

UNITED STATES PATENT OFFICE.

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ENAMELING METAL.

SPECIFICATION forming part of Letters Patent No. 679,300, dated July 30, 1901.

Application filed December 3, 1900. Serial No. 38,545. (No specimens.)

To all whom it may concern:

Be it known that I, WILLIAM A. DUNLAP, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Enameling Metal, of which improvements the following is a specification.

The invention described herein relates to certain improvements in enameling metal surfaces, and has for its object the production of surfaces which are free from ridges or irregularities and present a smooth, glossy, and beautiful appearance and which shall be of such thinness and elasticity that the contraction and expansion of the metal under changes of temperature, as in cooking utensils, will not crack or injure the enamel surfaces. It is characteristic of the methods heretofore employed for producing marbled or variegated effects that at least one of the coats should be comparatively thick, so as to sink into the other coat. Owing to the difference in plasticity both coats of enamel would not spread uniformly, so that ridges and irregularities would be produced in the finished surface; and, further, the difference in plasticity promotes coagulation of the coats during drying and burning. It is characteristic of my improved method that the two coats, or, more properly speaking, the two mixtures which form the finish-coat, have equal plasticity and specific gravity, so that they will mingle easily and uniformly over the metal surfaces.

In the practice of my invention the metal surfaces are prepared for enameling by the usual method of pickling, neutralizing, and cleansing well known in the art, especial care being taken in the preparation of the sheets to eliminate all traces of acid and to produce a smooth bright surface, so that the ground or foundation coating may enter closely into the pores of the metal and adhere tenaciously thereto. A ground or foundation coating is then applied in the usual manner—i. e., by slushing or dipping—the surplus enamel or material being shaken off, so as to leave only a very light, thin, and almost transparent coat on the metal surface. This ground or foundation is formed by mixing the following ingredients in about the proportions stated:

quartz, three hundred and fifty pounds; borax, five hundred pounds; feldspar, three hundred pounds; soda-ash, seventy-five pounds; cryolite, fifty pounds; fluorspar, forty pounds. To these is added a coloring material to produce the desired shade or color for the foundation or ground coat.

After the foundation or ground coat has been dried and burned in the usual manner a second or finish coat is applied in the same manner as the ground coat. This second or finish coat consists of the ingredients before stated and in about the same proportions, except that the fusing-point of the mixture is lowered by the addition of a suitable flux—such as borax, feldspar, soda-ash, &c.—and a coloring matter or material is added, so that the mixture will have the same color or contrast in color from the foundation-coat or ground. In preparing and applying this second coat care should be taken that it is sufficiently thin to run quickly over the surface and form only a thin coat thereon. While this finish coat is still fluid I apply a second coat by means of a brush or other appliance, so that it will be thrown or projected in drops or like spray with sufficient force to cause it to sink into and through the first coating until it comes in contact with the underlying foundation or ground coat. Then by shaking these two coats blend or run together, forming what is practically a single coat on the ground or foundation coat. The second coating is of the same character as the finish-coat, except that it is a contrasting color. In preparing these second coats care should be taken that the two mixtures shall have practically the same fluidity and specific gravity, so that when the second coat is applied and sinks into and through the first coat it will not tend to push up or raise the first coat by displacing the latter, but will simply intermingle or flow into the latter, and the two coats will spread as a single coat evenly and smoothly over the metal surface. After the two coats have been blended or intermingled, as stated, they are dried and burned in the usual manner, producing a smooth glossy surface entirely free from any ridges or irregularities.

As both coats are very fluid, and therefore spread thinly over the metal surfaces, there

is no liability of a coagulation of the coatings during the drying and burning, and, further, as the enamel surface is very thin it will accommodate itself to the expansion and contraction of the metal under changes of temperature without cracking or injury to the enamel.

I claim herein as my invention—

1. As an improvement in the art of enameling surfaces the method herein described, which consists in applying to a burned ground or foundation coat, a thin finish-coat and while the latter is still wet a second thin coat of a color contrasting with the finish-coat, substantially as set forth.

2. As an improvement in the art of enameling surfaces the method herein described, which consists in applying successively to a burned ground or foundation coat, two thin liquid coats of contrasting colors, the second coat being applied while the first is wet, both coats having the same specific gravity, substantially as set forth.

3. As an improvement in the art of enameling surfaces the method herein described, which consists in applying successively to a burned ground or foundation coat, two thin liquid coats of contrasting colors, the second coat being applied while the first is wet, both

coats having the same specific gravity and ground to the same or approximately the same degree of fineness, substantially as set forth.

4. As an improvement in the art of enameling surfaces the method herein described, which consists in applying successively to a burned ground or foundation coat, two coats of contrasting colors and having the same or approximately the same fluidity, the second coat being thrown or projected against the first coat while the latter is wet, so that it will enter the first coat, substantially as set forth.

5. As an improvement in the art of enameling surfaces the method herein described, which consists in applying successively to the surface to be enameled, two coats of contrasting colors and having the same or approximately the same fluidity, the second coat being thrown or projected against the first coat while the latter is wet, so that it will enter the first coat, substantially as set forth.

In testimony whereof I have hereunto set my hand.

WILLIAM A. DUNLAP.

Witnesses:

DARWIN S. WOLCOTT,
F. E. GAITHER.