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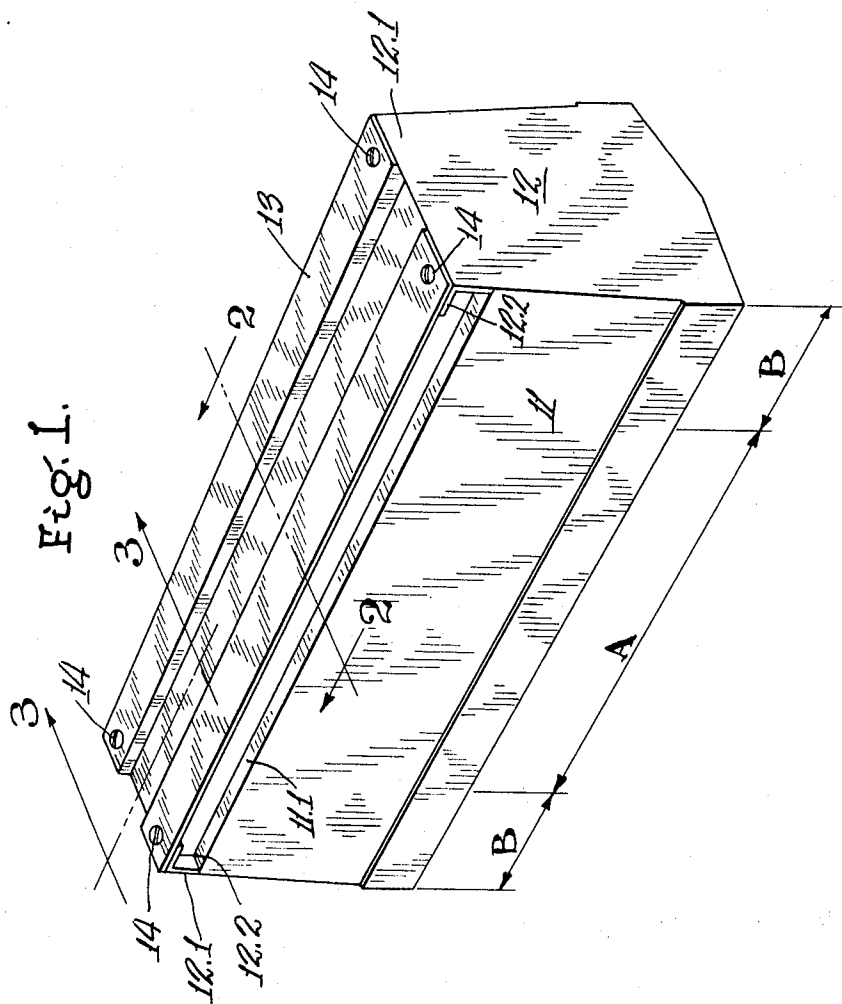
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ELECTRIC HEATER ASSEMBLY

