UNITED STATES PATENT OFFICE.

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IMPROVEMENT IN MANUFACTURE OF ENAMELED IRON-WARE.

Specification forming part of Letters Patent No. **177,953**, dated May 30, 1876; application filed April 7, 1876.

To all whom it may concern:

Be it known that we, FREDERICK G. NIEDRINGHAUS and WILLIAM F. NIEDRINGHAUS, residents of the city of St. Louis, State of Missouri, have invented a new and useful Improvement in Enameling Iron-Ware, of which the following is a full, clear, and exact description:

The present invention relates to an improvement in enameling sheet-iron ware, by means whereof a beautifully-mottled and more durable enamel is obtained. We do this by causing an oxidation of the metallic base during the enameling process. The preferable way of doing this, in practice, is by omitting the washing of the metal in the alkaline bath after it has, for the purpose of cleansing it, been immersed in the acid-bath, and by utilizing the acid which forms an element in the enameling-glaze to oxidize the metal.

The procedure, more particularly described, is as follows: The metal is cleaned, in the usual way, in an acid-bath; then, without employing an alkali-bath, it is, after the usual scouring to remove the scale, placed in clear water, and allowed to remain, say, at least half an hour, and so as to remove the acid. As soon as it is taken from the water, it is immediately coated with a liquid glaze and placed in the drying-room, where the glaze is slowly dried thereon. The appearance and character of the enamel are determined during this drying of the glaze, as according to the length of the time taken in the drying, and to the temperature of the drying-room, will be the amount of oxydation. No definite rule can be given for either, as the process is affected by many circumstances—as, for instance, the humidity of the atmosphere.

The ware must be carefully watched during the process, and the temperature and time regulated by the appearance of the ware.

We prepare our glaze from the ordinary ingredients, taking care to have the ingredients mixed and thoroughly smelted together in bulk, to expel all carbon and other elements that would impede oxidation, and in order that the acid in the glaze may have free action. They are then ground in water, and applied in the usual way.

Now, by reason of the presence of the acid of the glaze, an oxidation of the metallic base takes place freely during the drying process, and appearing in and throughout the glaze as reddish spots. This causes the enamel, when it is finally formed, in the usual way, by baking the ware in the oven, to assume the desired mottled appearance. By reason of this oxidation, also, the enamel is caused to enter the pores of the iron, and become more intimately incorporated with the metal, thus rendering the enamel more durable.

Another way of measurably accomplishing these ends, when the use of the ordinary alkali-bath is retained, is by increasing the quantity of the boracic acid and lessening the alkaline fluxes in the composition of the glaze sufficient to overcome the alkali and oxidize the metal; and the character of the mottling is affected by the amount of acid present in the glaze when applied to the ware. This process does not prevent the addition of the usual coloring matter to the glaze, if desired.

What we claim is—

1. The herein-described process of enameling iron-ware, by oxidizing the iron during the process of drying the glaze, substantially as set forth.

2. A new manufacture of enamel sheet-iron ware, enameled substantially as described.

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Witnesses:
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