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SPORTSMAN'S HEATER ASSEMBLY

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3 Sheets-Sheet 2

Fig. 3

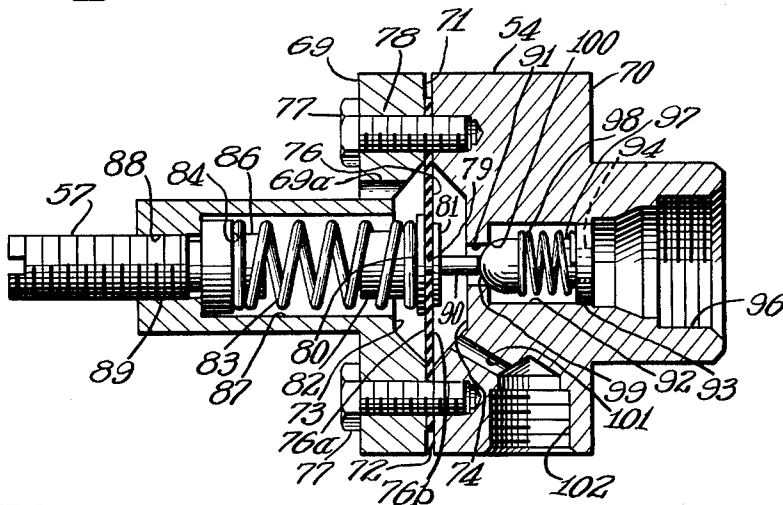
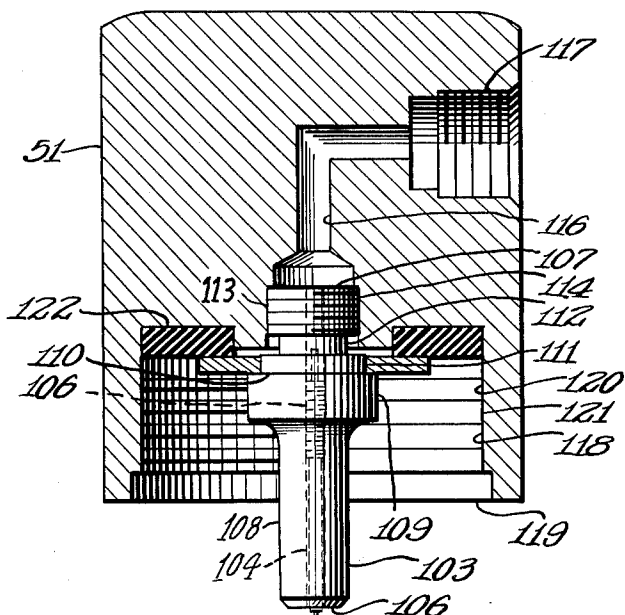


