This invention relates to comfort and well being and more particularly to individual localized comfort heating. Consequently, heaters for individual use have been provided. However, these have involved hazards of fire and electrical shock which have restricted the locations in which they may safely be used. In particular, there has been a need for a heater which could be positioned in the well of a desk. However, because of the lack of air circulation in the desk well and the presence of inflammables such as trash containers and of apparel such as the skirt or trousers of the occupant, and the need to permit freedom of movement of the occupant's feet within the well, the need for a heater suitable for a desk well has not heretofore been realized.

Accordingly, it is an object of the present invention to provide a heater especially adapted for the use of a desk which provides adequate heat without interfering with the use of the well and which does not present a fire or electrical shock hazard.

A further object is the provision of a heater which is attractive in appearance, easy to mount on a vertical surface and which functions without attention and without presenting a hazard.

These and other objects will become apparent from the following description in conjunction with the accompanying drawings in which:

FIG. 1 is an illustrative manner of using an embodiment of the invention;

FIG. 2, an exploded enlarged perspective;

FIG. 3, an enlarged fragmentary section showing the attaching means; and,

FIG. 4, a fragmentary perspective of the front panel showing the insulating attaching means.

Bearing stated, the heater of the present invention is comprised of a relatively thin, slim panel assembly having front and back walls and enclosing side walls, the front wall covered with electrical non-conducting material, an insulating sheet substantially coextensive with the front wall mounted on its inner surface, a thin heating element whose dimensions are slightly less than those of the insulating sheet positioned therein, the heating element having electrical means for energizing it and relatively thick heat insulating material positioned between the heating element and the back wall, the back wall having mounting means, and a sheet member with mounting means having means for connecting it to a vertical wall in order that the heater may be mounted in close proximity to the wall, the heating element having ornamental handles extending from the sides of its front in order to facilitate mounting and demounting it on the sheet mounting member when the latter is attached to a wall.

With further reference to the drawing, the heater of the present invention is exemplified by a relatively wide, thin panel member or housing 10, preferably of a length and width to be mounted on the front wall W of a desk as indicated in FIG. 1. The panel is relatively thin in order not to project substantially into the well space of the desk.

The panel member or housing includes a front member 12 having rearwardly extending side walls 14 and an outer covering 15 which may be decorative and is an electrical insulator. Mounted on the inner surface of the front member 12 is a sheet 16 of non-conducting material such as Mylar. The sheet 16 is substantially coextensive with the interior of the front member 12 and is positioned by strips 17 of flexible tape having tacky adhesive on both sides thereof which are attached to the inner face of the member 12. A tape 17 extends over the central portion of sheet 16 into engagement with the side edge surfaces of the member 12.

Positioned over the member 16 is a heating element 18. The element 18 is slightly smaller in length and width than the element 16 and is held in position within its borders by contact with the strips 17. The heating element 18 is a flexible, thin sheet member which conducts electrical current but whose resistance is such that the element reaches a desired temperature of, for example, 160° F. when connected to a conventional household outlet of approximately 220 volts alternating current. The electrical characteristics of the heating panel are such that it uses approximately 50 watts of electrical power. An example of such an electrical heating element is produced by Chemelex, Inc., Mineola, N.Y., under the trademark "Cellitherm."

In order to prevent substantial transmission of heat to the rear, a layer of insulation 20 is mounted over the back of the heating element. The back wall of the back member of the panel 22 preferably has side walls 23 which telescope with the side wall 14 of the front member in order to securely close and position the parts within the housing thus formed.

The heating element 18 has electrical conductor strips 24, 25 along opposite borders. The strips are connected to electrical leads or conductors 26, 27 which extend to a plug or connector 28 at one side of the panel. One of the leads 27 has a thermal overload protective device 30 which automatically breaks the circuit in the event that the temperature exceeds a predetermined level. A lead cord 31 is provided to attach the leads in the plug 28 to an electrical outlet.

The back member 22 has spaced teardrop apertures 32 for receiving mounting hooks. A thin sheet mounting member 34 is provided, having outwardly extending hook members 35 on its front surface, the hook members being spaced to engage apertures 32 in the back member 22. For ease of mounting member 34, its rear surface is coated with contact adhesive 36 which is protected until use by a backing sheet 37. The front member 12 and back member 22 are preferably of thin sheet material in order to rigidly support and protect the elements mounted in the housing, and the front member to efficiently radiate heat therefrom.

