

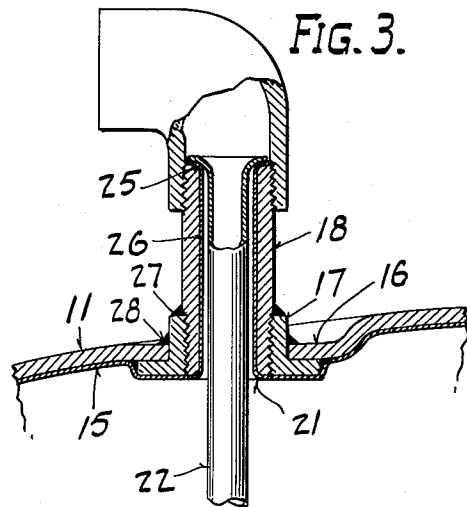
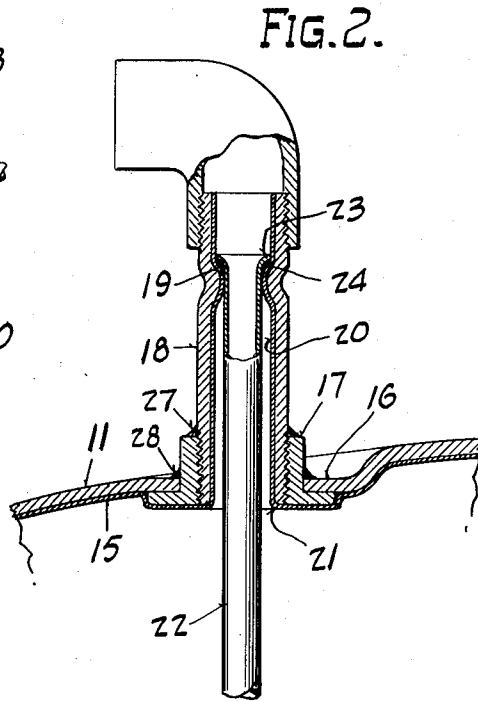
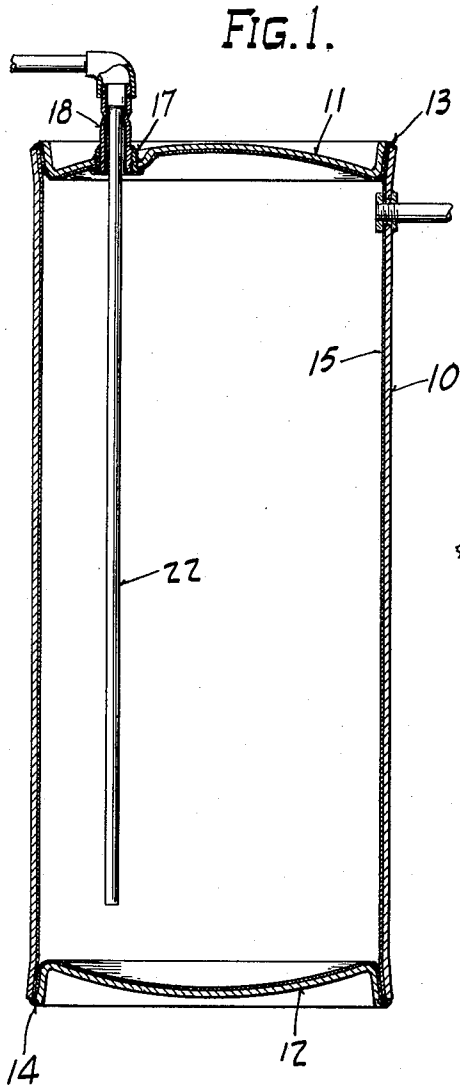
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DIP TUBE CONNECTION

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DIP TUBE CONNECTION

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1 Claim. (Cl. 285—47)

This invention relates in general to a dip tube connection for use in hot water storage tanks and particularly in storage tanks provided with a lining of vitreous enamel and wherein the metal of the tank is protected against corrosion by a system of cathodic protection such as that disclosed and claimed in Patent No. 2,267,361 of the present inventor and assigned to the same assignee as the present invention.

One object of the invention is to provide a dip tube connection for a vitreous enamel lined hot water storage tank in which a dip tube which has become corroded may be quickly and easily replaced.

A further object of the invention is to provide a support for a dip tube in which the inner surface of the support is provided with a lining of vitreous enamel fused to the body of the support.

A further object of the invention is to provide a dip tube connection wherein the dip tube is electrically insulated from the metal of the tank to thereby lessen the current required for cathodic protection of the tank as a whole.

The invention in general comprises providing a dip tube connection for use with a hot water storage tank having a corrosion resistance lining such as vitreous enamel on its inner surfaces wherein the dip tube itself simply rests on a similarly lined shoulder of the connection and is electrically insulated from the metal of the connection by the lining on the connection.

An embodiment of the invention is illustrated in the accompanying drawing in which:

Figure 1 is a view of a vertical medial section of a storage water tank incorporating the dip tube connection of the invention;

Fig. 2 is an enlarged fragmentary vertical section of the dip tube connection; and

Fig. 3 is a fragmentary vertical section of a modification of the dip tube connection.

Referring to the drawing, there is illustrated a hot water storage tank having a generally cylindrical shell 10, an upper head 11, and a lower head 12.

The heads 11 and 12 are each respectively disposed at opposite ends of the shell 10 to provide the circumferentially welded joints 13 and 14 when the heads are welded to the shell upon assembly.

The inner surfaces of shell 10 and the heads 11 and 12 are provided with a vitreous enamel lining 15 which is fused to the metal of the respective members to protect them from corrosion by fluids contained within the tank.

