

Feb. 24, 1925.

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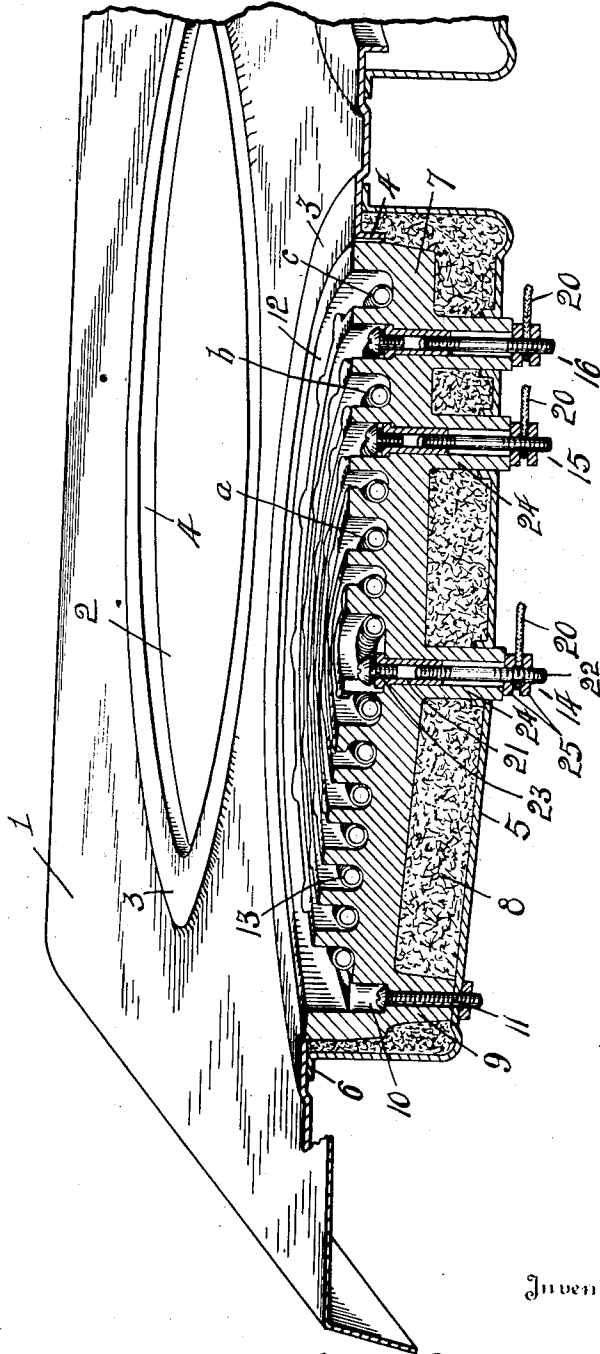
L. D. SMITH

ELECTRICAL HEATING UNIT

Filed Feb. 8, 1924

2 Sheets-Sheet 1

Feb 1.



