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BASEBOARD HEATER ASSEMBLY

Filed March 16, 1959

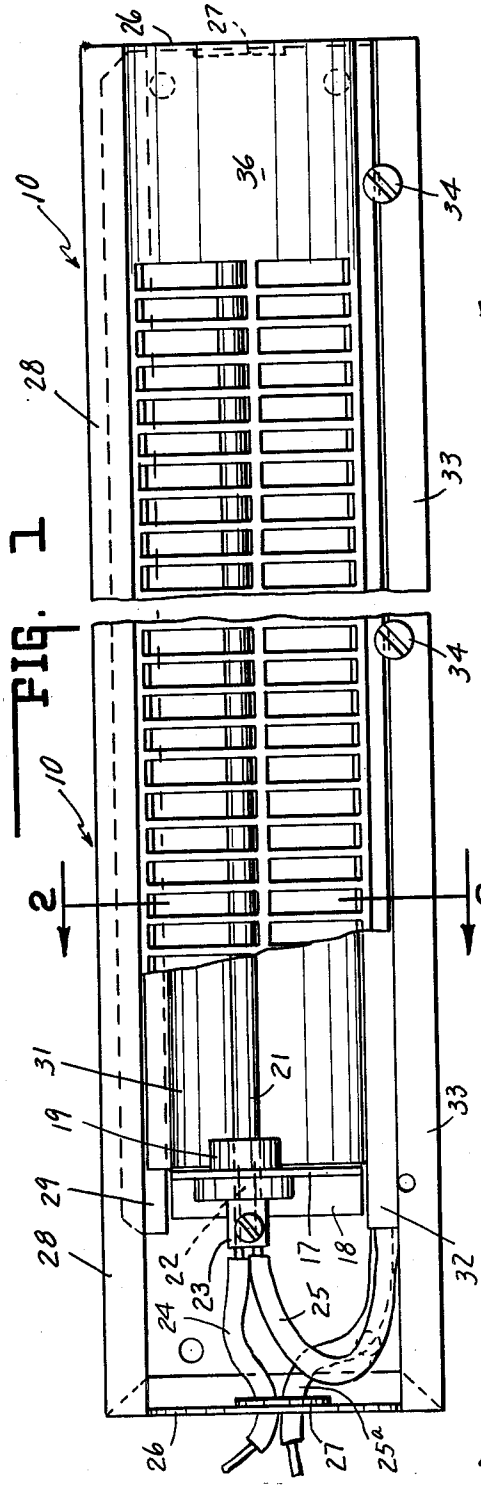


FIG. 1

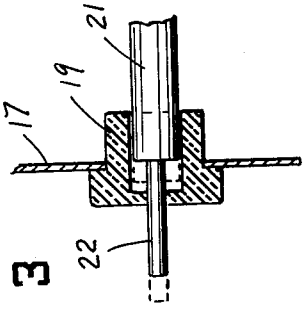


FIG. 3

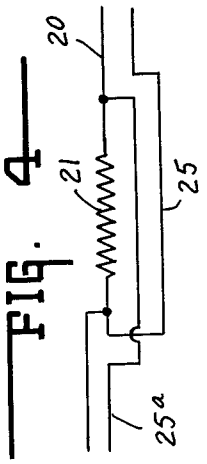


FIG. 4

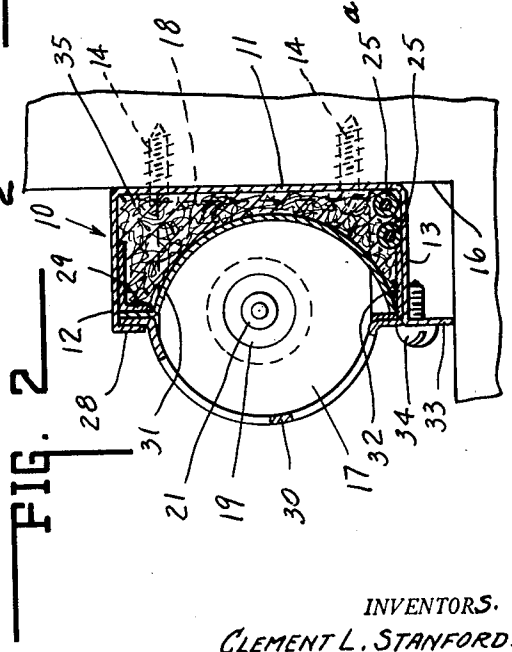


FIG. 2

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BASEBOARD HEATER ASSEMBLY

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1 Claim. (Cl. 219—34)

This invention relates generally to baseboard heaters and particularly to baseboard heater assemblies of the electrical radiant heating type.

