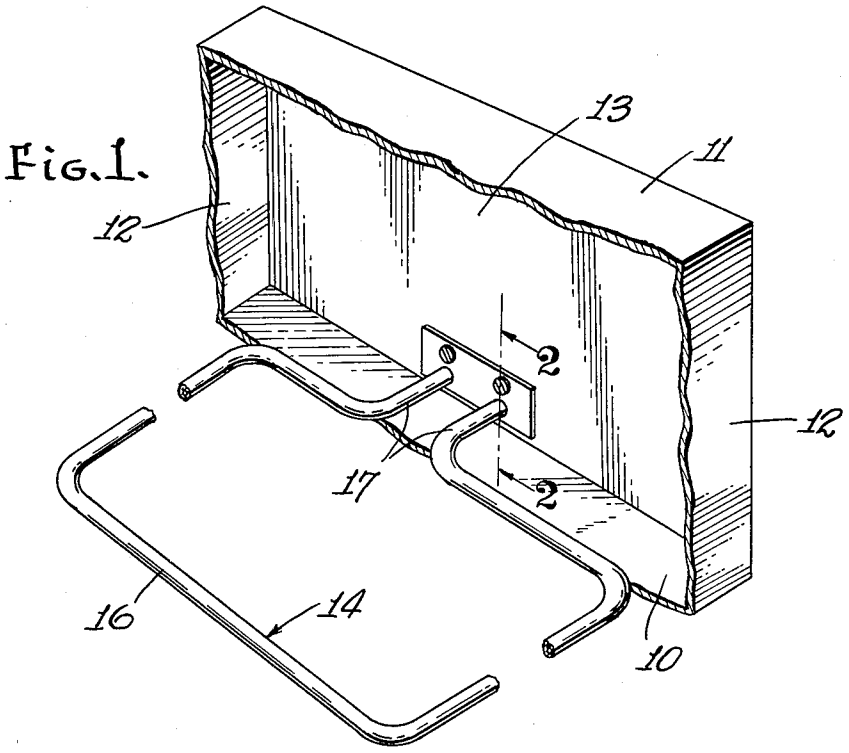
July 27, 1965 J. WETLESEN 3,197,615

ELECTRIC HEATING APPARATUS

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Fig. 1.



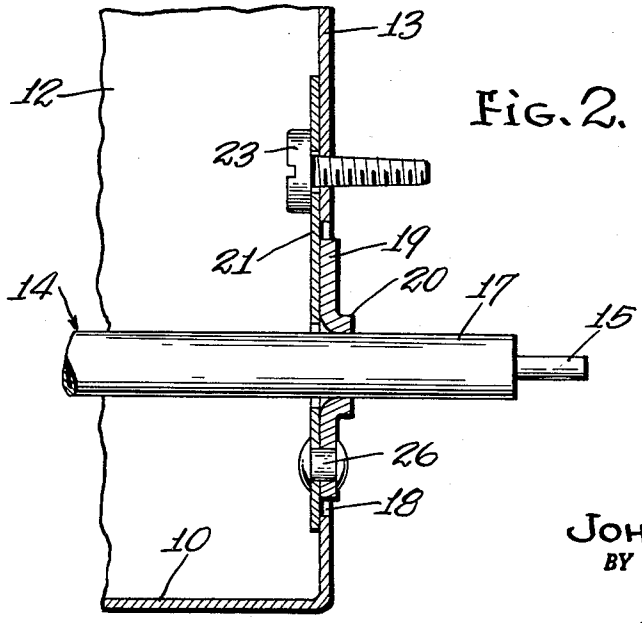


Fig. 2.

