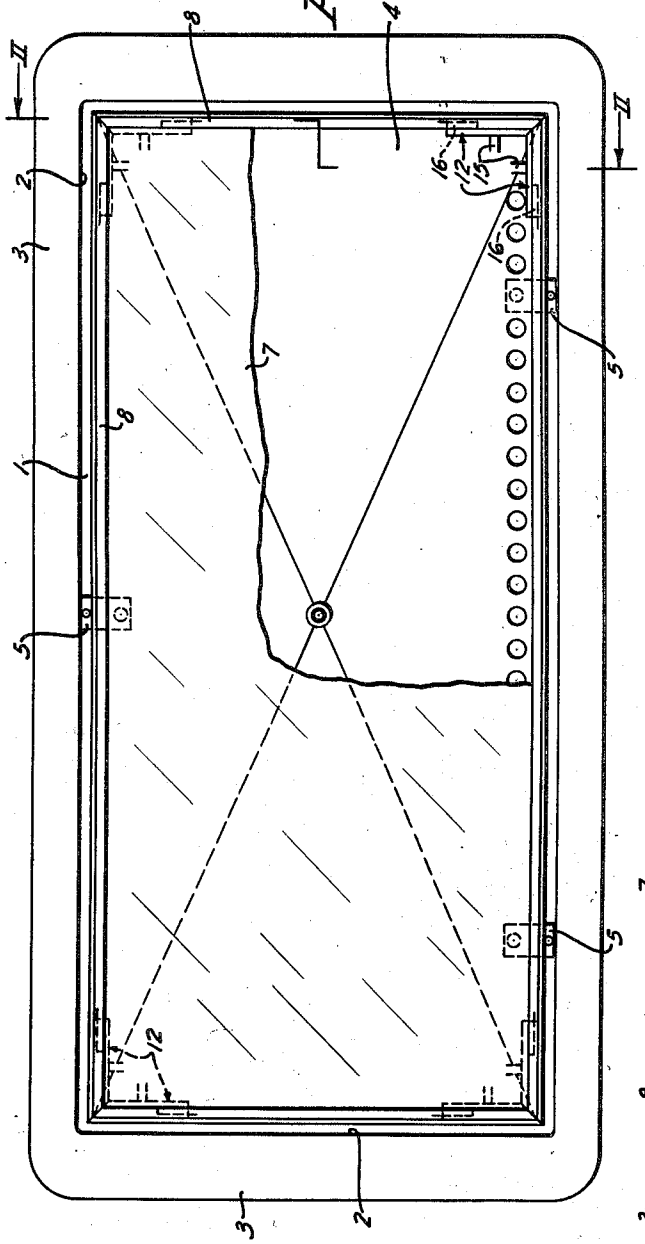
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ELECTRIC HEATER

