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E. W. MENG ETAL

3,171,945

RADIANT HEATER

Filed April 16, 1962

2 Sheets-Sheet 1

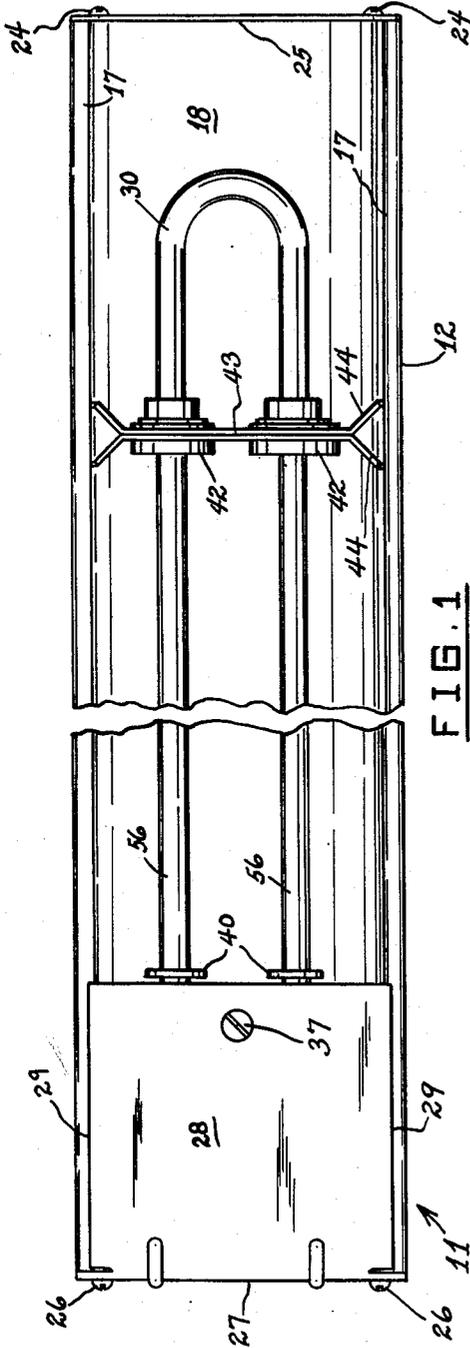


FIG. 1

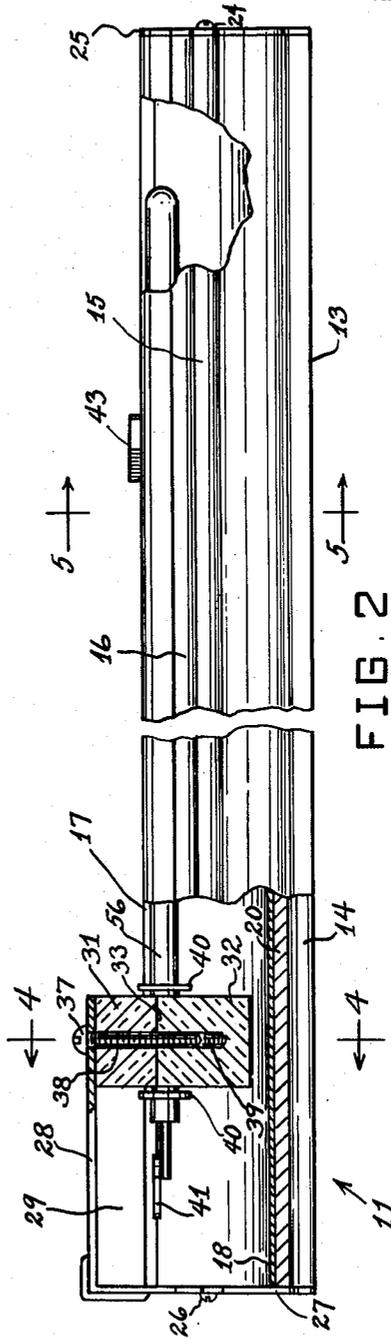


FIG. 2

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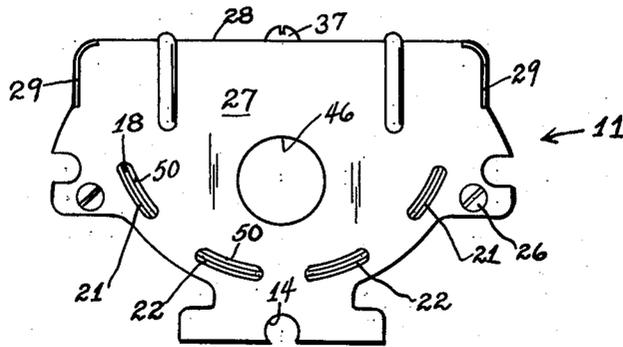