Fig. 4



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Fig. 5

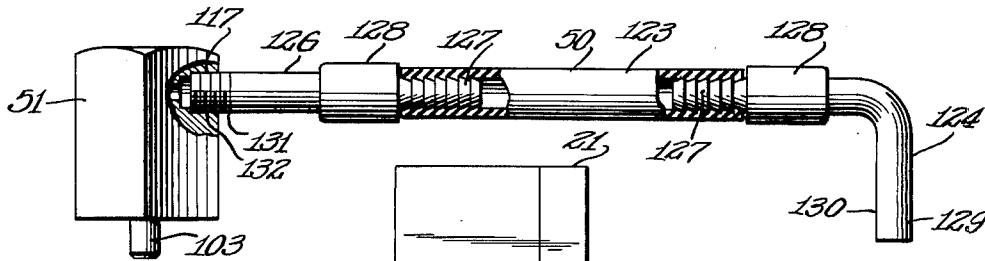


Fig. 6

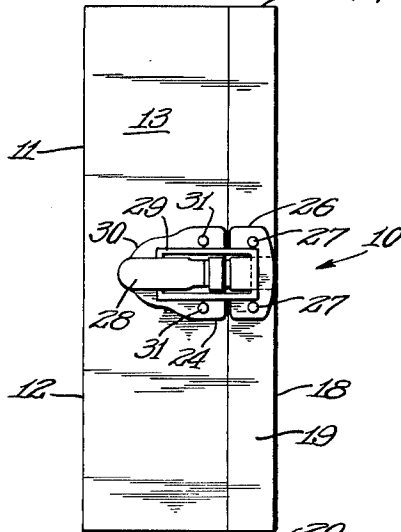
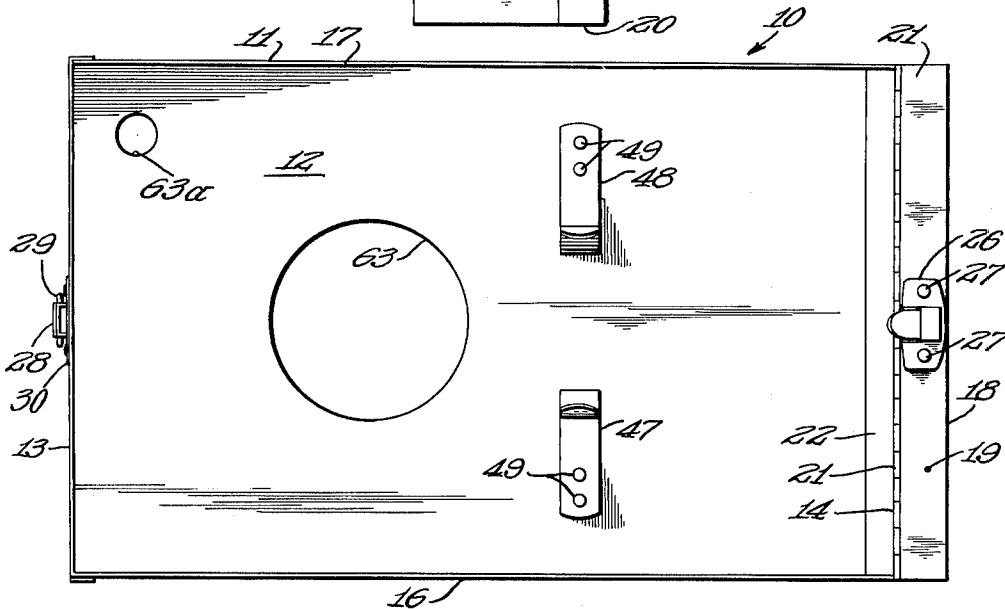


Fig. 7

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SPORTSMAN'S HEATER ASSEMBLY

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6 Claims. (Cl. 126-92)

This invention relates to a heater assembly and more particularly relates to a portable infrared radiant heater assembly adapted for utilizing and burning a liquefied petroleum fuel such as propane. The heater assembly of the present invention is particularly suited for use by sportsmen and is provided with a combination enclosure and support including a bail functioning either as a carrying handle or serving as a prop to position the assembly on a supporting surface either vertically or horizontally or at various tilted positions in between the horizontal and vertical. Further, an adjustable regulator device having an adjustment knob on the front of the enclosure is provided to selectively vary the rate of fuel consumption and correspondingly the heat output of the assembly.

Space is provided within the enclosure for storing an additional supply of L.P. fuel. Conduit means with a suitable connector are provided within the assembly for simply and quickly changing the supply fuel conduit to a fresh container of gas when the initial supply has been exhausted.

As the number of available hours for leisure increases ever year a greater number of people vacation or spend leisure hours away from the home. For example, sportsmen often embark on hunting and fishing trips into the country where outdoor camping is common. Although such outdoor living is generally refreshing and stimulating to the sportsman, and the facilities and accommodations of the home are gladly forsaken for a short period of time, nevertheless certain facilities, for example, a heat source for providing warmth are desirable to prevent excessive discomfort and to make outdoor camping more enjoyable and pleasant. Certain field sports also can be enjoyed more effectively through the use of a portable heating means, for example, in a duck blind or at the site of an ice fishing location.

As a result, there is a need for a heater assembly particularly adapted for sportsmen for use where the more common types of heating systems are not available.

A general object of the present invention is to provide a heater assembly particularly suited for sportsmen. The invention may be advantageously utilized by hunters, fishermen, ice fishermen, skiers and others whose outdoor activities can be made more enjoyable in times of reduced outdoor temperature by providing a source of heat and warmth. Even in the home, during periods of emergency breakdown of the heating plant, the present invention may be effectively used, and it can also be carried for emergency purposes in an automobile, boat and similar conveyances.

It is, therefore, an object of the present invention to provide a portable heater assembly particularly adapted for sportsmen.

A more specific object of the present invention is to provide a heater assembly which utilizes L.P. fuel such as propane with provisions made for storing an extra supply of fuel within the assembly.

