Dec. 18, 1962 R. S. WATERS 3,069,525

HEATING APPARATUS

Filed Jan. 31, 1961

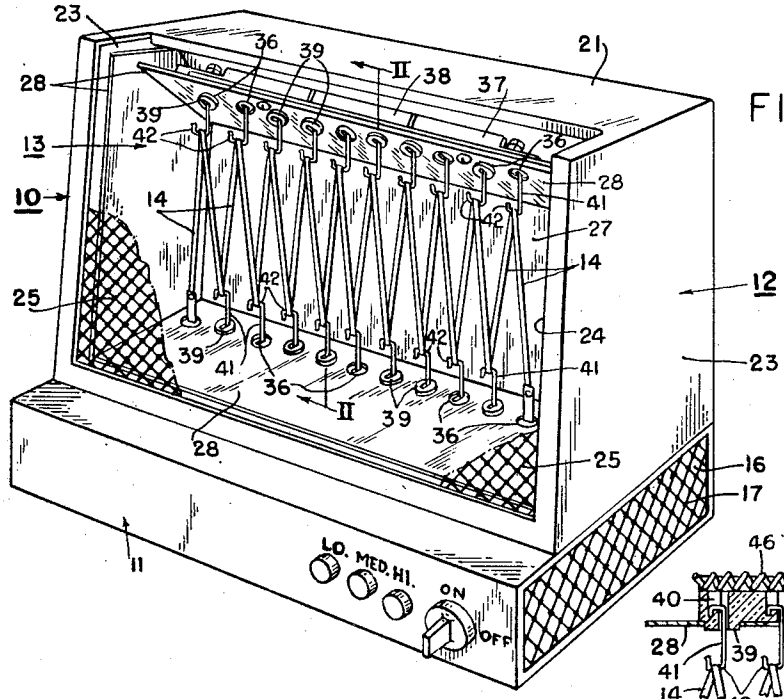


FIG. 1.

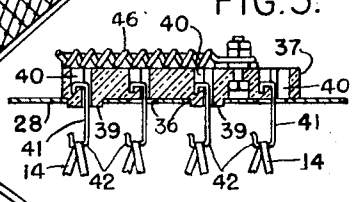


FIG. 5.

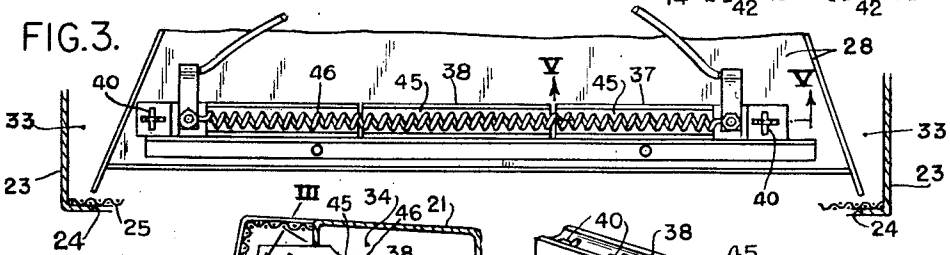


FIG. 3.

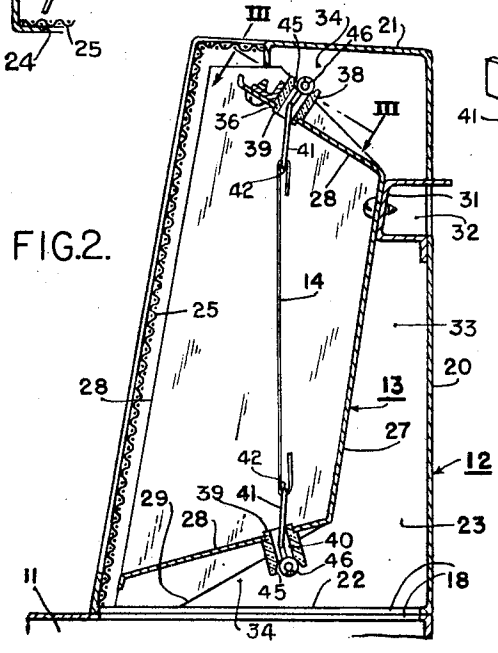


FIG. 2.

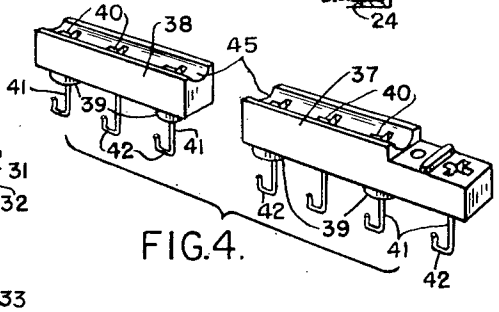


FIG. 4.

