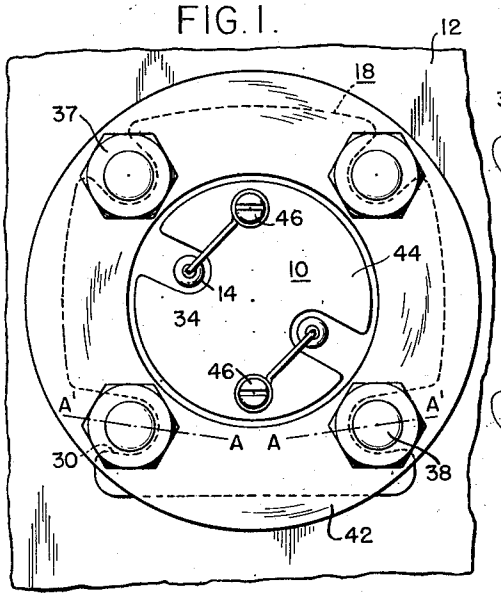
Oct. 7, 1952 V. D. THURSTON 2,613,312

HEATING APPARATUS

Filed Nov. 2, 1950

FIG. 1.



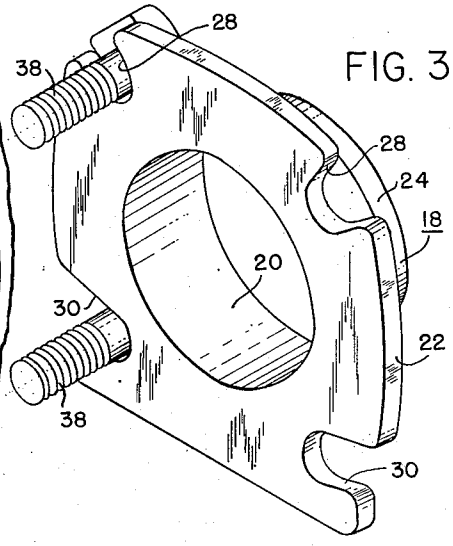




FIG. 3.

FIG. 2.

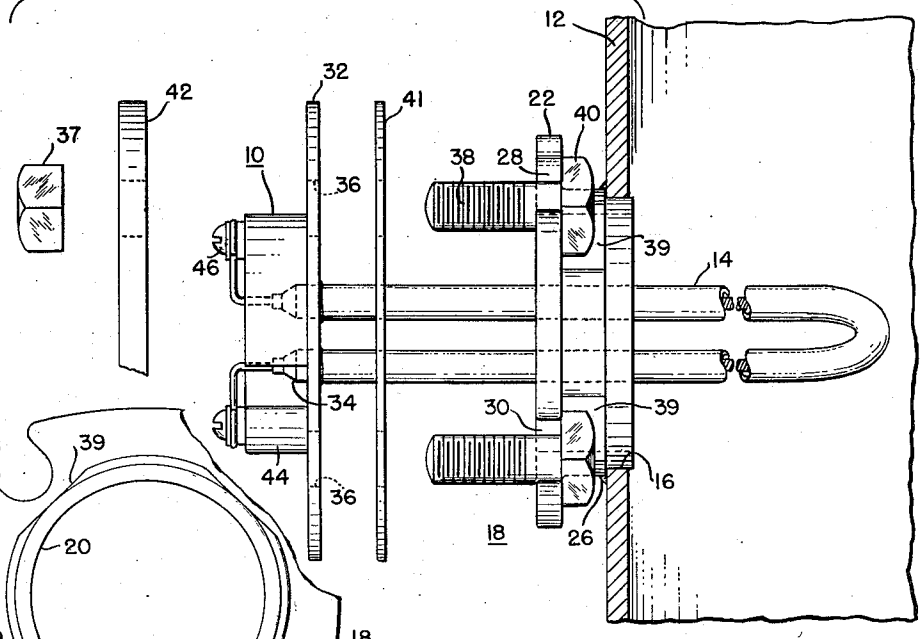



FIG. 4.

INVENTOR

Vinal Dale Thurston

BY R. J. Eisinger

ATTORNEY

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## HEATING APPARATUS

Vinal Dale Thurston, Mansfield, Ohio, assignor to Westinghouse Electric Corporation, East Pittsburgh, Pa., a corporation of Pennsylvania

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7 Claims. (Cl. 219—38)

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This invention relates to flanged couplings, but more particularly to a flanged coupling for a tank wall or the like.

Electrically heated water tanks having immersion heaters of the sheathed type are currently in common use and widely known. To permit replacement of the heater, the heater is provided with a mounting plate, by means of which it is detachably held in the tank, the wall being provided with a flanged coupling member against which the mounting plate is held by bolts. Generally, the flange of the coupling member is provided with tapped holes for receiving the bolts. The tanks, complete with the coupling members, are often stored outside by the manufacturer until needed. The exposure to the weather causes the threads to rust and the holes to be clogged with corrosion. Therefore, it is often necessary to retap the holes before the tanks can be used. Also, in assembling the mounting plate of the heater to the coupling member, the threads on the bolts or the coupling member are occasionally stripped or a bolt is broken, necessitating additional expense for repairs.