This application is a continuation-in-part of our copending application, Serial No. 684,138, filed September 16, 1957 and titled "Baseboard Heater Assembly" now abandoned.

With the increased availability of electrical service in rural areas, the use of electrical radiant heating units, such as those of the baseboard type has become widespread. In order that installations using electrical radiant heat may be competitive with heating installations of more conventional type, such as oil or gas fired warm air heating installations, the thermal output of the electric heating elements must be utilized with a high degree of efficiency. In electrical radiant heating assemblies this means that the radiant heat provided by the heating element must be properly directed into the room to be heated and the heating unit or assembly must be properly insulated thermally to permit only the minimum heat loss.

The present invention provides a baseboard heater assembly which utilizes a sheathed heating element. This type of heating element is conventionally used in industrial ovens and as top elements in domestic electric ranges. In these applications, they are conventionally operated either at or well above the glow point of the metal sheath and require a 220 volt power input. The apparatus of the present invention utilizes a sheathed element but operates it at a much lower wattage input so that, in use, the heating element does not attain a temperature equal to the glow point of the sheath. Since the heating element is operated at relatively low wattage, a concave reflector, and adjacent thermal insulation cooperate to provide efficient direction and utilization of the heat produced by the heating element. The portion of the assembly accommodating the insulation further provides a convenient conduit for the lead wires which permit the heater assembly to be connected in parallel with adjacent assemblies.

One particularly troublesome problem in the use of sheathed type heaters in baseboard heater assemblies involves the provision of some means for permitting thermal expansion of the heating element without undue stress therein. The element must be properly supported; however, rigid clamping of the elment has proven to be unsatisfactory in that, since no allowance is made for thermal expansion, the repeated stressing of the metal sheath eventually causes metal fatigue and, consequently, failure of the heater element. The provision of a means for supporting the heater element which allows for expansion of the elment is an important factor in adapting sheathed heater elements to baseboard heater assemblies.

The primary object of the present invention is to provide a baseboard heater assembly utilizing ceramic cradle members which permit rigid support of a sheathed heating element while permitting expansion of the element when energized.

It is a further object of the present invention to provide a baseboard heater assembly in which a concave reflector plate and thermal insulation are disposed within the assembly to provide an efficient radiation of radiant heat into the room to be heated with a minimum of heat loss.

A further object of the present invention is to provide a baseboard heater assembly which may be easily installed, wired and serviced, a guard-grille being removable from the assembly to provide access to the heating element and to wiring compartments at each end of the assembly.

These and other objects will become apparent as the the description proceeds with reference to the accompany drawings in which:

FIG. 1 represents a front view, with portions broken away, of a baseboard heating assembly embodying the present invention, and

FIG. 2 is a sectional view taken generally along the line 2—2 of FIG. 1.

FIG. 3 is an enlarged sectional view of the supporting means for the heater element.

FIG. 4 is a schematic wiring diagram of the assembly.

Referring to the drawings there is shown generally at 10 a housing which is channel-shaped, in cross section, having a web portion 11 and side-walls 12 and 13. The web portion is provided with suitable openings connected to accommodate mounting screws 14 serving to attach the housing to a wall surface 16.

Adjacent each of its ends, the housing carries brackets 17 (only one of which is shown in FIG. 1), the brackets having a base 18 which may be rigidly secured to the web portion of the housing by any suitable means such as spot-welding. Each of the brackets, disposed adjacent opposite ends of the housing, carries a ceramic insulating sleeve 19 into which a heating elemnts 21 freely extends. The heating element is of the conventional sheathed type in which a Nichrome wire extends through the metal sheath surrounded by impacted quartz or similar material. A conductor 22, internally connected to the Nichrome wire, extends from the heating element and freely through a reduced diameter aperture in the outer end of the sleeve 19 as will be evident from FIG. 3. The extending end of conductor 22 is connected by means of a solderless connector 23 to wires 24 and 25.

