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ELECTRIC HEATER WITH PLATE-CLAMPING REFLECTOR

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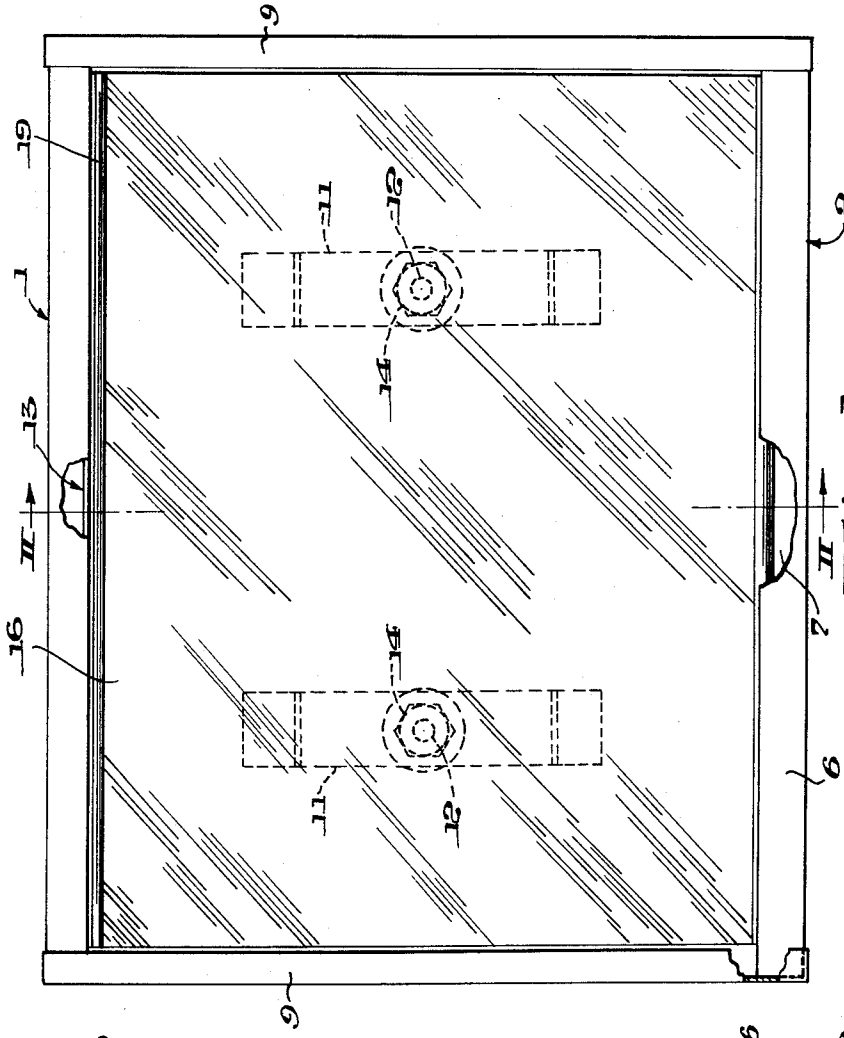


Fig. 1.

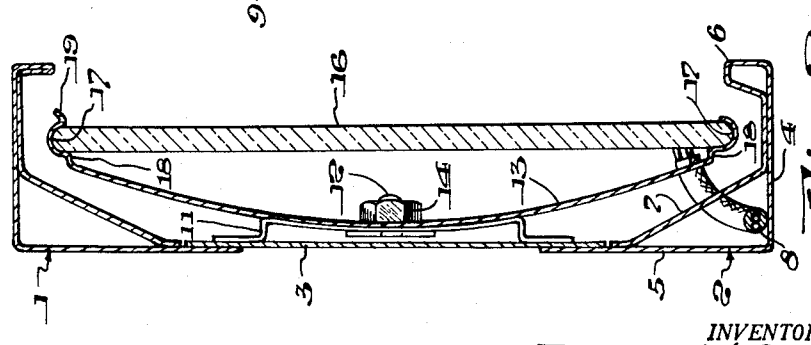


Fig. 2.

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ELECTRIC HEATER WITH PLATE-CLAMPING REFLECTOR

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This invention relates to electric heaters, and more particularly to those using glass plates on which electric heating elements are mounted.

In the usual electric heater containing a glass heater plate the plate is held in a surrounding frame by means of separate clamping elements or lugs that are detachably connected to the frame or the reflector behind the plate. Springs or resilient pads also are used with the clamps. Since it requires tools to fasten or remove the clamps, the customary practice is to ship such heaters with the glass plates mounted in place, but that is expensive because the freight rates are those that apply to glass and they are higher than for metal. Also, if a glass plate needs to be replaced after a heater has been put in use, it often is difficult for the householder to make the replacement.