It has been proposed to provide a conventional coupling member in which the flange is formed with a plurality of radially disposed slots, thereby eliminating the above-mentioned problem. With this arrangement, the bolts are placed in the slots with their heads next to the tank wall and their threaded portions extending forwardly to receive the mating nuts. Difficulty has been encountered when installing a heater on a tank in service, since the lower bolts must be manually held in alignment to receive the mounting plate of the heater. Otherwise, the bolts will fall out of the slots which are open at the bottom. The tank is provided with a layer of insulating material, such as glass wool; an opening being provided around the coupling member to permit replacement of the heater as mentioned above. However, the opening in the insulation is necessarily small, making manipulation of parts a tedious and painstaking operation.

In view of the above, it is an object of the invention to provide a coupling member which will retain the mounting bolts in their proper locations during assembly.

A more specific object is to provide a coupling member adapted to be mounted with the surface of its flange disposed in a vertical plane and provided with a plurality of slots, each of the slots being arranged in such a manner as to receive and support a bolt in proper position, whereby the mounting plate of an electric heater or the like may be clamped thereto with comparative ease.

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These and other objects are effected by my invention as will be apparent from the following description and claims taken in connection with the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a front elevation showing my invention embodied in an electrically heated water tank, only a fragmentary portion of the tank wall being shown;

Fig. 2 is a side elevation with the parts in exploded position, a fragmentary portion of the tank wall being shown;

Fig. 3 is a perspective view of the flanged coupling member; and

Fig. 4 is a fragmentary rear elevation of the flanged coupling member.

Referring to Figs. 1 and 2 of the drawing, there is shown an electric heating unit 10 fastened to the vertical wall 12 of a water tank. The heating unit is of the well-known type generally known as an immersion heater, having a U-shaped sheathed heating element 14 extending horizontally through an opening 16 in the tank wall and being adapted to be immersed in water contained therein. Thus, the heating element is adapted to heat water by direct conduction.

An annular coupling member 18 is attached to the tank in registry with the opening 16 and serves as the mounting means for fastening the heating unit 10 in fluid-tight relation with the tank. As best shown in Fig. 3, the coupling member has a central tubular portion 20 and a vertically disposed peripheral flange 22 disposed at one end of the tubular portion. The other end of the tubular portion has a peripheral shoulder 24 to facilitate proper positioning of the tubular portion 20 within the tank opening 16. The coupling member may be fastened to the tank wall in any desirable manner, for example, by welding as shown at 26.

The flange 22 of the coupling member is provided with a pair of upper slots 28 and a pair of lower slots 30 spaced substantially equidistantly and disposed above and below the horizontal centerline of the tubular portion, respectively. The upper slots 28 are open at their upper ends and extend downwardly in a radial direction toward their closed ends. Each lower slot 30 is open at its upper end and extends downwardly toward its closed end on a centerline A—A' which is disposed at an angle with the horizontal.

The heating unit has a circular mounting plate 32 fastened adjacent its terminals 34 and

provided with four holes 36 arranged to align with the slots 28 and 30 in the coupling member. The mounting plate 32 is held in clamped position against the coupling member 18 by a plurality of nuts 37 and bolts 38. The tubular portion 20 of the coupling member is provided with a flat chordal surface portion 39 disposed adjacent each of the slots 28 and 30. The bolts 38 are provided with square heads 40 of such dimensions that when the bolts are inserted in the mounting plate 32, the heads abut the flat portions 39 and are prevented from turning thereby. It will be noted from the drawings that the space between the flange 22 and the tank wall 12 is less than the length of the bolts and that the slots 28 and 30 permit placing the bolts with their heads 40 disposed between the flange 22 and the tank wall.

A gasket 41, having clearance holes for the bolts and the heating element 14, may be interposed between the mounting plate 32 and the coupling member to insure a fluid-tight fit. An annular clamping ring 42 may also be provided to distribute the pressure of the bolts 38 on the mounting plate.

To facilitate connecting the heating unit to a source of power, a circular terminal block 44 is attached to the mounting plate in any manner desired (not shown) and wire leads are brought out from the terminals 34 and attached to appropriate terminal screws 46.

*Assembly*

To assemble the heating unit to the tank, the bolts 38 are placed in the slots 28 and 30 with their heads 40 disposed between the coupling flange 22 and the tank wall 12. Since, as previously described, the slots are closed at the bottom and extend upwardly toward their open ends, the bolts 38 will be held against the closed ends of the slots by the action of gravity. In this position, the bolts are properly located to receive successively the gasket 41, the mounting plate 32 of the heating unit and the clamping ring 42. It will be noted that the flat portions 39 of the coupling member aid in retaining the bolts in their proper position by abutting the bolt heads 40 and limiting the tilting effect on the bolts. Thus, gravity acts to hold the bolts in the bottom of the slots and the bolt heads against the flat portions 39, minimizing the necessity for manually holding the bolts during assembly. The nuts 37 may then be threaded on the bolts to compress the gasket against the face of the coupling flange 22 to prevent leakage of water therethrough. The flat portions further serve to prevent rotation of the bolts while they are being tightened and eliminate the necessity for applying a wrench to the same, as well understood in the art.

