Sept. 13, 1955 M. NATHANSON 2,717,950

ELECTRICAL-RESISTANCE SPACE HEATERS

Filed April 30, 1954 2 Sheets-Sheet 1

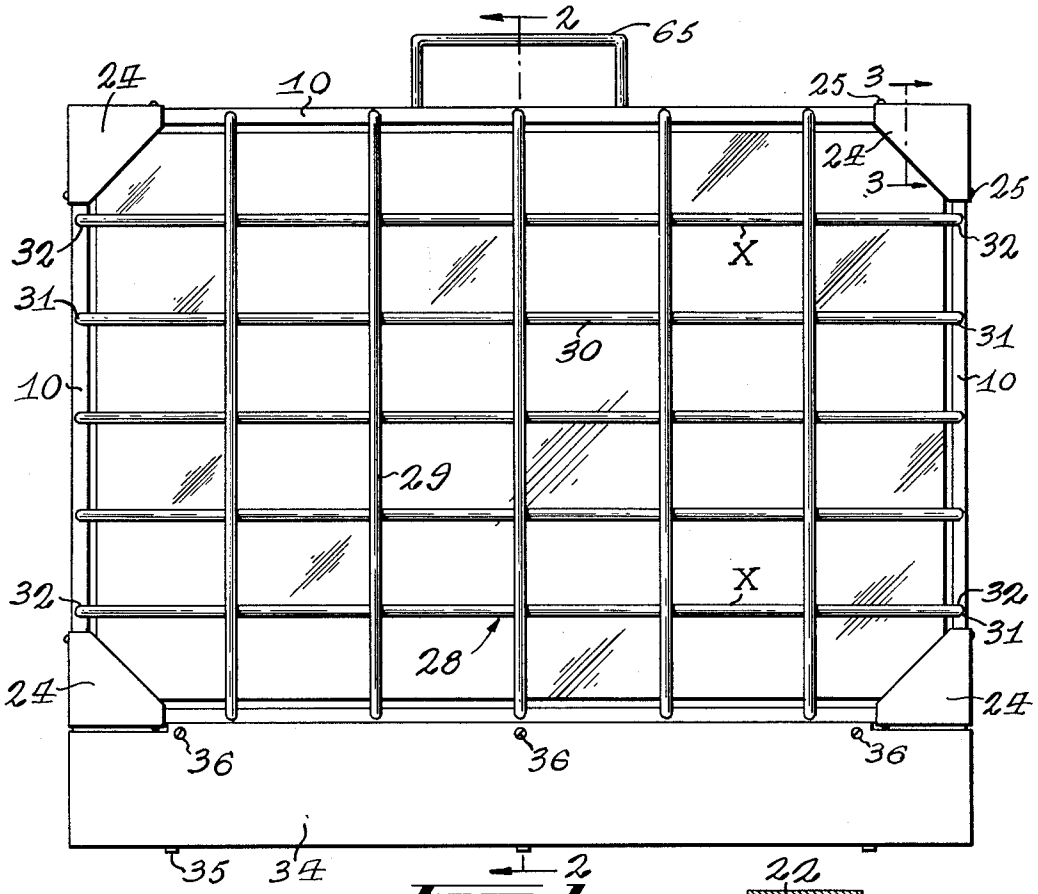


Fig. 1

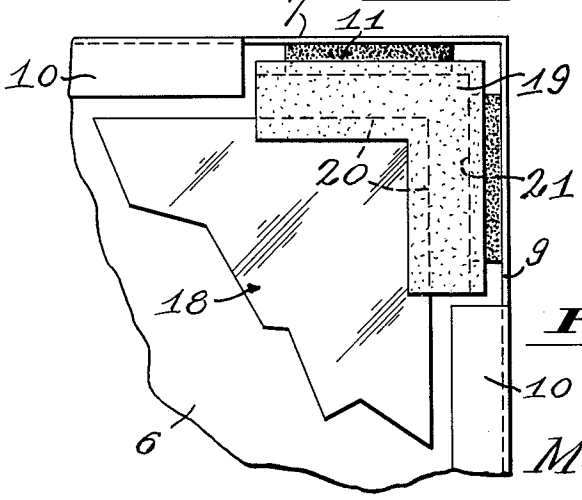


Fig. 4

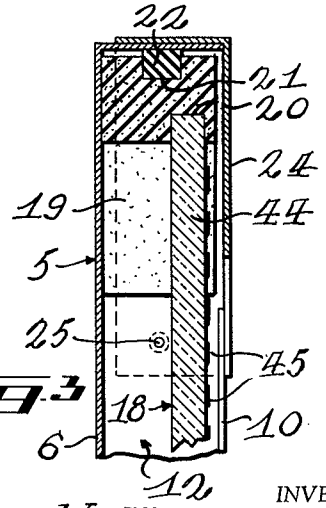


Fig. 3

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ELECTRICAL-RESISTANCE SPACE HEATERS

