Feb. 7, 1950 L. S. WEIMER 2,497,039

ELECTRIC HEATING UNIT

Filed Jan. 19, 1946

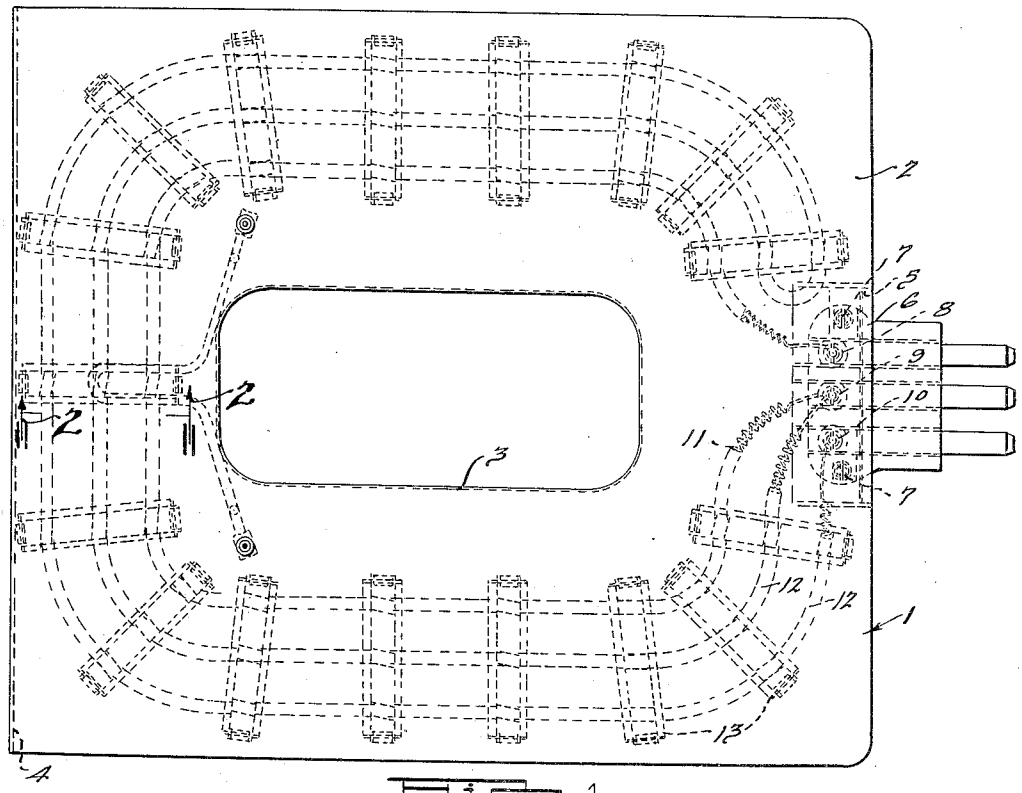


Fig. 1.

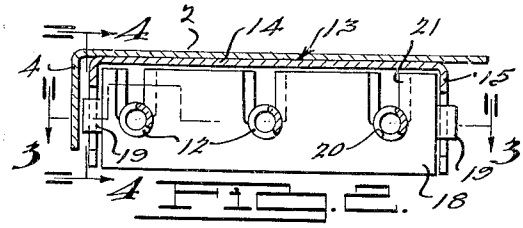


Fig. 2.

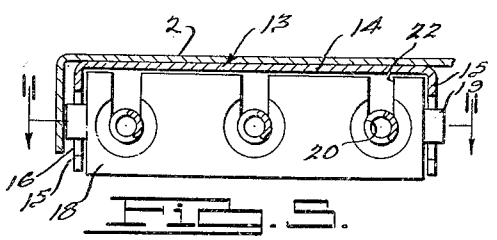


Fig. 5.

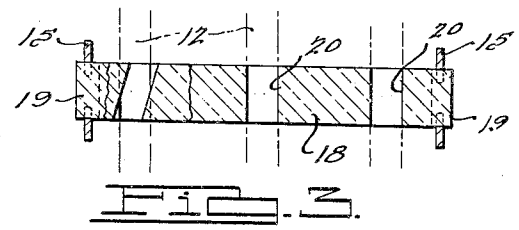


Fig. 3.

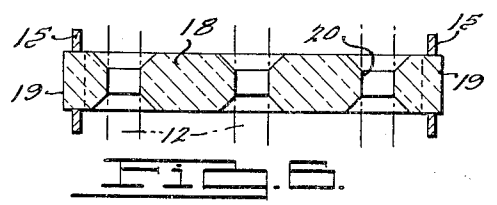


Fig. 6.

