June 10, 1947. C. J. WEINHARDT 2,422,057

ELECTRIC HEATING UNIT

Filed Dec. 15, 1945 2 Sheets-Sheet 1

Fig. 2.

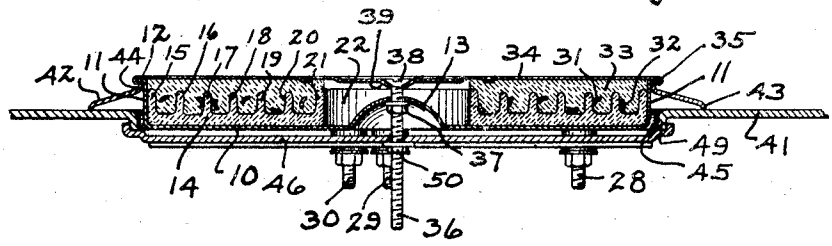
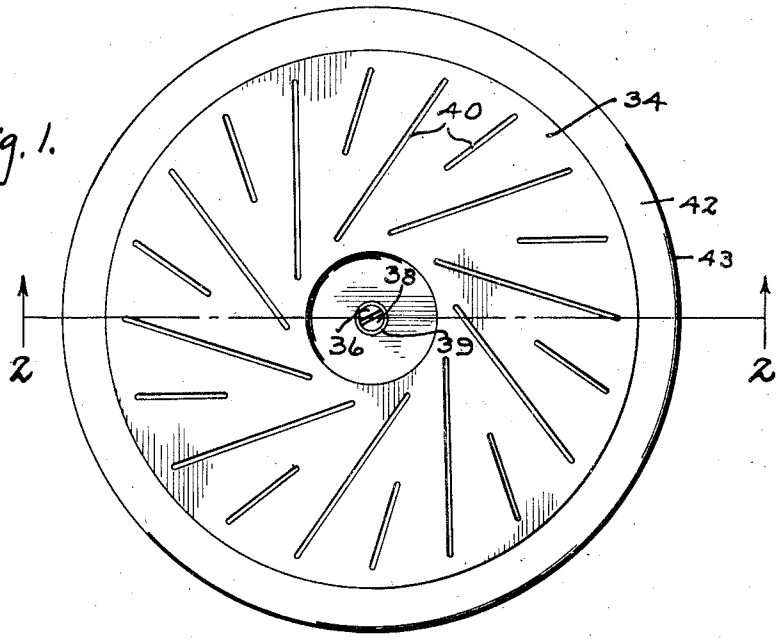


Fig. 1.



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Fig. 4.

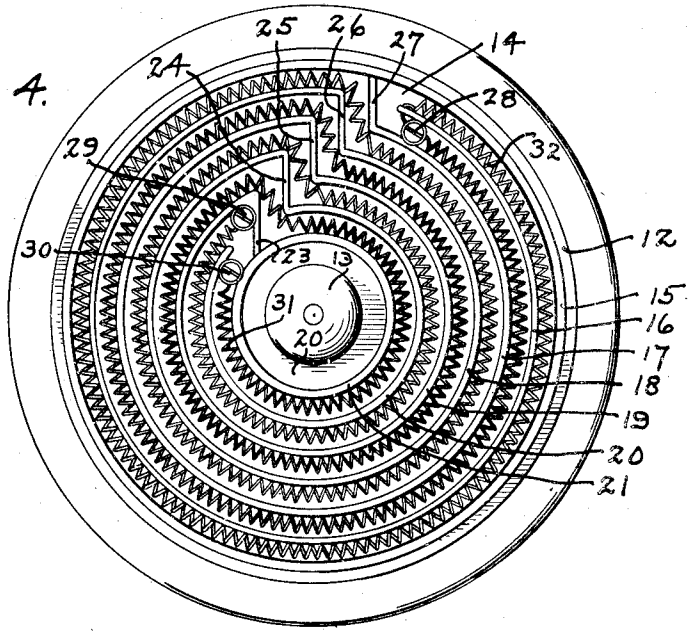


Fig. 3.