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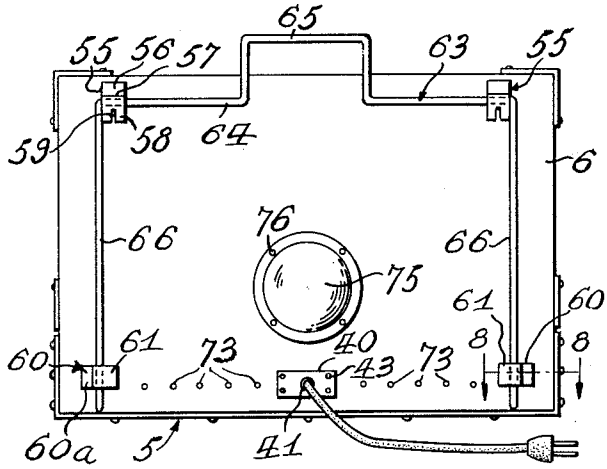


Fig. 5

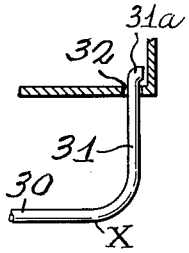


Fig. 7

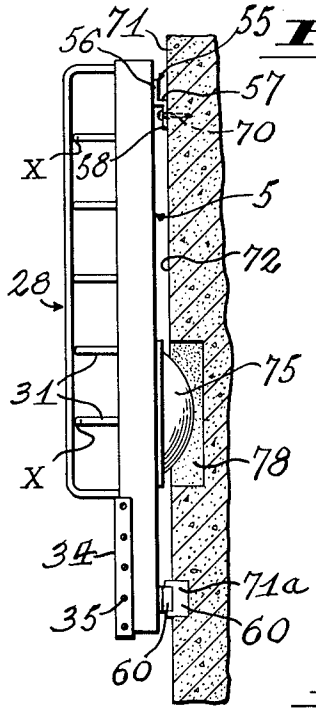


Fig. 6

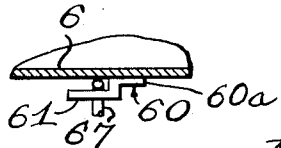


Fig. 8

Fig. 2

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ELECTRICAL-RESISTANCE SPACE HEATERS

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Application April 30, 1954, Serial No. 426,781

3 Claims. (Cl. 219—19)

This invention relates to improvements in electrical-resistance space heaters in which the heating element comprises a heat-radiating glass plate or panel having an electrical-resistance bonded thereto.

The heater provided by the present invention embodies, in the construction thereof, the novel panel mounting means and certain other novel features of construction forming the subject matter of my copending application Serial No. 346,999, filed April 6, 1953. Additionally, the heater provided by the present invention is designed so that it may be used as a portable heater or may be anchored to a wall of a room or the like to serve as a stationary wall-mounted heater.

A particular feature of the heater provided by the present invention is the provision of an open-front metal casing having an internal horizontal partition dividing the interior of the casing into an upper heat reflecting compartment in which the heat radiating panel is mounted and a lower connection-box compartment in which ends of conductors connected to the terminals of the heating panel are housed so that the connections between these conductors and lead-in conductors from the source of electrical energy may be conveniently made within the connection-box compartment without disturbing the mounting of the heat radiating panel, said connection-box compartment being provided with a rear opening through which lead-in conductors from the source of electrical energy may be passed into said compartment and being also provided with a front opening through which access is obtained to the interior of said compartment for making and breaking connections between the conductors connected to the heating panel and the lead-in conductors from the source of electrical energy.

Another feature of the invention consists in increasing the efficiency of the heater by covering the rear wall of the upper panel-receiving compartment of the casing with a lining of highly polished tin plate or other suitable heat reflecting material.

A further feature of the invention consists in the provision of a combined supporting base and carrying handle adapted to be attached to the casing of the heater to support the heater in an upright position on a floor or other surface and to facilitate movement of the heater from place to place when the latter is to be used as a portable heater, the means provided for attaching the combined supporting base and handle to the heater casing including bracket members and spacers which are also utilized in mounting the heater casing on a wall to provide a stationary wall-type heater installation.

