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(54) **DUAL SOURCE HEATER WITH RADIANT AND CONVECTION HEATERS**

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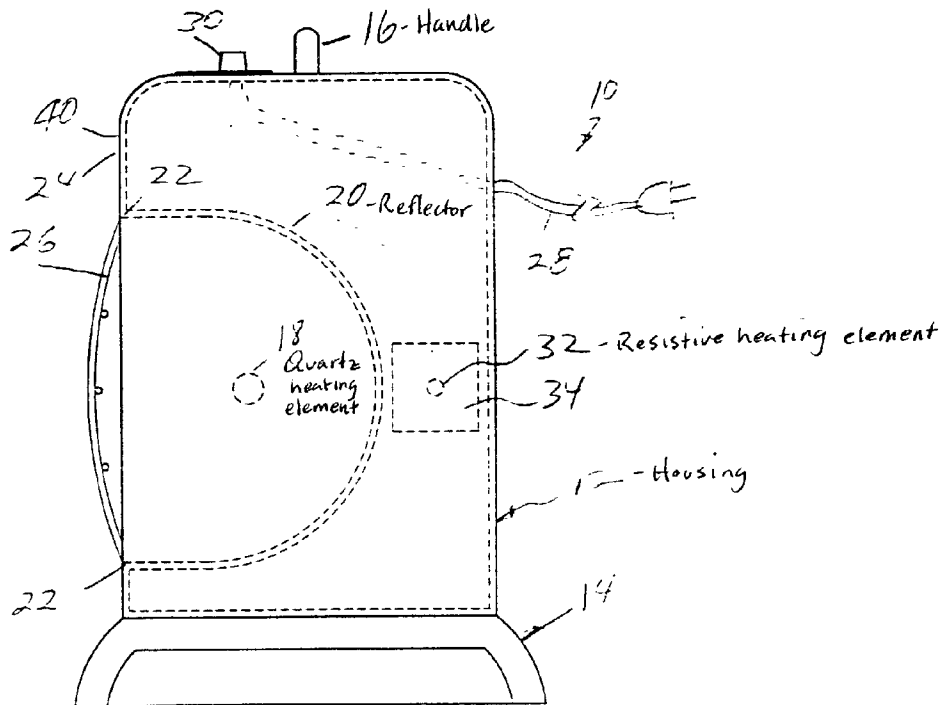
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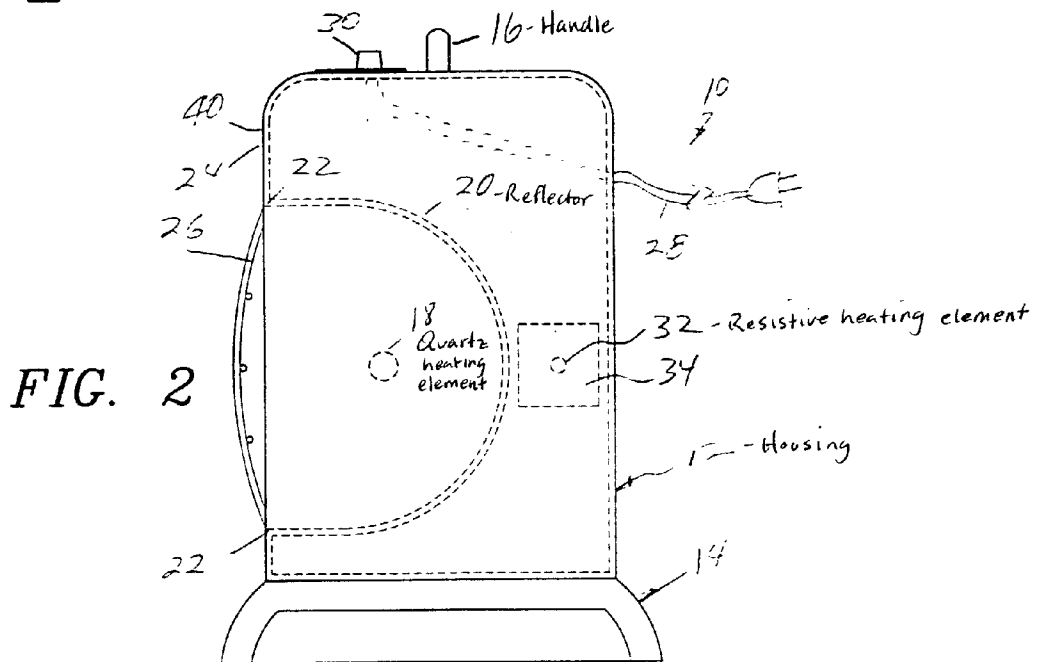
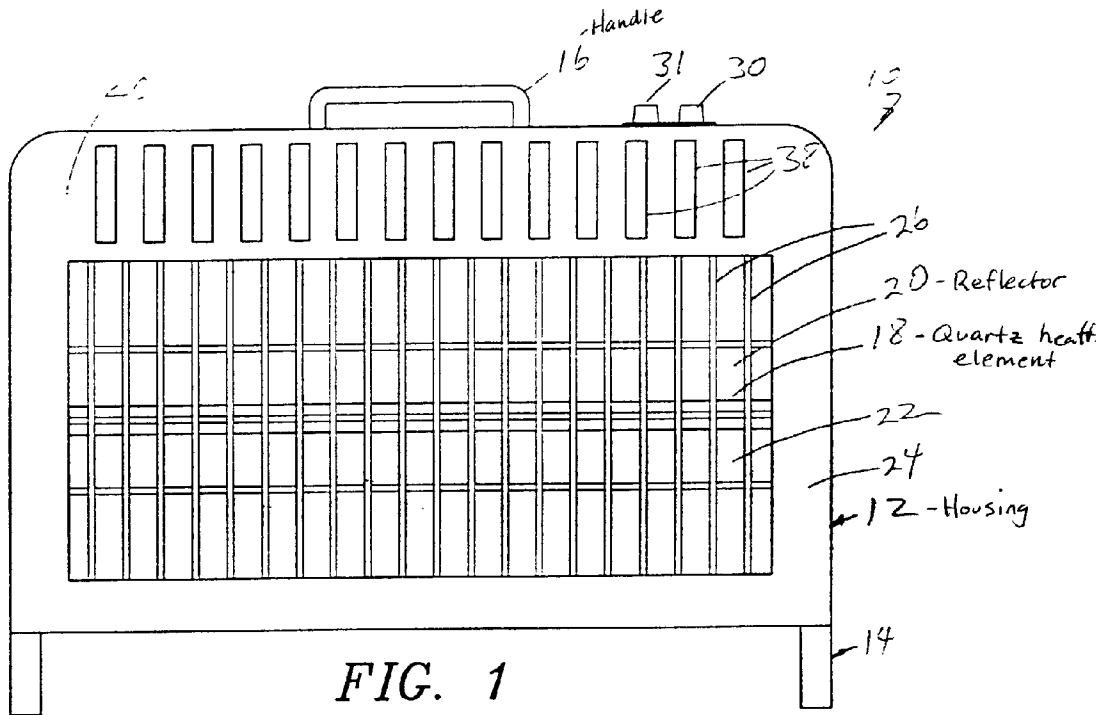
ABSTRACT

