

UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN COATING IRON AND STEEL WITH GOLD, SILVER, &c.

Specification forming part of Letters Patent No. 58,037, dated September 11, 1866; patented in England,
October 7, 1865.

To all whom it may concern:

Be it known that I, JACOB BAYNES THOMPSON, of Rothwell Street, Regent's Park Road, in the county of Middlesex, England, a subject of the Queen of Great Britain, have invented or discovered new and useful Improvements in Coating Iron and Steel with Gold, Silver, Platinum, or Copper; and I, the said JACOB BAYNES THOMPSON, do hereby declare the nature of the said invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof—that is to say:

This invention has for its object improvements in coating iron and steel with gold, silver, platinum, or copper; and it consists in, first, depositing iron from a solution onto the surfaces of articles composed of iron or steel, and thus obtaining thereon a coating of pure iron, and then further coating the surfaces of the articles with gold or silver, platinum, or copper by deposition from a solution of one or other of these metals.

By these means it will be found that the coating of gold, silver, platinum, or copper will be more secure and complete in its holding to the iron or steel surfaces than has heretofore been the case when these metals have been deposited directly onto steel or iron surfaces; and in order that my said invention may be most fully understood and readily carried into effect, I will describe the manner in which I prefer to conduct the process.

I take ten parts, by weight, of ferro-cyanide of potassium, and I dissolve it in forty parts of water, so as to obtain a saturated solution in the cold. I also prepare a solution of fused hydrate of potash by dissolving three parts of potash in six parts of water. These two solutions I then mix together, and I charge the depositing vessel or tank with the mixture. In place of the potash solution soda may be substituted, in which case two and a half parts of fused hydrate of soda should be dissolved in five parts of water. The article of iron or steel to be coated is thoroughly cleansed and is then dipped and moved about for a short time in a mixture of hydrochloric acid and water—say one part of acid to one or two parts of water, according to the strength of the

commercial acid. The article is then washed in a weak alkaline solution and afterward in clean water. The article is then immersed in the depositing vessel or tank and connected with the negative pole of the battery, and an iron plate, with about the same amount of surface as the article, is also immersed in the vessel or tank, and connected with the positive pole of the battery.

The bath should be kept at a temperature of from 100° to 120° Fahrenheit; and the intensity of the battery should be such that when at work a few bubbles of gas only are given off. After a time, varying usually from two to four hours, the article will have acquired a brilliant white silvery appearance. It is then removed from the iron-bath, washed rapidly with a cold and nearly saturated solution of ferro-cyanide of potassium, and it is at once transferred to the second bath for the deposition upon it of gold, silver, platinum, or copper.

For silver and gold the ordinary cyanide baths may be employed, and the process of deposition is conducted precisely in the usual manner; and for platinum an alkaline sodio-chloride solution or a cyanide solution is used, the former preferred.

For the deposition of copper on the iron-coated article I use the ordinary cyanide solution, or a solution of hydrated oxide of copper in hyposulphite of soda. The following proportions are suitable: one part of hyposulphite of soda and four parts of water, to which is added as much hydrated oxide of copper as it will dissolve. This solution should be gradually strengthened after the first film is deposited, and it should be worked at a temperature of not less than 60° Fahrenheit, and with an anode of copper of about the size of the article to be coated. If it is required to hasten the deposit, the article can be transferred to a sulphate-of-copper bath after it has received a thin deposit in either of the former baths.

The composition of the baths employed in working my invention may be varied; but those which I have described will, I believe, be found most suitable.

Articles which will be subjected to much friction—such as knife and fork blades, car-

riage-harness, &c., after being coated with silver or gold, I subject to a heat sufficient to cause the article to char paper or wood when pressed upon either.

In case of steel articles, such as knife-blades, they may be quenched after being heated; or they may be left previously of a little higher temper to admit of being slightly lowered. This, as it were, burns the silver or gold into the steel or iron.

What I claim as my invention, and desire to secure by Letters Patent, is—

The process hereinbefore described of coating an article of iron or steel with a precious metal, by first coating the article with pure iron and then with the precious metal, substantially as set forth.

J. B. THOMPSON.

Witnesses:

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