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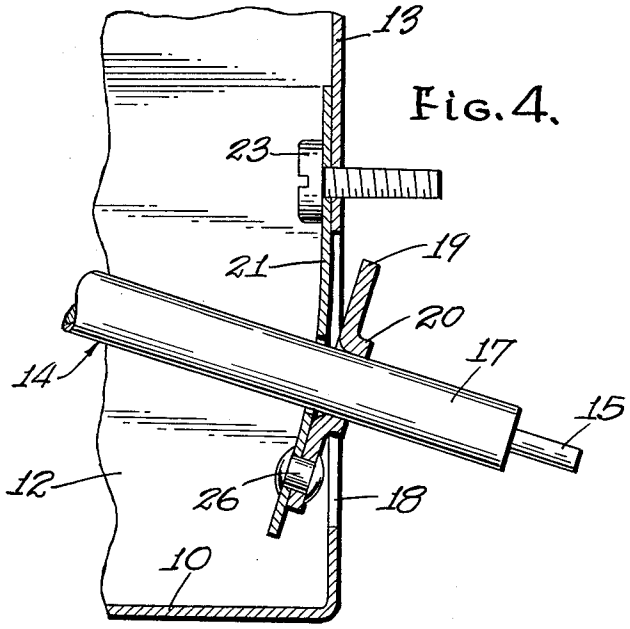
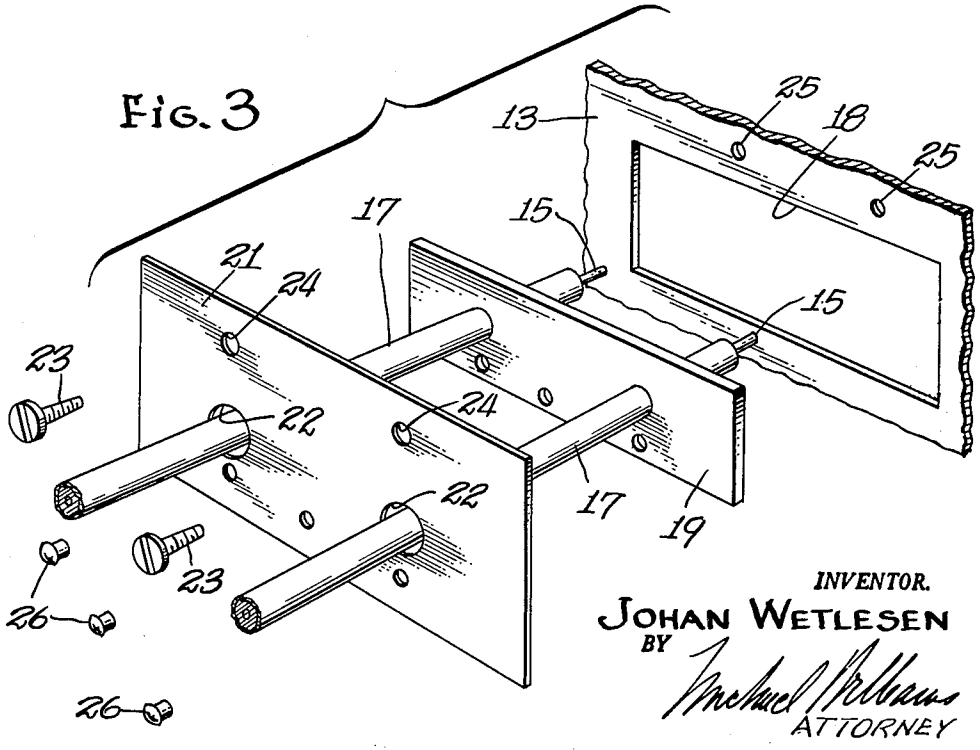


Fig. 4.

Fig. 3



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ELECTRIC HEATING APPARATUS

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4 Claims. (Cl. 219—404)

The present invention relates to electric heating apparatus, more particularly to such apparatus for use with an oven of an electric range, and the principal object of the invention is to provide new and improved apparatus of such character.

It has long been common to provide ovens of electric ranges with a baking element and, in most instances with a broiling element. The former element is usually positioned adjacent the bottom wall, or floor, of the oven while the latter element is usually positioned adjacent the top wall, or roof of the oven. Because of the close spacing of the elements aforesaid with their respective walls, it is considered essential that the elements be shiftable away from such walls to facilitate cleaning of the latter.

Two expedients are commonly used to provide for the aforesaid shifting of these elements. In the first, one wall of the oven, usually the rear wall, provides sockets into which respective elements may be plugged. Thus, the elements are bodily removable from the oven when the latter is to be cleaned. In the second, the elements are pivoted to one of the oven walls, usually the rear wall, so that the elements can be pivoted away from their respective adjoining walls, when the latter are to be cleaned. While the first type of construction is satisfactory in that cleaning of the oven is no problem, such constructions has been expensive initially and were troublesome to install and maintain. Accordingly, the second type of construction has come into even wider usage.