Other objects, advantages and characteristic features will become apparent from the following detailed description of the preferred embodiment shown in the accompanying drawings, in which—

Fig. 1 is a front elevational view of my improved heater.

Fig. 2 is a vertical sectional view taken substantially along the section line 2—2 of Fig. 1.

Fig. 3 is a fragmentary sectional view taken substantially along the section line 3—3 of Fig. 1.

Fig. 4 is an enlarged fragmentary detail view of a corner portion of the heater shown in Fig. 1 as it appears with one of the corner covers removed.

Fig. 5 is a rear view of the assembly shown in Figs. 1 and 2.

Fig. 6 is a side elevational view illustrating the manner in which the heater may be attached to a wall to serve as a stationary wall-type heater.

Fig. 7 is a detail view illustrating the manner in which a wire guard forming part of the assembly shown in Figs. 1 and 2 is removably anchored in place.

Fig. 8 is a detail sectional view taken substantially along the section line 8—8 of Fig. 5.

Referring more particularly to the drawings, 5 designates an open-front sheet metal casing presenting a rear wall 6, top wall 7, bottom wall 8 and side walls 9.

The interior of casing 5 is divided into an upper panel-receiving compartment 12 and a lower connection-box compartment 13 by means of a horizontal partition 14. As here shown, the partition 14 is substantially Z-shaped in cross section. It presents a horizontal web portion 15 separating compartments 12 and 13, a downwardly extending rear flange 16 welded or otherwise secured to the rear casing wall 6 and an upwardly extending trim-forming flange 17, having its ends terminated a substantial distance from the lower corners of compartment 12.

The top wall 7 and side walls 9 of casing 5 are also provided with inwardly directed trim-forming flanges 10 overlying the bottom wall 6 in spaced relation thereto. The ends of the flange 10 of top wall 7 and the upper ends of the flanges 10 of the side walls 9 terminate a substantial distance from the upper corners of compartment 12. The lower ends of the flanges 10 of the side walls 9 also terminate a substantial distance from the lower corners of compartment 12. The effect of terminating the flanges 10 of the casing wall 7 and 8 and the flange 17 of partition 14 in spaced relation to the corners of compartment 12 is to leave gaps 11 (Fig. 4) to facilitate insertion and removal of the insulators and heat radiating panel hereinafter referred to.

A rectangular glass heating panel 18, of the electrical-resistance type, is supported in compartment 12 of casing 5 in spaced relation to the defining walls of said compartment to provide for circulation of air between said panel and said walls.

Panel 18 is supported in place by substantially L-shaped supporting insulators 19. These supporting insulators, four in number, are located at the four corners of compartment 12 and are provided with inner L-shaped grooves 20 in which the corner portions of the heat radiating panel 18 are neatly fitted. The insulators 19 are also phovided with outer L-shaped grooves 21 in which cushioning members 22, made of rubber or other resiliently compressible material, are fitted so that said cushioning members 22 are confined between the insulators 19 and the opposing portions of the marginal walls of compartment 12. The insulators 19 are preferably seramic insulators made of porcelain or other suitable ceramic material but may also be made of hard rubber or any other suitable insulating material.

In assembling the component parts of the heater the insulators 19, carrying cushioning members 22, may first be assembled with the heating panel 18 and this assembly then inserted as a unit in the compartment 12. In this connection it will be noted that the previously mentioned gaps 11, resulting from the termination of the flanges 10 and 17 in spaced relation to the corners of the compartment 12, enables the insulators 19 to be readily inserted in or removed from the corner portions of said compartment. After panel 18 and insulators 19

have been arranged in compartment 12 the corner gaps 11 of said compartment are closed by corner cover plates 24 removably secured in place by screws 25 or other fastening means. These corner cover plates 24 serve to firmly hold the insulators 19 in correct position.

The front portion of plate 6 which forms the rear wall of compartment 12 is covered by a lining 26 of highly polished tin plate or other heat reflecting material to increase the efficiency of the heater.

The exposed area of heat radiating panel 18 is protected from damage by means of a wire guard 28. This guard consists of vertical guard wires 29 intersecting horizontal guard wires 30 which are welded or otherwise joined to the vertical wires at their points of intersection therewith. All the guard wires 29 and 30 are provided with right angularly bent end portions 31 which serve to space the central portions of the wires away from the open front of casing 5. Two of the horizontal wires 30, which are identified by reference character X in Figs. 1, 2 and 7, have their bent ends 31 forced into holes 32 provided in the side wall flanges 10 of casing 6 and function as spring-action anchoring members for positively anchoring the wire guard in proper position. The bent ends 31 of the guard anchoring wires indicated at X terminate in short outwardly directed hook extensions 31*a* which project over portions of the casing side wall flanges 10 bordering the holes 32 to releasably lock the wire guard 28 against accidental separation from the heater casing.