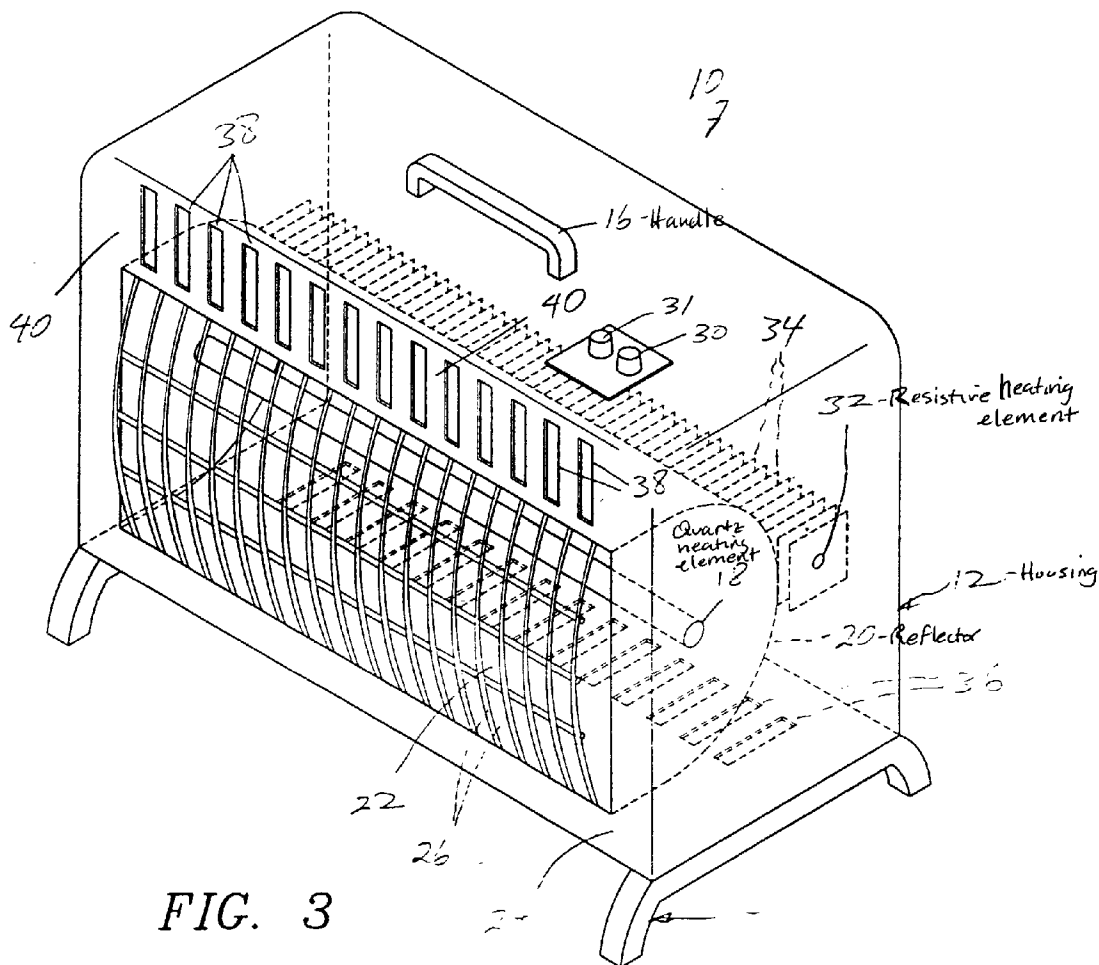
A dual source heater with radiant and convection heaters operates to provide radiant and convective heat for heating a surrounding space. A quartz heating element provides radiant heat, and a resistive heating element provides convective heat, through openings in the heater housing. A reflector is positioned so that an airflow updraft is created within the housing and airflow is concentrated through the resistive heating element.

