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PROCESS OF COATING METAL ARTICLES

Jose L. Teran Kosterlitzky, Guadalajara, Mexico

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The present invention has reference to a solid stable composition, which can be used for nickel plating metals of any kind, for the production of a plating upon such metals which has the appearance of a high-grade nickel plating, strongly adherent to the metal, having good wear-resisting properties and exhibiting a good brilliancy.

With metallic zinc present in the composition, no electric current from an outside source is needed. But in the modification in which the zinc is omitted, an electric current is also used, as described below.

The first component of this mixture I call, for lack of a better term "ferrous stannous chloride," namely, it is a mixed chloride containing about 3 to 10% of iron in the form of ferrous chloride, the remainder being stannous chloride, and the said body is substantially anhydrous. Such a body can be prepared by dissolving metallic iron and metallic tin in strong hydrochloric acid by boiling, and then, when solution is complete, decanting or filtering to remove any insoluble materials, then evaporating to dryness and heating substantially in order to drive off the water of crystallization and leave a hard crust of the mixed salts or double salts, which, after cooling, is carefully ground. In another modification, I can place the tin in an iron pot, add strong hydrochloric acid to this, heat the mixture on the stove until the tin has entirely dissolved, then decant or filter, and evaporate this solution and heat the same as above indicated. This double chloride, in an anhydrous condition, is stable in the atmosphere and will keep for a long time in air of ordinary moisture content.

The best proportions, so far developed by me, have been as follows:

Ferrous stannous chloride—22 parts.
Metallic zinc in powder form (zinc dust being satisfactory)—about 10 parts.
Potassium bitartrate—about 20 parts, or more broadly this means 15 to 25 parts.
Ammonium chloride—preferably 9 parts, variable between 7 and 12 parts.
Nickel sulphate—about 28 parts, variable between 21 and 35 parts.
Nickel ammonium sulphate—about 55 parts, variable between 41 and 59 parts.
Sodium chloride—preferably 6 parts, variable between 4.5 to 7.5 parts.
Copper sulphate—preferably 7 parts, variable between 5 and 11 parts.

For plating objects of metal, I sprinkle a little of the powdered material of the above composition, upon a wet rag, sponge or absorbent raw cotton or the like, and apply this by means of friction upon the surface of the metal object or metal part of the object. The metal object can be of copper, brass, bronze, steel, cast iron, galvanized iron, aluminum, stainless steel, sheet iron, tin, cobalt, and others. Added brilliancy may be obtained by polishing on a wheel, or by rubbing with a heavy rag such as duck or denim, with rouge or similar polishing powder.

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Several coats of the nickel plating can be applied if desired, to build up a coating of the desired thickness.

When the metal to be coated is copper, bronze or brass, the copper sulphate in the above formula can be omitted.

All of the above-mentioned substances are preferably ground to fine powders and the powders can be mixed in the proportions stated above. The ferrous stannous chloride, as will be noted, is substantially anhydrous, but it is not necessary to dehydrate the other materials, which can be used in the ordinary commercial form, as bought on the market (e. g., the copper sulphate can contain the usual amount of water of crystallization, or not, as desired).

The mixture of components can be sold in a bottle or jar if desired, with a tightly fitting closure, or the composition can be put up into paper bags or cardboard cartons, and the composition will keep, so put up, in air of ordinary moisture content for a period of at least several months.

The plating produced as above, by the use of this material, has the appearance of nickel plating, but it will be understood that it may also contain some other metals besides nickel, but the plating produced is stable under ordinary service conditions and does not seem to wear off the articles any faster than a good nickel plating produced by the ordinary methods heretofore used.

It will be understood that while the copper sulphate may be omitted if the composition is to be used for plating copper, brass or bronze, it is not necessary to omit the same when it is to be so used. Accordingly, when selling the composition for plating, ordinarily I prefer to put in the copper sulphate, except where the customer specifies that it is to be used on copper, brass, or bronze.

I claim:

1. The herein described process of plating an article made of a metallic material which contains copper as a substantial constituent, which

comprises rubbing upon the surface of such article, with an applicator which is wet with an aqueous liquid, a mixture containing:

	Parts
Ferrous chloride and stannous chloride	22
Metallic zinc in powder form	About 10
Potassium bitartrate	15 to 25
Ammonium chloride	7 to 12
Nickel sulphate	21 to 35
Nickel ammonium sulphate	41 to 59
Sodium chloride	4.5 to 7.5

such composition when in powdered dry form being substantially stable in air of ordinary moisture content.

2. The herein described process of plating a metal article which comprises rubbing upon the surface of such article, with an applicator which is wet with an aqueous liquid, a composition which contains:

	Parts
Ferrous chloride and stannous chloride	22
Metallic zinc in powder form	About 10
Potassium bitartrate	15 to 25
Ammonium chloride	7 to 12
Nickel sulphate	21 to 35
Nickel ammonium sulphate	41 to 59
Sodium chloride	4.5 to 7.5
Copper sulphate	5 to 11

such composition when in powdered dry form being substantially stable in air of ordinary moisture content.

3. The herein described process of plating an article made of a metallic material which contains copper as a substantial constituent, which comprises rubbing upon the surface of such article, with an applicator which is wet with an aqueous liquid, a mixture containing:

	Parts
Ferrous chloride and stannous chloride	22
Metallic zinc in powder form	About 10
Potassium bitartrate	About 20
Ammonium chloride	About 9
Nickel sulphate	About 28
Nickel ammonium sulphate	About 55
Sodium chloride	About 6

such composition when in powdered dry form being substantially stable in air of ordinary moisture content.

JOSE L. TERAN KOSTERLITZKY.

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