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Fig. 1



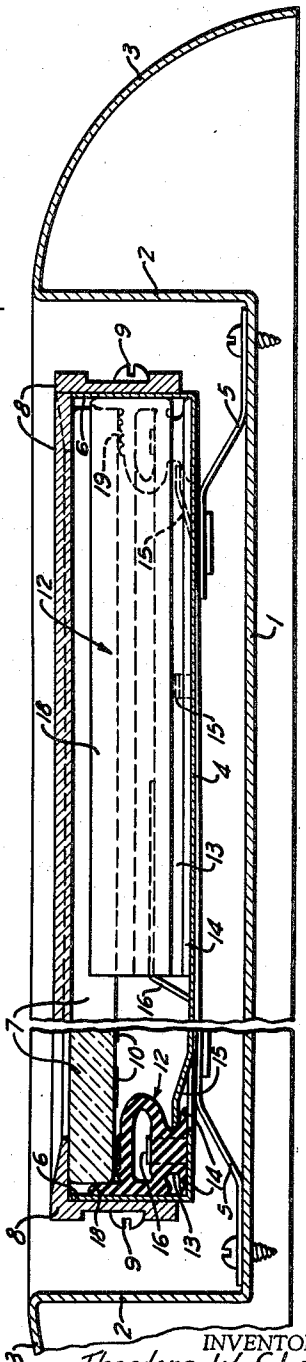


Fig. 2

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ELECTRIC HEATER

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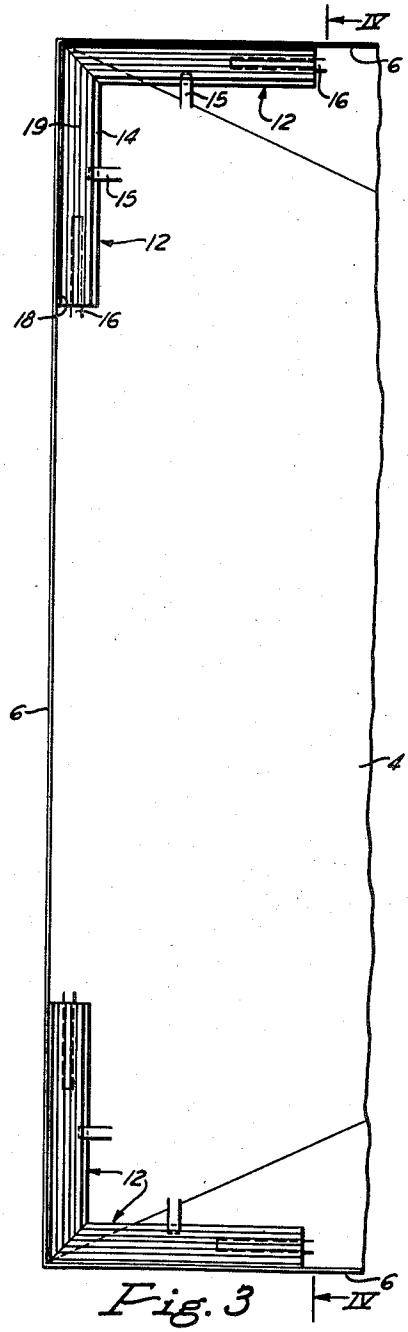


Fig. 3

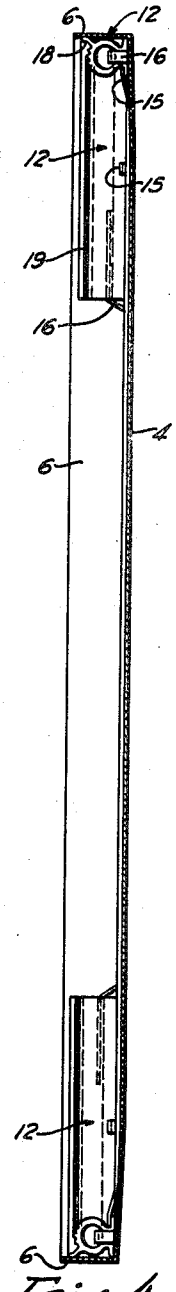


Fig. 4

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ELECTRIC HEATER

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Application August 30, 1957, Serial No. 681,209

8 Claims. (Cl. 219—34)

This invention relates to electric heaters, and particularly to wall type heaters in which a heating element is mounted on a glass plate in a metal frame.

In such heaters it is common practice to place a metal reflector, usually referred to as a tray, between the heater plate and the backwall of the frame. In some cases the plate is mounted inside of the tray. Generally, the manufacturer of the heater plate sells only the plate, which is then mounted in the frame by the heater manufacturer. As proper mounting of the plate in the frame requires considerable skill, it is difficult for the user to replace the plate if that should become necessary.

It is among the objects of this invention to provide a glass heater plate and metal tray assembly which permits the plate manufacturer to mount the plate in the tray which accommodates slightly warped plates and takes care of the usual variation in dimensions, which cushions the plate, which insulates the heating element from the tray, and which permits the plate to be replaced by the user without any difficulty.

