Jan. 21, 1941. H. E. SCHABACKER 2,229,526

METHOD OF COATING THE INTERIOR OF TANKS WITH VITREOUS ENAMEL

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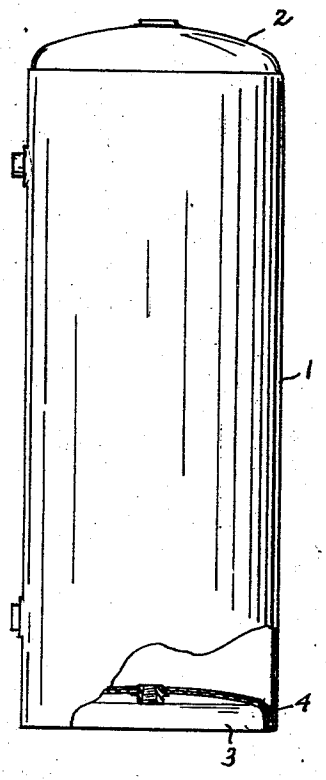


FIG. 1.

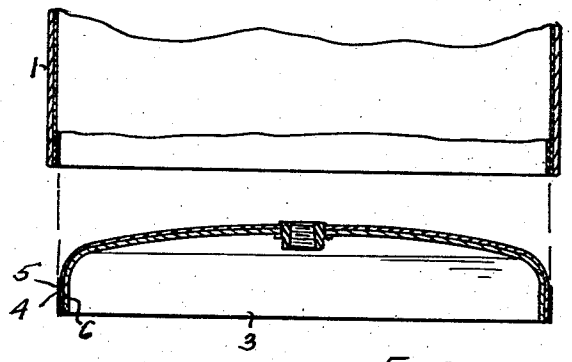


FIG. 2.

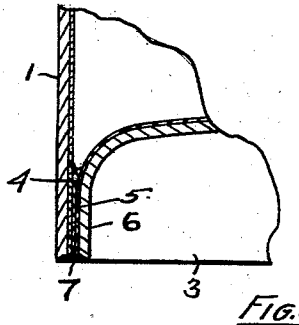


FIG. 3.

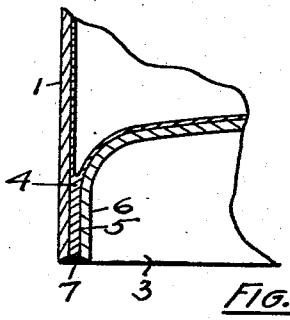


FIG. 4.

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METHOD OF COATING THE INTERIOR OF TANKS WITH VITREOUS ENAMEL

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2 Claims. (Cl. 29—84)

My invention relates generally to tanks and more particularly to tanks having an interior coating of vitreous enamel for retaining hot water, chemicals, food products and the like.

All devices of this character made according to the teachings of the prior art, and with which I am familiar, have been very unsatisfactory because it has been heretofore necessary to apply the enamel to the interior of the tank through the small openings provided in the ordinary hot water tank. The result was that many parts of the interior of the tank, especially the joints between the heads and the shell, were left with no coating thereby causing corrosion and consequent discoloration of the water would take place. The enameling operation is very delicate and a thorough cleaning of the surface to be enameled is absolutely necessary in order that the enamel will fuse with the iron. This cleaning has been a very difficult problem and many parts of the interior of the tank were unable to be reached and cleaned by the old method. It has heretofore been practically impossible to enamel the interior of comparatively small diameter tanks because it was necessary to work through small openings. The drying operation has also taken considerable time because the air could not get to the interior of the tank. Evaporation of the moisture from the interior surfaces of the tank during the enameling process has made it practically impossible to cover the interior surface with a continuous coat of vitreous enamel.

It is, accordingly, an object of my invention to overcome the above and other defects in methods of applying vitreous enamel to the interior surfaces of tanks, particularly the interior surfaces of tanks of comparatively small diameter.

Another object of my invention is to provide a method of coating the interior surfaces of a comparatively small diameter tank which is simple, cheap in cost, and efficient.

Another object of my invention is to provide a method of coating the interior surfaces of a comparatively small diameter tank without the necessity of working through the small openings of the tank.

Another object of my invention is to provide a method of coating the interior of a compartively small diameter tank with vitreous enamel wherein the time for drying the enamel is substantially reduced.

Another object of my invention is to provide a method of applying a coating of vitreous enamel to the interior of a comparatively small diameter tank wherein almost the entire area of the interior surfaces of the tank may be inspected after enameling for defects.

Another object of my invention is to provide a method of applying vitreous enamel to the interior surfaces of comparatively small diameter tanks wherein means are provided for easily and quickly cleaning and inspecting the surfaces of the tank to be enameled are provided.

Other objects of my invention will become evident from the following detailed description, taken in conjunction with the accompanying drawing, in which

Fig. 1 is a side elevational view with parts broken away showing the ordinary small diameter water tank now in use with a coating of vitreous enamel on the interior surfaces.

Fig. 2 is an exploded fragmentary sectional view of the head in the tank of Fig. 1 whose flanges extend inwardly.