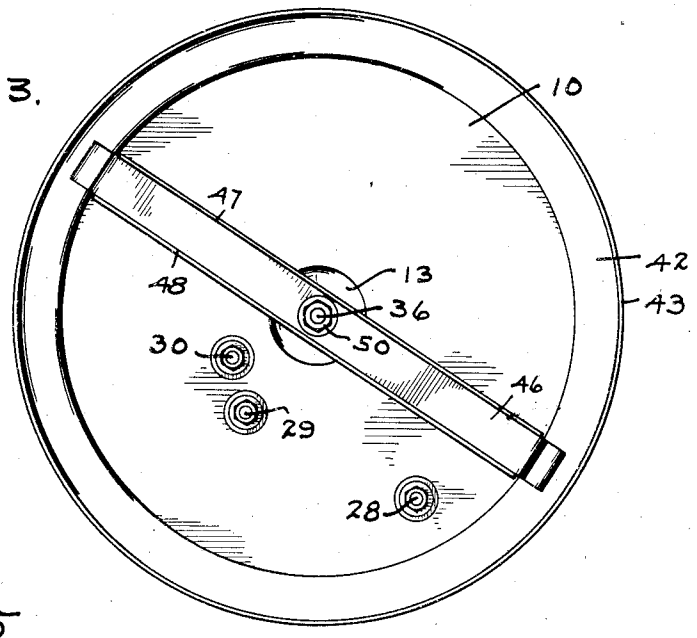
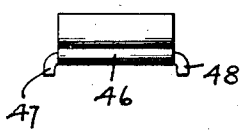


Fig. 5.



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UNITED STATES PATENT OFFICE

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ELECTRIC HEATING UNIT

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2 Claims. (Cl. 219—37)

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This invention relates to electric heating elements of the type to be employed for heating articles or vessels placed thereon, and is particularly adapted for use in cooking stoves, ranges, and the like.

A primary object of the invention is to provide a completely closed element wherein the resistance unit is embedded in an electrically dielectric body surrounded by a metallic housing, all assembled in such manner that there is a uniform heating of the element over its entire surface, including the outer circumferential portion thereof.

Another important object of the invention is to provide a heating element of the type above indicated which will be extremely durable over long periods of usage, and at the same time will be relatively low cost in production. A further important object of the invention is to provide an arrangement of the electrical resistance unit whereby the terminal posts thereof are kept relatively cool without causing cool spots to be developed at the surface of the element.

Another important advantage of the invention is found in the fact that by reason of the fact that a center post is provided to be removed from direct heating by the resistance unit, the element may be mounted and secured in position by means of that post so as to hold the element from direct contact with the plate of the stove or range from which the element is supported.

These and many other objects and advantages of the invention, including the novel arrangement of the various elements entering into the construction as set forth in the appending claims, will become apparent to those versed in the art in the following description of one particular form of the invention as illustrated in the accompanying drawings, in which

Fig. 1 is a top plan view of a structure embodying the invention;

Fig. 2, a view in vertical diametrical section on the line 2—2 in Fig. 1;

Fig. 3, a bottom plan view;

Fig. 4, a top plan view of the element with the cover removed and before the embedding cement is applied; and

Fig. 5, a view on an enlarged scale in end elevation of an under securing bar.

Like characters of reference indicate like parts throughout the several views in the drawings.

A metallic receptacle 10 is provided to have the major portion of its floor in the form of a circular disc, from the periphery of which is upturned substantially vertically the side wall 11. The

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upper edge of this wall 11 is provided with an outturned flange 12. The center of the floor of the receptacle 10 is upwardly bulged to form a dome 13.

Positioned within the receptacle 10 is a ceramic plate 14 having an outer diameter which will permit it to fit snugly within and against the wall 12. This plate 14 is provided with a circular central hole 22 therethrough to permit the dome 13 to protrude upwardly therein.