Another object of the present invention is to provide a heater assembly having storage capacity for a plurality of fuel containers and having supply conduit means and associated parts for changing from one container to another as the supply of gas in one is exhausted.

Another object of the present invention is to provide a gas operated infrared radiant heater assembly for lo-

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calizing heating effect and for providing maximum comfort and warmth per unit of fuel expended.

Yet another object of the present invention is to provide a gas operated heater assembly having a regulating device incorporated therein for selectively varying the rate of fuel consumption and correspondingly the heat output of the heater and which has an adjustment means located in a readily accessible position.

Still another object of the present invention is to provide a portable gas operated infrared radiant heater assembly having a bail carrying handle adapted to be pivotally adjustable to provide means for supporting the heater assembly in a vertical or horizontal position, or at various tilted positions in between horizontal and vertical, for varying the direction of the infrared heating waves emanating from the heater.

Another object of the present invention is to provide a portable gas operated heater assembly having handle means for carrying the assembly and for adjustably supporting the heater at any angle between the horizontal and the vertical and having a valve for controlling the heat output of the heater which is accessible at all angles of support of the heater.

Many other features, advantages and additional objects will become manifest to those versed in the art from the detailed description of the invention which follows and the accompanying sheets of drawings in which a preferred embodiment of a heater assembly incorporating the principles of the present invention is shown by way of illustrative example.

On the drawings:

FIGURE 1 is a side view of the heater assembly of the present invention with portions cutaway;

FIGURE 2 is a rear elevational view of the heater assembly of FIGURE 1 showing the rear cover lowered to an open position;

FIGURE 3 is a cross-sectional view of the regulating device incorporated into the heater assembly of the present invention taken generally on line III-III of FIGURE 2;

FIGURE 4 is a sectional view of a connector valve of the present invention;

FIGURE 5 is a fragmentary view of the heater hose assembly;

FIGURE 6 is an end view of the closed carrying case; and

FIGURE 7 is a view of the case open and with parts removed to show additional details.

As shown on the drawings:

An illustrative embodiment of a heater assembly incorporating the principles of the present invention is shown generally at 10 in FIGURES 1 and 2 wherein is illustrated a box-like structure forming a carrying case 11.

As shown in FIGURES 6 and 7 the carrying case 11 is made of sheet material such as sheet metal and is bent to form a generally rectangular enclosure having an enlarged front wall or panel 12 and opposite parallel end walls 13 and 14 and opposite parallel side walls 16 and 17.

A cover is provided for the enclosure and comprises a main panel 18 suitably flanged to provide an end wall 19 and opposite parallel side walls 20 and 21.

A piano type hinge 21 has a flap 22 connected in firm assembly, for example, by spot welding to the end wall 14, and a flap 23 is connected in the same manner to the main cover panel 18. Thus, the cover may be hinged for pivotal movement between the closed position shown in FIGURES 1 and 6 to an open position as shown in FIGURES 2 and 7.

As shown in FIGURE 6, the case 11 may have the cover locked closed by means of a toggle type latch 24

which includes a hasp 26 attached to the cover end wall 19 by a pair of rivets 27 and a toggle lever 28 having a toggle loop 29 which has one end engageable with the hasp 26 and its opposite end pivotally connected to the toggle lever 28. The toggle lever is carried by a toggle bracket 30 connected to the end wall 13 by a pair of rivets 31.

In order to conveniently carry the case 11 or to support it at various angles of adjustment relative to the horizontal, a bail member 32 is provided which is of a generally U-shaped configuration and which includes two spaced parallel legs 33 and 34 joined by a cross bar 36.

Each leg adjacent the end thereof is particularly characterized by the provision of an elongated slotted recess or opening 37.

Intermediate the opposite ends of each of the side walls 16 and 17, there is provided a threaded stud 38 and 39 respectively sized to freely extend through a corresponding opening 37. A knurled adjustment and locking knob 40 is threaded on the stud 38 and a corresponding knob 41 is threaded on the stud 39. Accordingly, by adjusting the relative position of a stud relative to the slotted recess or opening 37, the bail member 32 may be positioned in any selected position between an upright position as shown in full lines in FIGURE 1 to the dotted line position shown in FIGURE 1.

