Jan. 28, 1941. E. F. WACH 2,229,828

THERMORADIANT HEATING UNIT

Filed Feb. 14, 1938

Fig. 1

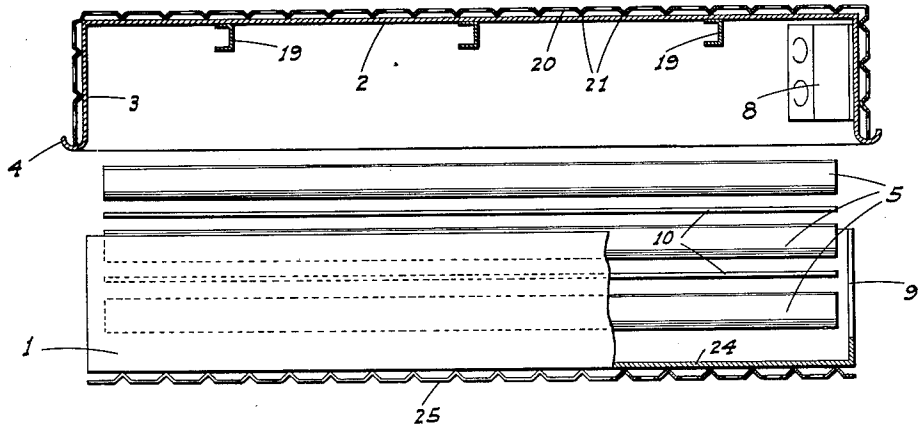


Fig. 2

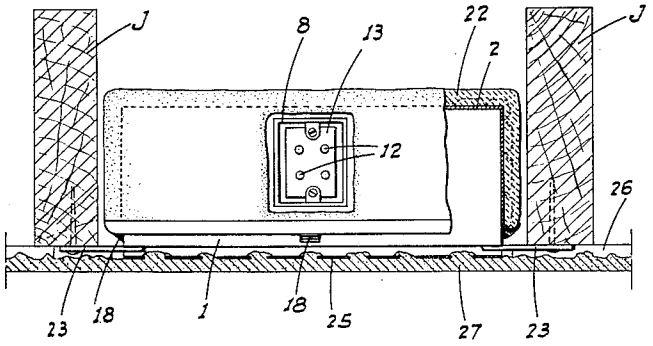


Fig. 3

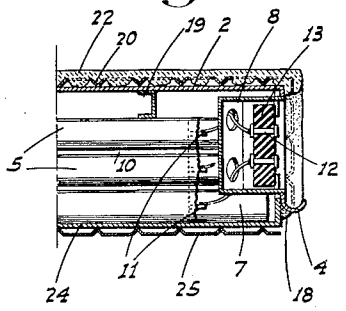
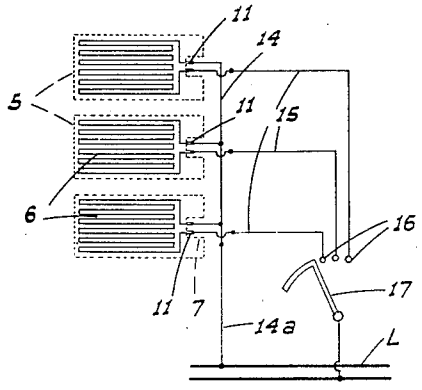
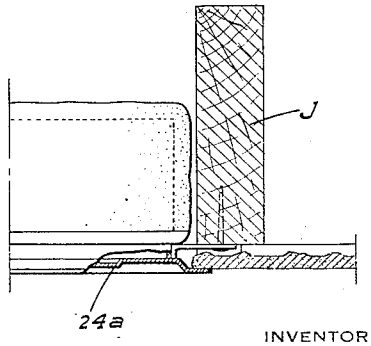


Fig. 4

Fig. 5





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THERMORADIANT HEATING UNIT

Edward F. Wach, Modesto, Calif.

Application February 14, 1938, Serial No. 190,373

3 Claims. (Cl. 219—34)

This invention relates generally to an electric heating unit of the radiant type, and in particular the invention is directed to and represents modifications and improvements in use and structure over the device shown in my United States Letters Patent #2,084,468, dated June 22, 1937.

The principal object of the present invention is to provide an electrically actuated radiant heating unit which, while suitable for many uses, is designed primarily for space heating in edifices and enclosures of all kinds such as homes, business offices, stores, hospitals, vehicles, boats, airplanes, and the like.

A further object of the invention is to provide an electric heating unit assembly of the type described which is safe and may be mounted in connection with wooden structures without danger of fire.

Another object is to provide a heating assembly, consisting of a number of identical heating units, so arranged that different heat intensities may be obtained from the assembly.

Another advantage of the present heating unit, resides in the fact that the same is readily adaptable to any style of architecture and may be mounted with a radiating surface exposed or entirely faced with plaster and thus out of sight.

A further object of the invention is to construct the device so as to utilize to the best advantage the principle of thermoradiant heating reflection, with its attendant advantages in reducing heat losses and fire hazards by minimizing the necessity of relying on heat insulation.

A further object of the invention is to produce a simple and inexpensive device and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawing similar characters of reference indicate corresponding parts in the several views:

Figure 1 is an exploded view partly in section of the constituent parts of the device.

Figure 2 is a fragmentary sectional elevation of the device, illustrating particularly the outlet box and wire connections with the several heating element units.

Figure 3 is an end view of the device as mounted in connection between building joists and entirely faced with plaster.

Figure 4 is a similar but fragmentary view of the device as mounted with the radiating face or panel exposed.

Figure 5 is a diagram of the preferred form of circuit for the device.

