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MOUNTING ARRANGEMENT FOR SHEATHED HEATERS

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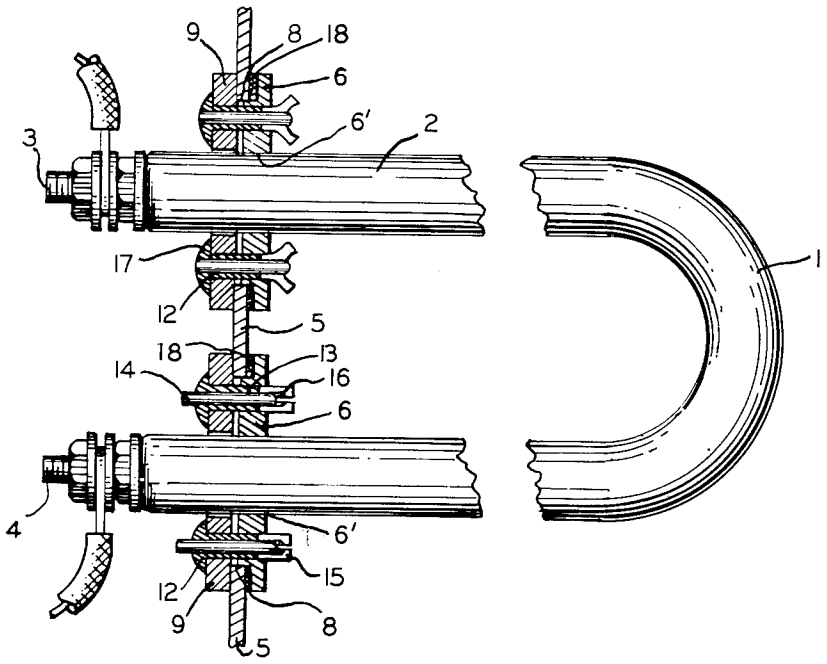


FIG. 1.

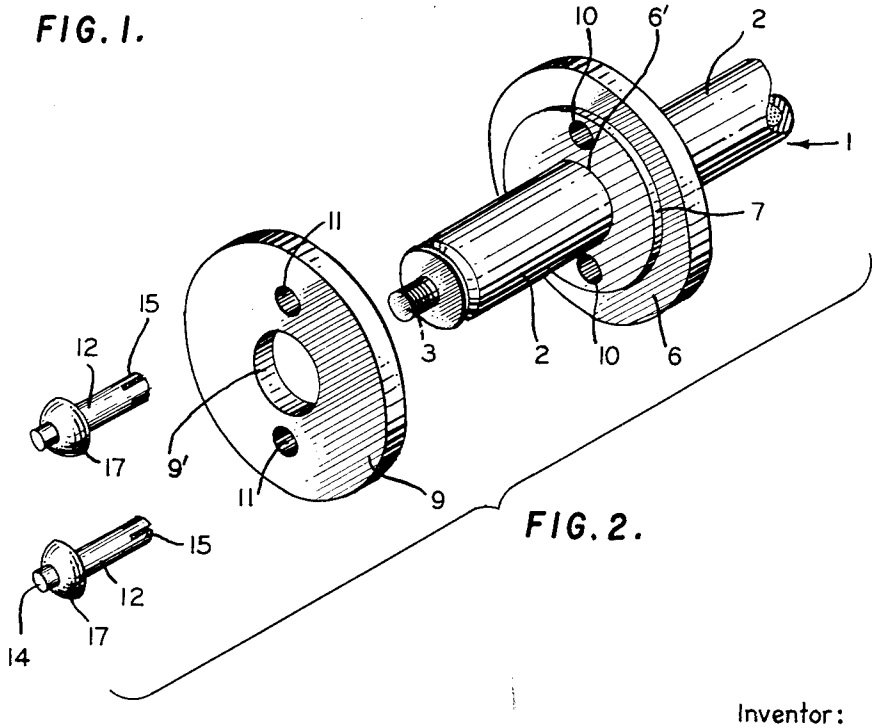


FIG. 2.

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MOUNTING ARRANGEMENT FOR SHEATHED HEATERS

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4 Claims. (Cl. 219—38)

My invention relates to electrical resistance heaters of the sheathed or encased type and has for its principal object the provision of an improved mounting arrangement therefor.

It is another object of my invention to provide an improved mounting arrangement for mounting sheathed heaters in panels or in walls of ducts, tanks, or other enclosures or receptacles into which they may be required to extend, which arrangement provides an inexpensive and mechanically rugged structure which is, nevertheless, susceptible to rapid and simple assembly and disassembly procedures.

