, of Paris, in the Empire of France, have invented an Improved Process for Preserving Iron from Corrosion, &c.; and I do hereby declare the nature of the said invention for an improved process for preserving iron from corrosion as produced by the influence of air and sea-water to be as follows:

The means hitherto employed for preserving iron from any corrosive actions are based either on galvanic processes or on the use of coatings intended to resist said corrosive actions. When substances are thus applied in a mechanical way to preserve the surface of iron they offer a very slight adhesion. Moreover, in many cases, according to the nature of the metallic oxide used for the coating, they will exert a direct corrosive action, such as takes place with minium when applied to the hulls of iron-built vessels. Acting upon these data, I have come to the conclusion that in order to obtain a most satisfactory result in preserving iron a coating must be used whose adhesion shall be the result of a chemical action on the metal itself. Among the various matters that will fulfill this condition, I prefer using the fusible and insoluble ferruginous compounds, they both protecting the surface of the iron and filling up, by reason of their fusibility, those imperceptible fissures and cavities which always occur in wrought-iron, owing to the porous nature of the metal, and to the imperfections unavoidably arising from the forging or rolling process.

A great number of compounds may be used, each answering the purpose of this invention, as above set forth. In order to show clearly its nature, and how it is or may be carried into effect, I will now describe the manner in which I employ one particular compound by which I have obtained the best result.

The process which I consider the most simple and reliable consists in subjecting the iron pieces to be preserved to the action of phosphorus at a high temperature, so as to produce on their surface a thin layer or coating of melted phosphide of iron. This coating proves to be very adhesive, and is hardly acted upon by the corrosive agents to which iron is commonly exposed. This operation may be effected by exposing the red-hot iron direct to

the vapors of phosphorus; but a more simple and economical way is by heating the pieces in cases or chambers similar to those of converting-furnaces, the pieces being embedded therein in a brasque or mixture composed of charcoal or coke dust impregnated with a solution of acid phosphate of lime. Pieces of large size may also be brought to a welding-heat and then be laid on a bed or brasque composed as aforesaid and well dried and covered up with the same materials. The heat radiated by the piece is sufficiently powerful to cause the distillation of the phosphorus and its combination with the iron.

This process may be advantageously applied in many instances, such as for iron plates to be used in ship and house building, anchors, gun-carriages, water-tanks, &c. It is peculiarly adapted for iron plating or iron shields or armors, for preventing the rapid deterioration of which no efficient means have been devised hitherto.

I wish it to be distinctly understood that I do not confine my process to the use of phosphorus only, as I may use in its stead any other body acting in the same way, such as arsenic, antimony, &c. The mode of applying these various substances will necessarily have to be somewhat modified, according to their reactions and the nature of the compounds from which they are derived. Arsenic, for instance, will be applied in the same way as phosphorus, with the only difference that the brasque shall be composed of a mixture of charcoal and arsenious acid with lime, carbonate of lime, or an alkaline carbonate.

Having thus described my invention and the several modes in which I contemplate its application, I claim as my invention and desire to secure by Letters Patent of the United States—

The protecting of iron plates, beams, and other articles of iron used for ships, vessels, wharves, buildings, and other purposes by subjecting the same to a chemical process and covering them with a coating, so as to prevent corrosion and the other actions of water and air, substantially as herein described.

C. DE BUSSY.

Witnesses:

F. COLHAUSEN,  
AMEIRÉ MAHEUSE.