In accordance with this invention a rectangular tray has a backwall and a forwardly extending side wall. Mounted in the tray and extending along its sidewall, at least at its corners, are tubular resilient spacers. The fronts of the spacers are engaged by a glass heater plate that has an electric resistance element on its rear surface. The plate is held firmly against the spacers by retaining means secured to the tray and which overlap the marginal areas of the plate. The spacers have integral protuberances extending forward between the tray sidewall and the edge of the plate to space the plate from the sidewall. Preferably, the spacers are formed from silicone rubber and are held in place by lugs struck out of the back of the tray.

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

Fig. 1 is a front view of an electric heater;

Fig. 2 is an enlarged fragmentary cross section taken on the line II—II of Fig. 1;

Fig. 3 is an enlarged fragmentary front view of one end of the tray before the heater plate has been inserted; and

Fig. 4 is a cross section of the tray taken on the line IV—IV of Fig. 3.

Referring to Figs. 1 and 2 of the drawings, a rectangular metal frame, which is adapted to be set vertically in a wall recess, has a backwall **1**, from which a sidewall **2** extends outward or forward. The front edge of the sidewall is surrounded by an integral flange **3** that curves rearwardly in order to overlie the edge of the wall recess to provide a finished appearance. A frame of this particular construction, however, is not necessary to this invention. Inside the frame there is a rectangular metal tray that serves as a heater plate support and heat reflector. The tray is a little smaller than the inside of the frame, and its backwall **4** is fastened to the frame's backwall by metal straps **5** that

space the tray and frame. The marginal area of the tray is turned up to form a sidewall **6**. A glass heater plate **7**, with rounded edges, is retained in the tray by means secured to the tray, which overlap marginal areas of the plate. Preferably the retaining means consist of trim strips **8** that surround the tray. They are fastened to the sidewall of the tray by self-tapping screws **9** and have a front flange engaging the front of the plate all around its periphery. The rear surface of the plate is provided with the usual electric resistance heating element **10**, as indicated in Fig. 2. It preferably is aluminum or aluminum alloy sprayed onto the glass in a predetermined pattern. It generally comes within one-sixteenth inch of the edge of the plate.

It is the mounting of the glass heater plate in the tray that is the subject of this invention. The plate is spaced from the tray and held against the front of the trim strips by means of resilient spacers **12** extending along the inner surface of the tray sidewall at least at its corners, although they can extend entirely around the tray if desired. The spacers are made of heat resisting material, preferably silicone rubber and are strong enough to hold the plate firmly against the trim strips. On the other hand, the spacers are weak enough to yield under the pressure of the plate without deforming the tray in case the plate is warped or thicker than normal, or the sidewall of the tray is narrower than it should be. Therefore, the spacers are extruded tubular members, which have considerably greater resiliency than solid sections. Also, less material is required for tubular sections, and that is important where silicone rubber is used, because it is very expensive.

To hold each silicone spacer in place, it is provided along its back with an integral rib **13** from the opposite sides of which feet **14** project along the backwall of the tray. The outer feet of the spacers engage the adjoining sidewall of the tray, but the inner feet are overlapped by spring clips **15** joined to the tray. Preferably, the clips are lugs struck out of the backwall of the tray. When the spacers are used only at the corners of the tray, spring tongues **16**, which may also be struck out of the tray, extend into the outer ends of the spacers to help hold them in position.

As shown in Figs. 3 and 4, before the heater plate is placed in the tray and locked therein by the trim strips, the tubular portions of spacers **12** are cylindrical and each has an integral radial protuberance, preferably a fin **18**, extending away from it at about 45° angle to the adjacent sidewall of the tray. When the glass plate is inserted in the tray and pushed in against the spacers by the trim strips, the tubular spacers are flattened to some extent as shown in Fig. 2. At the same time, the plate and laterally expanding tubes press the fins **18** out flat against the tray sidewall in the space between it and the edge of the plate. The fins therefore positively insulate and space the plate and the heating element from the surrounding wall of the tray, and also form cushions for the glass that will prevent chipping.

The glass engaging portion of each spacer may be provided with corrugations **19** extending lengthwise of the tube to provide increased resiliency in the over-all section.

