

UNITED STATES PATENT OFFICE.

ERNEST NIENSTAEDT, OF BERLIN, GERMANY.

METHOD OF ETCHING AND PRODUCING INEXTINGUISHABLE METALLIC DEPOSITS UPON BRIGHT METAL SURFACES.

SPECIFICATION forming part of Letters Patent No. 390,391, dated October 2, 1888.

Application filed September 27, 1887. Serial No. 250,853. (No specimens.) Patented in Germany May 23, 1882, No. 20,221; in France June 20, 1882, No. 149,685; in Belgium September 16, 1882, No. 59,039; in Italy December 31, 1882, No. 14,910; in Eng'land January 30, 1883, No. 509, and in Austria-Hungary December 13, 1883, No. 4,744.

To all whom it may concern:

Be it known that I, ERNEST NIENSTAEDT, a subject of the Regent of Brunswick, residing at Berlin, in the Kingdom of Prussia, German Empire, have invented an Improved Method of Etching and Producing Inextinguishable Metallic Deposits upon Bright Metal Surfaces, (for which I have obtained a patent in the German Empire, No. 20,221, dated May 23, 1882; in France, No. 149,685, dated June 20, 1882; in Belgium, No. 59,039, dated September 16, 1882; in Italy, No. 14,910, dated December 31, 1882; in Great Britain, No. 509, dated January 30, 1883, and in Austria-Hungary, No. 4,744, dated December 13, 1883;) and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improved method of etching and producing fast or indelible metallic deposits upon bright metal surfaces.

The method hitherto practiced to etch upon metal consisted in printing a suitable varnish upon the surface to be etched, leaving free the lines and places where the corrosive fluid was intended to act. The back of the metal plate or article having been also coated with varnish, the article was submerged in the corrosive fluid, or the latter was poured upon the surface and the incision was obtained in all places not covered by the varnish. The acids usually employed for etching are sulphuric acid, nitric acid, hydrochloric acid, and other acids; also diluted acid solutions of metallic salts, of iron, copper, silver, gold, platinum, and other metals. In using pure acids, such as indicated, the effect is only that of eating away the metal in the free or non covered lines or places. This is simple etching; but in using the solutions of metallic salts, as before stated, metallic deposits are obtained on the etched lines or places, such deposits being either bright, or brown, or black, according to the composition and the more or less concentrated state of the solution. The varnish subsequently is dissolved by oil of turpentine or any other suitable solvent, and the figure or design appears plainly visible upon the bright

metallic surface. This method, however, is very circumstantial and cumbersome. The operation of varnishing and treating with acids or acid solutions requires separate rooms, and, principally, the evaporation of the acids and acid solutions is very dangerous to the health of the operator.

My improved method of etching and producing fast or indelible metallic deposits upon bright metallic surfaces does away with the varnishing and coating of the article to be etched, and not the least unwholesome evaporations are developed. My improved method may be worked by anybody without any previous knowledge of the art.

To carry my improved method into effect, I use the neutral hygroscopic metallic salts as dry as possible, in which state the salts have the property of attracting the humidity of the air. Such salts, for instance, are chloride of antimony, dichloride of platinum, perchloride of iron, nitrate of copper, and other similar metallic salts; also chromic acid and the like. The dry crystals of such salts are finely ground and spread in a thin layer upon any convenient elastic stamping cushion, or upon a hard plate of convenient material, such as glass, (preferably unpolished,) porcelain, or the like. From the cushion or plate the pulverized salt, which rapidly becomes moist by attraction of humidity from the air, is taken off by a rubber stamp or any other suitable, preferably elastic, stamp, and printed or stamped upon the metallic surface to be etched. If such surface be cylindrical or globular, I generally roll it over the rubber stamp with a slight pressure, thus producing the same effect as by stamping. The design or figure of the stamp thus printed upon the bright metallic surface will at once appear in a metallic deposit, which indelibly adheres to the metallic surface, owing to the corrosive or etching quality of the salt. No coating or covering is necessary for the surface where no etching is required.

Where I wish only to etch the metallic surface of an article without metallic deposit I mix up a suitable acid—such as sulphuric, nitric, hydrochloric acid, or the like—with a suitable neutral intermedium—such as fine silica—

to form a paste, which I print or stamp upon the metallic surface, as before stated.

It will be evident that the method of printing or stamping directly upon any metallic surface may be usefully applied without any difficulty for a vast variety of purposes--for example, for gaging scales, weights, and measures, and for stamping and embellishing the metallic surface of any articles whatsoever in a rapid and convenient manner, and without any unwholesome effect to the operator.

I claim as my invention--

1. The process of producing fast or indelible metallic deposits upon bright metallic surfaces, which consists in printing the dry finely-ground hygroscopic salt, such as described, on

the metal and allowing it to stand in an atmosphere containing aqueous vapor till the metallic deposit has taken place, substantially as described.

2. The process of etching bright metallic surfaces which consists in printing on the surfaces with a paste or ink composed of the corroding acid herein described and a fine pulverulent material not acted upon by said acid and allowing it to stand.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

ERNEST NIENSTAEDT.

Witnesses:

B. ROI,

OTHMAR LENZ.