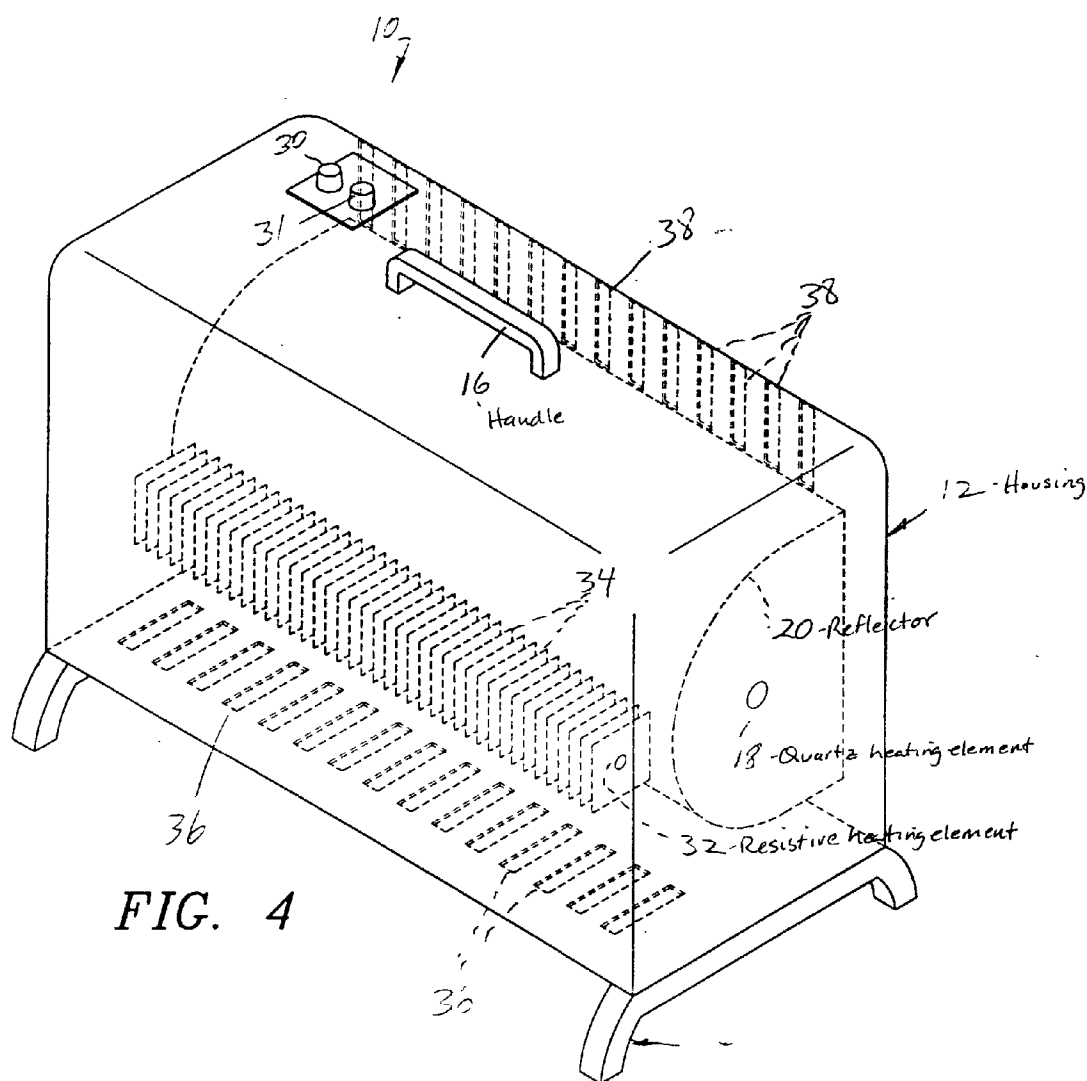
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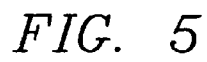
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DUAL SOURCE HEATER WITH RADIANT AND CONVECTION HEATERS