To replace a heating unit, the structure may be disassembled by reversing the above sequence of operations and assembling a new heating unit as previously described. Since the bolts are automatically held in the proper position by the slots 28 and 30, the assembly operation is simplified and may be accomplished by any service man without the use of special tools or fixtures, even though the tank may be located in such a position as to hamper free use of both hands.

While I have shown my invention in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What I claim is:

1. A coupling member having a tubular portion and a peripheral flange disposed adjacent one end of said tubular portion, said flange being adapted to assume an operative position in a vertical plane and having a plurality of peripherally spaced slots, at least two of said slots being disposed below the horizontal centerline of said tubular portion, said coupling member being adapted to be coupled to a mating member by a bolt received in each of said slots, and said slots being closed at their bottom ends and extending upwardly therefrom at an angle to the horizontal to thereby retain the bolts in position to receive said mating member.

2. A coupling member having a tubular portion and a peripheral flange disposed adjacent one end of said tubular portion, said flange being adapted to assume an operative position in a vertical plane and having a plurality of peripherally spaced slots including at least two lower slots disposed below the horizontal centerline of said tubular portion, said coupling member being adapted to be coupled to a mating member by a bolt received in each of said slots, said tubular portion having a surface portion adjacent each of said lower slots arranged to abut the heads of said bolts to thereby prevent tilting or rotation of said bolts, said slots extending upwardly at an angle to the horizontal and being closed at their bottom ends to thereby retain the bolts in position to receive said mating member.

3. In combination, a coupling member and a mating member adapted to be clamped to said coupling member, said coupling member having a tubular portion and a flange portion disposed adjacent one end of said tubular portion, said flange being adapted to assume an operative position in a vertical plane and having upper and lower slots, said upper slots being disposed above the horizontal centerline of said tubular portion and said lower slots being disposed below said centerline, each of said slots being adapted to receive a bolt for clamping said coupling and said mating member together, each of said slots having an open end and a closed end and extending downwardly from said open end to said closed end at an angle to the horizontal to thereby retain the bolts in position to receive said mating member.

4. A coupling member having a tubular portion and a flange portion disposed adjacent one end of said tubular portion, said flange being adapted to assume an operative position in a vertical plane and having at least two peripherally spaced slots, each of said slots being disposed below the horizontal centerline of said tubular portion and on opposite sides of the vertical centerline of said tubular portion, said coupling member being adapted to be coupled to a mating member by a bolt received in each of said slots, said slots extending upwardly at an angle to the horizontal and being open at their upper ends and closed at their bottom ends to thereby retain the bolts in the bottom ends of the slots in proper position to receive said mating member.

5. An electric water heater comprising a tank having a vertical wall and an opening in said wall, a coupling member having a tubular portion fixedly attached to said wall in registry with said opening, an electric heater having a mounting plate clamped to said coupling member and having a heating element extending through said tubular portion into said tank, said coupling member having a peripheral flange disposed in a vertical plane adjacent said tubular

portion, said flange having upper and lower slots, said upper slots and said lower slots being disposed above and below the horizontal centerline of said tubular portion, respectively, each of said slots having a bolt received therein for clamping said mounting plate to said flange, said slots extending at an angle to the horizontal and having a closed bottom end to thereby retain the bolts in position to receive said mounting plate.

6. A water tank having a vertical wall provided with an opening, a coupling member having a tubular portion fixedly attached to said wall in registry with said opening and a peripheral flange disposed in a vertical plane adjacent said tubular portion, said flange being adapted to be clamped to an electric heater having a mounting plate, said flange having upper and lower slots disposed, respectively, above and below the horizontal centerline of the tubular portion, each of said slots having an open end and being adapted to receive a bolt for clamping said flange and said mounting plate together, each of said slots extending downwardly from said open end at an angle to the horizontal and having a closed bottom end to thereby retain the bolts in position to receive the mounting plate.

7. In combination, a vertical wall member having an opening therein, a coupling member having a tubular portion fixedly atached to said wall in registry with said opening, and a mating member adapted to be clamped to said coupling member, said coupling member having a flange portion disposed in a vertical plane adjacent one end of said tubular portion, said flange having upper and lower slots, said upper slots and said lower slots being disposed above and below the horizontal centerline of said tubular portion, respectively, a bolt extending through each of said slots for clamping said mating member to said flange, said bolts having their heads disposed between said flange and said wall, said flange being spaced from said wall a distance less than the length of said bolts, and each of said slots being disposed at an angle to the horizontal and having an open upper end and a closed bottom end to thereby retain the bolts in position to receive said mating member.



VINAL DALE THURSTON.


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