

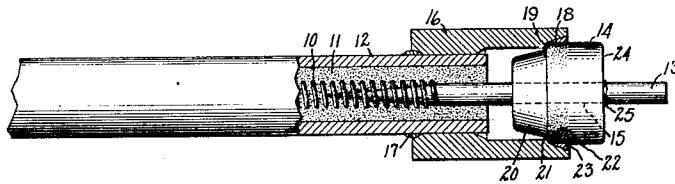
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ELECTRIC HEATER

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2,003,176

ELECTRIC HEATER

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Original application August 12, 1933, Serial No.
684,839. Divided and this application Novem-
ber 10, 1934, Serial No. 752,433

1 Claim. (Cl. 201—67)

My invention relates to electric heaters and the like, and it has for its object the provision of improved means for sealing the terminals of heaters of this type.

5 Although not limited thereto, my invention has particular application to electric heaters of the encased or sheathed type, such as described and claimed in the United States Patent No. 1,367,341 to C. C. Abbott, dated February 1, 1921. As there
10 described, heaters of this type comprise a resistance conductor embedded in an insulating material and enclosed by an outer metallic protective casing.

15 In one of its aspects, my invention contemplates the provision of improved means for sealing the terminals of electric heaters of this type whereby the heaters are rendered impervious to moisture, oil, gas, and like fluids.

20 In carrying my invention into effect in one form thereof, I surround each terminal of the heater with an insulating body formed of some suitable material, such as porcelain. This body may be in the form of a sleeve that is provided with an aperture for receiving the terminal. The
25 insulating sleeves are received in metallic cup-shaped casings that are applied to the ends of the sheath, and metallic fluid impervious joints are provided between the sleeves and the casings, as well as between the sleeves and the terminals
30 to which the sleeves are applied. Also, fluid-tight joints are provided between the casings and the sheath.

35 This application is a division of my copending application, Serial No. 684,839, filed August 12, 1933.

For a more complete understanding of this invention, reference should be had to the accompanying drawing in which the single figure is a fragmentary elevation of a sheathed electric
40 heater provided with a terminal seal arranged in accordance with my invention, portions of the heater being shown in section so as to illustrate certain details of construction.

Referring to the drawing, I have shown my
45 invention as applied to a helical coil sheathed electrical heating unit of the type described and claimed in the above-mentioned Abbott Patent No. 1,367,341.

As shown, this heating unit comprises a helical
50 resistance conductor 10 embedded in a compacted mass of powdered heat refractory electrically insulating material 11, the conductor and insulating material being encased by a metallic sheath 12.

55 The resistance conductor 10 extends through

a considerable portion of the length of the sheath 12 and has its two ends connected to terminal members 13 (only one of which is shown), which members project from the ends of the sheath.

While the resistance conductor 10 may be connected to its terminals 13 in any suitable manner, I prefer to connect them in the fashion described and claimed in United States Patent No. 1,494,936 to C. C. Abbott, dated May 20, 1924. As there described, each terminal member 13 has
10 its inner ends threaded and is electrically and mechanically connected with the resistance conductor 10 by screwing a number of the end turns of the conductor onto the threaded end of the terminal.

15 In making the heating unit thus far described, the terminals 13 are attached to the conductor 10 in the manner described, and then the conductor with the terminals attached is threaded through the sheath 12. The sheath is then loaded 20 with the magnesium oxide 11 in any suitable manner, and then its diameter is reduced, as by swaging or by rolling, so as to highly compact the magnesium oxide.

In order to render the heater impervious to the
25 passage of fluids through the terminals, I surround each terminal with a layer or a sleeve 14 formed of some suitable electrically insulating material, such as porcelain. The porcelain sleeve 14, as shown, is provided with a centrally arranged aperture 15 for receiving the terminal 13.

A cup-shaped casing or receptacle 16 is used to receive each insulating sleeve. As shown, the cylindrical casing 16 is fitted to the end portion of the sheath 12. The cup 16 is secured to the
35 sheath 12 by means of a brazed joint 17 which provides a fluid-tight connection between these members. The terminal 13 passes through the cup 16 and extends for some distance beyond the mouth of the cup. As shown, the sleeve 14 is inserted in the mouth of the cup. Preferably, the mouth of the receptacle 16 will be tapered, as indicated at 18, the taper terminating in a seat 19 for receiving the insulator. The insulator preferably will be formed with a tapered portion 20
45 which extends for some distance into the receptacle 16, and the insulator will be provided with a ledge 21 which rests upon the seat or shoulder 19. The projecting portion 20 increases the electrical creepage space between the terminal 13
50 and the metallic casing 16 and sheath 12.

Fluid-tight metallic joints are provided between the insulator 14 and the receptacle 16 and between the insulator and the terminal 13. For this purpose, the insulator 14 is provided with a 55

band of metal 22 surrounding that portion of the insulator which is received within the recess 18. As shown, this metallic band 22 has a width substantially equal to the depth of the recess. This metal coating is applied to the insulator in any suitable manner. Thus, the band may be formed by any well-known metallizing process. For example, if the layer of metal be formed of platinum, and this is a preferred metal, the layer may be applied by any well-known platinizing process. The important feature is that the metal be applied by some method which will practically integrally unite the metal with the porcelain sleeve 14, and that the metal applied be of such a character that it can be united with the terminal 13 and the metal cup 16.

The coating 22 on the insulator is soldered to the walls of the receptacle so as to form a fluid-impervious metallic joint 23 between these members.

The outer end surface of the insulator is provided with a metallic coating 24 substantially covering this surface of the insulator. This coating 24 is soldered to the terminal 13 so as to provide a fluid-impervious metallic joint 25 between these members.

It will be observed that the receptacle 16 is connected to the sheath 12 by means of the fluid-tight joint 17, while the insulating sleeve 14 is connected to the receptacle 16 by means of the fluid-tight joint 23 and with the terminal by the fluid-tight joint 25.

It will be understood that any suitable terminal

connector (not shown) may be secured to the portion of the terminal 13 that projects from the insulating sleeve 14.

While I have shown a particular embodiment of my invention, it will be understood, of course, that I do not wish to be limited thereto since many modifications may be made, and I, therefore, contemplate by the appended claim to cover any such modifications as fall within the true spirit and scope of my invention.

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

An electric heater comprising a resistance conductor, a metallic sheath encasing said conductor, a terminal connected with said resistance conductor having a portion projecting from said sheath, a metallic casing surrounding said terminal positioned in spaced relation with it, a fluid-tight joint between said casing and said sheath, an electrically insulating sleeve surrounding said terminal and received in said casing, a metallic band surrounding a portion of said sleeve within said metallic casing and rigidly secured to said sleeve, a metallic layer covering the outer surface of said sleeve rigidly secured to the sleeve, and metallic masses united into substantially homogeneous structures with said metallic band and the inner walls of said metallic casing and with said metallic layer covering the outer surface of said sleeve and said terminal, whereby a fluid-tight joint is effected between said terminal and said metallic casing.

LORETTA M. DALY.