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HEATING APPARATUS

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This invention relates to heaters, for example, room or space heaters of the electrical type, and has for an object to reduce the manufacturing costs of such heaters.

Another object of the present invention is to improve the appearance of such heaters, particularly with respect to the ceramic mounting members utilized for supporting the usual electrical resistance heating elements.

Yet another object of the invention is to provide a non-electrically conductive mounting member for supporting the electrical resistance heating element of a room heater, which member also functions to support an electrical resistance element which serves, when in circuit with the heating element, to reduce the heating effect of the heating element.

The foregoing and other objects are effected by the invention as will be apparent from the following description and claims taken in connection with the accompanying drawing, forming a part of this application, in which:

FIG. 1 is a perspective view of a room heater incorporating the present invention;

FIG. 2 is a transverse sectional view, taken along the line II—II of FIG. 1, looking in the directing indicated by the arrows;

FIG. 3 is a sectional view taken along the line III—III of FIG. 2, looking in the direction indicated by the arrows;

FIG. 4 is a perspective view of a pair of mounting members constructed in accordance with the invention; and

FIG. 5 is a longitudinal sectional view taken along the line V—V of FIG. 3, looking in the direction indicated by the arrows.

Referring to the drawing in greater detail, there is shown a space or room heater **10** comprising a base **11** on which is supported a casing **12** housing a reflector **13** in which is mounted an electrical resistance heating element **14**.

The base **11**, in the construction herein illustrated, is rectangular in shape and has open ends **16** covered by decorative mesh or similar material **17**, the open ends **16** providing for entry of air into the interior of the base for eventual discharge therefrom in a vertical direction to the interior of the casing **12** via aligned openings **18** (FIG. 2) in the top wall of the base and the bottom wall of the casing.

The casing **12** includes a rear wall **20**, a top wall **21**, a bottom wall **22** and side walls **23**. The casing is open at the front, as at **24** (FIG. 3), and this open front is preferably protected by a decorative mesh or wire screen **25** or the like.

Housed within the casing **12** is the reflector **13** which has a rear wall **27** and four sides walls **28**. While the side walls are illustrated as arranged in a rectangle, it should be pointed out that there may be a greater number of sides providing a hexagon or octagon, or an infinite number of sides providing a circular side wall construction, or any other suitable shape of reflector side wall construction. As best shown in FIG. 2, the vertical side walls **28** have lower extensions **29** projecting downwardly below the horizontal side walls **28** to provide, in effect, feet which support the reflector in spaced relation to the bottom wall **22** of the casing.

A bracket **31** (FIG. 2) is secured inwardly of the casing

rear wall **20** and serves as a support to which the rear wall **27** of the reflector may be attached by suitable means. The bracket **31** provides a recess **32** at the rear of the heater casing and near the top thereof for reception of the fingers of a person desiring to lift and transport the heater.

It will be noted that the reflector side wall extensions **29**, which rest upon the casing bottom wall **22**, and the bracket **31** serve to position the reflector in spaced relation to the surrounding casing walls. Consequently, air entering the base **11** from the open end walls of the latter passes upwardly through the openings **18** in the base top and casing bottom walls and flows past all side walls of the reflector **13** to pick up heat therefrom and to discharge forwardly through the open front **24** of the casing. This flow of air between the reflector and the casing not only serves as a heating means for the air but also as a cooling means for the casing, thereby preventing the latter from becoming too warm to be touched safely. The spaces between the vertical side walls **28** of the reflector and the side walls of the casing are indicated by the reference character **33**, and the similar spaces between the transverse side walls **28** of the reflector and the corresponding walls of the casing are indicated by the reference character **34**.

The top and bottom side walls **28** of the reflector are provided with opposed transversely extending rows of openings **36** disposed in spaced parallel relationship to the rear wall **27** of the reflector. A plurality of mounting bars **37** and **38** are disposed end to end in overlying relation to the opening **36**. These bars are preferably made of ceramic material or of other nonelectrical conducting material to provide electrical insulation for a purpose to be hereinafter noted.