Projecting outwardly from the panel 12 of the case 11 is a gas combustion incandescent filament member 42, adapted to radiate infrared heat waves when heated to high temperature, and a polished reflector 43 is positioned such that the filament 42 is situated at the focal point thereof. Infrared rays emanating from the filament 42 will be collected, focused and projected by the reflector 43 outwardly from the panel 12 of the case 11.

In accordance with the principles of the present invention, the filament 42 is heated to an elevated temperature by a flame supplied with a combustible fuel from a replaceable and refillable source enclosed within the carrying case 11. As illustrated at 44 and 46, a pair of fuel cylinders are mounted within the case 11 by means of mounting brackets 47 and 48 which are secured to the panel 12 by means of suitable fasteners, such as screws, rivets or the like as shown at 49.

In order to supply fuel from the cylinders 44 and 46 for combustion at the filament 42, a flexible conduit 50 is shown in FIGURE 2 as being attached to a coupling connector 51 which is suitably threaded for connecting to a threaded neck portion 52 at the outlet of the cylinders 20 and 21. The conduit 50 communicates with a second flexible conduit 53 through a regulating device or control valve 54 which is secured to the panel 12 of the case 11 by means of suitable fasteners such as a pair of sheet metal screws 56. The regulating device 54 controls the feed or supply of gas from the cylinders to the burner head at the filament 42, and in order to selectively adjust the regulating device 54 an adjustment screw 57 projects outwardly therefrom through an aperture 63a formed in the panel 12 to receive a manually operable control knob 58 for turning the adjustment screw 57.

The conduit 53 is connected in fluid communication with a burner head 59 adapted to mix fuel from the cylinders 44 and 46 with air for providing a hot flame at the filament 42. The conduit 53 may be threaded into a threaded inlet of the burner head 59 as at 60 and a threaded nut 61 may be used to maintain the conduit 53 and the burner head 59 in fixed coupled assembly.

It will be noted that a back portion 62 of the reflector 43 projects through a circular aperture 63 formed in the panel 12. The reflector 43, the filament member 42 and the burner head 59 are connected in fixed assembly to the panel 12 by means of a back-up plate 64, which is curved complementarily to the shape of the reflector 43 and has a diameter slightly greater than the diameter of the aperture 63. A threaded stem portion 66 of the burner head 59 projects through aligned apertures formed in the re-

lector 43 and the back-up plate 64 to be received in a complementarily threaded bore 67 of a bushing carrying the filament 42. Tightening of the threaded stem portion 66 into the bore 67 maintains the reflector 43, the filament 42, the burner head 59 and the back-up plate 64 in firm assembly on the front panel 12. A reflector guard 68 is snap-fit on the reflector 43 in order to prevent inadvertent contact with the filament 42 and to prevent damage to the reflector 43.

Referring now to FIGURE 3, in order to maintain a substantially constant flow of gas from the cylinders 44 and 46 to the burner head 59, a regulating device is provided as shown at 54.

As shown in FIGURE 3, the regulator is of the diaphragm type and includes first and second housing parts 69 and 70 having confronting faces 71 and 72 which are centrally recessed as at 73 and 74 respectively. A flexible diaphragm 76 is clamped between the faces 71 and 72 by a plurality of fasteners 77 each threadedly received in a threaded opening 78, and the diaphragm 76 extends through said recesses 73 and 74 to partition the recessed area into two separate pressure chambers disposed on opposite sides of the diaphragm 76.

One face of the diaphragm 76 as shown at 76a is subjected to ambient pressures communicated to the recess 73 via a venting aperture 69a. The opposite face of the diaphragm 76 as shown at 76b is subjected to pressures which are related to the pressurized fuel admitted and discharged into and out of the recess 74.

In this regard, the diaphragm 76 is centrally apertured as at 79 thereby to receive and carry a valve actuator having flanges 80 and 81 disposed on opposite sides of the diaphragm and clamping the edges of the aperture 79. The actuator has a pilot portion 82 which enters the coils of a loading spring 83 and which has one end thereof bottomed against the flange 80.

The opposite end of the spring 83 is bottomed against a flange 84 of the adjustment screw 57. A pilot portion 86 on the end of the screw 57 enters the coils of the spring 83 and operates as a pilot for the screw.

In order to support the screw for threaded axial adjustment, the housing part 69 has a projecting boss formed with a cylindrical bore 87 opening out of the recess 73 and housing the spring 83. At the end of the bore 87 is a reduced neck 88 threaded internally as at 89 and engaging the screw 57. Thus, by turning the screw 57, the diaphragm 76 is adjustably pre-loaded to achieve the fuel flow rate desired.