Fig. 3 is an enlarged fragmentary view showing the joint between the head in Fig. 2 and the interior of the shell before the baking operation.

Fig. 4 is an enlarged fragmentary sectional view showing the joint between the flange shown in Fig. 2 and the interior of the shell after the baking operation wherein all of enamel is fused into one mass.

Porcelain or vitreous enamel is a glass of special composition well known as an article of commerce. It is first ground with water and various other materials to a paint-like consistency. The enamel in a wet state is then applied by dipping or spraying to a piece of chemically cleaned iron. The water in the mixture is then allowed to dry out and the residue with the iron is heated to a point above the melting point of the enamel. During this firing operation, the enamel fuses with the iron into a continuous coating.

In applying a coating of vitreous enamel to the interior surfaces of a comparatively small diameter tank as shown in Fig. 1 of the drawing, the interior surface of the shell 1 with both of the heads 2 and 3 removed is coated with vitreous enamel after it is thoroughly cleaned and inspected. This coat of enamel is allowed to dry and it is then fired. After the firing operation, the interior surfaces of the shell 1 is then carefully inspected for minute defects which inspection heretofore has been impossible because of the method used. In all instances, the surface to be enameled must be chemically clean in order that the enamel will fuse with the iron to which it is applied. Improper cleaning has heretofore been the cause of many defects in surfaces of interiorly enameled tanks. A second coating of enamel is placed over

the first coat applied to the interior of the shell and this second coat is then allowed to dry.

The surfaces of the heads 2 and 3 which extend inwardly of the tank are then coated, dried, and fired in the same manner as that of the shell 1. A second coating is applied and allowed to dry as in the shell 1. The heads 2 and 3 are then assembled in the ends of the shell 1 and an extra coating of vitreous enamel is applied between the outer surfaces of the flanges of the heads and the interior of the cylinder as shown by head 3 in Fig. 2. Fig. 2 shows an extra coating 4 of enamel applied to the outer portion 5 of the flange 6 of the head 3. This extra coating insures a complete fusion of the enamel with the surfaces in which it is in contact. After assembly of the heads 2 and 3 in the shell 1 and the drying of the extra coating of enamel between the outer portion of the flanges of the heads 2 and 3, all of the vitreous enamel is subjected to firing operation to completely fuse all of the vitreous enamel and provide a continuous enameled surface. Fig. 3 shows the head 3 after assembly with the extra coat 4 of enamel between the outer surface 5 of the flange 6 and the interior surface of the shell 1. Fig. 4 shows the same joint as that shown in Fig. 3 after the firing operation wherein a fusion has taken place between all contacting surfaces. The flange 6 of head 3 is welded as shown at 7 by any suitable welding method to provide a tank which will withstand high pressures. Head 2 is also welded externally.

It will be evident that one head may be assembled in the shell 1 and all enameling operations take place from the other open end of the shell 1 without departing from the spirit of my invention.

The second coating of enamel placed on the interior surfaces of the shell 1 and the inwardly projecting portions of the heads 2 and 3 have been fired before assembly of the heads 2 and 3 in the shell 1 with good results. In this case, it is necessary to provide an extra firing operation for the extra coating between the outer portions of the flanges of the heads and the interior surface of the shell 1. Water may be added to the extra coating of enamel between the outer portion of the flanges of the heads and the shell 1 where there is not intimate enough contact between the enameled surfaces and the extra coating to assure fusion into an intimate mass or continuous coating.

It is not absolutely necessary to provide an initial coating of fired enamel in that the first coat may be dried and the same method used as described above after applying the second coating of enamel. I have found the first described method preferable because of the means provided for minute inspection of the first fired coating of vitreous enamel applied.

It will be evident from the above that I have provided a method of coating the interior surfaces of comparatively small diameter tanks whereby the interior surfaces may be chemically cleaned with ease, no excessive evaporation of the interior surfaces takes place, full inspection of the cleaned and enameled surfaces may be made, and a continuous enameled surface covering the entire interior surfaces of the tank is provided without defects.

Various changes may be made in the specific embodiment of the present invention without departing from the spirit of the present invention, or from the scope of the appended claims.

What I claim is:

1. A method of coating the interior surface of comparatively small diameter tanks with vitreous enamel comprising the coating of the interior surface of the shell and the inner projecting surfaces of the heads with a fired vitreous enamel, coating said same surfaces with a second coat of vitreous enamel and drying said enamel, disposing an extra coating of enamel on the outer surfaces of the flanges on the heads contacting the interior surface of the shell and assembling said heads in the ends of said shell, drying said extra coat of enamel after assembly, and firing all of the vitreous enamel covering the interior surfaces of the tank.

2. A method of coating the interior surfaces of comparatively small diameter tanks with vitreous enamel comprising the coating of the interior surface of the shell with vitreous enamel and drying said enamel, coating the inwardly projecting portions of the flanged heads with vitreous enamel and drying, disposing an extra coating of vitreous enamel on the outer surfaces of the flanges of the heads contacting the interior surface of the shell, drying said extra coating, and firing all of the vitreous enamel after assembly of the heads in the shell.

H. ERIC SCHABACKER.