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W. J. DZAACK  
ELECTRIC HEATING DEVICE  
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2,624,829

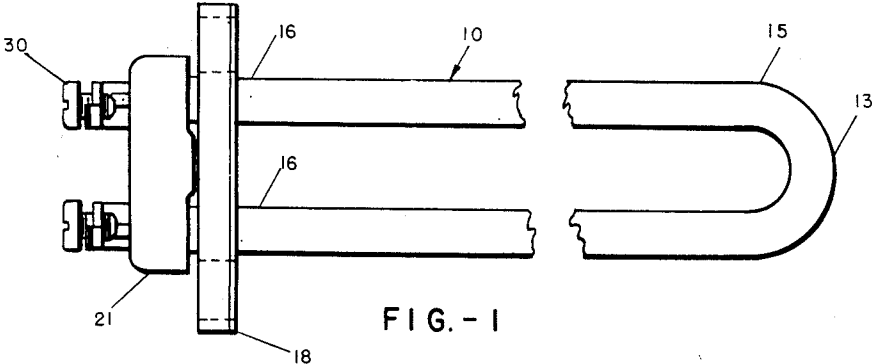


FIG. - 1

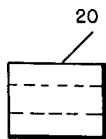


FIG. - 4



FIG. - 5

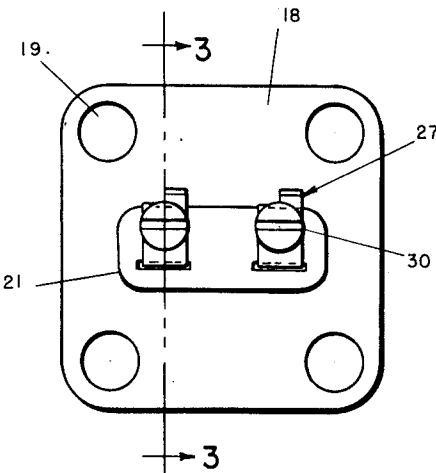


FIG. - 2

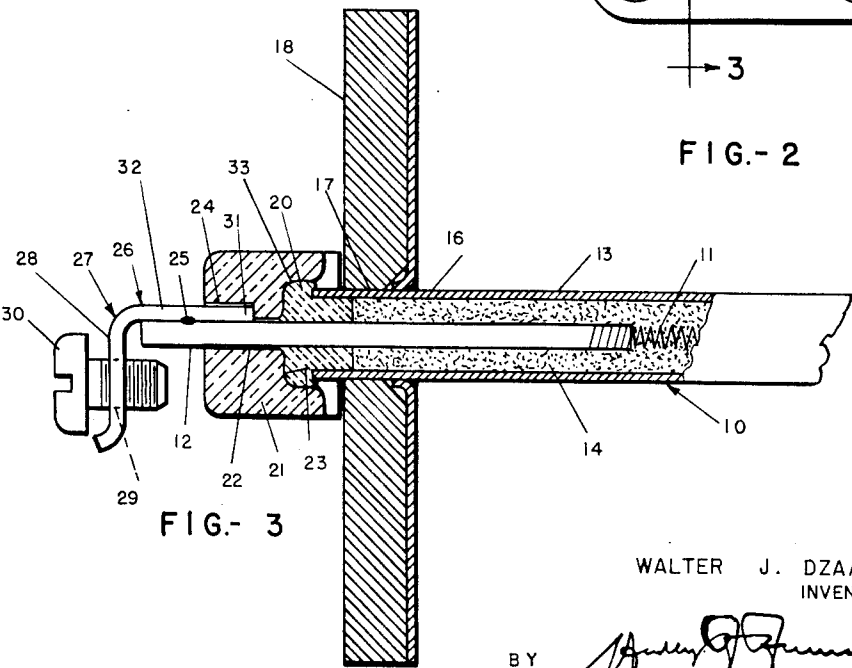


FIG. - 3

WALTER J. DZAACK  
INVENTOR

BY

*Walter J. Dzaack*  
ATTORNEY

## UNITED STATES PATENT OFFICE

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## ELECTRIC HEATING DEVICE

Walter J. Dzaack, Glenshaw, Pa., assignor to  
Edwin L. Wiegand Company, Pittsburgh, Pa.,  
a corporation of Pennsylvania

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2 Claims. (Cl. 219—38)

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My invention relates to electric heating devices, and the principal object of my invention is to provide electric heating devices comprising improved terminal provisions.