FIG. 3

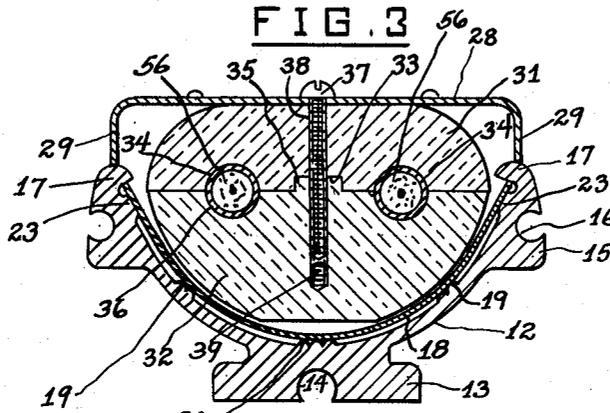


FIG. 4

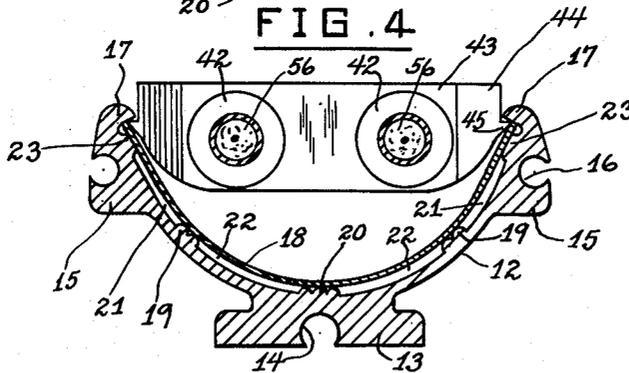


FIG. 5

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RADIANT HEATER

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3 Claims. (Cl. 219—347)

This invention relates to electric radiant heaters, and more particularly to radiant heaters of the type utilizing a sheathed elongated electric heating element mounted in a channel-shaped reflector.

A main object of the invention is to provide a novel and improved radiant heating device which is relatively simple in construction, which is easy to install, and which is provided with efficient ventilating means so that its temperature will never become excessive.

A further object of the invention is to provide an improved radiant heating device of the type utilizing an elongated sheathed electric heating element mounted in a channel-shaped reflector housing, said device being relatively inexpensive to manufacture, being rugged in construction, being provided with means for externally housing associated wiring so that said wiring will be protected against mechanical damage as well as being retained adjacent the device, and being further provided with means defining an air cooling jacket between the main body and the reflector element thereof through which cooling air may flow continuously from one end to the other of the device.

A still further object of the invention is to provide an improved radiant heating device of the type utilizing an elongated sheathed heating element in a channel-shaped reflector, said device involving a minimum number of parts, being arranged to allow free thermal expansion of its heating element, and being easily assembled and disassembled, as required.

Further objects and advantages of the invention will become apparent from the following description and claims, and from the accompanying drawings, wherein:

FIGURE 1 is a fragmentary plan view of an improved radiant heating device constructed in accordance with the present invention.

FIGURE 2 is a fragmentary side elevational view, partly in vertical longitudinal cross-section, of the radiant heating device of FIGURE 1.

FIGURE 3 is an enlarged end elevational view of the radiant heating device of FIGURES 1 and 2.

FIGURE 4 is an enlarged transverse vertical cross-sectional view taken on the line 4—4 of FIGURE 2.

FIGURE 5 is an enlarged transverse vertical cross-sectional view taken on the line 5—5 of FIGURE 2.

Referring to the drawings, 11 generally designates an improved radiant heating device according to the present invention. The device 11 comprises a generally channel-shaped main body 12, which may be of extruded metal, such as extruded aluminum. As shown in FIGURES 4 and 5, the body 12 may be substantially parabolic in transverse cross-section and is integrally formed with the flanged head portion 13. Said head portion is formed with the longitudinal, undercut groove 14, of generally circular cross-section, which is employed as an integral externally facing housing for receiving electrical conductors associated with the device, thus protecting the conductors from mechanical damage as well as neatly retaining them adjacent to the device. It will be noted that the groove 14 is accessible from the outside of the device so that easy and convenient access to the conductors is provided, thus facilitating the installation or dismantling of said device.