Briefly stated, I provide, in accordance with one embodiment of my invention, a flange type mounting plate which is brazed or otherwise suitably attached to the outer sheath of the heater to be mounted, and which is provided with suitable alignment surfaces engageable with the defining surfaces of an aperture in a panel or wall of the duct, tank or other enclosure or conduit in which the heater is to be mounted. The mounting plate is constructed and attached to the heater so as to be engageable with the inner surface of the wall or plate in which the heater is to be mounted and form a closure for the aperture through which the heater extends.

A second plate member, having an aperture therein of a diameter greater than that of the heater sheath, is slipped over the terminal portion of the heater protruding from the external side of the mounting wall and is brought into engagement with the outer surface of the mounting wall. A series of aligned apertures are provided in the outer plate, the mounting wall and the inner mounting plate and drive rivets or other similar attachment means operable from the exterior side of the mounting wall are then inserted into the aligned apertures and caused to distend at their inner ends to draw the inner and outer mounting plates toward each other into clamping engagement against the mounting wall. In the event that a fluid tight closure is desired, a gasket or other sealing means may be inserted between the inner mounting plate and the inner surface of the mounting wall.

My invention will be better understood, and other objects and advantages thereof will be apparent from the following description taken in connection with the accompanying drawing, and its scope will be pointed out in the appended claims.

Referring to the drawing, Fig. 1 is a fragmentary elevational view, shown partly in cross section, of a sheathed heater, commonly referred to as the "hairpin" type, mounted in accordance with one embodiment of my invention with several of the securing rivets shown as they appear prior to distending; while Fig. 2 is an exploded perspective view of the elements forming the mounting structure of Fig. 1.

The heater shown in Fig. 1 and identified by the numeral 1, is of the sheathed or encased type in which a resistance heating element is enclosed in spaced, electrically insulated and heat conducting relationship with respect to an outer metallic sheath 2, through which terminal members 3 and 4 protrude at opposite ends thereof. There is shown in Fig. 1, a mounting wall or panel 5 through which the heater is to extend and on which it is to be mounted. It will be understood that the wall 5 may be part of a tank or duct or some other enclosure or receptacle in which the heater is to extend or it may form part of some other structure on which the heater 1 is to be mounted. It will be found however that the mounting arrangement of my invention is particularly well suited to applications of the former type, that is wherein it is desired to mount a heater with a portion thereof extending into a duct or receptacle of some kind whereto only a limited access can be gained.

Referring now to the particulars of the mounting arrangement illustrated in the drawing, in which like elements forming the mountings for the two terminal ends of the heater 1 are designated by like reference numerals, I provide, at each terminal end of the sheath 2, a mounting plate or flange 6 which is provided with a central aperture 6^1 allowing the plate 6 to be slipped over the sheath 2 and brazed or otherwise attached to the sheath as shown. The mounting plate 6 is provided with rabbeting surfaces, in this case, a cylindrical guide surface 7 which is shaped so as to be engageable with and form a closure for a mounting aperture 8 in the wall 5.

A second mounting or securing plate 9 is provided with a central aperture 9^1 which allows the plate 9 to be slipped over the terminal portion of the heater sheath 2 extending from the mounting aperture 8. The plates 6 and 9 are provided with apertures 10 and 11 which are positioned so as to be alignable within the diameter of the mounting aperture 8.

In order to attach the plates 6 and 9 in clamping relationship with respect to the wall 5, I provide attachment means which can be extended through the apertures 10 and 11 and into the interior of the receptacle or duct defined by the wall 5, and which can be caused to distend at their innermost ends by means operable from the exterior side of the wall 5 to thereby bring the plates 6 and 9 into clamping relationship with the wall 5.

In the present embodiment of my invention, I prefer to use drive rivets of the type which can be caused to distend at their innermost portions by driving a pin through the center of the rivet from the head portion thereof. For purposes of illustration, I have shown rivets 12 of this type, which are illustrated in the lower terminal mounting of Fig. 1 as they appear prior to distending.

The drive rivets are also shown prior to distending in the view of Fig. 2 and it will be seen from this illustration, and that of Fig. 1, that the rivet 12 is provided with a central core 13 into which a drive pin 14 extends. The end of the rivet is split into a series of bendable portions 15 and a tapered surface 16 is provided at the end of the core 13, against which surface the head of the pin may be driven to cause distension of the split end of the rivet by outwardly bending the split sections 15.

Prior to upsetting or distension of the inner end of the rivet, the pin 14 protrudes from the head 17 on the exterior side of the mounting wall 5 so that the flange 6 and the securing plate 9, when once positioned as shown, may be clamped against the wall 5 merely by inserting the rivets 12 into the aligned holes 10 and 11 and driving the pins 14 flush against the heads of the rivets as shown in the upper terminal structure of Fig. 1.

