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ELECTRIC WALL HEATER WITH HEAT REFLECTOR

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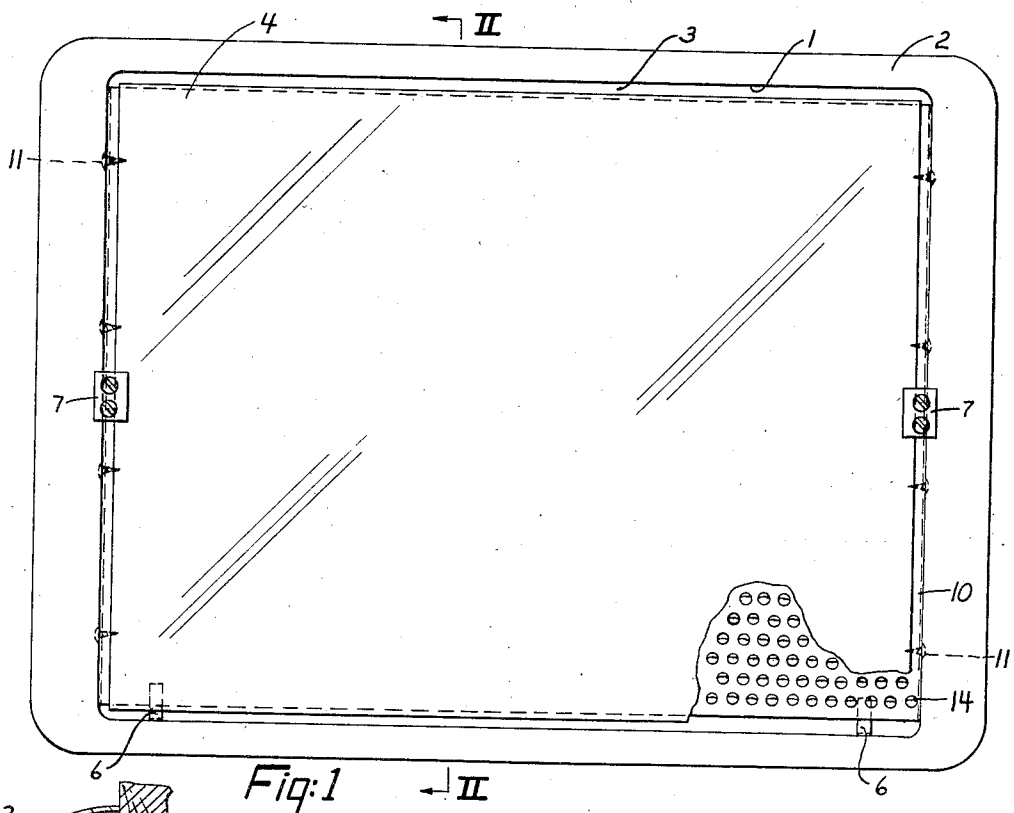


Fig: 1

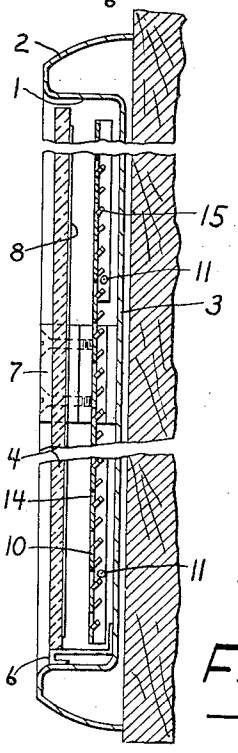


Fig: 2

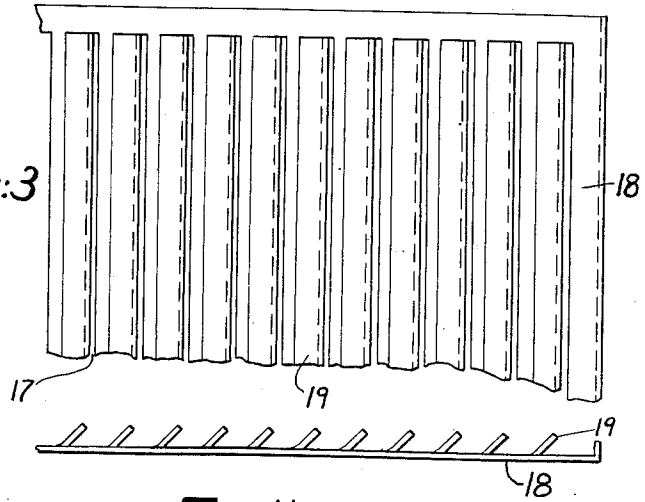


Fig: 3

Fig: 4

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ELECTRIC WALL HEATER WITH HEAT REFLECTOR

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5 Claims. (Cl. 219—34)

This invention relates to electric wall heaters, in which an electrical resistance heating element is mounted on a glass plate in a metal frame containing a reflector behind the plate.