The opposite end of the actuator has a stem 90 which projects through the recess 74 and into a reduced diameter opening 91 formed at one end of a valve controlled fuel flow passage 92 formed in the housing part 70 and coaxially aligned with the bore 87 formed in the housing part 69. The other end of the passage 92 receives a plug member 93 which is centrally apertured as at 94 to provide fluid communication between the passage 92 and a main inlet to the device as at 96 for receiving fuel from the cylinders 20 and 21.

The plug member 93 forms an inwardly projecting reduced diameter shoulder portion 97 which projects within and receives the coils at one end of a coil spring 98 housed within the passage 92. At the other end of the spring 98 a valve head 99 is fixedly secured thereto and is particularly characterized by the provision of a semi-spherically shaped end surface 100, the diameter of which is greater than the opening 91 so that normally the surface 100 is spring biased to close the opening 91 and to abut the distal end of the stem 90.

In operation, the inlet 96 is connected to a fuel cylinder by means of the conduit 50 and the fuel flow passage 92 is thereby subjected to a gas pressure substantially equal to the pressure of the fuel in the cylinder. The combination of this pressure and the load of the spring 98 is sufficient to bias the valve head 99 to close the opening 91. However, if the adjustment screw 57 is

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thereupon turned slightly to increase the tension of the spring 83, the diaphragm 76 and the stem 90 will be correspondingly moved slightly toward the valve head 99 to unseat the head and to slightly "crack" the opening 91. The gas will thereby flow from the passage 92 into the recess 74, and through an outlet passageway 101 to a main outlet 102 connected to the conduit 53 (FIGURE 1). The pressure of the gas in the recess 74 will act against the face 76b of the diaphragm 76 to balance the oppositely directed force of ambient pressure and of the spring 83 acting on the diaphragm face 76a. The valve head 99 will be adjusted by this diaphragm balancing effect such as to position itself relative to opening 91 so that the pressure drop of the gas through opening 91 will be sufficient to provide a pressure in recess 74 just sufficient so that the force acting on face 76b of the diaphragm will be substantially equal and opposite to the force acting on face 76a.

For any selected position of the adjustment screw 57, therefore, a pre-determined constant flow of fuel will be delivered from the fuel cylinder to the burner head 59. The flow of fuel to the burner head can thereby be controlled and regulated and it will be appreciated that in this respect the regulated device 54 acts essentially as a gas pressure regulator valve and that the pressure of the gas being discharged through the outlet 102 can be maintained at a predetermined pressure by selective adjustment of the adjustment screw 57.

The pressurized fuel cylinders 44 and 45 are normally provided with a valve controlled outlet in the neck portion 52 thereof. The coupling connector 51 is fitted with a pusher pin 103 (FIGURE 4) having a fuel passage 104 extending therethrough from one end 106 to an opposite end 107 of the pin, which pusher pin engages the axial stem actuator of a tire valve carried in the neck portion 52 of the fuel cylinder 44 or 46.

The pin 103 is particularly characterized as having a reduced diameter body portion 108, and enlarged mid-section 109 which forms a shoulder 110, reduced diameter portions 111 and 112 and a threaded end portion 113. The threaded end 113 is received in a complementarily threaded bore 114 formed in the connector valve 51 and a passageway 116 is connected in open communication with the bore 114 and a threaded valve outlet 117 which is adapted to receive the conduit 50 (FIGURE 2).

A cavity 118 opens to one end 119 of the connector valve 51 and is formed by a side wall 120 which is threaded as at 121 to receive the complementarily threaded neck portion 52 of the fuel cylinders. In order to connect the valve 51 to a fuel cylinder, conduit 50 (FIGURE 1) is coupled to the outlet 117 and the neck portion 52 of a cylinder is inserted into the cavity 118. The cylinder is then rotated so as to thread the neck portion 52 of the cylinder into the connector valve 54 whereupon the pusher pin 103 will open the tire-valve and fuel will be conveyed from the cylinder through the passage 106 and thence through passageway 116 and outlet 117 through the conduit 50 to the regulating device 54.

In order to insure a leak-proof connection between the connector valve 51 and the fuel cylinder, a gasketing member 122 formed of suitable gasket material is inserted into the cavity 118 for receiving in abutting engagement the upper edge of the neck portion of the cylinder.