The connection-box compartment 13 is normally closed at the front of a removable front cover plate 34 provided with side and bottom flanges overlying the side and bottom walls of said compartment and secured in place by screws 35. The upper edge portion of cover plate 34 overlies and is removably secured by screws 36 to a downwardly directed flange portion 37 of an angle member 38 welded or otherwise secured to the underside of the web portion 15 of partition 14. The rear wall of compartment 13 is provided with an access opening 39 covered by a removably rear cover plate 40 provided with an opening 41 for the passage of electrical conductors therethrough, said cover plate 40 being removably secured in place by screws 43.

The heat radiating panel 18 shown in the present drawings is of well-known type comprising a tempered glass plate 44 having an electrical resistance 45 bonded thereto and extending across the plate in conventional zig-zag fashion. The terminals 47 and 48 of electrical-resistance 45 are located adjacent the lower edge of heating panel 18 and are connected to corresponding ends of conductors 49 and 50 having their remaining ends disposed within the connection box compartment 13 and connected, by splices 51, or other suitable form of connections, to power line conductors 52 and 53 which are passed into compartment 13 through the opening 41 of rear cover plate 40.

In the case of the portable heater shown in Figs. 1 to 5 inclusive the ends of the power line conductors 52 and 53 remote from the splices 51 are attached to a plug connector 54 which may be plugged into any convenient wall socket connected to a source of electrical energy.

A pair of supporting brackets 55 are attached to the rear wall 6 of casing 5 preferably in the vicinity of the top wall 7. Each of these brackets includes upper vertical portions 56 flatly attached to the casing wall 6, an intermediate horizontal shoulder forming portion 57 projecting rearwardly from the said wall and a downwardly directed lower vertical portion 58, the latter being provided with a slot 59 extending upwardly from the lower edge thereof.

The rear wall 6 of casing 5 also carries a pair of spacers 60 attached thereto adjacent the lower corners of the casing. Each of these spacers 60 includes a body portion 60*a* formed with a horizontally directed extension 61 which overlies the casing wall 6 in parallel spaced relation thereto.

When the heater described herein is to be used as a portable floor-type heater it is supported in an upright position on the floor by a combined supporting base and carrying handle structure generally indicated at 63. As here shown the combined supporting base and carrying handle is formed from a single length of wire bent to provide a horizontal top member 64 having its central portion looped upwardly to provide a carrying handle 65, a pair of side members 66 inclining downwardly and rearwardly from the ends of top member 64 and a pair of horizontal bottom members 67 extending forwardly from the lower ends of side members 66 and having their front ends bent upwardly from right angles to provide vertical extensions 68. In appiying structure 63 to the heater casing 5 the end portions of the top member 64 of said structure are fitted between the rear casing wall 6 and the downwardly extending vertical portions 58 of brackets 55. The vertical extensions 68 of bottom members 67 of structure 63 are fitted between the rear casing wall 6 and the horizontal extensions 61 of spacers 60. The side members 66 of structure 63 are thus disposed in a position inclining downwardly and outwardly from the upper end of the rear casing wall 6.

When it is desired to mount the heater on a wall in the manner shown in Fig. 6, the combined supporting base and carrying handle structure 63 is detached from the brackets 55 and the spacers 60 and the slotted portions 58 of said brackets are engaged over nails or screws 70 driven into the wall 71 on which the heater is to be mounted. In this case, the spacers 60 serve to space the lower portion of the heater casing away from the surface 72 of wall 71 a distance corresponding substantially to the spacing of the upper portion of the heater from said wall by the spacing effect of the brackets 55. The heater may be permanently attached to the wall 71 by passing nails or screws through openings 73 in the lower portion of the casing and into the wall structure.

In the case of the wall mounting arrangement shown in Fig. 6 the rear cover plate 40 of connection-box compartment 13 is removed and the rear wall of said compartment in which the opening 39 is formed is positioned directly against the front of an outlet box 71*a* from which power supply conductors are brought into the connection-box compartment 13 and there joined to the conductors 49 and 50 connected to the resistance terminals of the heat radiating panel 18.

