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METHOD OF DEENAMELING

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No Drawing. Continuation of application Serial
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4 Claims. (Cl. 87—5)

The present invention relates to the removal of enameling from enameled metal ware.

In the enameling of metal ware, and particularly vitreous enamel ware, a material loss is suffered by reason of faulty enameling, and consequent rejection of a considerable proportion of enameled articles. Various methods have been proposed for the removal of vitreous enamel from such articles, but such methods have been unsatisfactory because not applicable to many types of enameled articles or because of injurious chemical action on the metal and its warping, or by reason of danger or great inconvenience in operation. For example, methods such as sand blasting, treatment with hydrofluoric acid, fused caustic soda and the like have been employed. Sand blasting, while satisfactory when applied to large articles, is not satisfactory nor economical when applied to smaller articles. Hydrofluoric acid is corrosive, dangerous to the operators, and attacks the metal after acting on the silicious material of the enamel. Fused caustic soda is likewise dangerous in use, and requires the use of such high temperatures as to warp and attack the metal and has an embrittling effect upon iron ware. Furthermore, since fused caustic soda acts by solution of substantially the entire vitreous enamel coating, there is a very material consumption of the reagent.

In accordance with the present invention, I have been able to secure a satisfactory removal of enamel without the disadvantages attendant upon methods previously known, by employing caustic alkali in the presence of water, and particularly caustic soda solutions, whereby a partial solvent action upon the enamel and disintegration of the remainder is secured as an alternate result. By suitable treatment of the enameled articles with such solutions of caustic alkali of this character, there is apparently a solvent action exerted upon a small portion of the enamel, this portion apparently acting as a binder, the greater portion of the enamel disintegrating and depositing as a sludge. As a result, in contrast with the use of fused caustic soda, for example, there is but a very small and slow consumption of the alkali, which is gradual in character and not accompanied by chipping or peeling of the enamel in parts with incomplete or no removal in other parts.

The strength of solution required for securing the desired partial solvent action may vary from 30% upwards, the minimum depending upon the specific character of the enamel. So-

lutions of 40 to 50% caustic soda or caustic potash are generally applicable, and produce the desired deenameeling action in a relatively short period of time, say 5 to 10 hours. Stronger solutions may be employed, but in general solutions stronger than 60 to 70% caustic soda or caustic potash are not desirable. Lower concentrations of caustic soda, within the range set forth, require longer periods of treatment. While the minimum strength which may be used may be readily determined by experiments upon articles enameled with the particular enamel to be removed, in general it is not desirable to employ solutions of the minimum strength.

The articles to be de-enameled are placed in a hot solution of the caustic alkali, say caustic soda or caustic potash, preferably of 40 to 50% concentration. The solution is maintained hot, preferably at a boiling temperature, which in the case of such a solution is from 125° to 145° C. at atmosphere pressure. The caustic alkali solution exerts a solvent action upon but a small portion of the total enamel, the removal of which causes the remainder to disintegrate and gradually leave the surface of the article. The undissolved portion forms a sludge, which is kept in suspension and in constant motion in the solution by the boiling of the solution, preferably assisted by mechanical agitation. This mechanical agitation is suitably effected by constantly moving the articles under treatment about in the solution. Under these circumstances, the sludge also assists the removal by exerting to some extent a scouring action on the article under treatment. However, it is not necessary to maintain the sludge in suspension, although its deposition upon the heated walls of the container or on heating coils within the container is undesirable. Deenameeling of the vitreous enamel, under these circumstances requires from 5 to 10 hours, depending upon the thickness of the enameled coat.

Water which evaporates is replaced, preferably continuously during operation and to maintain a substantially constant level. The constant agitation of the solution is advantageous in preventing the formation of a layer of water so added upon the heated, heavier caustic solution.

The consumption of the caustic is slow, since it attacks but a small proportion of the enamel under treatment. The use of a bath may be continued until the solution strength drops below that at which the desired partial solvent action is exerted, say to 30%, depending upon the character of the enamel. Additional caustic may

then be supplied in the solution to bring it back to its original strength.

The accumulation of the silicious sludge constituting the major portion of the enamel renders it advisable to stop the operation occasionally, and remove the sludge. This may be effected, for example, by permitting the sludge to settle, decanting the clear solution, and then removing the sludge from the container by shoveling or by washing out through a suitable discharge outlet.

This application is a continuation of my co-pending application Serial No. 425,728, filed February 3rd, 1930.

The deenameling of the metal ware in accordance with the present invention does not result in any chemical attack or other deleterious effect upon the metal itself. The enamel is completely removed, and the metal may then be washed, and subjected to the usual pickling and cleaning treatment preparatory to again enameling it.

I claim:

1. The method of removing vitreous enamel

from metal articles which consists in immersing them at atmospheric pressure in a caustic soda solution of at least 30% strength, at a temperature as high as the boiling point of a 30% solution thereof, and for a time sufficient to remove the enamel.

2. The method of claim 1, in which the solution is of upwards of 40% strength and is at a temperature as high as the boiling point of a 40% solution.

3. The method of removing vitreous enamel from metal articles which consists in immersing them at atmospheric pressure in a constantly agitated caustic soda solution of at least 30% strength at a temperature as high as the boiling point of a 30% solution thereof, and for a time sufficient to remove the enamel.

4. The method of claim 3, in which the solution is of upwards of 40% strength and is at a temperature as high as the boiling point of a 40% solution.

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