When the supply of fuel from a cylinder has been exhausted, for example, cylinder 44 of FIGURE 2, the cylinder can be removed from the case by expanding the bracket 47 and urging the cylinder away from the panel 12. The cylinder can then be rotated relative to the connective valve 51 to remove the valve from the neck portion of the cylinder and a fresh cylinder, for example, cylinder 46 can be removed from the case 11, threaded to the connector valve 51 and re-inserted into the case.

Referring to FIGURE 5, the conduit 50 comprises a length of hose 123 which may be formed of any suitable

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deformable and flexible material such as rubber or plastic and which connects at one end to a rigid tubular elbow member 124 and at its opposite end to a straight length rigid tubular member 126. Each of the members 124 and 126 comprises a barbed end portion 127 adapted to be inserted into the hose 123 to form a gas-tight connection therewith. In order to provide protection for the ends of the hose 123 pressed on the barbed ends of members 124 and 126 an enlarged diameter ferrule or ring 128 is formed respectively on members 124 and 126 to receive and envelop the ends of the hose.

An opposite end 129 of the elbow member 124 is threaded as at 130 to connect to the complementarily threaded inlet 96 of the regulator device 54 (FIGURE 3) and an opposite end 131 of the member 126 is threaded at 132 to connect to the outlet 117 of the connector valve 51. The hose 123 is of sufficient length and flexibility so that when the elbow member 124 is connected in fixed assembly to the regulator device 54 (FIGURE 1) the connector valve 51 may be conveniently and alternatively connected to either of the fuel cylinders 44 and 46.

Although various modifications might be suggested by those versed in the art, I wish to embody within the scope of the patent warranted hereon all such modifications as come within the scope of my contribution to the art.

I claim as my invention:

1. A portable radiant heater assembly comprising, in combination,

- a rectangularly shaped case having a front wall and spaced parallel side walls,
- a reflector mounted on said front wall and projecting outwardly therefrom,
- a gas combustion incandescent filament member situated substantially at the focal point of said reflector,
- a burner head mounted on said front panel and connected to said filament for receiving liquefied petroleum fuel from a source and for mixing air with the fuel to provide a hot flame at said filament to incandesce said filament,
- a bail member for carrying said case and for selectively supporting said case in any position from horizontal to vertical,

said bail member having a pair of elongated legs and a cross bar interconnecting the legs to maintain the legs in spaced parallel relation and in an overlying relation relative to said side walls, means forming elongated parallel slots in said legs, a pair of threaded studs firmly affixed to and projecting outwardly from said side walls to be received respectively in said slots for pivotally mounting said bail member on said case, and an adjustably threaded locking knob on each of said studs for urging said legs against said side walls to selectively and immovably position said legs relative to said side walls in any position from vertical to horizontal.

2. A portable radiant heater assembly comprising, in combination,

- a rectangularly shaped case having a front wall and spaced parallel side walls,
- a reflector mounted on said front wall and projecting outwardly therefrom,
- a gas combustion incandescent filament member situated substantially at the focal point of said reflector,
- a burner head mounted on said front panel and connected to said filament for receiving liquefied petroleum fuel from a source and for mixing air with the fuel to provide a hot flame at said filament to incandesce said filament,
- a bail member for carrying said case and for selectively supporting said case in any position from horizontal to vertical,

said bail member having a pair of elongated legs, a cross bar interconnecting the legs to main-

tain the legs in spaced parallel relation and in overlying relation relative to said side walls, means forming elongated parallel slots in said legs, a pair of threaded studs firmly affixed to and projecting outwardly from said side walls to be received respectively in said slots for pivotally and for extensively mounting said bail member on said case, means on said side walls around said studs forming embossments to receive said legs in abutting relation and to provide a bearing surface for said legs to maintain said legs in spaced relation relative to said side walls, and an adjustable threaded locking knob on each of said studs for urging said legs against said embossments to selectively and immovably position said legs relative to said side walls for supporting said case in any position from horizontal to vertical.