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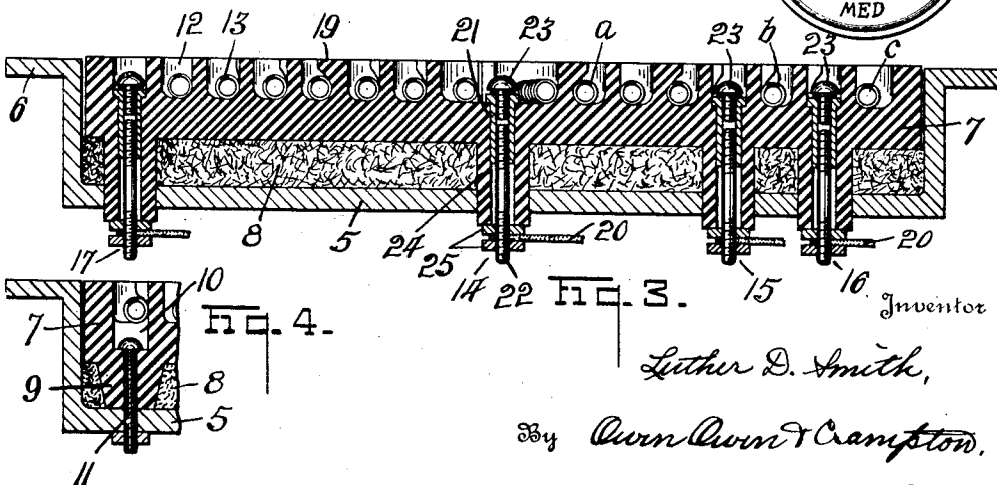
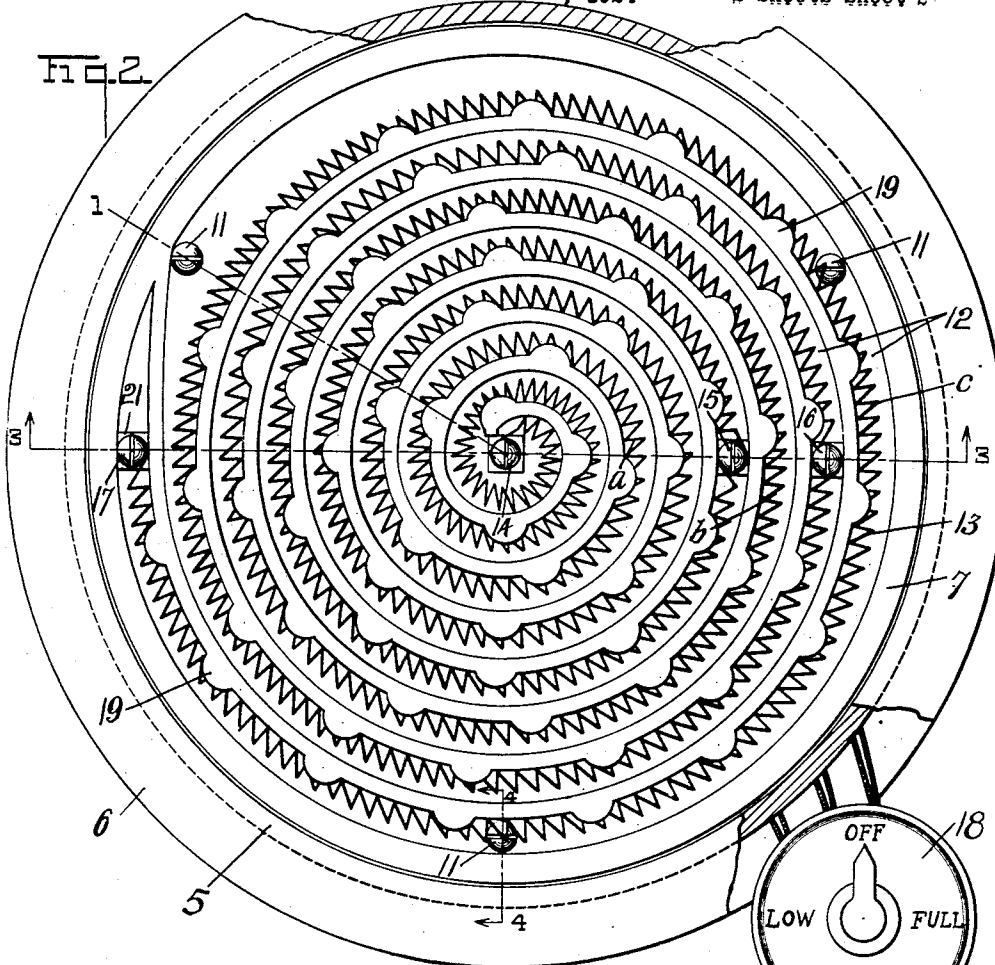
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ELECTRICAL HEATING UNIT

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

LUTHER D. SMITH, OF TOLEDO, OHIO.

ELECTRICAL HEATING UNIT.

Application filed February 8, 1924. Serial No. 661,353.

To all whom it may concern:

Be it known that I, LUTHER D. SMITH, a citizen of the United States, and a resident of Toledo, in the county of Lucas and State of Ohio, have invented a new and useful Electrical Heating Unit, which invention is fully set forth in the following specification.