Filed Jan. 28, 1964

5 Sheets-Sheet 1



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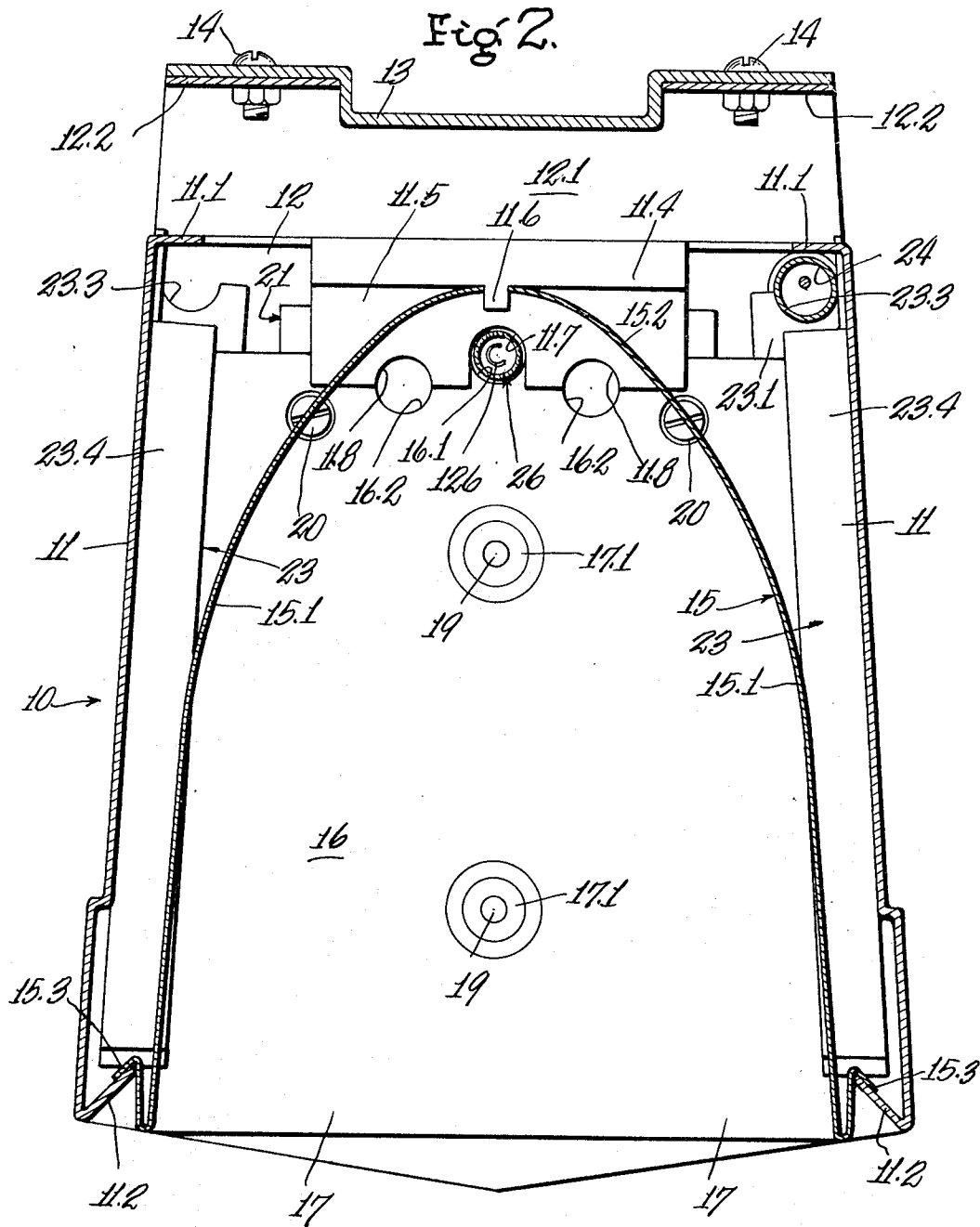
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