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] This invention relates to space heaters. More particularly, this invention relates to space heaters producing radiant heat and convective heat for heating the surrounding space.

[0003] 2. Description of the Background Art

[0004] Presently, there exists many types of space heaters that employ various heat sources. One of the oldest types of space heaters consists of a propane or natural gas space heater that operates by producing a flame proximate to a ceramic heating element to radiate heat therefrom. Another popular type of space heater includes a fan blower that blows air across an electric resistive heating element to the space to be warmed. Still another type of space heater employs a quartz heating element surrounded on one side by a reflector for radiating heat outwardly from the heater. Finally, still other types of heaters consist of a baseboard configuration wherein the heating element is heated by means of steam or hot water or by an electric resistive element whereupon air flow from the bottom of the base board heater convectively flows upwardly there through to be warmed by the heating element and to then flow into the surrounding space.

[0005] The aforementioned space heaters have enjoyed widespread use throughout the world in various climates. For example, baseboard heaters are more commonly utilized in colder climates, whereas resistive space heaters, being more portable in nature, are more commonly used in the warmer climates. Unfortunately, each type of space heater has certain disadvantages that reduces their versatility. For example, gas space heaters require a permanent connection to a gas line and therefore they are not portable. Baseboard heaters supplied by steam or heated water are likewise non-portable. However, baseboard heaters do not present the safety concerns associated with gas heaters. Similarly, quartz heaters are commonly portable and efficient, yet, the wattages employed are typically reduced to minimize excessive heating of the grillwork across the face of the space heater. Space heaters employing fans and resistive elements, are inherently safer than quartz space heaters that are not as efficient.

[0006] Therefore, it is an object of this invention to provide an improvement which overcomes the aforementioned inadequacies of the prior art devices and provides an improvement which is a significant contribution to the advancement of the space heater art.