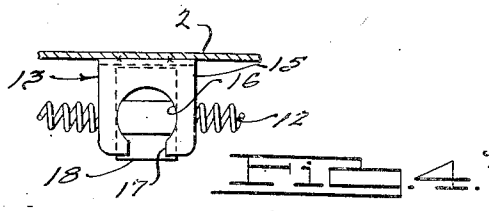


Fig. 4.

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Patented Feb. 7, 1950

2,497,039

UNITED STATES PATENT OFFICE

2,497,039

ELECTRIC HEATING UNIT

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Application January 19, 1946, Serial No. 642,311

4 Claims. (Cl. 219—37)

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This invention relates to electric heating units, and particularly to insulating elements for supporting the resistance wire and which may be substituted for the original elements when broken.

The invention applies to heating units which are employed in ovens and the like having a plurality of coils of resistance wires or loops thereof disposed in parallel relation on a supporting member. The supporting member has a plurality of U-shaped members, in the nature of hangers, secured thereto in spaced but aligned relation. The projecting arms of the members are provided with apertures for receiving and supporting the ends of the insulating elements. The apertures comprise slots extending from the ends of the arms to communicate with circular holes disposed inwardly from the ends thereof. The insulating elements have truncated circular end portions in the nature of trunnions which pass through the slots in the ends of the arms in one position and when rotated 90° extend crosswise of the circular holes to thereby lock the elements in secured position.

One or more circular apertures extend through the insulating elements, one for each of the coiled resistance wires of the heating unit through which the coiled wires are threaded when initially assembled. Should an insulating element become broken, this may be replaced by another unit having slots communicating with the circular apertures from one edge of the element. The slots are preferably disposed at an angle to the axes of the apertures so that after the coiled wire has been passed through the slot into the aperture, the change of its position from the axis of the slot to that of the aperture will dispose the coil beneath overhanging portions of the slot and the coiled wire will be anchored within the aperture.

Accordingly, the main objects of the invention are: to secure insulating elements on hangers for supporting coiled resistance wires of a heating element which are replaceable by other units when broken; to provide U-shaped members having in the arms thereof cylindrical apertures communicating with slots which extend to the end of the arms for receiving truncated circular portions on the ends of insulating elements which pass therethrough in one position and which are locked in position when rotated 90°; to provide a plurality of insulating elements with apertures for receiving and supporting coiled resistance wires of a heater, which are joined by slots extending from one edge of the elements through which the coiled wires may be inserted when disposed in said apertures; and, in general, to provide an electric heating unit which is simple in construction, positive in operation and economical of manufacture.

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Other objects and features of novelty of the invention will be specifically pointed out or will become apparent when referring, for a better understanding of the invention, to the following description taken in conjunction with the accompanying drawing, wherein:

Figure 1 is a plan view of a heating unit having insulating elements for supporting the coiled resistance wires embodying features of this invention;

Fig. 2 is an enlarged sectional view of the structure illustrated in Fig. 1, taken on the line 2—2 thereof;

Fig. 3 is a sectional view of the structure illustrated in Fig. 2, taken on the line 3—3 thereof;

Fig. 4 is a sectional view of the structure illustrated in Fig. 2, taken on the line 4—4 thereof;

Fig. 5 is a view of structure, similar to that illustrated in Fig. 2, showing a modified form thereof; and

Fig. 6 is a sectional view of the structure illustrated in Fig. 5, taken on the line 6—6 thereof.

Referring to the figures, a heating unit 1, which is herein illustrated as being constructed for an oven, embodies a plate 2 made of metal having a central flanged opening 3, an end flange 4, and an opening 5 in which the insulating portion of a connecting plug 6 is secured, herein illustrated as by bolts 7. Terminals 8, 9 and 10 are provided on the plug to which coiled resistance wires 11 and 12 are secured in the conventional manner. The resistance wire 11 forms an inner loop about the central opening 3, while the resistance wires 12 form a parallel loop outwardly thereof. The inner loop is connected across the terminals 8 and 9 while the outer loop is connected across the terminals 9 and 10.

For supporting the resistance wires, a plurality of U-shaped supporting members 13 are employed having the web portions 14 welded or otherwise secured to the plate 2. The arms 15 of the U-shaped elements 13 extend outwardly from the plate 2 and are provided with cylindrical apertures 16 and slots 17 of less width than the diameter of the apertures forming a passageway from the end of the arm to the apertures 16. Insulating elements 18 for supporting the coiled wire are of rectangular construction having a length to fit between the arms 15 and having truncated cylindrical trunnion portions 19 extending from each end. The width of the trun-

nion portions is such as to pass through the slot 17, while the diameter of the cylindrical portion is substantially equal to the diameter of the apertures 16. After the element has been inserted between the arms 15 by passing the narrow width of the trunnion portions 19 through the slots 17, it is rotated 90° to have the trunnion portions of greatest length extend across the diameter of the apertures 16 to be securely anchored to the arms 15.