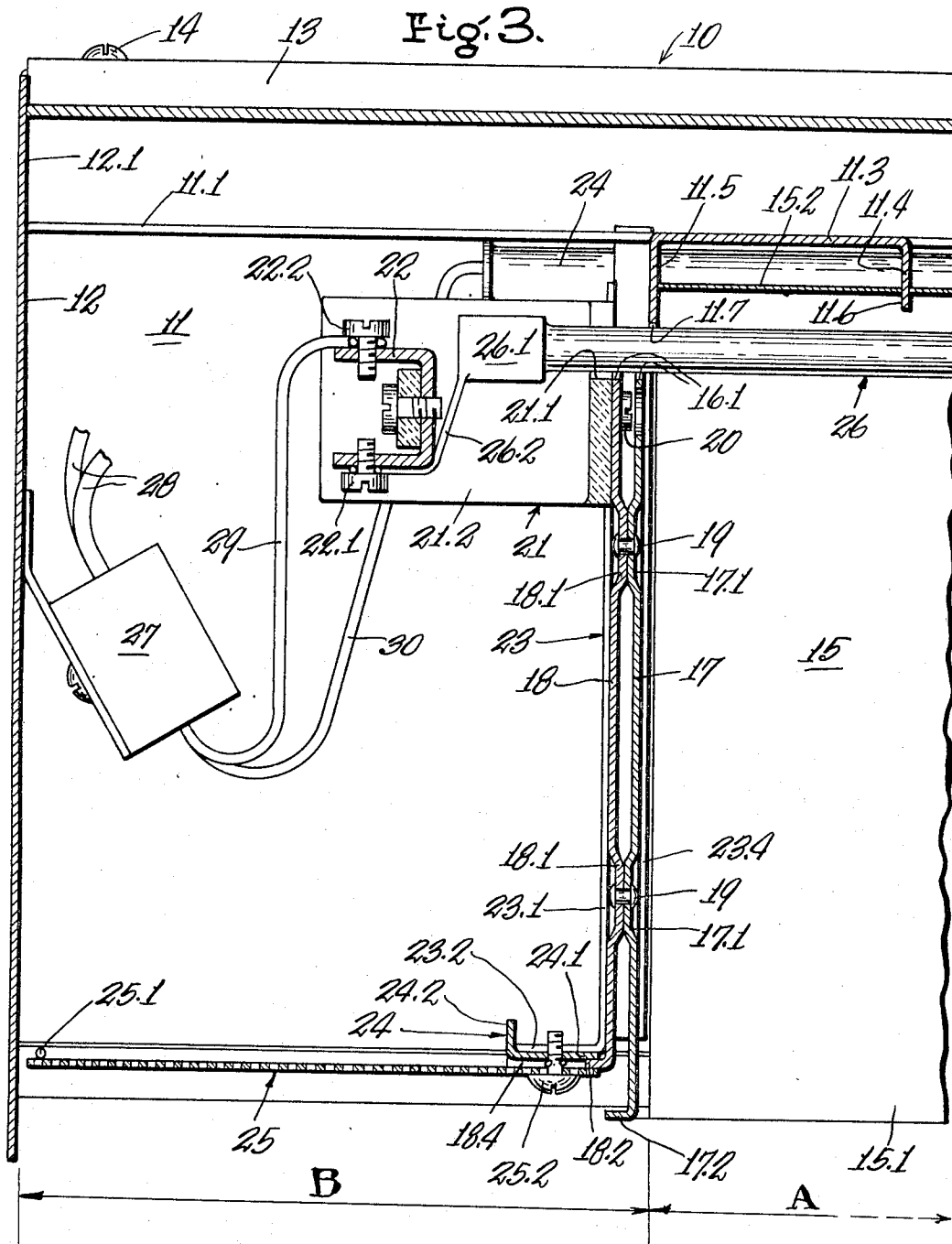
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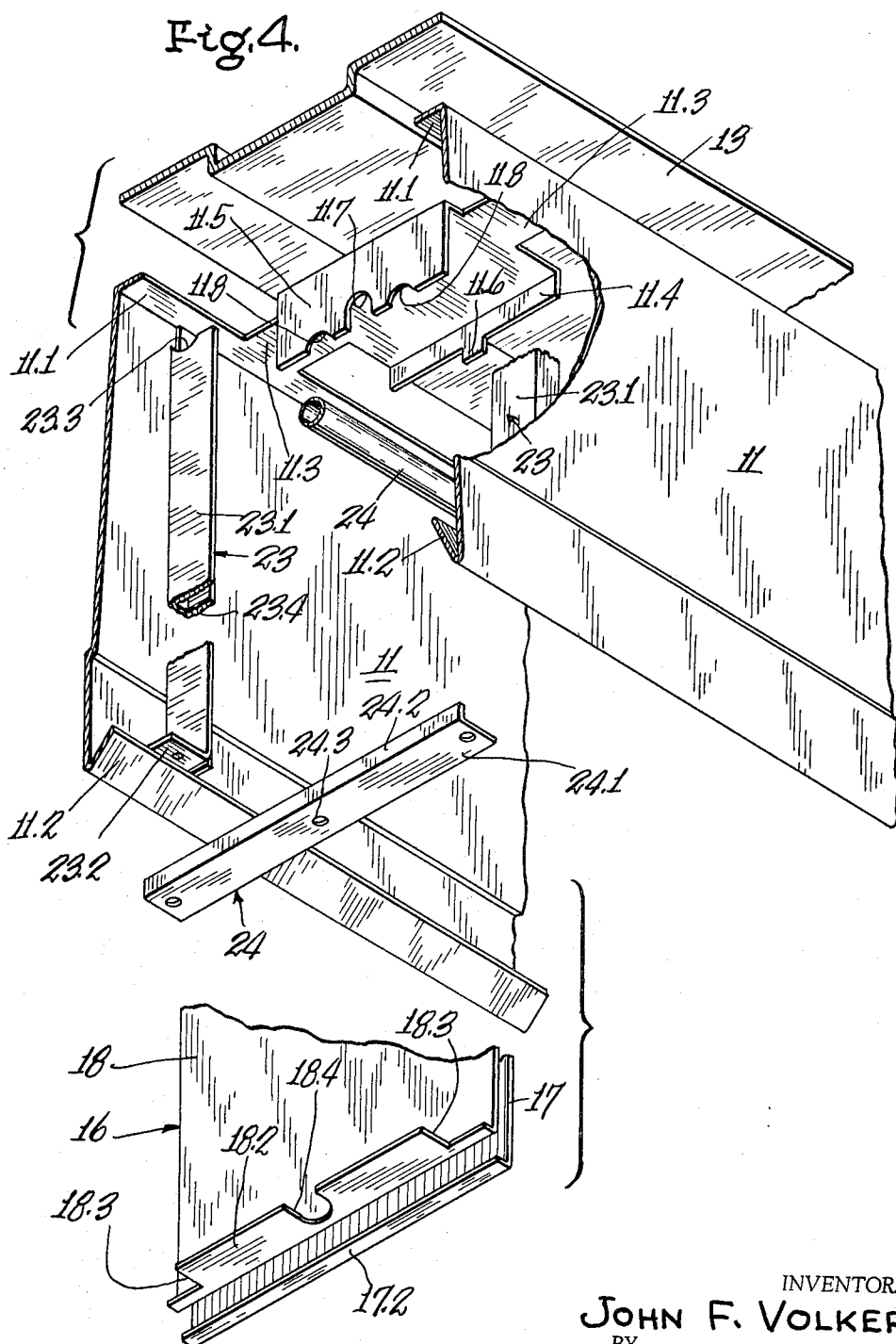
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5 Sheets-Sheet 4