Referring now more particularly to the characters of reference on the drawing, the device comprises a relatively shallow, rectangular metallic box 1 provided with a top 2 having side flanges 3 which are of substantial height relative to the depth of the box 1. The box and top are preferably constructed of a metal such as steel or aluminum. The lower edges of flanges 3 are provided with outwardly rolled lips or gutters 4 for the purpose hereinafter described.

A plurality of heating element units 5, preferably three in number, are disposed in the box one upon the other in close face to face relation as shown in Fig. 2. Each of such heating element units is of envelope type and includes a heating element 6 embedded in suitable insulation material, and is constructed in substantially the same manner as the envelope type heating element units shown in my patent above identified. The heating element units 5 are notched or cut away at one end and in matching relation as shown at 7 so that an outlet box 8, mounted on and opening through one end flange 3 of the box top, may project within the box and into such matched notched or cut away portions of the several heating element units as shown in Fig. 2. The corresponding end of the box 1 is also provided with an open ended slot 9 for the reception of the outlet box. Of course, the outlet box 8 can be mounted in either end or in the top of the box depending on the particular installation required, and the heating units are notched or cut away to correspond. If desired, the insulation sheets 10 may be disposed between adjacent heating element units 5.

Each heating element 6 of the units 5 is provided with a pair of terminals 11 one of each of which are connected to binding posts 12 mounted in a porcelain terminal block 13 carried in the outlet box and open to the end of the device. The other terminal 11 of each heating element unit 5 is connected to a common supply lead 14, connected to another binding post 12, from which a wire 14a leads to one side of the current supply line L. Individual wires 15 lead from the other posts 12 to separate contact points 16, adapted to be successively engaged by a switch blade 17, which may be thermostatically controlled, connected to the other side of line L. In this manner one or more of the heating units may be used simultaneously to provide low,

medium or high heat radiation as may be desired. In the described wiring arrangement it is necessary that the terminal block be provided with four of the posts 12 as shown in Fig. 3. However, the wiring circuit as above described may be varied as desired.

When the heating element units are assembled in the box and wired as above described and the top disposed on the box, the flanges 3 at the lower edge are welded, as at 18, onto the box in order to seal the same. Relatively small cross channels 19 are fixed on the inner face of the top and engage the uppermost heating element unit in close face to face relation as shown in Fig. 2, and hold the units together and in place. The inner face of the top 2 is either lined with reflective material or is polished, painted or plated to form a reflective surface.

A corrugated or rib metal lath 20 is shaped to conform to and is disposed over the entire top 2 and down the side flanges 3 to the lips or gutters 4; such corrugated or rib lath being so disposed that only the corrugations or ribs 21 rest against the outer surface of the top and its side flanges, to which it may be fixed in any suitable manner, as by welding. After the lath is so fixed, it is embedded in a layer of refractory cement, illustrated at 22, which covers the entire top of the box and the side flanges down to the lips or gutters 4. This refractory material in combination with the reflective inner face of the top prevents heat loss through the top and sides of the device. If desired other forms of insulation or refractory material may be substituted for the refractory cement.

In use, the device is mounted between building joists J by means of suitable mounting brackets 23. In the embodiment of the invention shown in Figs 1 to 3 the bottom 24 of the box is provided on its entire outer surface with a corrugated or rib lath 25 fixed thereto in the same manner as lath 20 on the top of the box. The device is disposed between the building joists J so that the lath 25 is flush with the adjacent building lath 26. The wall or ceiling plaster 27 then covers the entire bottom of the device and the radiant heat from the unit passes directly through the wall plaster into the room. Also, the device is thus hidden from sight.

In the embodiment of the invention shown in Fig. 4, the device is mounted on the joists J in substantially the same manner but the bottom or radiant panel 24a of the device is not provided with any rib laths nor is it covered by plaster and it remains exposed to the room. In such event such panel will be ornamentally designed so as to present a neat and pleasing appearance within the room.

The device may be mounted on concrete or steel structures in any suitable manner.

Also, the box 1 can be made in curved or circular form, if desired, rather than flat as shown.

The device may be constructed as a portable assembly, having ornamental radiant panels in certain instances, and used as a portable screen as well as for space heating.

From the foregoing description it will be readily seen that I have produced such a device as substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention, what I claim as new and useful and desire to secure by Letters Patent is:

1. An electric thermoradiant assembly comprising, as an initially portable unit, a metallic box, a heating unit disposed in the box, a top for the box including a side flange of a height substantially equal to the depth of the box and adapted to surround the box, an out-turned lip extending about the lower edge of the flange, and a refractory material forming a part of the unit facing the top of the box and the side flange and engaging in said lip; the bottom of the box being adapted for heat radiation.

2. An electric thermoradiant assembly comprising an enclosed metallic box, a plurality of separate envelope type electric heating units disposed in the box in superimposed relation, a top fixed on the enclosed box, an outlet box mounted within the first named box and open to the exterior thereof, the several heating units being cut away in matching relation whereby to receive the outlet box in such cut away portions, the outlet box including a dielectric plate, and connector elements on said plate; the several heating units being separately wired to said connector elements.

3. An initially portable thermoradiant heating device comprising an enclosed metal box unit, one panel of the box being of heat conducting material and the opposite panel being of a heat reflecting nature, a heat insulating jacket covering all but said one panel of the box unit, the dimension of the unit in one direction in a plane parallel to said one panel being less than the spacing between adjacent joists of a building, and its dimension in a plane at right angles to said panel being less than the depth of a joist, means to support the device from and between such joists so that said one panel is disposed in a plane adjacent the outer edges of the joists and plaster supporting means mounted on and projecting from the outer face of said one panel of the box unit before the latter is mounted in place.

EDWARD F. WACH.