Each mounting bar is provided with at least two cylindrical projections **39** on the face thereof which engages the corresponding wall of the reflector, these projections being of such size that they are closely received in associated openings **36**, with the result that they serve to prevent displacement of the mounting bars in a plane parallel to the planes of the reflector side walls with which they cooperate. Each bar **37** and **38** is provided with a plurality of openings or passages **40** therethrough, in which are disposed supporting wires or members **41**, preferably of resilient metal, one end of each support **41** being fixed within the mounting member **37** or **38** against movement in a direction toward the interior of the reflector. The free ends of the supports **41** project into the space within the reflector **13** and terminate in hook-like portions **42**. An electrical resistance heating element, herein illustrated as of ribbon form, is supported by these hook-like portions **42**, being woven back and forth between the hooks of first one row and then the other row of supports **41**. Preferably, these supporting wires **41**, being resilient, are deflected when the ribbon is wound or placed therein, with the result that, when the ribbon expands due to heating thereof, the resilience of the supports **41** will result in movement of the hook-like free ends of the supports sufficiently to take up any slack which would otherwise be produced in the heating element as a result of expansion thereof under temperature rise.

As clearly shown in FIGS. 1 and 2, the ceramic mounting bars **37** and **38**, and the projections **39**, serve to space the supports **41** from the metal of the reflector side walls. It should be further noted that the projections **39** are only of sufficient length to extend slightly through the associated openings in the reflector side walls, with the result that very little of these ceramic members extend into the interior of the reflector where they can be seen from the front of the heater. Accordingly, there is provided a very pleasing appearance as compared with prior heat-

ers of this type where a major portion of the supports for the heating element or ribbon extended a considerable distance into the interior of the reflector.

As best shown in FIGS. 2 and 4, the mounting bars **37** and **38** are provided, on the face thereof opposite to the face which engages the reflector side walls, with a longitudinally extending groove or recess **45** in which is disposed an electrical resistance element **46**. This element is arranged to be placed in series with the heating element **14** for a heat setting less than "high," thereby reducing the heating effect of the main heating element **14**. As best shown in FIG. 2, both the upper and lower rows of mounting bars **37** and **38** are provided with this groove and each row supports and houses a resistance element **46**, one of these being placed in series with the main heating element **14** for "medium" heat setting, and both being in series with the main heating element for "low" setting.

Inasmuch as the wiring arrangement for a heater of this type having "low," "medium" and "high" positions of heat control is conventional and well known in the art, no further description thereof is deemed necessary.

While the invention has been shown in but one form, it will be obvious to those skilled in the art that it is not so limited, but is susceptible of various changes and modifications without departing from the spirit thereof.

What is claimed is:

1. In a space heater, a reflector having rear and side walls and being open at the front, a casing housing said reflector and spaced from the side walls thereof, two opposed side walls of said reflector each having a series of aligned openings therethrough in parallel spaced relation to the reflector rear wall, a plurality of mounting bars of electrically insulating material disposed against said opposed side walls in longitudinal alignment and in overlying relation to each series of openings, said bars being located in the space between the reflector and the casing and having one or more projections disposed in openings of said series of openings, a plurality of supports carried by said bars and projecting through said openings into the interior of the reflector, a resistance heating element looped back and forth between, and supported by, the projecting ends of said supports, the sides of said bars remote from the sides thereof which engage the reflector side walls having longitudinally-extending grooves therein, and a resistance element positioned in said grooves.

2. In a space heater, a reflector having rear and side walls and being open at the front, a casing disposed in spaced surrounding relation to the reflector, two opposed side walls of the reflector each having a row of openings therethrough in spaced relation to the reflector rear wall, a series of longitudinally-aligned mounting bars of electrically insulating material disposed in the space between the reflector and the casing in overlying relation to each row of openings, each of said mounting bars having at least two projections disposed in openings of said rows of openings, a plurality of resilient supports carried by said bars with free terminal portions of hook-like configuration disposed within the reflector, a resistance heating element looped alternately over the support hook-like terminals of the two rows, the bars of one of said series of longitudinally-aligned mounting bars having longitudinally-aligned grooves in a surface thereof, and an electrical resistance element disposed in said longitudinally-aligned grooves.

3. In a room heater, a reflector having rear and side walls, a casing housing the reflector and having rear and side walls spaced from the corresponding walls of the reflector, two opposed side walls of the reflector each having a row of longitudinally-aligned openings therethrough, one or more mounting bars of electrically insulating material disposed in the space between the casing and the reflector in overlying relation to each row of openings, each mounting bar having at least one projection extending through one of said openings, the extent to which said projections extend into the reflector being only sufficient to limit movement of said mounting bars in the planes of the reflector side walls with which they are associated, those of said bars which are associated with one of said rows of openings having a groove extending longitudinally on one face thereof, an electrical resistance element in said grooves, a plurality of supports carried by the bars and projecting through said openings into the interior of the reflector, the projecting portions of said supports having hook-like terminals, and a resistance heating element supported by said hook-like terminals.

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