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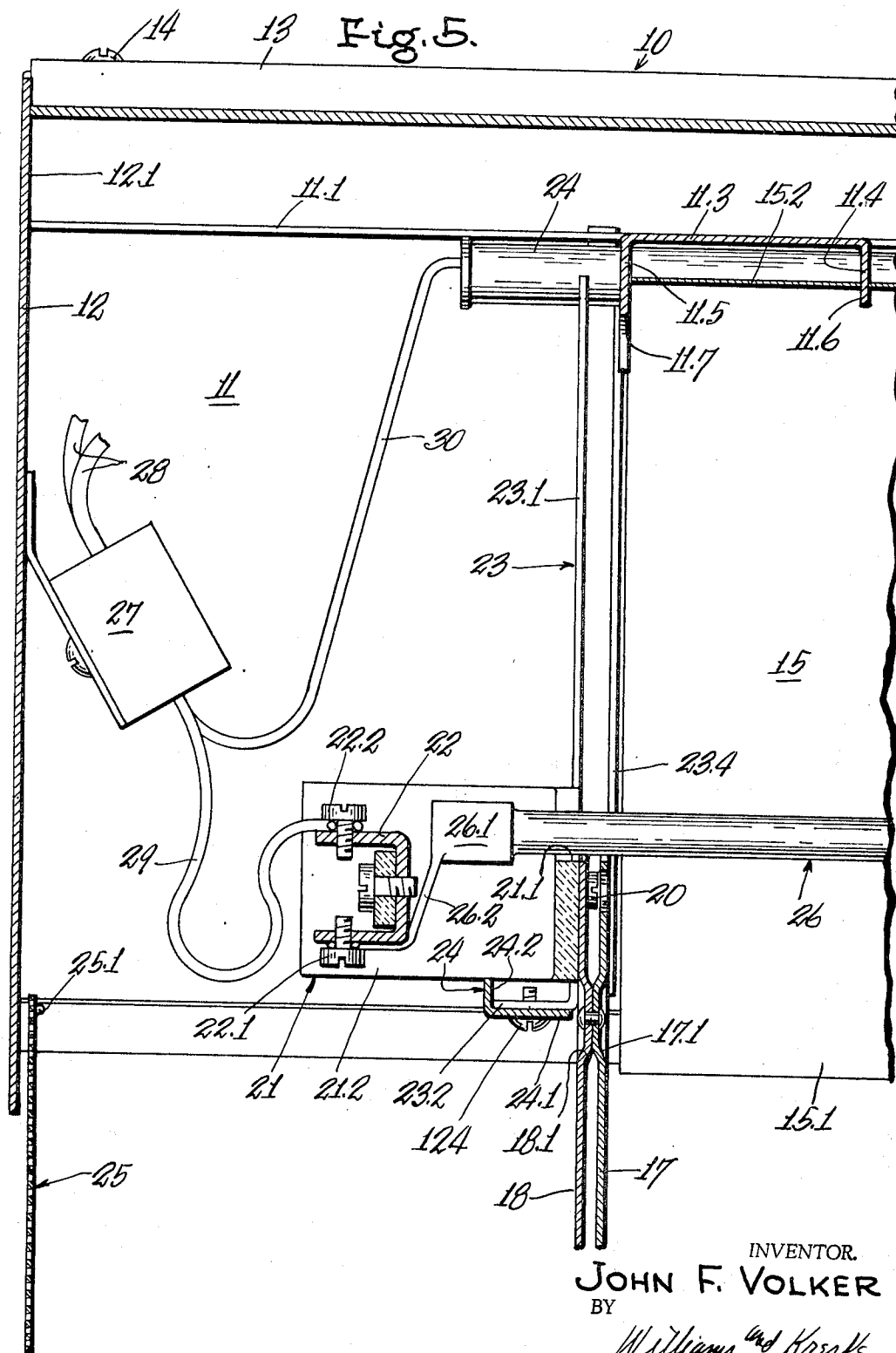
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ELECTRIC HEATER ASSEMBLY