3. A portable radiant heater assembly comprising, in combination,

- a rectangularly shaped case having a front wall and a pair of spaced parallel side walls,
- a reflector mounted on said front wall and projecting outwardly therefrom,
- a gas combustion incandescent filament member situated substantially at the focal point of said reflector,
- a burner head mounted on said front panel and connected to said filament for receiving liquefied petroleum fuel from a source and for mixing air with the fuel to provide a hot flame at said filament to incandesce said filament,
- conduit means in said case and connected to said burner head for supplying fuel from a fuel cylinder to said burner head,
- a fuel regulating device mounted in said case interiorly thereof and connected in said conduit means for selectively regulating the flow of fuel to said burner head,
- a manually operated adjustment screw on said regulating device for adjustably controlling the fuel flow therethrough,
 - said adjustment screw extending through said front panel adjacent said burner head for manual operation thereof exteriorly of said case,
- a bail member for carrying and for supporting said case,
- mounting means on said case for pivotally mounting said bail member thereon,
 - adjustable locking means on said mounting means for selectively locking said bail member in any angular position relative to said front panel,
- whereby said case and said front panel can be supported at any angle between horizontal and vertical to provide selective direction of radiation of heat waves and accessibility of said adjustment screw to control heat output.

4. A portable radiant heater assembly comprising, in combination,

- a rectangularly shaped case having a front panel, spaced parallel side walls and spaced parallel end walls,
- a cover hingedly mounted on one of said end walls to close the back of said case,
- latch means mounted on the other of said end walls to selectively maintain said cover in a closed position,
- a liquefied petroleum fuel burner head mounted on said front panel having a gas combustion incandescent filament connected thereto and projecting outwardly therefrom,
- a concave reflector mounted on said front panel for collecting, focusing and radiating heat waves from said filament,
 - said filament being situated at the focal point of said reflector,

first conduit means in said case and connected to said burner head for supplying liquefied petroleum fuel thereto,

- a regulating device in said first conduit means for adjustably controlling the flow of fuel therethrough,
 - said regulating device having an adjustment screw manually operable to selectively adjust the flow through said device,
 - said adjustment screw extending through said front panel adjacent said reflector and protected from heat waves emanating therefrom,
- bracket means in said case for removably mounting a plurality of fuel cylinders,
- second conduit means in said case for supplying fuel from any one of said fuel cylinders to said regulating device,
 - said second conduit means being connected at one end to said regulating device and having mounted thereon at the other end thereof a connector valve for releasably connecting to a fuel cylinder,
 - said second conductor means comprising a flexible hose to accommodate convenient connection to any one of the plurality of cylinders,
- a bail member for carrying said case and for selectively supporting said case in any position from horizontal to vertical,
 - said bail member having a pair of elongated legs and a cross bar interconnecting the legs to maintain the legs in spaced parallel relation and in overlying relation relative to said side walls,
- means forming elongated parallel slots in said legs, a pair of threaded studs firmly affixed to and projecting outwardly from said side walls to be received respectively in said slots,
- means on said side walls surrounding said studs forming embossments to receive said legs in abutting relation to provide a bearing surface for said legs and to maintain said legs in spaced relation relative to said side walls,
- an adjustable threaded locking knob on each of said studs for urging said legs against said embossments to selectively and immovably position said legs relative to said side walls.

5. The portable radiant heater assembly as defined in claim 3 in which said adjustment screw is situated adjacent said reflector and protected from heat waves emanating from said reflector.

6. A portable radiant heater assembly comprising, in combination,

- a rectangularly shaped case having a front wall and a pair of spaced parallel side walls,
- a reflector mounted on said front wall and projecting outwardly therefrom,
- a gas combustion incandescent filament member situated substantially at the focal point of said reflector,
- a burner head mounted on said front panel and connected to said filament for receiving liquefied petroleum fuel from a source and for mixing air with the fuel to provide a hot flame at said filament to incandesce said filament,
- conduit means in said case and connected to said burner head for supplying fuel from a fuel cylinder to said burner head,
- a fuel regulating device mounted in said case interiorly thereof and connected in said conduit means for selectively regulating the flow of fuel to said burner head,
- a manually operated adjustment screw on said regulating device for adjustably controlling the fuel flow therethrough,
 - said adjustment screw extending through said front panel for manual operation thereof exteriorly of said case,
- a bail member for carrying and for supporting said

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case and having a pair of spaced parallel leg members for overlying the side walls of said case, and mounting means on said side walls for pivotally mounting said legs of said bail member thereon, and whereby the legs of the bail member can be pivoted to support the case at any angle between horizontal and vertical without interference of the adjustment screw.

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