In electric wall heaters it is highly desirable, if not necessary, to keep the temperature of the tempered glass plate below 200° C. If the heater is to be mounted on combustible material, such as a wooden wall, the maximum operating temperature of the back of the heater permitted by the underwriters is 90° C. It is desirable to use as high a wattage as possible, but a wattage sufficient to bring the operating temperature of the glass plate up near its maximum will overheat the back of the heater. Therefore, it is customary to place a false back or reflector between the plate and the back wall of the frame to shield the wall from some of the heat. The reflector usually is a bright aluminum sheet, which is a good reflector and a poor radiator. Although the reflector reduces the amount of heat that reaches the back of the frame to a safe temperature, the heat reflected forward from the sheet increases the temperature of the plate so that a lower wattage must be used than if no heat were reflected against the plate. The result has been that in a standard 16" x 24" wall heater, for example, the wattage has been limited to about 1000 to keep the plate from overheating, even though this leaves the back of the heater considerably cooler than necessary.

It is among the objects of this invention to provide a wall heater which has a higher wattage than could be used heretofore, which does not have an overheated glass plate; and in which the temperature of the back of the heater remains below the maximum allowed. Another object is to accomplish all of this in a simple and inexpensive manner without the addition of any parts.

In accordance with this invention a vertical glass heater plate is provided on one side with an electrical resistance heating element. The plate is supported in a frame that is provided with a back wall, from which the plate is spaced. Mounted in the frame between its back wall and the heater plate, from both of which it is spaced, is a vertical heat reflector that protects the back wall from overheating. This reflector is provided with openings to allow some of the heat radiating from the back of the plate to pass through the reflector into the space behind it. This reduces the amount of heat reflected and radiated by the reflector to the plate, with the result that the wattage of the plate can be increased considerably without exceeding the maximum safe temperature for the plate. At the same time, the reflector shields the back of the heater enough to keep it from overheating. The reflector preferably is a metal sheet, and the metal punched out of it to form the openings therein is left attached to the sheet and is disposed at an oblique angle to obstruct passage of heat forward through the reflector.

The invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a front view of my wall heater with part of the glass plate broken away to show the reflector behind it;

Fig. 2 is an enlarged vertical section of the heater, taken on the line II—II of Fig. 1, with portions broken away to reduce its height.

Fig. 3 is a fragmentary front view of a modified form of reflector; and

Fig. 4 is a top view of the modified reflector.

Referring to the drawings, a rectangular vertical metal frame, which is adapted to be mounted against a wall, has the front edge of its side wall **1** surrounded by an integral flange **2** that curves rearwardly to meet the wall. The frame also has an integral back wall **3** that forms the back of the heater. Disposed in the front part of the frame is a vertical glass heater plate **4** that is rectangular and made of tempered glass. It is located within the front part of the frame, but is slightly smaller so that it can be spaced a short distance from the surrounding sides of the frame. The plate is supported above the lower side of the frame by means of metal strips **6** secured to the frame, and is held in place by suitable clamps **7**. The clamps grip the central portions of the ends of the plate and are secured to the ends of the frame. The rear surface of the plate is provided with the usual electrical resistance heating element **8** (Fig. 2) preferably made of aluminum or aluminum alloy sprayed onto the glass in a predetermined pattern in a well-known manner.

Behind the glass plate, there is a rectangular reflector **10** that preferably is as long as the back wall of the frame but not quite so high. This reflector most suitably is formed from a metal sheet, such as aluminum, the opposite ends of which are turned back to provide flanges that are connected to the adjoining side walls of the frame by screws **11**. The reflecting sheet is spaced from both the glass plate and the back wall of the frame, and the top and bottom of the sheet are spaced from the top and bottom of the frame so that air can circulate upward between the back of the reflector and the frame. The reflector reflects and radiates heat forward to prevent that heat from reaching the back of the heater and overheating and possible burning the wall on which the heater is mounted. This reflected and radiated heat raises the temperature of the plate.

It is a feature of this invention that the amount of heat reflected and radiated by the reflector to the glass plate, and the amount of heat that is radiated to the back wall of the heater, are controlled to permit the wattage of the heater to be increased. Accordingly, the reflecting sheet is provided with a plurality of openings **14**, uniformly distributed over substantially the entire area of the sheet, to permit a material amount of the radiant heat from the back of the heater plate to pass right through it, instead of being reflected and radiated back to the plate. Some of the heat that passes through the holes in the reflector in this way is carried away by convection, while the rest of it raises the temperature of the back wall of the heater. By controlling the number and size of the openings in the reflector, the temperature of the back of the heater can be allowed to approach closely to the maximum allowed by the underwriters, thereby causing the heater plate to operate at a lower temperature for the same wattage. Consequently, the wattage of the plate can be increased without exceeding the maximum temperature at which the plate should be operated. It has been found that this invention permits the 1000 watt heater plate mentioned at the beginning of this specification to be increased to 1250 watts without overheating either the glass plate or the wall behind the heater.