This invention relates to electrical heating units of the type commonly used in electric cook stoves, hot plates and the like.

In heating units of this class, the part which is most liable to and frequently breaks, thereby requiring replacement, is the heating or resistance coil or element. With all of the heating units now used, so far as I am aware, it is a difficult and expensive matter to replace a worn out or broken resistance coil or wire, such work usually requiring the services of an electrician or one skilled in making such repairs, thereby involving considerable delay, expense and annoyance. With many of the electric stoves or hot plates now used, it is necessary to replace the entire electrical unit if the resistance wire or other part of the unit becomes broken.

The primary object of the invention is the provision of a heating unit of the class described, the resistance element of which when broken is capable of being easily and quickly replaced by a maid or housewife without disturbing the position of the unit in the stove or hot plate in which it is located, thereby saving the time, expense and trouble incident to calling in an electrician or mechanic to make the change.

Another object of the invention is the provision of a refractory plate or resistance element carrying member of novel and improved construction; whereby it is more efficient in its function and is capable of being assembled with the other parts of a unit in an easier and more effective manner.

Another object of the invention is the manner employed for maintaining the coil or resistance element in the refractory plate of the unit and of connecting it with a source of electrical supply and controlling it, whereby successive parts or sections of the coil or element may be practically

placed in closed circuit enabling all or a greater or less portion of the element to be used as the heating desired may require.

Other objects and advantages of the invention will be apparent from the following detailed description thereof.

While the invention in its broader aspect is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a fragmentary perspective view of a stove top with a unit embodying the invention mounted therein and in section, as along a line 1—3 in Fig. 2. Fig. 2 is a top plan view of a unit embodying the invention with the pan member thereof partly broken away and comprising a casting, and with a circuit control shown in connection therewith. Fig. 3 is a section on the line 3—3 in Fig. 2, and Fig. 4 is a section on the line 4—4 in Fig. 2.

Referring to the drawings, 1 designates the top of a stove or hot plate having one or more openings 2 therein for receiving an electrical heating unit. The portion of the stove immediately surrounding the opening 2 is preferably, though not necessarily, raised as at 3, and the free edge of the raised portion is turned downward to form a flange 4. A pan 5, which may be of sheet metal, as shown in Fig. 1, or cast, as shown in Figs. 2, 3, and 4, or made in any other manner, as desired, is preferably slightly larger in diameter than the hole 2 with which it is associated, and the upper free edge of the pan is provided with an outwardly turned flange 6 for seating up against the under side of the raised portion 3 of the top, preferably in outwardly spaced relation to the top flange 4. The pan flange 6 is secured to the top 1 by electric welding, riveting or in any other suitable manner.

The refractory element or plate of the unit is designated 7 and is customarily of porcelain. This element is circular in form and of a size to fit into the associated opening 2 and down into the pan 5 with its side wall preferably slightly spaced from the marginal flange 4 of the opening to allow for contraction and expansion of the parts

under changing heat conditions. It is desirable to heat-insulate the refractory plate 7 from the pan 5, and for such purpose the plate is spaced from the bottom of the pan and in some instances from its side walls to permit a heat-insulating packing 8 of asbestos, mineral wool or other suitable material to be packed therein.

An important feature of the invention consists in providing the bottom of the refractory plate 7 with a plurality of integral legs 9, in the present instance three in number, which rest on the bottom of the pan 5 and maintain the plate in permanent spaced relation thereto, thus facilitating mounting the plate in the pan, and requiring less skill and time in assembling the plate and pan and in packing the heat-insulating material 8 therebetween in such quantity that the plate will bear the desired relation to the pan and to the stove top. A hole 10 is provided longitudinally through each leg 9 and plate body to receive a retaining bolt 11, which extends therethrough and through a registering opening in the pan bottom and, in the present instance, has its head shouldering in an enlarged top portion of the opening and has its nut acting against the underside of the pan bottom, as shown in Figs. 1 and 4. The screw member of the bolt has its head grooved to enable a screw driver to be used over the top of the unit to disconnect the plate and pan.