The ceramic plate 14 is provided with a plurality of spaced apart, upwardly extending, concentric ribs, herein shown as seven in number and respectively numbered beginning from the outer side, 15, 16, 17, 18, 19, 20 and 21. The outer rib 15 extends upwardly along the metal wall 12, whereas the inner rib 21 constitutes the upper part of the wall around the hole 22 above mentioned. The other ribs 16, 17, 18, 19, and 20 are equally spaced apart therebetween. Referring to Fig. 4, the rib 20 is not continuous but is broken to permit a ceramic bar 23 to enter between the ends thereof and interconnect an end of the rib 19 with the inner rib 21. The rib 19 is interrupted between its junction with its bar 23 to permit a bar 24 to pass through that interruption to interconnect an end of the rib 20 with the end of the rib 18. In turn, a bar 25 passes through an opening in the rib 18 to interconnect an end of the rib 17 with the rib 19, the bar 25 being spaced from the bar 24 a distance substantially equal to the distance between the circumferential portions of the ribs. The same spacing applies as between the ribs 23 and 24. A bar 26 interconnects an end of the rib 16 through an interruption in the rib 17 with the rib 18, the bar 26 likewise being spaced the same as the rib spacing from the bar 25. Then a bar 27 has an end extending inwardly from the non-interrupted outer end 15 through an opening in the rib 16 to interconnect with an end of the rib 17, the bar 27 being spaced from the bar 26 the distance of the rib spacings.

A terminal post 28 is located to pass vertically through the ceramic plate 14 between the ribs 16 and 17 adjacent but spaced from the bar 27. A post 29 extends vertically through the plate 14 on the inner side of the rib 19 at the bar 23. A third post 30 is positioned to extend vertically through the plate 14 between the ribs 20 and 21 adjacent the end of the rib 20 spaced counterclockwise, Fig. 4, from the bar 23. A coiled electric resistance unit 31 has one end secured to the post 30 and is then carried around between the ribs 21 and 20 to pass between the bars 23

and 24, and then continue around between the ribs 19 and 18 to pass between the bars 25 and 26 to continue on around between the ribs 17 and 16 to connect with the post 28.

Then a second part 32 of the electric resistance unit (a continuation of or a separate part from the unit 31) electrically connected with the post 28 is carried around through the opening between the bar 27 and the rib 16 to lie between the rib 16 and the rib 15 and then be carried inwardly between the bars 26 and 27 to enter and be carried around between the ribs 18 and 17 to drop inwardly between the bars 24 and 25 to enter and be carried around between the ribs 20 and 19 to have its end electrically connected to the post 29. By this arrangement, not only is the unit so carried on the plate 14 between the terminal posts 28, 29 and 30 to permit the usual series and parallel connections for different heat outputs, but those posts are removed from the concentrated portions of the resistance unit thereabout. For example, posts 29 and 30 are spaced adjacent the inner rib 21 to have no parts of the units 31 or 32 on the inner sides thereof. The post 28 is located near the outer peripheral portion of the plate 14 which is normally the coolest part of the plate in any event, and there is a considerable area relatively of the plate 14 uncovered by the resistance unit between that post 28 and the bar 27, and in any event only a very short portion of the unit 32 is carried across the outer side of the post 28. The posts 29 and 30 are further shielded from excessive heat by reason of the presence of the hole 22 provided centrally through the plate 14. The dome 13 extends up into this hole 22 a sufficient distance to aid in dissipating heat by radiation and conduction from the central zone of the assembled element.

The units 31 and 32 thus laid within the grooves of the plate 14 are embedded within an applying cement 33, the composition of which per se does not enter into this present invention. It is sufficient to state that this cement has those qualities of being a high dielectric and at the same time a high heat conducting medium. Following the application of the cement, a cover 34 is applied directly over the cement (preferably while the cement is still in a moistened state in order to secure a bonding between the cement and the cover 34). The cover 34 has a peripheral portion which is rolled around and under the flange 12 to form an interlocking connection therewith, Fig. 2. This construction leaves an annularly extending shoulder 35 around the upper portion of the element. A further cover securing means is provided, and this means consists in the present form of a bolt 36 extending vertically downwardly centrally through the cover 34 and centrally through the dome 13. A nut 37 is screw-threadedly carried on the bolt 36 to be drawn up against the under concave side of the dome 13 in order to pull the head of the bolt 36 downwardly so as to draw the central portion of the cover 34 toward the dome 13. The bolt 36 in the present showing is provided with a countersunk head 38 carried within a central depression 39 provided in the cover 34. The cover 34 is provided in the usual manner with a plurality of depressions 40 therearound in order to absorb expansion and contraction of the metal cover 34 as the cover heats and cools in accordance with the energizing of the resistance units thereunder.