The simplest form of openings **14** in the reflecting sheet is simply holes that have been punched through it. It is preferred, however, to use a beveled punch that

will not remove the punched-out metal slugs or tongues **15** completely from the sheet, but will merely bend them back while leaving them connected at one point to the edges of the holes. The exposed edges of the holes and of the tongues increase the radiating surface of the reflector to some extent. Of more importance is the fact that the tongues are bent backward at a suitable angle, such as 45°, to minimize the reflection of heat rays from the back wall of the frame forward through the holes and back to the glass plate. The tongues do not interfere with passage of heat from the plate back through the holes, because the heat rays striking the tongues will be reflected against the back side of the reflector and from it back against the back wall of the heater. In effect, the tongues serve as check valves that allow the heat to pass through the holes in the reflector in only one direction.

This invention provides for the reduction in the total reflective and emitive area of the reflector. The punching of holes in the sheet is a simple and controllable method of adjusting the temperature of the frame of the heater so that it will approach closely but not exceed the operating temperature permitted by the underwriters. The resulting reduction in the amount of heat reflected and radiated back to the heater plate allows the wattage of the heater to be increased, which is the ultimate purpose of this invention.

In the modification shown in Figs. 3 and 4, slots **17** in the reflecting sheet **18** have been substituted for the round holes of the first embodiment. These slots may extend horizontally or vertically across the reflector. Also, they may be completely open, but it is preferred to leave the metal, that was struck out in forming the slots, attached along one edge in order to form tongues or louvers **19**. These louvers serve the same purpose as tongues **15** previously described herein.

According to the provisions of the patent statutes, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. An electric wall heater comprising a vertical glass heater plate provided with an electrical resistance heating element, a frame around the plate provided with a back wall, means supporting the plate in the frame spaced from said back wall, and a vertical heat reflector mounted in the frame between the heater plate and said back wall and spaced from both of them to protect the back wall from overheating, said reflector being provided with openings uniformly distributed over substantially its entire area to allow a material amount of the heat radiating from the back of the heater plate to pass through the reflector into the space behind it, thereby reducing the amount of heat reflected and radiated by the reflector to the plate so that the wattage of the heater can be increased.

2. An electric wall heater comprising a vertical glass heater plate provided with an electrical resistance heating element, a frame around the plate provided with a back wall, means supporting the plate in the frame spaced from said back wall, and a vertical heat reflector mounted in the frame between the heater plate and said back wall and spaced from both of them to protect the back wall from overheating, said reflector being provided with openings uniformly distributed over substantially its entire area to allow a material amount of the heat radiating from the back of the heater plate to pass through the reflector into the space behind it, thereby reducing the amount of heat reflected and radiated by the reflector to the plate so that the wattage of the heater can be increased, said reflector being a metal sheet provided with integral tongues inclined toward said back wall from the edges of said openings to keep heat from radiating from said back wall forward through said openings again.

3. An electric heater in accordance with claim 2, in which said tongues are disposed at an angle of substantially 45° to said sheet.

4. An electric wall heater comprising a vertical glass heater plate provided with an electrical resistance heating element, a frame around the plate provided with a back wall, means supporting the plate in the frame spaced from said back wall, and a vertical heat reflecting sheet mounted in the frame between the heater plate and said back wall and spaced from both of them to protect the back wall from overheating, said sheet being provided with a plurality of rearwardly inclined louvers forming parallel slots through the sheet, and said slots being uniformly distributed throughout substantially the entire area of the sheet, whereby some of the heat radiating from the back of the heater plate will pass through the sheet into the space behind it and not be reflected or radiated back to the plate.

5. An electric wall heater comprising a vertical glass heater plate provided with an electrical resistance heating element, a frame around the plate provided with a back wall, means supporting the plate in the frame spaced from said back wall, and a vertical heat reflector mounted in the frame between the heater plate and said back wall and spaced from both of them to protect the back wall from overheating, said reflector being provided with openings uniformly distributed over substantially its entire area to allow a material amount of the heat radiating from the back of the heater plate to pass through the sheet into the space behind it, thereby reducing the amount of heat reflected and radiated by the reflector to the plate so that the wattage of the heater can be increased, the combined area of said openings being great enough to permit sufficient heat radiating from said plate to pass through those openings in order to allow the temperature of said back wall to approach closely to 90° C.

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