[0007] Another object of this invention is to provide a space heater that employs a quartz element for producing radiated heat at a sufficiently low wattage to minimize fire hazards that is integrated with a resistive heating element to thereby provide a dual source heater.

[0008] Another object of this invention is to provide a dual source heater that employs a quartz heating element for producing radiated heat and a resistive heating element that produces heat convectively.

[0009] Another object of this invention is to provide a dual source space heater that includes a quartz heating element for producing radiated heat and a resistive heating element and fan for producing heated air flow.

[0010] The foregoing has outlined some of the pertinent objects of the invention. These objects should be construed to be merely illustrative of some of the more prominent features and applications of the intended invention. Many other beneficial results can be attained by applying the disclosed invention in a different manner or modifying the invention within the scope of the disclosure. Accordingly, other objects and a fuller understanding of the invention may be had by referring to the summary of the invention and the detailed description of the preferred embodiment in addition to the scope of the invention defined by the claims taken in conjunction with the accompanying drawings.

SUMMARY OF THE INVENTION

[0011] For the purpose of summarizing this invention, this invention comprises a dual source space heater for producing heat to heat the surrounding space around the space heater.

[0012] In its preferred embodiment, the dual source space heater of the invention is fully electrically operated and configured with an appropriate handle and housing stand so as to be portable in nature. In the preferred embodiment, a quartz heating element is employed along with a reflector for reflecting the radiant heat outwardly from the face of the space heater. In one of the preferred embodiments, the heat produced by the quartz heater heating element is supplemented by means of a resistive element and blower fan that produces a heated air stream outwardly from the face of the space heater.

[0013] In another preferred embodiment, the quartz heating element is supplemented with a resistive element that is positioned above vent holes in the bottom of the space heater so as to produce heat convectively.

[0014] It should be appreciated that in both of the preferred embodiments, one source of heat comprises the quartz element and another source of heat comprises the resistive element. This dual-source functionality allows the space heater to operate efficiently. Specifically, the quartz element may be powered to produce low and medium heating levels. Whenever higher levels of heating are required, the resistive heating element is employed. In this manner, the efficiencies of employing a quartz heater are achieved while minimizing the possibility of the grill of the space heater becoming too hot as could occur in the prior art quartz heaters of a higher wattage.

[0015] The foregoing has outlined rather broadly the more pertinent and important features of the present invention in order that the detailed description of the invention that follows may be better understood so that the present contribution to the art can be more fully appreciated. Additional features of the invention will be described hereinafter which form the subject of the claims of the invention. It should be appreciated by those skilled in the art that the conception and the specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the spirit and scope of the invention as set forth in the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

[0017] **FIG. 1** is a front elevational view of the first preferred embodiment of the dual source heater of the invention;

[0018] **FIG. 2** is a right end view of **FIG. 1**;

[0019] **FIG. 3** is a perspective view of **FIG. 1** showing the relative positioning of the resistive heating element above the vent holes in the bottom of the housing that allows convective flow from such vent holes upwardly through the vent holes along the upper front of the space heater;

[0020] **FIG. 4** is a rear perspective view of **FIG. 1**;

[0021] **FIG. 5** is a rear perspective view of another preferred embodiment of the dual source heater of the invention that employs a blower fan for circulating air flow through the bottom vents, across the resistive heating element and then through the front vents of the space heater;

[0022] **FIG. 6** is a front perspective view, partially cut away, of another preferred embodiment of the dual source space heater of the invention wherein the quartz heating element is positioned vertically and wherein the resistive heating element and blower fan are positioned below the quartz heating element to circulate air from the lower vents, across the resistive heating element and then through upper vents to then flow outwardly from the grillwork of the space heater; and

[0023] **FIG. 7** is a right side view, partially cut away, of **FIG. 6**.

[0024] Similar reference characters refer to similar parts throughout the several views of the drawings.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0025] **FIGS. 1-4** illustrate the first preferred embodiment of the dual source space heater **10** of the invention. Specifically, the space heater **10** comprises a generally rectangular-shaped housing **12** having a floor stand **14** and carrying handle **16**. A quartz heating element **18** is positioned horizontally within the longitudinal length of the housing **12** and is encompassed by an arcuate reflector **20**. The opened end **22** of the reflector is connected to the front wall **24** of the housing **12**. A grillwork **26** is positioned across the opened end **22** of the reflector **20**. Electrical power from a conventional power cord flows to a switch **30** and then to the quartz heating element **18** for supplying electrical energy thereto causing the quartz heating element to produce heat which is then radiated off the reflector **20** to exit the housing **12** via the opened end **22**.

