

UNITED STATES PATENT OFFICE.

JOSEPHA SCHIELE, OF BRUSSELS, BELGIUM.

SILVER-PLATING OR GILDING PROCESS.

SPECIFICATION forming part of Letters Patent No. 722,148, dated March 3, 1903.

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To all whom it may concern:

Be it known that I, JOSEPHA SCHIELE, a subject of the Emperor of Germany, residing at Brussels, Belgium, have invented certain new and useful Improvements in or Relating to Silver-Plating or Gilding Processes, of which the following is a specification.

The present invention relates to improvements in or relating to silver-plating and gilding processes.

Up to the present time it has been possible to silver-plate and gild on copper or alloys of metals the foundation of which is copper—such as white metal, argentine, nickel, &c.—or on any kind of metallic surface previously covered with a layer of copper. For a large number of objects—for instance, surgical instruments, household utensils, covers, &c.—the copper foundation, which is laid bare through slight wear or unplating of the points and projections of the object, constitutes an injurious and dangerous element in the use of such objects, owing to the facility with which it becomes oxidized by the contact of air and damp and owing to the toxic properties of this oxid, (“verdigris.”) Many attempts have been, therefore, made to avoid the use of this metal for silver-plating and gilding. I have succeeded in this by employing a preparatory bath of special composition in which there is no particle of copper, whereby all metals (iron, steel, nickel, &c.) can by electrolysis be supplied with an intermediate metallic surface or coating absolutely adherent and resistant and allowing silver-plating or gilding to be applied in the usual manner. At the same time, owing to the nature of the intermediate metallic surface, the silver-plating and gilding is more adhesive, more durable, finer, and richer than ordinary silver-plating or gilding. Moreover, the special properties of this intermediate metallic surface renders unnecessary the long and difficult operation of burnishing which has hitherto been necessary in order to give to the plated articles the desired polish and finish.

The preparatory bath consists of an ordinary tinning-bath with an addition of a solution of salts of aluminium and of magnesium. Supposing for the sake of easy calculation a bath of ten liters is required, into any kind of suitable vessel (of wood, stone, &c.) nine

liters of distilled water are poured in which five hundred grams of pyrophosphate of sodium are dissolved. Then one hundred grams of crystallized protochlorid of tin are placed in a cloth or sieve and immersed in the solution until complete solution has taken place. The preparation thus formed constitutes the well-known bath in which objects of iron, &c., are tinned; but such a coating is not able to secure a silver-plating or gilding coating, which would peel off on the least rubbing. Therefore to this first bath is added a solution of fifty grams of nitrate of aluminium and fifty grams of nitrate of magnesium in one liter of distilled water. The bath constitutes the electrolyte, thin plates of tin and aluminium constituting the anode, while the cathode is formed by the objects to be plated. The metallic objects previously well polished and cleaned are put into the bath and are coated in a few minutes (according to the strength of the electric current) with a layer constituted by an alloy of tin, aluminium, and magnesium, capable of receiving the silver-plating or gilding coating which is to follow. After a thorough rinsing the articles are placed in a silver-plating bath, which is the ordinary cold silver-bath, consisting of pure silver converted into nitrate and cyanid of potassium.

The electrolytic tinning-bath above described is also well known; but the novel feature consists in the addition of the aluminium and magnesium salts, which have a great affinity for tin and silver and provide the tin with the properties which it lacks—*i. e.*, durability and adhesive power, particularly to iron. Moreover, it must be repeated, articles tinned in the ordinary bath do not support silver when applied, while after treatment in the improved bath above described iron articles can be as easily silver-plated or gilded as any copper articles and with the same adhesive capacity. Not only iron and steel but other metals which up to the present time could not be silver-plated or gilded without the preliminary use of a copper-bath can now be treated by means of the preparatory or intermediate bath. Moreover, by the use of this preparatory bath worn articles which formerly had to be unsilvered and submitted to an entirely fresh operation can be directly

replated without undergoing any desilvering process after being tinned in the preparatory bath. Even ordinary nickeled articles which had to undergo unnickeling before silvering
5 can be directly silver-plated after being treated in the preparatory bath.

By this process the deposit is whiter in silvered articles and more uniform and delicate than in ordinary silver-plating or gilding.
10 This latter property allows the finishing and polishing of the articles to be effected with the aid of a polishing-cloth and paste or powder, such as is usually used for polishing precious metals. Thus the troublesome burnishing operation by means of special articles
15 of steel and stone (such as agate or blood-stone) is avoided, which instruments being very sharp can only be used for direct silver-plating perfectly adhering to the foundation
20 metal. Still it may be remarked that the articles plated according to this process can be perfectly burnished with the aid of such instruments.

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

1. A silver-plating or gilding process for iron, steel nickel and other metal without the use of copper consisting in submitting the articles to be plated to an electrolytic
30 tinning-bath having an addition of a solution of salts of aluminium and of magnesium in or-

der to cover them with an intermediate deposit composed of mixture of tin aluminium and of magnesium and then silver-plating and gilding the articles in the ordinary manner. 35

2. The art of plating or gilding metals, consisting in coating the same by means of an electrolytic preparatory bath of ordinary tinning elements, without copper, with an addition of a solution of salts of aluminium and
40 of magnesium, covering said metals with a coating of tin, aluminium and of magnesium and then silver-plating and gilding the metals, substantially as described.

3. The process of silver-plating and gilding
45 metals, without the use of copper, the use of an electrolytic preparatory bath composed of a solution of pyrophosphate of sodium and of protochlorid of tin in combination with a solution of nitrate of aluminium and of mag-
50 nesium in suitable proportions, immersing the metals in said bath in order to coat them with an intermediate layer and then silver-plating and gilding the metals, substantially as described. 55

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

JOSEPHA SCHIELE.

Witnesses:

BEACHMONT,
P. PINAR.