

UNITED STATES PATENT OFFICE.

QUINTIN MARINO, OF LONDON, ENGLAND.

METALLIZING CERAMIC AND OTHER SURFACES.

1,077,357.

Specification of Letters Patent.

Patented Nov. 4, 1913.

No Drawing.

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To all whom it may concern:

Be it known that I, QUINTIN MARINO, electrochemist, citizen of Italy, and residing at "The Homestead," Woodstock avenue, Golder's Green, London, England, have invented certain new and useful Improvements Relating to Metallizing Ceramic and other Surfaces, of which the following is a specification.

10 This invention relates to the metallizing of ceramic and other surfaces more especially as a preparation for electro-deposition of metals thereon.

I have previously proposed a method for 15 this purpose consisting in applying to the required surface a solution prepared by dissolving in hydrofluoric acid the substance obtained by adding cuprous oxid to a solution of nitrate of silver, and reducing the 20 silver and copper in the fluorid solution on the surface.

By the present invention I deposit on the ceramic or other surface metallizing coatings of copper, tin, cadmium, cobalt, iron 25 or other metal (except silver or nickel) or of combinations or of alloys of these metals.

According to the present invention I apply to the surface to be metallized a solution of fluorid of copper, tin, cadmium, cobalt, 30 iron or other soluble metallic fluorid (except fluorid of silver or of nickel) capable of being reduced to the metallic state upon the surface, and I reduce the fluorid upon the surface by appropriate means. In some 35 cases I may employ solutions of more than one of such fluorids together.

The fluorid solution may be prepared by dissolving the required metal in aqua regia (say 1 part hydrochloric acid and 4 parts 40 nitric acid) precipitating with carbonate of soda or other carbonate, and dissolving the well-washed precipitate, while wet in hydrofluoric acid. In the case of copper, cadmium, cobalt, or iron, the corresponding 45 metal carbonate will be formed in precipi-

tating from the solution in aqua regia as mentioned; in the case of tin, hydrated stannous oxid will be precipitated by the carbonate. The precipitate will be washed and dissolved while wet in the hydrofluoric acid 50 as mentioned.

When a solution of fluorids of more than one of the metals above is to be applied, the corresponding carbonates (or hydrated stannous oxid in the case of tin) may be 55 prepared separately and dissolved in the hydrofluoric acid, or the said carbonates (or hydrated stannous oxid) can be dissolved separately in hydrofluoric acid and the solutions mixed. 60

The fluorid solution is applied to the required surface, usually roughened or suitably prepared, and the metal is precipitated by applying a metallic powder which will precipitate the metal or metals from solution. 65 In the case of the metals, iron or tin, the metallic powder may consist of zinc, magnesium or aluminum or a mixture of these metals. Again, the metal may be precipitated by rubbing the surface with a brush made of 70 or coated with such a metal. Another means of reducing the metal of the fluorid is by subjecting the surface to a stream of a reducing gas such as coal gas. When a metallic dust is applied for effecting the precipi- 75 tate, it may be blown on by an air blast.

I claim:—

Process for metallizing ceramic and other surfaces, consisting in applying to the said surfaces a solution of iron fluorid and subsequently reducing the iron of the fluorid solution to a metallic state by applying to the said surface a finely divided metal capable of reducing the iron. 80

In witness whereof I have hereunto set 85 my hand in the presence of two witnesses.

QUINTIN MARINO.

Witnesses:

H. D. JAMESON,
W. E. ROGERS.