In order to facilitate carrying and mounting the panel in close proximity to a wall, handles 39 are provided which extend from the sides of the front surface. The handles have gripping portions 40 spaced from the panel by legs 41. The legs 41 are adapted to receive fasteners 42 which extend through openings in the back member 22 and the front member 12. Spacer blocks 43 are preferably positioned within the panel member between the fasteners to prevent inward bowing of the back when the fasteners are tightened.

In the use of the device the mounting member 34 is positioned in the desired location, for example, on the inner side of the front wall of the well of the desk. By grasping the handles 40 the heating panel may be mounted on the hooks 35 of the mounting sheet. The cord 31 may be plugged in or removed, as desired. Alternatively, the mounting sheet may be connected to the panel initially, and, with the backing removed from the mounting sheet, the panel and sheet pushed into position on the wall.

Since the panel is thin, it does not project substantially into the desk well and hence does not interfere with the use of the space. Further, since the heating element is entirely insulated from the exterior of the panel, there is no shock hazard present. Further, since the tempera-
nature is at a relatively low level, there is no fire hazard involved. However, due to the heating of a substantial area of the panel, the occupant receives a substantial radiation of heat at a temperature which is pleasant.

Accordingly, it will be seen that the present invention includes a broad, slim heater adapted to be positioned in a desk wall or other suitable location, which operates at a relatively low temperature and without any electrical shock or fire hazard and which has means for easily mounting it in difficult-to-reach locations and which is attractive in appearance.

It will be obvious to one skilled in the art that various changes may be made in the invention without departing from the spirit and scope thereof and therefore the invention is not limited by that which is illustrated in the drawing and described in the specification, but only as indicated in the accompanying claims.

What is claimed is:

1. A radiant desk heater comprising a relatively flat panel of a size to fit on the inner surface of the front wall of a desk and adding little additional bulk thereto, said flat panel being composed of front and rear plates with angularly disposed margins which overlap when the plates are assembled in parallel relation, said front plate having front and rear insulating surfaces, a sheet type heating element covering substantially the entire rear surface of said front plate, said sheet type heating element having widely spaced generally parallel copper strips incorporated therein with conductors extending therefrom to a connector by which said heater can be detachably connected to a source of electrical energy, heat responsive means connected to said conductors for breaking the circuit when the temperature exceeds a predetermined value, strip means having adhesive on both sides securing said heating element to the insulating rear surface of said front plate, a relatively thick layer of thermal insulation mounted between said heating element and the rear panel plate whereby the transmission of heat to the rear panel is substantially restricted, means for fastening the front and rear plates in assembled relation with said heating element and relatively thick layer of thermal insulation therebetween, and a strip for mounting said panel on a wall surface, said strip having means whereby it may be adhesively attached to a wall surface and with means by which said panel may be attached to said strip.

2. A radiant heater applicable to a wall surface such as the inner surface of the front wall of a desk to supply heat to increase the comfort of the user, said heater comprising a housing with front and rear plates and defining a relatively flat panel of a size to fit on the inner surface of a desk and adding little additional bulk thereto, said front plate having front and rear surfaces with electrical insulation covering the same, a low wattage and temperature sheet-type electrical heating element within said housing and attached by a tacky adhesive to and covering substantially the entire rear surface of said front plate, said sheet-type electrical heating element having electrical contacts attached to spaced portions thereof, electrical conductors extending from said spaced contacts to a connector by which said heater can be detachably connected to a source of electrical energy, means operatively associated with said electrical conductors for breaking the electrical circuit when the temperature exceeds a predetermined value, a relatively thick layer of thermal insulation overlying said sheet-type electrical heating element and between said electrical heating element and said rear plate, whereby the transmission of heat to said rear plate is substantially restricted, means for fastening the front and rear plates in assembled relation, and means by which said heater may be mounted upon a wall surface, whereby a radiant heater is provided of a character to produce a safe and comfortable heat.

3. The heater of claim 2 in which said sheet-type electrical heating element has widely spaced generally parallel electrically conductive strips incorporated therein to which said electrical conductors are attached.

4. The structure of claim 2 in which the said sheet-type electrical heating element is attached to the rear surface of the front plate by strip means having adhesive on both sides.

5. The structure of claim 2 in which means whereby the panel may be mounted upon a wall surface includes a mounting strip having an adhesive surface with a removable covering so that such a strip may be adhesively attached to a wall surface and with means by which said panel may be attached to said mounting strip.

6. The structure of claim 2 in which the heater is provided with handle means at spaced locations with fastening means extending through said front and rear plates and into said handle means and securing the parts in assembled relation.

7. The structure of claim 2 having spacing means maintaining the spaced relation of the front and rear plates.

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