The present invention is concerned with the above-mentioned second type of construction and has as its principal objects the provision of a structure which is low in cost, quickly installed, trouble-free in operation and highly efficient in use. Other advantages will readily become apparent from a study of the following description and from the drawings appended hereto.

In the drawings accompanying this specification and forming a part of this application there is shown, for purpose of illustration, an embodiment which the invention may assume, and in these drawings:

FIGURE 1 is a fragmentary perspective view of an electric heater assembly of the present invention in operable relation with the oven of an electric range,

FIGURE 2 is an enlarged, fragmentary sectional view generally corresponding to the line 2—2 of FIGURE 1,

FIGURE 3 is a reduced size, exploded, fragmentary perspective view of parts seen in FIGURES 1 and 2, and

FIGURE 4 is a view similar to FIGURE 2 but with certain parts shown in another position.

With reference to FIGURE 1, there is fragmentarily shown an oven of an electric range having a bottom wall 10, a top wall 11, side walls 12, and a rear wall 13. Although not shown, the front of the oven will be closed by the usual door which provides access to the oven interior. Disposed within the oven is an electric heating element 14 of the usual type wherein a resistor conductor is disposed within an intermediate portion of an elongated tubular sheath which is filled with compacted, heat-conductive, electric-insulating material. Connected to respective ends of the conductor within the sheath are the usual terminal pins 15 (see FIGURES 2 and 3) which project beyond respective sheath ends for connection to a suitable source of electrical energy. The intermediate portion of the heater, that portion in which is enclosed the resistor conductor, is often referred to as

the heat-generating portion of the element while its end portions, which enclose the terminal pins 15, are often referred to as the terminal portion of the heater.

In the present embodiment, the intermediate portion 16 of the element is bent to a rectangular configuration generally corresponding to that of the bottom wall of the oven and its terminal ends 17 are brought together in spaced, side-by-side relation for projection through the rear wall 13 of the oven, as will later appear. Thus, the element 14 has its heat-generating portion disposed on one side of the wall 13 within the chamber provided by the oven walls while the terminal portion of the element is disposed on the other side of the wall 13 (see FIGURE 2) on the outside of the oven chamber.

With reference to FIGURES 2 and 3, the rear oven wall 13 is presently formed with a rectangular opening 18 adjacent the oven bottom wall 10 through which project the element ends 17. Extending between the element ends 17 is a plate 19 which provides a radially extending flange. Any suitable means may be employed to rigidly secure this plate to the element and in the present embodiment, the plate has extruded apertures through which the element ends 17 extend. Such apertures provide circumscribing collars 20 which are tightly crimped about respective element ends 17. Obviously, the plate could be welded or brazed to the element to form the desired structural rigidity therebetween. It is to be noted that plate 19 is smaller than the wall opening 18 so as to freely pass therethrough.

Means are provided for shiftably securing the element to the oven wall 13 and, in the present embodiment, such means preferably comprises a sheet metal plate 21 of considerable flexibility. At the present time, plate 21 is formed of thin, spring-like material and is of a size larger than the wall opening 18 so as to overlie and close the latter (see FIGURE 2).

For a purpose to appear, oversized apertures 22 in the plate 21 pass respective element ends 17 and, in the position of parts shown, the upper margin of plate 21 is removably secured to the inside of the oven wall by means of sheet-metal screws 23, or the like, which pass through aligned apertures 24 in plate 21 and apertures 25 in the oven wall 13. It is to be understood that in the normal position of parts seen in FIGURE 2, the margins of plate 21 overlap the margins of the aperture 18 of wall 13 and the plate closely fits against the inner side of wall 13 to tightly close such wall aperture. The lower end of plate 21, however, being free, may be flexed away from the wall 13 as will later appear.

Plate 19 normally abuts the face of plate 21 adjacent wall 13 and is secured to plate 21 at a place spaced from the plate apertures 22 in a direction toward the lower, or free end of plate 21. At the present time, rivets 26 pass through aligned apertures in respective plates 19, 21 to effect such securement. However, it will readily be apparent that spot welding or the like could be employed for this purpose if desired. The importance of securing the plates 19, 21 together at the place described will hereinafter be disclosed.