The connectors 23 are positioned so as to closely abut the outer end face of the ceramic sleeves 19 thereby rigidly supporting the element 21 when in deenergized condition. Upon heating of element 21, it will expand to a position such as that indicated in broken lines in FIG. 3. Since the element 21 and the conductor 22 extend freely through the apertures in the ceramic sleeve, such expansion places no compressive stress on the heating elements. The ceramic sleeves thus form cradles or expansion chambers for the ends of the heating element.

Each of the end walls 26 of the housing is provided with a knockout opening 27 to permit entry of service wiring. It will be understood that the space between the brackets, similarly locating at each end of the housing, and the housing end walls provides wiring compartments, with the bus wires 24 and 25*a* entering the left-hand compartment through the knockout opening. Wire 24 is connected to one of the connectors 23, the opposite end counterpart of this connector being connected to wire 20 as shown in FIG. 3. As may be seen in FIGS. 2 and 4, wire 25, also connected to connector 23, and wire 25*a* extend along the base of the housing and into the opposite wiring compartment, wire 25*a* being connected to the opposite end of the heating element. The wires 20 and 25 are available for connection to an adjoining heater unit when the units are installed as sections of a complete assembly.

As may be seen in FIG. 2 the extremity of the sidewall 12 is provided with a downwardly turned flange 28. A member 29, L-shaped in cross section, is mounted upon the housing in a position spaced rearwardly somewhat from the flanged outer margin of the housing. Re-

ceived within the slot thus formed are the upstanding ends of a concave reflecting plate 31 and a convex guard-grille 30. The reflector plate extends across the housing with its lower edge abutting an upstanding flange provided by a member 32, similar in configuration to the member 29, and rigidly attached to the housing. The space between the reflector plate and the housing walls is suitably packed with thermal insulating material 35 to minimize the transfer of heat to the housing.

The lower extending portion of the housing is provided with a down-turned marginal flange 33 adapted to receive locking screws 34 which serve to hold the downwardly extending lower margin of the grille in position across the face of the housing.

The grille is provided with a perforated central area overlying the heating element and with closed end-sections 36 (only one of which is shown in FIG. 1) which overlie the wiring compartments.

In operation, with the heating element energized and at its operating temperature, the heat radiated against the reflector plate will be reflected from the surface thereof and directed back through the grille into the room to be heated. The thermal insulating material filling the space between the rear face of the reflector plate and the housing limits the loss of heat by conduction and prevents excessive temperature rise of the housing surfaces.

Convenient access to the wiring compartments and to the heating element may be accomplished by removal of the locking screws and withdrawal of the upper margin of the guard-grille from the between the enclosing flanges provided upon the upper extending portion of the housing.

While the invention has been disclosed and described in some detail in the drawings and foregoing description, they are to be considered as illustrative and not restrictive in character, as other modifications may readily suggest themselves to persons skilled in this art and

within the broad scope of the invention, reference being had to the appended claim.

The invention claimed is:

An electrical baseboard heating unit comprising an elongated housing, said housing being channel-shaped in cross section with its web portion adapted to be rigidly mounted upon a wall of a room to be heated, brackets carried by said housing adjacent each of its ends, an elongated electric heating element of the sheathed type adapted to be supported between said brackets and longitudinally within said housing, said brackets including ceramic members each having a central bore therein aligned with the axis of the heating element and sized to slidably receive the heating element ends, said bores being of reduced size adjacent the outer ends of said ceramic members to accommodate the reduced diameter terminal portions of said heating element, said ceramic members thereby forming cradle and expansion chambers for the opposite ends of said heating element, a concave reflector plate supported at the extremities of the extending portions of the housing and disposed between the housing and said heating element, thermal insulating means backing said plate, and a concave guard-grille coextensive with said housing and removably mounted across the open face thereof.

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