UNITED STATES PATENT OFFICE.

PIERRE HENRY BERTRAND, OF PARIS, FRANCE.

PROCESS OF DEPOSITING METAL UPON METAL.

SPECIFICATION forming part of Letters Patent No. 510,376, dated December 5, 1893.

Application filed April 25, 1893. Serial No. 471,733. (No specimens.) Patented in France June 10, 1891, No. 214,030, and in England February 17, 1892, No. 3,120.

To all whom it may concern:

Be it known that I, PIERRE HENRY BERTRAND, a citizen of France, residing at Paris, France, have invented certain new and useful Improvements in Processes of Depositing Metal Upon Metal, which is fully described in the following specification, and for which I have obtained Letters Patent as follows: in France, June 10, 1891, No. 214,030, and in England, February 17, 1892, No. 3,120.

My invention has for its object the formation upon metallic surfaces of a thin coating or layer of another metal, such as is usually obtained by electro-deposition, and consists in the use of sulpho-carbolic acid, which is a mixture of orthophenol, or metaphenol, or paraphenol and sulphuric acid, and is a solvent of metallic salts, such as those of tin, copper, zinc and silver. I have found that it can advantageously replace pyro-phosphate of soda in electro-deposition.

In carrying my invention into practice I mix equal, or about equal weights of crystalized carbolic acid and sulphuric acid and dissolve such sulpho-carbolic acid in water. I have found that a small quantity of such acid is sufficient to give to the solution proper dissolving power, and I have obtained useful results by using ten parts of the sulpho-carbolic acid to one hundred parts of water. I then place in the bath the metallic salts, such as sulphates or chlorides of the metals to be deposited, in such quantity as is necessitated by the operation. The original weight introduced may be about ten parts of the salt to one hundred and ten parts of the solution or bath, but both the sulpho-carbolic acid and the metallic salts must be gradually restored to the bath as the deposition of the metal progresses. I then prepare the surfaces of the objects upon which the metal is to be deposited by pickling, or filing them, or otherwise removing any substance which might oppose the deposit. I then immerse them quickly in a bath consisting of about ten parts of sulphate of copper and ten parts of sulphuric acid to one hundred parts of water, and when sufficiently drained I place them for about ten minutes in the sulpho-carbolic solution or bath above described, preferably keeping this bath warm. I then withdraw and brush them, after which I place them again in the same bath, leaving them there for about ten to fifteen minutes. When withdrawn and dried, the objects are ready.

The sulpho-carbolic solvent may be used with or without the aid of electricity, in a hot or cold condition, with or without zinc.

My invention can be used in all cases where electro-deposition is now used, and is especially useful in causing a deposit of tin or copper, or an alloy of tin and copper, upon wrought and cast iron articles, such as cooking utensils, and in coating sheets and plates of iron and sheet iron articles. Moreover, it is distinctly advantageous when employed in coating wrought and cast iron, as it does not form sulphurets in its combination with these metals, as in the case of sulphuric acid alone.

What I claim as my invention is--

1. The process herein described of coating or covering metallic articles with other metals forming soluble salts, by immersing them in a bath composed of a solution of such salts in dilute sulpho-carbolic acid, and depositing the coating or covering thereon; substantially as described.

2. A bath for coating or covering metallic articles with metals forming soluble salts, consisting of a solution of such salts in dilute sulpho-carbolic acid; substantially as described.

In testimony whereof I have hereunto set my hand this 4th day of April, 1893.

PIERRE HENRY BERTRAND.

Witnesses:

OCTAVE DE ROCHEFORT LUCAN,

CH. F. THIRION.