It is among the objects of this invention to provide an electric heater, in which no tools are required for mounting a glass heater plate in its frame or for removing it therefrom, in which the plate is resiliently supported, in which separate fastening members for a plate of any desired length are unnecessary, and in which the heater plates can be inserted easily by nearly anyone.

In accordance with this invention, the heater frame has a backwall and an open front. Inside the frame there is a concave rectangular sheet metal reflector facing the open front of the frame. Fastening means connect the central portion of the reflector to the back wall. Above and below the fastening means the reflector curves forward and has top and bottom marginal portions that are bent into shapes that will grip the top and bottom edges of a vertical glass heater plate. The reflector is sufficiently resilient to permit at least one of its marginal portions to be sprung away from the opposite one in order to allow a heater plate to be inserted or removed from between them. Thus, the reflector itself resiliently grips the plate and holds it in place.

The preferred embodiment of the invention is illustrated in the accompanying drawings, in which

FIG. 1 is a front view of the heater; and

FIG. 2 is a vertical section taken on the line II—II of FIG. 1.

Referring to the drawings, the frame of the heater is formed of sheet metal and may be any size and length desired. It can be mounted in or against a wall or be substituted for part or all of the baseboard. Preferably, the frame is formed from a minimum of three parts; a top section **1** and a bottom section **2** joined by a central vertical plate **3**. The bottom section is made from a sheet or strip of sheet metal folded upon itself to form a bottom wall **4**, a rear wall **5**, a front flange **6** and an inclined inner wall or partition **7** that serves as a brace. The space between the rear wall and the partition wall can be used as a duct or raceway for electric wiring **8**. The upper section **1** is formed in substantially the same way as the bottom section. These two sections are spaced vertically, but their rear walls are connected by the flat plate **3** that is welded to them. This plate and the rear walls of the upper and lower sections form the back wall of the forwardly opening heater frame. The ends of the frame may be closed by stamped end caps **9** telescoped over the ends, but removable in case it is desired to place two or more of the frames end to end as a long, continuous baseboard heater.

At suitable intervals along back plate **3** inside the frame, there are vertical brackets **11** that have their upper and lower ends welded to the plate. The central portion of each bracket is spaced from the back plate, but is bowed toward it to form a forwardly facing concave front surface. The center of the bracket is provided with a hole, in which is mounted a bolt **12** that extends forward. According to this invention, the bolts also extend through holes midway between the top and bottom of a rectangular sheet metal reflector **13**, and nuts **14** are screwed on the bolts to clamp the reflector against the concave brackets. The reflector is concave also and it curves forward above and below the central line of retaining bolts. It is resilient so that it will spring back into the shape shown after being flexed. The top and bottom of the reflector are spaced a short distance from the top and bottom of the frame and from its front flanges.

A rectangular glass heater plate **16**, carrying on its back in a well known manner an electric resistance heating element (not shown), is disposed between the upper and lower marginal portions of the reflector in engagement with them. In order to hold the glass plate in place, the marginal portions of the reflector are pre-bent to extend around the top and bottom edges of the plate. That is, the edges of the reflector are bent to provide grooves or channels **17** that receive the edges of the plate. To help steady the plate in the reflector, the channels may be joined to the rest of the reflector by substantially horizontal shoulders **18**, rather than merge directly into the concave body of the reflector. It also is desirable to bend out one edge, preferably the upper edge, of the reflector to form a lip **19** that is inclined forward and away from the opposite edge. The plate is electrically connected to wire **8** by the usual detachable clips (not shown).

When it is desired to insert a heater plate in the reflector, the lower edge of the plate is inserted in the lower groove **17** and then the upper edge is pushed back against the sloping lip **19**, which causes the reflector to bend backward or straighten and thereby spread its upper and lower edges far enough apart for the upper edge of the plate to snap into the upper groove. The plate can be removed by pressing the fingers against the lip to spring the upper portion of the reflector back away from the plate in order to release the plate from the upper groove. The plate then can be lifted out of the reflector.

It will be seen that the reflector not only serves as a clamp forming the sole support for the glass plate, but that it supports it resiliently. Consequently, all separate fastening members, springs and pads are eliminated at a considerable saving in cost, and installation and removal of the plate are greatly simplified. Due to the fact that the plate is supported continuously throughout its length, any length heater can be used, which makes this invention especially important in connection with baseboard heaters. A further advantage is that the glass plate can be made more cheaply, because it can be cut from a ribbon of glass that is rolled to exact width with rounded edges as shown, instead of having to be cut from a large sheet and its edges ground to smooth them.

There is another advantage when this heater is designed as a baseboard heater, in which the glass heater plate is not materially more than six inches high. In such a case, if the height of the opening at the front of the frame is kept less than six inches and the plate is located at least one-half inch behind the front plane of the heater, the necessity for a guard or metal grille in front of the plate, which otherwise would be required by the Underwriters, is avoided.