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ELECTRIC HEATER ASSEMBLY

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7 Claims. (Cl. 219—347)

ABSTRACT OF THE DISCLOSURE

A radiant heater assembly wherein opposite ends of the heating elements are mechanically and electrically connected to terminal blocks which are respectively connected to walls which are slidably mounted in guides carried by the heater housing, so that the heating element and terminal blocks may be slid between an operative position wherein the heating element is disposed adjacent to the bight of a U-shaped reflector, to an access position wherein the heating element and terminal blocks are disposed adjacent to the open side of the reflector.

The present invention relates to electric heater assemblies, more particularly to electric heater assemblies of the radiant type, and the principal object of the present invention is to provide new and improved heater assemblies of the character described.

It has long been common practice to form a radiant heater assembly by mounting an elongated, radiant heating element within an elongated reflector. Normally, such reflector is mounted within a housing which supports both the reflector and the heating element and provides a space within which the element terminal ends are located along with the wiring which connects the element terminal ends to an electrical power circuit.

In prior art heater assemblies, the replacement of a defective heating element or a change in the wiring between several elements, if more than one is included in the assembly, is frequently a rather difficult operation in the field. This is so because the assembly is not always readily accessible, the replacement or changing operations must frequently be done while the assembly is hot, and the element is usually far inside the housing and, when the reflector and the housing are deep, accessibility suffers even more.

A principal object of the present invention, therefore, is to provide a radiant heater assembly whose heating element is readily accessible for replacement or the like. This and other advantages will readily become apparent from a study of the following description and from the drawings appended hereto.

In the drawings accompanying this specification and forming a part of this application there is shown, for purposes of illustration, an embodiment which the invention may assume, and in these drawings:

FIGURE 1 is a perspective view of a heater assembly constructed in accordance with the present invention,

FIGURE 2 is an enlarged, transverse sectional view generally corresponding to the line 2—2 of FIGURE 1,

FIGURE 3 is an enlarged, fragmentary, longitudinal sectional view generally corresponding to the line 3—3 of FIGURE 1,

FIGURE 4 is a reduced, fragmentary, exploded perspective view of that portion of the assembly seen in FIGURE 3, certain parts being omitted in the interest of clarity, and

FIGURE 5 is a view similar to FIGURE 3 but with certain parts shown in another position.

With reference to FIGURES 1 and 2, the radiant heater assembly herein disclosed comprises, in the position of parts shown, an inverted, trough-like, sheet metal hous-

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ing 10 having inclined side walls 11, end walls 12, and a top wall 13. The lower portion of the housing 10 is open for a purpose to appear. End walls 12 project above the side walls 11 at 12.1 and are turned over to provide spaced ears 12.2 to which the top wall 13 is secured as by means of bolts 14. Similarly, the side walls 11 are turned over at their upper margins to provide opposed, facing flanges 11.1. The considerable spacing thus provided between the side walls 11 and the top wall 13 allows ample circulation of cooling air through the housing interior. As best seen in FIGURE 2, the lower margins of side walls 11 are turned over to form angularly disposed flanges 11.2 extending inwardly of the housing. Such flanges provide abutments for a purpose later to be disclosed.