In order to prevent damage to the heat-radiating panel 5, due to over heating, a thermostat switch 74 is preferably connected in series with the heating panel and the source of electrical energy to automatically break the connection between the heating panel and the source of electrical energy when the temperature of the glass plate 44 reaches a predetermined value. This thermostat switch may be included in the electrical circuit of the heat-radiating panel by connecting it between divided portions of the conductor 50 as indicated in Fig. 2. The thermostat switch 74 is preferably secured to the rear side of casing wall 6 and covered by a cover plate 75 secured to said wall by screws 76 or other suitable fastening means.

In the case of the wall mounting shown in Fig. 6 the cover 75 of thermostat switch 74 may be accommodated in recess 78 formed in the wall 71 or, alternately, the spacers 60 and, if desired, the brackets 55 may be made of sufficient size to provide sufficient clearance between the rear wall casing 6 and the surface 72 of wall 71 to accommodate the thermostat switch and its cover.

Having thus described the nature of my invention and several applications thereof, it will be understood that various modifications will be resorted to within the scope

and spirit of the invention as defined by the appended claims.

What I claim is :

1. A heater assembly comprising a heat-radiating unit including a heat-radiating panel and a heat-reflector positioned behind said panel, wall-engaging members carried by said reflector for use in mounting said unit on a wall when the heater is to be used as a stationary wall-mounted heater and a floor-engaging supporting base engageable and cooperable with said wall-engaging members to support the heater on a floor surface when it is to be used as a portable heater, said wall-engaging members including wall-engaging supporting brackets secured to the upper rear portion of the reflector and wall-engaging spacers secured to the lower rear portion of the reflector, each of said brackets and spacers having a portion thereof opposed to and spaced from an underlying portion of the reflector, said supporting base including upper and lower heat-reflector engaging portions, the upper reflector engaging portion of the base being insertable between the reflector and the portions of said brackets which are spaced from the reflector and the lower reflector engaging portions of said base being insertable between the reflector and the portions of said spacers which are spaced from said reflector.

2. A space heater comprising a heat-radiating unit including a heat-radiating panel and a heat-reflector positioned behind said panel, wall-engaging brackets and spacers secured to said reflector for use in mounting the unit on a wall when it is desired to install the heater as a stationary wall-mounted heater, said brackets being secured to the upper rear portion of the reflector and said spacers being secured to the lower rear portion of the reflector, each of said brackets including a vertically disposed portion flatly secured to the reflector, an intermediate portion extending outwardly from the lower end of the vertical portion substantially at right angles to the reflector and a lower portion extending downwardly from the rear end of the intermediate portion in spaced opposing relation to said reflector, each of said spacers including a body portion secured to the rear surface of the reflector and a horizontal extension projecting laterally from the body portion and overlying the reflector in spaced relation thereto and a floor-engaging supporting base engageable and cooperable with said brackets and spacers to support said unit on a floor surface when it is desired to use the unit as a portable heater, said supporting base including upper and lower reflector-engaging portions, the upper reflector-engaging portions of the supporting base being insertable between the reflector and the lower portion of said brackets and the lower reflector engaging-portions of said supporting base being insertable between the reflector and the said horizontal extensions of the spacers.

3. A space heater comprising a heat-radiating unit including a heat-radiating panel and a heat-reflector positioned behind said panel, wall-engaging brackets and spacers secured to said reflector for use in mounting the unit on a wall when it is desired to install the heater as a stationary wall-mounted heater, said brackets being secured to the upper rear portion of the reflector and said spacers being secured to the lower rear portion of the reflector, each of said brackets including a vertically disposed portion flatly secured to the reflector, an intermediate portion extending outwardly from the lower end of the vertical portion substantially at right angles to the reflector and a lower portion extending downwardly from the rear end of the intermediate portion in spaced opposing relation to said reflector, each of said spacers including a body portion secured to the rear surface of the reflector and a horizontal extension projecting laterally from the body portion and overlying the reflector in spaced relation thereto and a combined floor-engaging supporting base and carrying handle engageable and cooperable with said brackets and spacers to support said unit on a floor surface when it is desired to use the unit as a portable heater, said combined base and carrying handle being formed from a single length of wire bent to provide a top member extending transversely across the upper rear portion of the reflector and having its end portions positioned between the reflector and the lower portions of said brackets and having its central portion looped upwardly to provide a carrying handle projecting above the top of said unit, side members inclining downwardly and rearwardly from the ends of said top member to the lower end of said unit and horizontal bottom members extending forwardly from the lower ends of said side members and having upwardly directed vertical end portions fitted between the lower rear surfaces of the reflector and the horizontal extensions of said spacers.

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