Now to mount the element assembled as above indicated, such as through an opening in a supporting stove plate 41, a mounting ring 42 is

provided to have a downturned marginal edge 43 to bear on the top side of the plate 41 and an upturned marginal edge 44 around the inner side thereof to bear against the underside of the shoulder 35 whereby the element is dropped through the ring 42 to rest thereon. The diameter of the element wall 12 is less than the diameter of the opening 45 through the plate 41 so that the wall 12 is removed from contact with the marginal edge of that opening 45.

Now to fix the element in position so as to maintain that spaced relation between the wall 12 and the margin of the hole 45, an anchor bar 46 is provided to have a central opening therethrough to receive the bolt 36. This bar 46 in the present showing has marginal downturned flanges 47 and 48, Fig. 5, and the ends of the bar are preferably upturned to engage around the downturned flange 49 of the plate 41 so as to prevent longitudinal slippage of the bar 46. A nut 50 is carried up on the bolt 36 to bear against the underside of the anchor bar 46 to compressibly draw the assembled element downwardly toward the anchor bar 46 to seat it firmly on the ring 42. Thus, it is to be seen that the assembled element is not covered over from the underside by any mounting plate as has been the usual practice, but is left uncovered to permit radiation of heat therefrom and particularly the underside of the dome 13 is left open to permit dissipation of heat from that central zone of the element. Also, easy access is had to the terminal posts 28, 29 and 30 from the underside of the element after it is mounted on the stove plate 41.

While the invention has herein been shown in the one particular form, it is obvious that structural changes may be employed without departing from the spirit of the invention, and therefore, the invention is not to be limited to that precise form beyond the limitations as may be imposed by the following claims.

I claim:

1. For a stove having a heating element receiving hole in a top thereof, and a downturned flange forming the margin of said hole, a heating element for mounting across said hole, comprising a metallic receptacle having an upturned side wall; a grooved ceramic plate seated on the floor of said receptacle and having its circumferential edge substantially in contact with said wall, said plate having a central opening therethrough; an electrical resistance unit in the grooves of said plate; a ceramic filling over said plate embedding said unit; a cover plate intimately seated on said filling and extending beyond said ceramic plate; the wall of said receptacle being crimped together with a marginal edge portion of said cover plate to form a shoulder and seal therebetween; a supporting ring encircling said receptacle to have said shoulder rest on the ring; a bolt centrolly extending from said cover plate through said opening and through said receptacle floor; a mounting bar having ends formed to engage the under side of said flange at diametrically opposed positions; said bolt passing through said bar to draw it relatively toward said receptacle; said ring being formed to hold said receptacle in spaced relation above said bar.

2. For a stove having a heating element receiving hole in a top thereof, and a downturned flange forming the margin of said hole, a heating element for mounting across said hole, comprising a metallic receptacle having an upturned side wall; a grooved ceramic plate seated on the floor

of said receptacle and having its circumferential edge substantially in contact with said wall, said plate having a central opening therethrough; an electrical resistance unit in the grooves of said plate; a ceramic filling over said plate embedding said unit; a cover plate intimately seated on said filling and extending beyond said ceramic plate; the wall of said receptacle being crimped together with a marginal edge portion of said cover plate to form a shoulder and seal therebetween; a supporting ring encircling said receptacle to have said shoulder rest on the ring; a bolt centrally extending from said cover plate through said opening and through said receptacle floor; a mounting bar having ends formed to engage the under side of said flange at diametrically opposed positions; said bolt passing through said bar to draw it relatively toward said receptacle; said

ring being formed to hold said receptacle in spaced relation above said bar; a dome upwardly extending from the floor of said receptacle and projecting into said ceramic plate opening; and means interengaging said dome and said bolt for relatively drawing said dome toward said cover plate.

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