Referring now to FIGURES 1 and 3, housing 10 is divided into an intermediate section A and end sections B. Although but one housing end section B is seen in FIGURE 3, it will be understood that the end sections are identical and thus, a detailed description of but one is necessary. Briefly, the housing intermediate section A encloses the heat-generating portion of a radiant heating element and a reflector therefor, while the housing end sections B enclose the terminal ends of the heating element aforesaid and the wiring and other electrical connection components by means of which the element is connected into an electrical power circuit. As will later appear, means are provided for dividing the housing section A from the housing sections B to prevent heat from the former from getting into the latter.

As seen in FIGURES 2, 3 and 4, but most clearly shown in the latter, the side walls flanges 11.1 are joined by an integral connecting strap 11.3 adjacent one end of the housing intermediate section A. The intermediate portion of strap 11.3 is enlarged in a direction longitudinally of the housing and is turned over to provide spaced, downwardly extending flanges 11.4 and 11.5. Flange 11.4 has a central depending tongue 11.6 while flange 11.5 is somewhat deeper than flange 11.4 and is provided with a relatively deep, central notch 11.7 and shallower, flanking notches 11.8.

Although not shown, an identical structure (strap 11.3, flanges 11.4, 11.5) is provided at the other end of the intermediate section A, it being understood, however, that the structures are so arranged that the flanges 11.4 are in facing relation with the flanges 11.5 oriented toward respective housing end walls.

As previously mentioned, housing intermediate portion A encloses a reflector and as herein disclosed, such reflector is identified by reference character 15 and is formed of reflective, resilient sheet metal which is U-shaped in cross-section (FIGURE 2) to provide spaced leg portions 15.1 joined together at their upper ends by an integral bight portion 15.2. The lower, or free ends, of reflector leg portions 15.1 are doubled back on themselves toward the outside of the reflector and each provides a hook 15.3 disposed for engagement with respective housing abutments 11.2. As best seen in FIGURE 3, reflector 15 is of a length to fit closely between the housing flanges 11.5 (only one of which is shown in FIGURE 3) with the reflector bight portion 15.2 resting upon the edges of housing flanges 11.4. The reflector bight portion is apertured to pass respective flange tongues 11.6, such arrangement insuring proper registry of the reflector with the housing.

With the reflector 15 assembled with the housing as illustrated in FIGURE 2, disassembly of the reflector therefrom may easily be effected by pressing upwardly (in the position of parts shown) on the reflector leg free ends until the hook portions 15.3 disengage from the housing abutments 11.2. With the hook portions thus

disengaged, the reflector may be removed through the open housing bottom. Reassembly will be effected by reversing the above operations, first making certain that the tongues 11.6 enter respective apertures in the reflector bight portion. The foregoing assembly and disassembly of the reflector with the housing is made possible by reason of the fact that the reflector is of resilient material and thus its hook portions may easily be sprung to and from engagement with the housing abutments.

As previously mentioned, means are provided for dividing the housing intermediate portion A from the housing end portions B and as viewed in FIGURES 2 and 3, such means comprise a generally rectangular, sheet metal inner wall 16. At the present time, wall 16 is formed of two sheet metal pieces 17, 18 in spaced, side-by-side relation, such pieces having registering indented portions 17.1, 18.1 secured together by a rivet 19. This double-thickness construction of inner wall 16 is not only provided additional strength but also improves the heat-insulative value of the wall. For a purpose to appear, the upper edge of wall 16 is provided with notches 16.1, 16.2 in register with and complementary to respective notches 11.7, 11.8 of the housing flange 11.5 to form circular openings.

Disposed within the housing portion B and secured to the upper end of wall piece 18 by means of screws 20 is a dielectric terminal block 21 (see especially FIGURE 3). Block 21 is notched at 21.1 in registry with the above-described inner wall notches 16.1, 16.2 and provides a respective pocket 21.2 (open at top and bottom for cooling air circulation therethrough) in side-by-side relation in alignment with respective notches. Disposed in each terminal block pocket 21.2 is a U-shaped conductor member 22 having screws 22.1, 22.2 threaded into respective legs thereof.

Means are provided for sliding the inner wall 16 transversely of the housing through its open lower side and as herein disclosed, guide members 23 of U-shaped cross-section are secured to respective housing side walls 11 in facing relation as seen in FIGURE 4. At the present time, the web of each guide member is extended through an aperture in respective wall flanges 11.1 and the members may be riveted or otherwise secured in position to respective housing side walls. The lower end of a flange 23.1 of each guide member is turned over to provide a threaded apertured ear 23.2 which abuts an adjoining side wall abutment 11.2 and the opposite, upper end of such guide member flange is notched at 23.3 to pass a tube 24 which extends between the housing end portions B. The spacing between the flanges 23.1, 23.4 of each guide member 23 is such to closely but slidably receive the inner wall 16 therebetween.