In the drawing accompanying this specification and forming a part of this application I have shown for purposes of illustration one form which my invention may assume, and in this drawing:

Figure 1 is a side elevation of a heating device embodying the illustrated form of my invention;

Figure 2 is a top view of the heating device of Figure 1;

Figure 3 is an enlarged partial section on the line 3—3 of Figure 2; and—

Figures 4 and 5 are respectively a side elevation and an end view of the closure body prior to application and deformation.

The heating device shown in the drawing is of the type commonly used for heating liquids, and comprises a heating element 10 including a resistor 11 designed for the passage of an electric current and the consequent generation of the desired heat, terminal pins 12 to which the ends of the resistor 11 are suitably secured, a sheath 13 suitable to the temperatures to be experienced and commonly of metal, and refractory material 14 embedding the resistor 11 and the inner ends of the pins 12 and serving both to electrically insulate the resistor and the pins and also to conduct the heat from the resistor to the sheath.

In the present embodiment the element 10 is bent upon itself, providing a body portion 15 suitable to be inserted into the liquid to be heated, as through an opening in the wall of the tank or other vessel in which the liquid is contained, and in furtherance of this arrangement the two substantially parallel end portions 16 are pressed or otherwise secured fluid-tight in openings 17 in a plate 18 containing further openings 19 by means of which the plate 18 may be bolted or otherwise suitably secured to the wall of the tank or other vessel marginally of the opening through which the body portion 15 has been inserted.

According to the present embodiment the refractory material 14 is not extended to the ends of the sheath, or is routed out short of the ends of the sheath, and the heater is provided with closure means including resiliently deformable closure bodies 20 initially of the form shown in Figures 4 and 5 and preferably formed of a suitable silicone rubber, and a holding body 21 pro-

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vided with transversing apertures 22 through which the terminal pins 12 extend, and with inner-face recesses 23 into which the closure bodies 20 are received, and pressed into position deforming the closure bodies 20 and causing them to fill the recesses 23, overlies the ends of the sheath terminal portions 16, and closely engage both the peripheral surfaces of the terminal pins 12 and the interior walls of the sheath terminal portions 16.

In the present embodiment the holding body 21 is further provided with outer-face recesses 24 laterally adjoining and open to the respective apertures 22, and suitably secured to the terminal pins 12, as by welding at 25, are connection terminals 26 each comprising a strip 27 bent intermediately at substantially a right angle, provided in its outer section 28 with a screw-threaded aperture 29 receiving a binding screw 30 adapted for the attachment of a supply conductor, and each having the inner end 31 of its inner section 32 seated in the respective recess 24 of the holding body 21 and thereby operating to maintain the holding body 21 in assembled position.

With the described construction, the interrelation between the outer portions 33 of the closure bodies 20 and the holding body inner-face recesses 23 operates to retain the holding body 21 also against movement parallel to the plate 18, and the interrelation between the terminal pins 12 and connection terminal inner ends 31 and the respective apertures 22 and recesses 24 operates to hold the connection terminals 26 and terminal pins 12 against rotation upon application or removal of the supply conductors.

From the foregoing those skilled in the art will appreciate that the described embodiment accomplishes at least the principal object of my invention. However, obviously various changes may be made, and therefore it is to be understood that the present disclosure is illustrative only, and that my invention is not to be regarded as limited thereto, but to be defined by the claims herebelow set forth.

Wherefore I claim:

1. A sealing closure for an electric heating device having resistor means including a terminal and sheath means generally enclosing said resistor means and provided with a tubular portion defining an opening through which said terminal extends, said closure comprising a mass of yieldable rubber-like material disposed within said opening and in sealing engagement with the adjacent inner wall surface of said tubular por-

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tion and the adjacent surface of said terminal, said material extending outwardly of said opening, and a member overlying said opening and having a recess providing a surface encompassing said tubular portion and shaping the outwardly extending rubber-like material about and against the terminal end and the adjacent outer wall surface of said tubular portion.

2. A sealing closure for an electric heating device including a terminal, tubular sheath means generally enclosing said resistor means and having an open end through which said terminal extends, and heat-conducting electric-insulating material insulating said resistor from said sheath means, said insulating material terminating short of said open end to form with the sheath means a pocket, said closure comprising a mass of yieldable rubber-like material disposed within said pocket and in sealing engagement with the adjacent inner wall surface of

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said sheath and the adjacent surface of said terminal, said rubber-like material extending outwardly of said pocket, and a member overlying said pocket and having a recess providing a surface encompassing the tubular open end of said sheath and shaping the outwardly extending material about and against the terminal end and the adjacent outer wall surface of said tubular open end.

WALTER J. DZAACK.

## REFERENCES CITED

The following references are of record in the file of this patent:

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