It will be realized that other types of attachment means may be employed which operate on a similar principle to the drive rivets shown in the drawing, that is, which are operable from the exterior side of the wall 5 to cause distension of the inwardly extending portions, thereby drawing the plates 6 and 9 into clamping engagement with the wall 5. By way of example, another type of attachment means which would be satisfactory comprises

a rivet operating on the aforementioned principle and commonly identified as a "explosive rivet," the operation of which type rivet is well known in the art.

The mounting arrangement just described may be employed in a wide variety of applications, among which are immersion heating installations and air duct heating systems, both of which involve the mounting of heaters in a wall or a panel with the terminals of the heater on the exterior side thereof and the heat generating portions of the heater extending into the interior of the duct or receptacle in which the heater is to be mounted. In the event that it is desired to utilize the mounting arrangement of my invention in immersion heating applications, it may be found desirable to employ a gasket **18** between the mounting plate **6** and the wall **5**, as shown in Fig. 1, in order to prevent leakage of the fluid being heated.

The heater **1** may be dismounted by merely driving the pins **14** completely through the rivets **12** and then prying the rivets out of the apertures by inserting a screwdriver, chisel or some similar tool under the head **17** of the rivet. Thus it will be seen that, with the mounting arrangement of my invention, the heater **1** may be readily and quickly mounted on and dismounted from the wall or panel **5**.

Further, it will be observed that my invention provides a mounting arrangement of very few parts, which parts are simple in design and inexpensive to manufacture.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. An arrangement for mounting a sheathed heater in a panel having an aperture therein through which said heater is to extend, said arrangement comprising a first mounting plate attached to the outer sheath of said heater and extending transversely therefrom to form a flange on said sheath, said first mounting plate being engageable with one side of said panel so as to form a closure for said aperture with said heater extending through said aperture, a second mounting plate having an aperture therein for allowing it to be moved over said sheath and into engagement with the opposite side of said panel, attachment means extendible through aligned apertures in said first and second mounting plates and in said mounting panel, and means operable from one side of said panel for causing distension of those portions of said attachment means extending through the mounting plate on the opposite side of said panel, whereby said first and second mounting plates are brought into clamping engagement with opposite sides of said mounting panel to secure said heater in said panel.

2. An arrangement for mounting a sheathed heater in the wall of a receptacle or other enclosure having an aperture therein through which said heater is to extend, said arrangement comprising a mounting flange attached to and extending transversely from said heater sheath, rabbeting surfaces on said flange engageable with said aperture to form a closure therefor when said flange is brought into engagement with one side of said wall with said sheath extending through said aperture, a securing plate having an aperture therein for allowing it to be moved over said sheath and into engagement with the opposite side of said wall, attachment means engageable with said securing plate and extendible through aligned apertures in said plate, said wall and said mounting flange, and means operable from the mounting plate side of said wall for causing distension of said attachment means on the opposite side of said wall and thereby clamp said flange and said securing plate on opposite sides of said wall to secure said heater in said wall.

3. An arrangement for mounting a sheathed heater in the wall of a receptacle or enclosure having an aperture therein through which said heater is to extend, said arrangement comprising a mounting flange attached to and extending transversely from said heater sheath near a terminal end thereof, rabbeting surfaces on said flange engageable with said aperture to form a closure therefor when said flange is brought into engagement with the inner side of said wall with said terminal end of said heater extending through said aperture, a securing plate having an aperture therein for allowing it to be moved over said sheath and into engagement with the outer side of said wall, attachment means including at least one member having a first portion thereon engageable with said securing plate and a second portion thereon extendible through aligned apertures in said plate, said wall and said mounting flange with a part of said second portion protruding from said flange into the interior of the receptacle or enclosure defined by said wall, and means operable from the outer side of said wall for upsetting and distending said protruding part of said member to thereby clamp said flange and said securing plate to said wall and secure said heater thereon.

4. An arrangement for mounting a sheathed heater in a panel having an aperture therein through which said heater is to extend, said arrangement comprising a mounting flange attached to and extending from said heater sheath near a terminal end thereof, rabbeting surfaces on said flange engageable with said aperture to form a closure therefor when said flange is brought into engagement with one side of said panel with said terminal end of said heater extending through said aperture and protruding from the opposite side of said panel, a securing plate having an aperture therein for allowing it to be moved over said protruding terminal end of said heater and into engagement with said opposite side of said panel, attachment means including at least one rivet having a head portion thereon engageable with said securing plate and a body portion extendible through apertures in said plate, said panel and said mounting flange with a portion of said rivet body protruding from said mounting flange, and means operable from the side of said panel engaged by said securing plate for upsetting and distending said protruding portion of said rivet body and thereby clamp said flange and said securing plate to said panel to secure said heater thereon.

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