Extending between and underlying the ears 23.2 of the facing guide members 23 is an angle member 24 having an apertured leg 24.1 secured to the ears 23.2 by suitable screws 124 (see FIGURE 5) and a leg 24.2 which extends upwardly a slight amount into the housing end portion B. Inner wall piece 18 has its lower end doubled over to provide a flange 18.2 which normally underlies and abuts the underside of leg 24.1 of member 24. The ends of flange 18.2 are notched at 18.3 to clear the screws 124 which mount the member 24 to the members 23 and the central portion of flange 18.2 is notched at 18.4 to clear a central threaded aperture 24.3 in the member leg 24.1. Similarly, the wall piece 17 is doubled over to provide a flange 17.2 which faces in the same direction as flange 18.2; however, flange 17.2 is smaller than flange 18.2, is not notched, and extends downwardly a little further.

Normally closing the lower part of housing end portion B and still referring to FIGURE 3, is a door 25 presently formed of perforated metal or screen. A pintle 25.1 at one end of the door is pivotally engaged with respective housing side wall flange abutments 11.2 and a captive screw 25.2 is carried by the other end of door 25 and

is threaded into aperture 24.3 of member 24. In the position of parts shown, door 24 underlies the flange 18.2 of inner wall member 16 to maintain the latter in the position illustrated.

While only one housing end B has been shown in detail, it will be understood that the opposite housing end B will be arranged identically to the one just described. Duplicated at such other housing end, therefore, will be the inner wall, its guides, terminal block, door and the like.

As previously mentioned, a heating element extends longitudinally of the housing 10 and as herein disclosed, such element comprises a rectilinear glass tube 26 which extends through the cooperating notches 11.7; 16.1 of the housing flanges 11.5 and inner walls 16 respectively, and has terminal ends 26.1 disposed within a recess 21.2 of respective terminal blocks 21. As is well known, element tube 26 will enclose an electric resistance heating wire 126. A pig tail lead 26.2 extends from each element terminal end and is secured to respective connectors 22 by screws 22.1. Lead 26.2 thus not only establishes an electrical connection between the connectors 22 and respective element ends but also mechanically secures the element to respective inner walls 16. While but a single heating element is herein disclosed, it will readily be apparent that provision has been made for mounting as many as three elements within the reflector 15. Furthermore, while element 26 has been disclosed as comprising a glass tube, a metal sheathed or other well-known type of electric heating element could as well be employed.

Mounted within a housing end portion B as seen in FIGURE 3 is a dielectric junction block 27 to which electrical power leads 28 are connected. A flexible lead 29 extends from the junction block 27 to the connector 22 to which it is secured by the screw 22.2. Lead 29 will, of course, be in electrical contact with one of the power leads 28. Extending from the block 27 and in electrical contact with the other power lead 28 is a lead 30 which passes through the previously mentioned tube 24 to the other housing end portion B and is in electrical engagement with the opposite end of the heating element 26. Obviously, if more than one heating element is employed, other leads would be used to place such elements in the power circuit in any desired manner.

In the event a heating element is to be replaced, heating elements are to be added to or removed from the assembly, or if the wiring to the elements is to be changed, the element may be lowered to the open side of the housing, as shown in FIGURE 5, in the following manner: Firstly, the door screws 25.2 at each housing end will be loosened to permit each door 25 to assume the position seen in FIGURE 5. Each inner wall 16 will then fall of its own weight or may be pulled down, if necessary, until its terminal block 21 rests upon member leg 24.2 as illustrated. As the inner walls 16 move downwardly, they will, of course, carry the element 26 (or elements if more than one is employed) down with them to the illustrated position adjacent the open side of the housing where any servicing or the like which may be required may easily be performed. If the inside of the reflector is to be cleaned, this may easily be done at this time, with or without removing the reflector from the housing, as desired. Following servicing, inner walls 16 will again be elevated and the doors 25 raised and secured to once again return the parts to the normal positions seen in FIGURE 3.