A plurality of apertures 20 are provided through the insulating elements 18 through which the coiled resistance wires 11 and 12 are threaded and are held in position on the plate 2, as clearly illustrated in Fig. 1. Slots 21 may be provided through one wall of the insulating elements 18 communicating with the apertures 20 so that the coiled wires may be passed into the apertures 20 through the slots 21 when originally assembled or after one of the elements 18 has broken and another element 18, having the slot 21, is substituted therefor. The element 18 which is damaged may be broken up in small sections through each of the apertures 20 so that the parts may be removed without damaging the coiled resistance wires 11 and 12. Thereafter an insulating element 18, having the slots 21 therein, may have the trunnion portions 19 passed into the apertures 16 through the slots 17, and after the wires have been aligned with the slots 21 the element 18 is rotated through 90° to lock the trunnion portions 19 within the arms 15 and to have the resistance wires 11 and 12 disposed in the slots 21. The resistance wires may then be pushed through the slots 21 into the apertures 20 where they are anchored in position, as illustrated in Figs. 2 and 5.

In Fig. 2, the slots 21 are disposed at an angle to the axes of the apertures 20 but of the same diameter so that the resistance wires 11 and 12 will readily pass through the slots 21 into the apertures 20. When the axes of the coiled resistance wires coincide with the axes of the apertures 20, the wires are locked in position by the overhanging ends of the wall of the slots 21 which are disposed at an angle to the axes of the coiled wires.

In Fig. 5, slots 22 are similar to slots 21, with the exception that they are of slightly less diameter than the diameter of the apertures 20 but are disposed parallel to the axes of the apertures. The coiled resistance wires 11 and 12 are reduced in diameter by the change of the pitch of the coils when passing through slots, and when returned to the original pitch the coils will be securely anchored within the apertures 20.

When the elements 18 are provided with apertures 20 without the slots 21 and 22, the resistance wires 11 and 12 are fed thereon before the elements are attached to the U-shaped elements 13. It is within the purview of the invention to apply the coiled wires to the plate 2 and assemble the insulating elements seriatim on the supporting members 13 when slots are provided in the elements communicating with the apertures which receive the wires. After any one of the units becomes damaged, it may be broken through the apertures 20 and the pieces removed so that a new insulating element may be applied to the heating unit, as pointed out hereinabove.

What is claimed is:

1. A heating unit embodying a plate and a coiled resistance wire, arms extending from the plate containing an aperture joined by a slot of less width than the width of the aperture, and insulating elements having trunnion portions at the ends, the truncated portions being so formed as to pass through the slots when in one position and when rotated 90° from said position to be secured in the apertures, said insulating elements containing apertures and communicating slots, the wall of the latter overhanging at least a portion of the apertures in which the coil resistance wires are secured after passing through said slots.

2. A heating unit embodying a plate and a coiled resistance wire, U-shaped brackets secured to the plate having spaced arms extending therefrom, each said arm containing a cylindrical aperture joined by a slot of less width than the diameter of the aperture, and insulating elements having truncated cylindrical trunnion portions at the end, the width across the truncated portions being such as to pass through the slots and when rotated 90° to be secured in the apertures, said insulating elements containing apertures and communicating slots in the former of which the coiled resistance wires are secured after passing through said slots, said slots in said insulating elements extending at an angle to the axes of the apertures for projecting over the coiled resistance wires after passing therethrough into the apertures.

3. A heating unit embodying a plate and a coiled resistance wire, U-shaped brackets secured to the plate having spaced arms extending therefrom, each said arm containing a cylindrical aperture joined by a slot of less width than the diameter of the aperture, and insulating elements having truncated cylindrical trunnion portions at the end, the width across the truncated portions being such as to pass through the slots and when rotated 90° to be secured in the apertures, said insulating elements containing apertures and communicating slots in the former of which the coiled resistance wires are secured after passing through said slots, said slots in said insulating elements being of less width than the diameter of the apertures for securing the coiled resistance wires therein.

4. An insulating element for a heating unit embodying a supporting element having spaced apertures provided with communicating slots, said insulating element having an elongated body portion containing an aperture and a trunnion at each end, the width of the trunnions being greater than the thickness so as to be capable of passing through the slot into the communicating apertures in one position and to be retained in the apertures when rotated ninety degrees from said position, said aperture in the body portion being capable of receiving and supporting a resistance wire, and an overhanging projection adjacent to said last aperture which prevents the element from rotating on its trunnions when the resistance wire is retained thereby within the apertures.

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