Finally, the heater frame and reflector can be shipped separately from the glass plates, because the plates are so easy to insert by the heater installer, and the metal parts will therefore go at a lower freight rate than the glass.

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. In an electric heater, a frame having a back wall and an open front, a concave rectangular sheet metal reflector in the frame facing said open front, and means connecting the central portion of the reflector to said back wall, the reflector above and below said means curving forward and having recessed top and bottom marginal portions adapted to receive the top and bottom edges of a vertical glass heater plate, the reflector being resilient to permit at least one of said marginal portions to be sprung away from the other marginal portion for receiving a heater plate between them.

2. In an electric heater, a frame having a back wall and an open front, a concave rectangular sheet metal reflector in the frame facing said open front, and means connecting the central portion of the reflector to said back wall, the reflector above and below said means curving forward and having recessed top and bottom marginal portions curved vertically away from each other to provide opposed horizontal channels adapted to receive the top and bottom edges of a vertical glass heater plate, the reflector being resilient to permit at least one of said curved marginal portions to be sprung away from the other one to allow a heater plate to be inserted in said channels.

3. In an electric heater, a frame having a back wall and an open front, a concave rectangular sheet metal reflector in the frame facing said open front, and means connecting the central portion of the reflector to said back wall, the reflector above and below said means curving forward and having recessed top and bottom marginal portions curved vertically away from each other to provide opposed horizontal channels adapted to receive the top and bottom edges of a vertical glass heater plate, the reflector being resilient to permit at least one of said curved marginal portions to be sprung away from the other one to allow a heater plate to be inserted in said channels, and the edge of the reflector along one of the channels being inclined forward and away from the other channel to form a lip.

4. In an electric heater, a frame having a back wall and an open front, a concave rectangular sheet metal reflector in the frame facing said open front, and means connecting the central portion of the reflector to said back wall, the reflector above and below said means curving forward and having recessed top and bottom marginal portions curved vertically away from each other to provide opposed horizontal channels adapted to receive the top and bottom edges of a vertical glass heater plate, said marginal portions being connected to the rest of the reflector by integral shoulders extending lengthwise thereof, the reflector being resilient to permit at least one of said curved marginal portions to be sprung away from the other one to allow a heater plate to be inserted in said channels.

5. In an electric heater, a frame having a back wall and an open front, a concave rectangular sheet metal reflector in the frame facing said open front, brackets in the frame secured to said back wall behind the reflector, each

bracket having a concave front engaging the central portion of the back of the reflector, the reflector above and below the brackets curving forward, and means fastening the reflector to said brackets, the top and bottom of the reflector being provided with plate-gripping portions, and the reflector being resilient to permit it to be bent backward to spread said gripping portions apart for receiving a vertical glass heater plate between them.

6. An electric heater comprising a frame having a back wall and an open front, a concave rectangular sheet metal reflector in the frame facing said open front, means connecting the central portion of the reflector to said back wall, a reflector above and below said means curving forward, and a vertical glass heater plate disposed between the top and bottom marginal portions of the reflector in engagement therewith, the upper and lower edges of the plate being curved transversely, said marginal portions being curved transversely and extending around the adjoining edges of the plate to hold it in the reflector, the reflector being resilient to permit at least one of said marginal portions to be sprung away from the heater plate to release the plate.

7. In an electric heater, a frame having a back wall and an open front, a rectangular sheet metal reflector inside the frame facing said open front, and means connecting the reflector to the frame, the reflector having recessed top and bottom marginal portions spaced from the top and bottom of the frame and adapted to receive the top and bottom edges of the vertical glass heater plate, and the reflector being resilient to permit at least one of said marginal portions to be sprung away from the other marginal portion to permit insertion of a heater plate between them.

8. In an electric heater, a frame having a back wall and an open front, a rectangular sheet metal reflector in the frame facing said open front, and means connecting the reflector to the frame, the reflector having recessed top and bottom marginal portions spaced from the top and bottom of the frame and curved vertically away from each other to provide opposed horizontal channels adapted to receive the top and bottom edges of a vertical glass heater plate, said marginal portions being connected to the rest of the reflector by integral shoulders extending lengthwise thereof, the reflector being resilient to permit at least one of said curved marginal portions to be sprung away from the other one to allow a heater plate to be inserted in said channels, and the edge of the reflector along one of the channels being inclined forward and away from the other channel to form a lip.

9. In an electric heater, a concave rectangular sheet metal reflector having a pair of straight parallel marginal portions, and means connected with the central portion of the reflector for supporting it, said marginal portions being provided with opposed channels adapted to receive opposite edges of a glass heater plate to hold the plate in front of the reflector, and the reflector being resilient to permit at least one of said marginal portions to be sprung away from the other marginal portion to permit insertion of a heater plate.

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