With the parts assembled as shown in FIGURE 2, element 14 will be in its normal position wherein it is disposed adjacent the lower wall 10 of the oven. When the oven is to be cleaned, it is only necessary to grasp the element portion adjacent the oven door and swing the element up about its mounting and away from the lower oven wall 10 to the position seen in FIGURE 4. This it will be evident, will provide adequate space for cleaning the portions of wall 10 underlying the heating element. Note that as the element is tilted to the position seen in FIGURE 4, plate 21 will flex, its lower free end swinging away from the wall while the upper margin of plate 19 tilts away from the plate 21. The apertures

22 in the plate 21, being larger than the portions of the element which pass therethrough, do not interfere with the aforesaid relative tilting of the plates. Release of the element will cause the parts to return to the position seen in FIGURE 2. The solid connections between the plate 21 and oven wall 13, and between the plates 19 and 21, insure of good earthing of the heating element 14 in any position of the latter.

As earlier indicated, an important feature of the present invention is the place of securement between the plates 19, 21. With the plates thus secured together, plate 21 flexes over a relatively large span to thus maintain the stresses induced by such flexure wall within the elastic limit of the material of which the plate is made. Obviously, if the stresses produced in the plate 21 by tilting of the element exceed the elastic limit of the plate material, as would be the tendency in prior units now in use, the plate will be permanently deformed and will not return to the position seen in FIGURE 2 upon release of the element.

While only the lower, or baking, element has been illustrated herein, it will be apparent that the same construction can as well be applied to an upper, or broiling, element merely by inverting the described construction so that the element swings downwardly for cleaning instead of upwardly. In such case suitable means, as a latch for example, will be used to hold the element in its upper position. While two element ends 17 pass through the plates 19, 21 in the construction illustrated, the construction could well be modified by providing but one element-passing aperture in the plates for accommodating but a single element end.

In view of the foregoing it will be apparent to those skilled in the art that I have accomplished at least the principal object of my invention and it will also be apparent to those skilled in the art that the embodiment herein described may be variously changed and modified, without departing from the spirit of the invention, and that the invention is capable of uses and has advantages not herein specifically described; hence it will be appreciated that the herein disclosed embodiment is illustrative only, and that my invention is not limited thereto.

I claim:

1. In an electric heater assembly for use with an apertured wall, the combination of an electric heating element extending through the wall aperture to dispose a heat-generating portion of said element on one side of said wall and a terminal portion of said element on the other side of said wall, a first flat plate of resilient sheet metal larger than said wall aperture and disposed on one side of said wall with its margins overlapping the margins of said aperture to close the latter, such plate being apertured in register with said wall aperture, the plate aperture being larger than said element to freely pass the same, a portion of such plate adjacent one side of said wall aperture being anchored to said wall and the opposite portion of such plate being free to shift toward and away from said one wall side upon plate flexure, and a second flat plate, smaller than said wall aperture and secured to and extending radially of said element, said second plate being secured flatwise to that face of said first plate adjacent said wall and at a place spaced from the aperture in said first plate in a direction toward said opposite, free portion of the latter to minimize stress on said first plate upon flexure thereof caused by tilting of said element.

2. An electric heater assembly for attachment to an apertured oven wall, comprising a large and a small metal plate in face to face relation, the larger plate being of flexible material and said plates having certain marginal portions adjoining and mechanically and electrically connected and opposite free portions overlying and capable of moving apart through flexure of said large plate, a sheathed electric heating element having a terminal portion which is mechanically and electrically connected to said small plate and which passes through an oversize opening in said large plate to accommodate free flexure of the latter, the free end of said large plate being adapted to be mechanically and electrically connected to said oven wall at said oven aperture whereby said large plate normally overlies the inner surface of said oven wall and closes said oven aperture.

3. The construction according to claim 2 wherein the oven aperture and the large and small plates are rectangular, said plates having corresponding long marginal portions adjoining and connected.

4. An oven assembly, comprising an oven having a rear wall formed with an aperture therein, a flexible flat metal plate having one marginal portion mechanically and electrically connected to said oven wall, said plate being of larger size than said oven aperture to overlie and close the same, a sheathed electrical heating element having terminal ends in side-by-side relation, and a rigid flat metal plate disposed flatwise against said flexible plate and mechanically and electrically connected to said terminal ends and spanning the latter to rigidly connect the same, said rigid plate being of a smaller size than said oven aperture and having a marginal portion mechanically and electrically connected to that marginal portion of said flexible plate which is opposite said one marginal portion so as to be supported for flatwise swinging movement.

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