Prior to fusing the vitreous enamel lining to the upper head 11 and preferably to one side of the vertical center line of the tank, the head is formed so as to provide a substantially flat surface 16 through which extends upwardly an interiorly threaded spud 17. The spud is preferably of the same composition as the shell of the tank and is secured to the inner surface of the flattened surface 16 of the head preferably by welding. After thus securing the two members together the coating of vitreous

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enamel is fused thereto so that the inner surface of the head 11 and the head of the spud is protected from corrosion by fluids contained in the tank.

A threaded connection such as, for instance, a nipple 18 is removably secured in spud 17. The nipple is provided with an upwardly facing shoulder or seat 19 preferably intermediate the ends thereof. The seat 19 may be formed by pressure rolling the metal of the nipple inwardly. Subsequently to forming the shoulder 19, and assembly of nipple 18 with spud 17, the interior surface of the nipple is provided with a lining of vitreous enamel 20 which is fused thereto. The inner circumferential edge of the nipple 18 may, if desired, be rounded at 21 so that vitreous enamel will cover the edge and prevent sharp exposures of steel which might electrically contact the dip tube. The interior surfaces of the tank, the spud 17 and the nipple 18 are thus protected from corrosion by the vitreous enamel linings fused thereto, and by virtue of the lining in the nipple, the metal of this connection may be fabricated from relatively inexpensive metal, preferably metal of the same composition as that of the shell, the heads and the threaded spud.

Dip tube 22 may be of any suitable metal such as brass, and extends downwardly through nipple 18 for a distance so that the lower end of the tube is disposed adjacent but above the lower head 12. The upper end 23 of the dip tube is flared outwardly so that the diameter of the same is slightly greater than the inner diameter across the shoulder member 19. The flared end of the dip tube seats on the shoulder when the tube is inserted downwardly through the nipple 18.

A suitable plastic washer or packing 24 may be disposed between the shoulder and the dip tube if desired, which serves to prevent cracking or chipping of the lining 20 on the interior of the nipple and also to lessen the leakage of the inflowing water.

Where the tube is never to be removed, instead of forming the metal at shoulder 19 inwardly, the same may be formed outwardly or opposite to that shown in the drawing. If the latter form is desired the tube is formed outwardly, as by spinning and the tube is flared after assembly so that the spun portion of the tube will seat on the outwardly curved shoulder.

The upper or outer end of the nipple 18 may be threaded for connection to a source of water supply.

In the modification shown in Fig. 3 the intermediate portion of the nipple is not deformed to provide shoulder 19 as in the preferred embodiment of the invention above described. In the modification the upper inner circumferential edge of the nipple is rounded as at shoulder 25 so that the vitreous enamel lining 26 may extend uninterruptedly from the inner cylindrical surface of the nipple across the rounded shoulder 25 and across the upper end of the nipple. The dip tube in this instance is flared outwardly at its outer end as formerly described, but rests on the enamel shoulder at the top of the nipple rather than upon enamel within a shoulder formed intermediate the ends of the nipple.

It is necessary to prevent the dip tube from making electrical contact with the steel in any part of the tank or fittings. This may best be accomplished by utilizing the preferred form of the invention.

In both embodiments the length of the nipple 18 below shoulder 19 should be sufficient to hold the dip tube which is loosely assembled therein against lateral displacement within the tank during shipment and installation.

In such a construction it is possible to form the nipple as an integral part of the tank such as, for instance, by welding the nipple to the spud with a weld 27, the spud being secured to the tank as by a weld 28. This form of

construction provides a support integral with the tank and avoids likelihood of chipping or crazing the enamel lining at the inner end of the nipple when fittings are threaded home tightly on the outer end of the nipple.

It is also possible to secure the nipple directly to the outer surface of the tank thereby obviating the use of an intermediate spud. As above described, all welding of the various parts of the device takes place prior to fusing the lining of vitreous enamel to the respective parts.

The above described invention provides a dip tube connection for a vitreous enamel-lined hot water storage tank in which the tube is easily replaceable, a tube which is relatively inexpensive to manufacture in that a cheap metal may be utilized in fabricating the nipple or supporting member which supports the dip tube itself, a dip tube connection in which the tube supporting member is substantially completely protected from corrosion due to electrolysis by virtue of electrical insulation of the dip tube from the tank by the vitreous enamel lining, and a dip tube connection in which electrical insulation of the dip tube from the metal of the tank thereby lessens the current required for cathodic protection of the tank as a whole.

The outwardly facing shoulder in the nipple of the connection whether the shoulder be provided as in Figs. 2 and 3 or formed by forming a portion of the nipple radially outwardly as described provides a positive support to receive the flared end 23 of the dip tube and retain it in the desired position in the tank.

Various embodiments of the invention may be employed within the scope of the following claim.

I claim:

A cold water dip tube construction for use with a cathodically protected hot water storage tank having a

vitreous enamel lining comprising: a metallic cold water inlet dip tube; an insulating connection therefor consisting of a tubular member secured to the upper tank wall and upstanding therefrom for connection with a cold water supply pipe, said tubular member having a circumferential shoulder facing upwardly and inwardly therein, the enamel lining of the tank extending continuously over the inner end of the tubular member and upwardly on the inside thereof over the top of said shoulder, and said dip tube being flanged outwardly at its upper end and supported by said flange to rest on the enamel shoulder of said tubular member which serves to freely suspend the dip tube within the tank, and said tubular member being of a substantial length to dispose the shoulder thereof at a distance above and outside the tank whereby cathodic potentials are reduced in the region of the flange support for the dip tube and displacement of the dip tube within the tank is substantially curtailed.

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