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ELECTRIC IMMERSION HEATER UNIT

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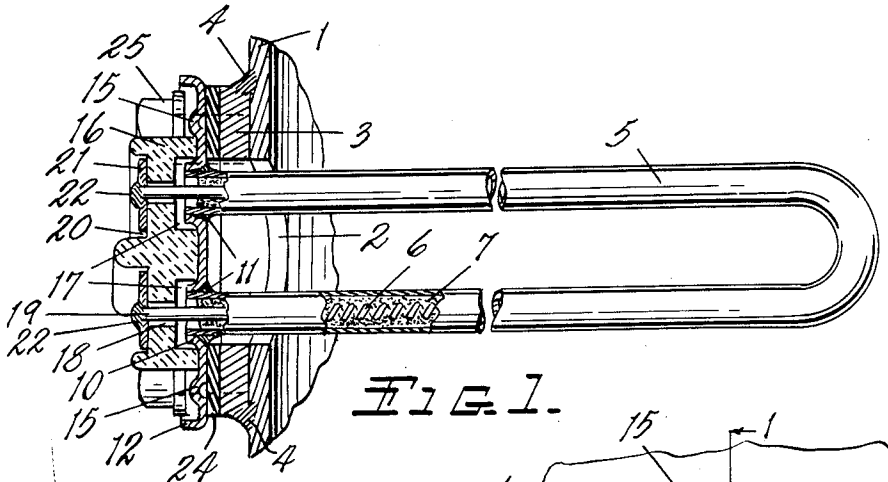


FIG. 1.

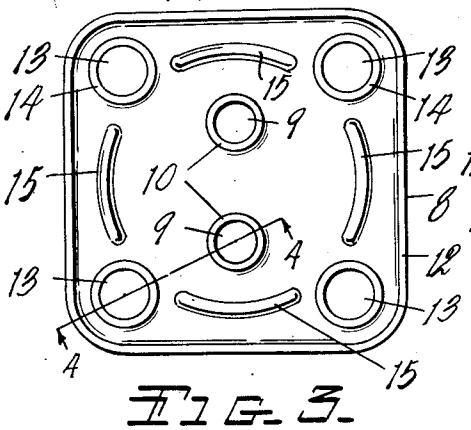


FIG. 3.

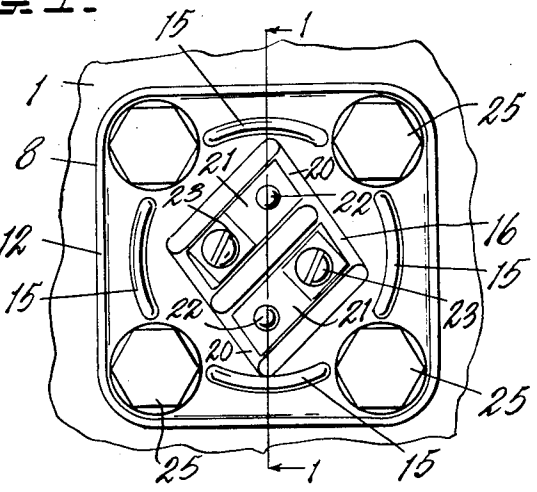


FIG. 2.

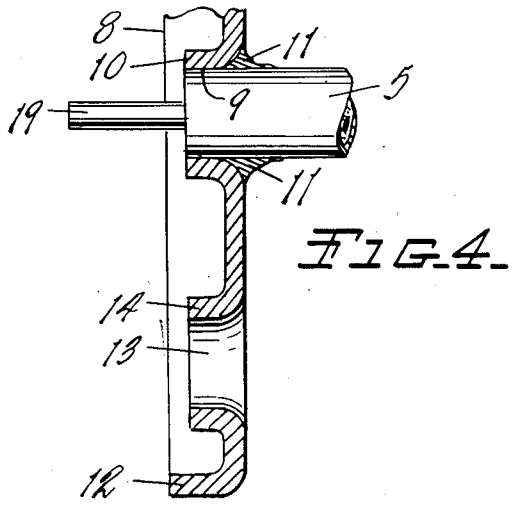


FIG. 4.

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ELECTRIC IMMERSION HEATER UNIT

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4 Claims. (Cl. 219—38)

This invention relates to an electric immersion heater unit. The invention relates particularly to an electric immersion heater unit for mounting on tanks or receptacles provided with openings to receive the same.

The main objects of this invention are:

First, to provide an electric immersion heater unit which may be quickly and very securely mounted upon a tank or heater wall having an opening therein which unit is simple and economical in its parts and the parts readily assembled as a complete unit including a mounting plate.

Second, to provide an immersion heating unit in which the mounting plate can be readily formed as a stamping of corrosion resistant material and at the same time is rigid and effective as a support and closure.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

Fig. 1 is a view partially in section on a line corresponding to line 1—1 of Fig. 2 and partially in elevation of a heater unit embodying my invention mounted upon a heater wall.

Fig. 2 is a front elevational view looking from the left of Fig. 1.

Fig. 3 is a plan view of the mounting plate.

Fig. 4 is an enlarged fragmentary view partially in section on a line corresponding to line 4—4 of Fig. 3 showing details of the mounting of one end of the heater unit sheath to the mounting plate.

In the accompanying drawing 1 represents a wall of a tank or heater receptacle and with an opening 2 therein. The wall is reinforced by the ring 3 surrounding the opening which is welded to the wall at 4. As an alternative the wall of the cylinder may be flattened around the opening but as that forms no part of this invention I have not illustrated that adaptation.

The purpose of the ring in the embodiment illustrated is to reinforce the wall which is commonly formed of thin stock and provides a flat face or surface on which to mount the unit.

