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ENAMEL WARE

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This invention relates to enamel ware, that is to say, to articles of iron or steel coated with a fused, vitreous enamel; and consists in an improvement in the application of the coating material, in consequence of which the coating is rendered more minutely and firmly adherent to the coated body, and the ware is rendered more durable.

It is already known that if upon the surface of the iron or steel article a metal of the iron group—cobalt, nickel, or manganese, or a combination of two or more of these—be first applied, either in metallic state or in the form of oxide or salt, then the subsequently applied and fused enamel will be more closely adherent. This invention concerns the application of the metal.

This invention lies in the provision of a jelly in which the metal in the condition of a water-soluble salt is dissolved. The jelly solution is spread upon the surface to be coated, and is dried. The enamel is then applied and fired in usual manner.

The jelly may be either natural or synthetic, it may be organic or inorganic. It should be soluble in or miscible with water, but it should be of relatively firm character, retaining its peculiar gelatinous characteristic, even when mingled with relatively large quantities of water. Aluminum silicate, either native or synthetic, is suitable; hydroxide of iron is suitable, although it has a tendency to discolor the enamel, and will be used either in a relatively thin and watery preparation or where discoloration of the enamel is not objectionable. Hydroxide of silicon is suitable, and, generally, the so-called "silica jels", of which diatomaceous earth is a native example. Among organic jellies, that produced from Irish moss is suitable. The jelly is dispersed in water, until preferably the preparation has the consistency of cream. In the case of hydroxide of iron, the preparation may, as has just been explained, be thinner. To this preparation a soluble salt of a metal of the iron group, cobalt, for example, is added, and, while any soluble salt may be employed, the nitrate of cobalt has been found to be peculiarly suitable. The degree of concentration of the solution is not a limiting feature; the good effect desired may be attained throughout the range of concentration, and will be attained in larger measure, up to the point of saturation.

The jelly solution of metal salt, when prepared, is spread upon the surface of iron or steel to be coated. Conveniently it may be spread by dipping the article in a bath of the jelly solution, or the jelly solution may be sprayed upon or otherwise applied to the surface. After spreading, the jelly solution is dried upon the surface of the article, and when dried it will be found to have produced a smooth and homogeneous coating which has not cracked in drying.

To the so-coated surface of the iron or steel article the enamel may be applied in any preferred manner. The article may be dipped in a soft and pasty preparation of the essentially vitreous enamel material to form a "slip," or the enamel in finely divided form may be sifted upon the surface of the article, when the article has been heated to a temperature to effect fusion. The further procedure is that known to the art, and consists essentially of firing the article; that is to say, raising it to or maintaining it at a temperature at which the applied vitreous material will fuse and form a smooth and glassy coat. Ultimately, atmospheric temperature is attained at a properly controlled gradient. As has already been said, the application of the metal of the iron group in the form of an aqueous solution and in association with a jelly affords a ground to which the layer of enamel will be found to be adherent with tenacity and with continuity.

I claim as my invention:

1. The method herein described of coating iron and steel articles with vitreous enamel which consists in applying to the surface of the article an initial coating of a jelly containing a solution of a salt of a metal of the iron group, applying to the initially coated surface a vitreous material, and firing the so prepared article.

2. The method herein described of coating iron and steel articles with vitreous enamel which consists in applying to the sur-

face of the article an initial coating of a solution of a salt of a metal of the iron group in association with aluminum silicate, drying the initial coating, applying to the dried coating a layer of vitreous material and firing the so prepared article.

3. The method herein described of coating iron and steel articles with vitreous enamel which consists in applying to the surface of the article an initial coating of a solution of a salt of a metal of the iron group in association with a silica jel, drying the initial coating, applying to the dried coating a layer of vitreous material, and firing the so prepared article.

4. The method herein described of coating iron and steel articles with vitreous enamel which consists in applying to the surface of the article an initial coating of a jelly containing a solution of nitrate of cobalt, applying to the initially coated surface a vitreous material, and firing the so prepared article.

In testimony whereof I have hereunto set my hand.

OSCAR HOMMEL.