[0026] As also shown in **FIGS. 1-4**, this preferred embodiment of the space heater **10** includes another source of heat; namely, a resistive heating element **32** that is similarly positioned horizontally within the longitudinal length of the housing **12**. Preferably, the resistive heating element **32** includes a plurality of heat-dissipating fins **34** along its longitudinal length to enhance its convectivity. Electrical power to the resistive heating element **32** is supplied via cord **28** and switch **31**.

[0027] As best shown in **FIGS. 3 and 4**, the convective heat flow through the fins **34** of the resistive heating element **32** flows upwardly through vents **36** positioned across the longitudinal bottom of the housing **12**, upwardly through the fins **34** of the resistive heating element **32** and around the reflector **20** to then exit the housing **12** via a plurality of upper vents **38** positioned across the upper face **40** of the housing **12**.

[0028] **FIG. 5** illustrates another preferred embodiment of the dual source space heater **10** of the invention that is similar to the first preferred embodiment shown in **FIGS. 1-4** but additionally includes a fan assembly **50**, powered via switch **31** and positioned within the housing **12** in alignment with the front vents **38**. The addition of the fan assembly **20** creates an air flow from the bottom vents **36**, across the fins and resistive heating element **34** and **32**, and out the front vents **38**. Thus, in this embodiment it should be appreciated that while some convective heat flow occurs, increased flow can be achieved by means of the fan assembly **50**.

[0029] **FIGS. 6 and 7** illustrate still another preferred embodiment of the dual source space heater **10** of the invention that includes a generally vertical configuration as opposed to the horizontal configurations shown in **FIGS. 1-5**. More particularly, as shown in **FIGS. 6 and 7**, this vertical embodiment includes a vertically disposed housing **12** in which is vertically positioned in the quartz heating element **18** and reflector **20**. The resistive heating element **32** comprises a generally cylindrical configuration that is positioned in the bottommost portion of the housing **12**. The bottom vents **36** are positioned across the bottommost face **24** of the housing **12** and the upper vents **38** are positioned proximate to the lower end of the space encompassed by the reflector **20**. Finally, the fan assembly **50** is positioned proximate to the resistive heating element **32**.

[0030] Upon operation of the quartz heating element **18**, the heat produced thereby is radiated off the reflector **20** outwardly from the opened end **22** thereof to heat the surrounding space. Additional heat can be obtained by turning on the resistive heating element **32** and the fan assembly **50** whereupon air is drawn through the bottom vents **36**, across the resistive heating element **32** and then through the upper vents **38** into the space defined by the reflector **20** to then exit the space heater **10**.

[0031] The present disclosure includes that contained in the appended claims, as well as that of the foregoing description. Although this invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention.

[0032] Now that the invention has been described,

What is claimed is:

1. A heater, comprising in combination:

a housing;

a quartz heating element positioned within said housing for radiating heat through an opening in said housing; and

a resistive heating element positioned within said housing for convecting heat through said housing.

2. The heater as set forth in claim 1, further including a fan assembly for creating an airflow across said resistive heating element.

3. The heater as set forth in claim 2, wherein said airflow flows into said housing by means of vents positioned in a bottom portion of said housing and out of said housing by means of vents positioned in an upper portion of said housing.

4. The heater as set forth in claim 2, wherein said airflow flows into said housing by means of vents positioned in a bottom portion of said housing and out of said housing through said opening in said housing.

5. The heater as set forth in claim 1, wherein said quartz heating element is horizontally positioned within said housing.

6. The heater as set forth in claim 1, wherein said quartz heating element is vertically positioned within said housing.

7. The heater as set forth in claim 6, further including a fan assembly positioned below said quartz heating element for creating an airflow across said resistive heating element and wherein said airflow flows into said housing by means of vents positioned in a bottom portion of said housing and out of said housing through said opening in said housing.

8. The heater assembly as set forth in claim 1, wherein said housing includes a handle and a stand for functioning as a portable space heater.

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