In the event complete removal of either of the inner walls 16 from the housing should be desired, it is only necessary, after such wall has been lowered as seen in FIGURE 5, to disconnect the leads 26.2, 29 and to remove the two screws 124 retaining the member 24 to the guide member ears 23.2. This will permit the inner wall 16 and its attached terminal block 21 to be removed as a unit from the housing.

While reference has hereinbefore been made to the

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"upper" or "lower" portions of certain parts, it is to be understood that this has been done for convenience only and is only applicable when the assembly is oriented in the manner herein illustrated with the reflector facing downwardly. Obviously, the assembly could be used in inverted relation or otherwise displaced from the position herein shown.

In view of the foregoing it will be apparent to those skilled in the art that I have accomplished at least the principal object of my invention and it will also be apparent to those skilled in the art that the embodiment herein described may be variously changed and modified, without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described; hence it will be appreciated that the herein disclosed embodiment is illustrative only, and that my invention is not limited thereto.

I claim:

1. In a radiant heater assembly having an elongated reflector which is U-shaped in cross-section to provide an open side in opposed relation to a bight portion, an elongated radiant heating element within said reflector and extending longitudinally thereof, said element being disposed adjacent to said reflector bight portion and having terminals for connection to an electrical power supply, the improvement comprising a pair of support members mechanically connected to opposite ends of said heater element to support the same, and a slide for each member, said slides guiding sliding movement of said members to provide for movement of the supported heating element between normal position adjacent to said reflector bight portion and access position adjacent to said reflector open side, said support members comprising walls adjacent to respective ends of said reflector for normally closing the ends thereof.

2. The construction of claim 1 wherein an insulating block is secured to each wall and extends from that surface which is directed outwardly of said reflector, and wherein each end of said heater element is mechanically and electrically connected to a respective block and each block is adapted to be electrically connected to the electrical power supply.

3. The construction of claim 1 wherein the reflector is mounted within a housing and the slide guides are mounted on the housing.

4. The construction of claim 3 wherein said reflector is of less length than said housing and disposed therein to provide a heating chamber and terminal chambers on opposite sides of said heating chamber, guard members over the open side of respective terminal chambers and each having a portion abutable with a respective wall to restrict the same from sliding movement.

5. In a radiant heater assembly having a housing, a U-shaped reflector within said housing and having an open side in opposed relation to a bight portion, said housing being of a length greater than said reflector, a pair of walls slidably mounted on said housing and positioned adjacent respective ends of said reflector for normally closing such ends, said reflector and said walls cooperating to define an open-sided heating chamber and said walls being spaced from respective ends of said housing to provide a terminal chamber at each housing end, a dielectric ter-

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minal block carried by each of said walls and disposed within said terminal chambers, a perforated cover closing that side of each terminal chamber which faces in the same direction as the open side of said reflector, each cover being removably secured in position, a radiant heating element disposed within said reflector and extending longitudinally thereof, said element being normally disposed adjacent to the bight portion of said reflector and having terminal portions secured to respective terminal blocks, said walls being mounted for sliding movement in a direction transversely of said reflector and each cover, in terminal-chamber closing relation, overlying a portion of a respective wall to retain the same in normal position closing respective reflector ends.

6. The construction of claim 5 wherein that portion of each cover spaced furthest from the adjoining wall aforesaid is pivoted to said housing for movement of its free end toward and away from a chamber-closing, wall-retaining position.

7. A radiant heater assembly comprising an elongated, resilient, sheet-metal reflector which is U-shaped in cross-section thus providing spaced leg portions and a bight portion, the latter being disposed at one end of and connected to respective leg portions and said bight portion being disposed opposite an open reflector side, a radiant heating element within said reflector and extending longitudinally thereof, said element normally being disposed adjacent said reflector bight portion and having terminal portions for connection to an electrical power circuit, a sheet metal housing for said reflector and having portions adjacent the open side of said reflector doubled back on themselves and toward said reflector to provide respective abutments, each reflector leg portion opposite end being doubled back on itself and toward the outside of said reflector and each doubled back reflector leg portion providing a hook oriented away from said reflector bight portion and said hooks being resiliently engaged with respective support portion abutments to retain said reflector assembled with said housing, and walls adjacent respective ends of said reflector for normally closing such ends, said element terminal portions being secured to respective walls and the latter being slidably carried by said housing for movement in a direction away from said reflector bight portion and toward said reflector open side from their normal positions closing said reflector ends to dispose said element terminal portions adjacent said reflector open side to facilitate making electrical connections to said element.

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