When a glass heater plate is mounted in a tray in the manner disclosed herein, the tray protects the edges of the glass from damage in shipment. The tubular spacers accommodate plates that are slightly warped, which often happens because they are tempered glass, and allow for the usual variations in plate thickness and tray sidewall dimensions. My plate mounting relieves the heater manufacturer of all responsibility for proper design and for securing underwriters' approval, thereby permitting him to get into production months faster and at less expense.

It also permits the plate manufacturer to guarantee the service life of the plate. When the plate alone was sold, there always was the possibility that careless handling or assembly might result in chipping or damage to the edges of the tempered glass, which might cause premature failure. Replacement of a broken plate is simple and can be done easily by the ultimate user himself.

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 rectangular metal tray having a backwall and a forwardly extending sidewall, tubular resilient spacers mounted in the tray and extending along its sidewall at its corners, a glass heater plate engaging the front of the spacers and having an electrtic resistance element on its rear surface, and retaining means secured to the tray overlapping marginal areas of the plate to hold the plate firmly against the spacers, the spacers having integral fins extending lengthwise of the spacers and forward between the tray sidewall and the edge of the plate.

2. In an electric heater, a rectangular metal tray having a backwall and a forwardly extending sidewall, tubular resilient spacers mounted in the tray and extending along its sidewall at its corners, the spacers having feet engaging the backwall and projecting inward along it, clips secured to said backwall and overlapping said feet to help hold the spacers in place, a glass heater plate engaging the front of the spacers and having an electric resistance element on its rear surface, and retaining means secured to the tray overlapping marginal areas of the plate to hold the plate firmly against the spacers, the spacers having integral protuberance extending forward between the tray sidewall and the edge of the plate.

3. In an electric heater according to claim 2, said clips being resilient lugs struck out of said backwall.

4. In an electric heater, a rectangular metal tray having a backwall and a forwardly extending sidewall, tubular resilient spacers mounted in the tray and extending along its sidewall at its corners, tongues secured to said backwall and extending into the ends of the tubular spacers to help hold them in place, a glass heater plate engaging the front of the spacers and having an electric resistance element on its rear surface, and retaining means secured to the tray overlapping marginal areas of the plate to hold the plate firmly against the spacers, the spacers having integral protuberance extending forward between the tray sidewall and the edge of the plate.

5. In an electric heater according to claim 4, said tongues being resilient and struck out of the backwall of the tray.

6. In an electric heater, a rectangular metal tray having a backwall and a forwardly extending sidewall, tubular resilient spacers mounted in the tray and extending along its sidewall at its corners, each spacer normally being cylindrical and provided with an integral protuberance projecting radially therefrom at about a 45° angle to the adjoining sidewall, a glass heater plate engaging the front of the spacers and having an electric resistance element on its rear surface, and retaining means secured to the tray overlapping marginal areas of the plate to hold the plate firmly against the spacers, pressure of said plate against the spacers flattening them and causing said protuberances to extend forward between the tray sidewall and the edge of the plate.

7. In an electric heater, a rectangular metal tray having a backwall and a forwardly extending sidewall, tubular resilient spacers mounted in the tray and extending along its sidewall at its corners, the spacers having feet engaging the backwall and projecting inward along it, clips secured to said backwall and overlapping said feet to help hold the spacers in place, a glass heater plate engaging the front of the spacers and having an electric resistance element on its rear surface, and retaining means secured to the tray and overlapping marginal areas of the plate to hold the plate firmly against the spacers, each spacer having an integral fin extending lengthwise thereof and forward between the tray sidewall and the edge of the plate, and each spacer also being provided with longitudinal corrugations engaging the back of the plate.

8. In an electric heater, a rectangular metal tray having a backwall and a forwardly extending sidewall, tubular resilient spacers mounted in the tray and extending along its sidewall at its corners, a glass heater plate engaging the front of the spacers and having an electric resistance element on its rear surface, the plate-engaging surfaces of said spacers having corrugations extending lengthwise thereof, and retaining means secured to the tray overlapping marginal areas of the plate to hold the plate firmly against the spacers, the spacers having integral protuberances extending forward between the tray sidewall and the edge of the plate.

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