Body 12 is also integrally formed at its opposite side margins with thickened ribs or flanges 15, 15, said flanges

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being provided with generally circular, outwardly facing, undercut longitudinal grooves 16 similar to groove 14.

The external contour of body 12 is thus shaped so that it has a relatively large outside cooling surface area, thereby aiding in dissipating heat therefrom.

The main flanges or ribs 15, 15 are formed at their top ends, as viewed in FIGURES 4 and 5, with inwardly directed hook-shaped subflanges 17, 17 against which abut the respective side edges of a thin sheet metal reflector 18, of suitable non-tarnishing, heat-resistant metal, such as stainless steel, or the like, whereby the reflector 18 is resiliently locked against a plurality of spaced longitudinally extending groups of integral spacer ribs or projections 19, 20 and 19 formed on the inside surface of body 12, thereby defining a plurality of longitudinally extending air flow conduits 21, 21 and 22, 22 between reflector 18 and the major portion of said inside surface. Terminal longitudinal spacer ribs 23, 23 are integrally formed in body 15 adjacent subflanges 17, 17, as is clearly shown in FIGURES 4 and 5.

Transversely secured to one end of body 12 by a pair of fastening screws 24, 24 is a plate-like end wall 25 conforming generally to the external contour of said body. Secured to the opposite end of body 12, as by fastening screws 26, 26, is another plate-like end wall 27 of similar external contour. End wall 27 is integrally formed with the inwardly directed upwardly offset flange 28, as shown in FIGURES 1 and 2, which overlies the end portion of body 12 adjacent wall 27. Flange 28 is provided with the depending side wall portions 29, 29 whose lower edges substantially engage on the top surfaces of the subflanges 17, 17, as shown in FIGURE 4.

Designated at 30 is a conventional elongated U-shaped sheathed heating element which is mounted in the main body 12 in the manner illustrated in FIGURES 1, 2, 3 and 4. The end portions of the legs of element 30 are secured between a pair of supporting blocks 31 and 32 of ceramic refractory material. As shown in FIGURES 2 and 4, the upper block 31 is formed in its bottom surface with a central rectangular longitudinal groove 33 and with a pair of semi-cylindrical grooves 34, 34 parallel to and spaced symmetrically on opposite sides of groove 33. The lower block 32 is provided with an upstanding rectangular longitudinal central rib 35 which is received in groove 33, and is provided with symmetrically arranged semi-cylindrical grooves 36, 36 registering with the grooves 34, 34. The legs 56, 56 of the element 30 are received between the registering pairs of grooves 33, 36. A fastening screw 37 extends through flange 28 and a central bore 38 in block 31 and is threadedly engaged in a tapped bore 39 in the lower block 32.

Respective pairs of stop collar elements, such as washers 40, 40, are secured on the legs 56, 56 adjacent the front and rear sides of the supporting blocks 31, 32 to limit longitudinal movement of the legs relative to the blocks.

The ends of the heater element 30 are provided with conventional terminals 41 adapted to be connected to the current supply wires associated with the assembly.

Legs 56 extend supportingly through respective ceramic bushing assemblies 42, 42 mounted in a transversely extending supporting bracket 43 of suitable heat-resistant metal. The bracket 43 is disposed in the body 12 adjacent the bight portion of element 30, as shown in FIGURE 1. Said bracket is provided at its ends with resilient divergent pairs of flanges 44, 44 formed with generally triangular locking lugs 45 which lockingly engage beneath the in-turned subflanges 17, 17, as shown in FIGURE 5, to secure the bracket 43 in the channel-shaped main body 12, with the heating element 30 supported in the body in a position substantially parallel to the plane of the top sur-

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faces of the subflanges 17, 17, as is clearly apparent from FIGURES 1 and 5.

The end walls 25 and 27 are formed with arcuate slots 50 registering with the ventilation channels 21, 21 and 22, 22, whereby said channels are freely exposed to atmosphere at their opposite ends, and whereby free flow of cooling air is provided from one end of the assembly to the other in the space between the reflector 18 and the main body 12. This, together with the provision of extended external cooling surface of the body, as above described, assures safe and relatively cool operation of the assembly.