The embodiment of my invention illustrated comprises a heating element of loop or U shape and having a sheath 5 and coil resistant element 6 embedded in insulating material 7 filling the sheath 5.

The mounting plate 8 is desirably formed as a stamping from a plate of corrosion resistant material, for example, brass. This plate has spaced centrally disposed openings 9 surrounded by outwardly projecting flanges 10 in which the ends of the sheath 5 are disposed. The sheath is brazed or welded, as indicated at 11, to fixedly secure the sheath to the mounting plate and to seal the joint between the sheath and the plate. The outturned flanges not only serve to reinforce the mounting plate but to provide an effective opening wall for the ends of the sheath and a substantial surface to which the sheath may be welded.

The mounting plate is provided with an outturned peripheral flange 12 and bolt openings 13 surrounded by outturned flanges 14. Between these flanges 14 the mounting plate has segmental outwardly projecting ribs 15. Thus formed the plate may be formed of relatively light stock and at the same time is strong and rigid.

On the outer side of the mounting plate I mount an insulating block 16, this block being recessed at 17 to receive the flanges 10. The block 16 has holes 18 therein opening to these recesses and positioned to receive the terminals 19 of the resistant element 6. The terminals project from the sheath and through the openings 18. The insulating block is provided with outwardly facing recesses 20 in which the terminal plates 21 are disposed, the terminal plates being fixedly secured to the terminals 19 by upsetting the terminals at 22 desirably by welding heat. The plates 21 are provided with binding ports 23 or other suitable circuit connections.

In installing the unit an annular gasket 24 is arranged between the mounting plate and the ring 3. The ring 3 is tapped to receive the attaching bolts 25. By providing the flanges 14 the plate is reinforced so that it is not easily distorted by the manipulation of the clamping bolts.

In some installations the bolts may desirably be mounted on the ring 3 and project through the holes 13 to receive clamping nuts. I have not illustrated this adaptation as it will readily be understood by those skilled in the art to which my invention relates.

I have illustrated and described my invention in a highly practical embodiment thereof. I have not attempted to illustrate or describe other adaptations which I contemplate as it is believed the disclosure will enable those skilled in the art to adapt my invention as may be desired.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination of a looped sheathed electric immersion heater unit adapted for insertion into a container through an opening in the wall thereof and having current terminals projecting from each end of the sheath, a combined mounting plate and closure for a container opening formed from corrosion resistant stock of substantially uniform thickness and having spaced centrally positioned openings surrounded by outwardly projecting flanges in which the ends of said sheath are disposed and supportingly welded to said plate to support the sheath and close the joint therebetween, said mounting plate having an outturned peripheral flange and attaching bolt openings surrounded by outturned flanges and having outwardly projecting segmental stiffening ribs between adjacent pairs of said bolt opening flanges, an insulating block supportedly disposed upon said mounting plate between said ribs and bolt opening flanges thereof and having recesses in its inner side receiving said sheath opening flanges and holes therein through which said terminals project, and terminal plates provided with binding posts, said insulating block having recesses on its outer side in which terminal plates are disposed and to which said heater unit terminals are welded in spaced relation to said binding posts whereby the insulating block is fixedly mounted on said mounting plate.

2. The combination of a looped sheathed electric immersion heater unit adapted for insertion into a container through an opening in the wall thereof and having current terminals projecting from each end of the sheath, a combined mounting plate and closure for a container opening formed from corrosion resistant stock of substantially uniform thickness and having spaced centrally positioned openings surrounded by outwardly projecting flanges in which the ends of said sheath are disposed and supportingly welded to said plate to support the sheath and close the joint therebetween, an insulating block supportedly disposed upon said mounting plate and havnig recesses in its inner side receiving said sheath opening

flanges and holes therein through which said terminals project, and terminal plates provided with binding posts, said insulating block having recesses on its outer side in which terminal plates are disposed and to which said heater unit terminals are welded whereby the insulating block is fixedly mounted on said mounting plate.

3. The combination of a sheathed electric immersion heater unit adapted for insertion into a container through an opening in the wall thereof and having current terminals projecting from the ends of the sheath, a combined mounting plate and closure for a container opening of corrosion-resistant material having spaced openings surrounded by outwardly projecting flanges in which the ends of said sheath are disposed and supportingly secured to said plate to support the sheath and close the joint therebetween, the mounting plate having an outturned peripheral flange and attaching bolt openings surrounded by outturned flanges and having outwardly projecting segmental stiffening ribs between adjacent pairs of said bolt opening flanges, an insulating block supportedly disposed upon said mounting plate between said ribs and bolt opening flanges thereof and having recesses in its inner side receiving said sheath opening flanges and holes therein through which said terminals are disposed, and terminal plates disposed on said insulating block and to which said heater unit terminals are welded whereby the insulating block is fixedly mounted on said mounting plate.

4. The combination of a sheathed electric immersion heater unit adapted for insertion into a container through an opening in the wall thereof and having current terminals projecting from the ends of the sheath, a combined mounting plate and closure for a container opening of corrosion-resistant material having spaced openings in which the ends of said sheath are disposed and supportingly secured to said plate to support the sheath and close the joint therebetween, and insulating block supportedly disposed upon said mounting plate and having holes therein through which said terminals are disposed, said block having spaced recesses in its outer side around said holes, and terminal plates disposed on said insulating block in said recesses and to which said heater unit terminals are welded whereby the insulating block is fixedly mounted on said mounting plate, said terminal plates having connections thereon for attachment of electric wires, the connections being spaced from the welded connections to the terminals of the heater unit.

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