

# UNITED STATES PATENT OFFICE.

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## PROCESS OF PRODUCING METALLIC DEPOSITS.

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Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, FRANÇOIS AUGUSTE ROUX, a citizen of the Republic of France, and resident of Paris, France, have invented a new and useful Process of Producing Metallic Deposits, which is fully set forth in the following specification.

The present invention relates to improvements in processes of depositing metallic layers or films upon articles constructed of different metals. In carrying out processes of this general class or character, it is common to pass an electric current through a solution of the metal to be deposited, and it is also common to employ what is known as the "pulverization" treatment. These processes, however, are not always readily applicable, and it is often preferred to substitute therefor, for instance in metallizing the interiors of tubes or boxes, the "tempering" method. Various ways of carrying this method into effect have been proposed, one of which consists in adding to a solution of nickel chlorid, alkaline chlorids or chlorids of ammonium or zinc, and in utilizing the bath thus obtained in a boiling state. According to another process, carbonyl nickel is used. Many other processes are known, but besides the fact that they do not give a really satisfactory result from a commercial standpoint, they are not suitable for all metals, particularly for aluminum, and they are much less satisfactory in forming metallic deposits upon non-metallic articles, such for instance as porcelain.

It is the object of the present invention to provide a process which shall remedy these defects, and which shall be capable of bringing about the deposition of a good metallic coating both upon any metal, and especially upon aluminum, and also upon non-metallic articles or substances.

According to the improved process, articles to be coated are first cleansed in any desired manner, and then subjected to the action of metallic phosphites or hypophosphites, or to the action of alkaline or ammoniacal phosphites or hypophosphites, or of a salt of the metal to be deposited.

In actually carrying out the invention, the cleansed articles are steeped in a solution such, for instance, as either of the following, which are given merely by way of

example and which can be more or less varied according as it is desired to produce the deposit rapidly or slowly.

*Example I. The hypophosphite solution.*—Water 1,000 grams, citrate of nickel or other salt of nickel 100 grams, ammonia, alkalis or alkaline salts 100 grams, ammoniacal or alkaline hypophosphite 100 grams.

The proportions just given are in no way absolute, as they may be widely varied. The presence of the phosphite or hypophosphite and of the metallic salt is sufficient in itself to effect the precipitation of the metal; the metallic salt may be added in proportion, or, on the contrary, the hypophosphite or phosphite may be added little by little to the said salt. In any case, the articles are left in the bath until they are sufficiently metallized, after which they are rinsed and dried. The metallic deposit thus obtained may be utilized as a preparatory film or layer, and deposition may thereafter be continued by electrolysis.

*Example II. The phosphite solution.*—Water 1,000 grams, cyanid of gold 10 grams, sodium phosphite 100 grams. The cleaned articles are steeped in this solution, hot or boiling, according as deposition is to be effected slowly or rapidly.

As a development of the above process, a metal may first be deposited, and the operation may thereafter be continued by depositing a different metal upon the first; thus, for instance, the articles may first be nickelled and then gilded, and thereafter rinsed, dried and polished.

I claim as my invention—

1. The herein-described process of producing metallic deposits, which consists in subjecting the articles to be coated, until sufficiently metallized, to the action of a bath containing a solution of a salt of the metal to be deposited and an alkline hypophosphite.

2. The herein-described process of producing metallic deposits, which consists in subjecting the articles to be coated, until sufficiently metallized, to the action of a bath containing a solution of a salt of the metal to be deposited, an alkaline hypophosphite and ammonia.

3. The herein-described process of pro-

ducing metallic deposits, which consists in steeping the articles to be treated, until sufficiently metallized, in a hot bath containing a solution of citrate of nickel, an alkaline hypophosphite and ammonia.

4. The herein-described process of producing metallic deposits upon aluminum-surfaced articles, which consists in subjecting the articles to the action of a bath containing a solution of a salt of the metal to be deposited treated with an alkaline hypophosphite.

5. The herein-described process of producing metallic deposits upon aluminum-surfaced articles, which consists in subjecting the articles to the action of a bath con-

taining a solution of citrate of nickel treated with an alkaline hypophosphite.

6. The herein-described process of producing metallic deposits upon aluminum-surfaced articles, which consists in subjecting the articles to the action of a bath containing a solution of citrate of nickel, an alkaline hypophosphite, and ammonia.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRANÇOIS AUGUSTE ROUX.

Witnesses:

EMILE LEDRET,  
HANSON C. COXE.