The assembly may be mounted in any suitable position or orientation providing the desired free flow of cooling air by convection through the space between the reflector 18 and the main body 12.

The end wall 27 is formed with a circular opening 46 adapted to receive a conventional BX cable connector.

While a specific embodiment of an improved electric radiant heater assembly has been disclosed in the foregoing description, it will be understood that various modifications within the spirit of the invention may occur to those skilled in the art. Therefore it is intended that no limitations be placed on the invention except as defined by the scope of the appended claims.

What is claimed is:

1. A radiant heater comprising a channel-shaped main body, respective transverse end walls secured to the ends of said main body, one of said end walls being integrally formed with a plate-like flange offset from and extending over the adjacent end portion of the main body, a pair of superimposed supporting blocks of refractory material at a location spaced inwardly from said one end wall, a fastening bolt depending from said flange and extending through one of said blocks and threadedly engaged in the subjacent block, whereby to clampingly secure the blocks in said main body, an elongated electrical heating element of the sheathed type having one end portion thereof supportingly engaged between said blocks, a bracket member transversely mounted in the main body and supportingly engaging the opposite end portion of the heating element, the inside surface of said main body being formed with a plurality of spaced continuous longitudinal ribs, respective inwardly directed hook-shaped flanges at the longitudinal edges of said main body, and a thin metal reflector disposed in said main body in contact with said ribs and with its longitudinal edges lockingly engaged in said hook-shaped flanges, whereby to define a plurality of continuous longitudinally extending ventilating air passages between the reflector and the inside surface of said main body, said end walls being formed with apertures registering with said air passages, whereby free longitudinal flow of air is provided from one end of the assembly to the other in the space between the reflector and the main body.

2. A radiant heater comprising a channel-shaped main body, respective transverse end walls secured to the ends of said main body, one of said end walls being integrally formed with a plate-like flange offset from and extending over the adjacent end portion of the main body, a pair of superimposed supporting blocks of refractory material at a location spaced inwardly from said one end wall, a fastening bolt depending from said flange and extending through one of said blocks and threadedly engaged in the subjacent block, whereby to clampingly secure the blocks in said main body, an elongated generally U-shaped elec-

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trical heating element of the sheathed type having the terminal end portions of its legs supportingly engaged between said blocks and projecting into the space between said blocks and said one end wall, whereby said space may house the connections of said terminal end portions to current supply wires, stop means on the legs of said heating element located outwardly adjacent the respective opposite transverse sides of the blocks and limiting end-wise movement of said legs, a bracket member transversely mounted in the main body and supportingly engaging the opposite end portion of the heating element, the inside surface of the main body being formed with a plurality of continuous spaced longitudinal ribs, respective inwardly directed hook-shaped flanges at the longitudinal edges of said main body, and a thin metal reflector disposed in said main body in contact with said ribs and with its longitudinal edges lockingly engaged in said hook-shaped flanges, whereby to define a plurality of longitudinally extending continuous ventilating air passages between the reflector and the inside surface of said main body, said end walls being formed with apertures registering with said air passages, whereby free longitudinal flow of air is provided from one end of the assembly to the other in the space between the reflector and the main body.

3. A radiant heater comprising a channel-shaped main body, respective transverse end walls secured to the ends of said main body, one of said end walls being integrally formed with a plate-like flange offset from and extending over the adjacent end portion of the main body, a pair of superimposed supporting blocks of refractory material subjacent said flange and spaced from said one end wall, said blocks having abutting surfaces located in a plane substantially parallel to said flange, depending bolt means extending through the flange and the uppermost block and secured to the lowermost block, whereby to fasten the blocks beneath the flange, an elongated electrical heating element of the sheathed type having one end portion thereof supportingly engaged between the blocks, a bracket member transversely mounted in the main body and supportingly engaging the opposite end portion of the heating element, the inside surface of said main body being formed with a plurality of spaced longitudinal ribs, and a thin metal reflector secured in said main body in contact with said ribs, whereby to define a plurality of longitudinally extending ventilating air passages between the reflector and the inside surface of said main body, said end walls being formed with apertures registering with said air passages, whereby free longitudinal flow of air is allowed from one end of the assembly to the other in the space between the reflector and the main body.

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