The refractory plate 7 is formed on its top with a resistance element receiving groove 12 which, in the present instance, is of convolute form and extends out from the center of the plate in progressively enlarging convolutions to near the outer edge of the plate. The resistance element employed in the present instance comprises a wire coil 13, which seats in and follows the convolutions of the groove 12 and, in the present instance, is separated into three sections *a*, *b* and *c* connected in series and adapted to be progressively placed in closed circuit, thereby enabling the heating action of the unit to be regulated as desired. The inner section *a* is connected at its inner end to a central binding post 14 and at its outer end to an intermediate binding post 15. The section *b* is connected at its inner end to the binding post 15 and at its outer end to an intermediate binding post 16, and the section *c* is connected at its inner end to the binding post 16 and at its outer end to an outer binding post 17. The several binding posts 14, 15, 16 and 17 are connected through a suitable control 18 with a source of electrical current supply, so that the sections of the heating element 13 may be progressively placed in closed circuit with the source of supply either outwardly from the inner section *a* or inwardly from the outer

section *c*, as may be desired, thereby enabling any number of the sections, less than the full number, or all of the sections, to be rendered operative as conditions may require. The manner of connecting the different sections of the heating element, so that some or all may be placed in closed circuit, is well understood in the art and need not, therefore, be specifically described or shown.

If a groove or channel 12 of the open top type is employed for receiving the heating element 13, it is preferable to provide one or both walls of the groove at intervals with overhanging projections 19 to retain the coil or element 13 within the groove. If the space left between the outer ends of the projections 19 and the opposed wall of the groove is less than the diameter of the coil 13, as illustrated in the present case, it will be necessary in placing a coil in the groove to thread it through the same under the projections.

The connections of the several binding posts 14, 15, 16 and 17 with the respective circuit wires 20 are disposed below the pan 5. In order to enable the heating element 13 of the sections thereof, if it is of sectional form, to be easily connected or disconnected from the respective binding posts at the top of the unit and without necessitating a removal of the unit from the stove the binding posts are made of sectional form each comprising an anchoring sleeve 21, a lower threaded stem 22 to which the respective circuit wire 20 is connected and a top screw which binds the adjacent end of the coil 13 or of a section thereof to the sleeve 21. Each binding post is mounted in a tubular bottom extension 24 of the refractory plate 7, each of such extensions extending through a registering opening in the bottom of the pan 5 and preferably a short distance below the same and having its bore extending up through the body of the plate. The anchoring sleeve 21 is mounted in the upper portion of said bore and is preferably provided with a head which is square or of other form than round to fit a corresponding portion of the groove 12 to hold the sleeve against turning relative to the plate. The stem 22 of a binding post threads at its upper end into the sleeve 21 and receives a pair of binding nuts 25 at its lower end below the extension 24. The screw 23 threads into the upper end of the sleeve 21 and may be removed therefrom without disturbing the other members of the binding post, thereby enabling a heating element 13 to be easily and quickly disconnected from the binding post by merely removing an associated screw 23 from the sleeve, and a new element may be as easily connected therewith. This is a very im-

portant feature in heating units of the class described as it enables broken heating elements to be replaced in an exceedingly simple and easy manner without necessitating the calling of an electrician or mechanic for such purpose, and it also obviates the necessity of replacing the entire unit, as is now so often the case when a heating element has become broken.

10 I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit
15 of the claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination with a plate having an opening with the marginal part thereof raised and the free edge flanged downwardly to form a circular channel, a pan having a perforated bottom and a rim the free edge of which is flanged outwardly and
25 secured in the channel, a grooved refractory element in the pan engaged at its periphery with the flange of the plate and having a series of spaced depending legs seated on the pan bottom, heat insulating material between the periphery of the element and the pan rim and between the pan bottom and the under face of said element, hollow depending members carried by the element and extending through said perforations of the
30 pan bottom, means extending through the legs and engaging the pan bottom to secure the element to the pan, resistance means in the groove of the element and means engaged in the tops of the hollow members of the element to removably secure the resistance means in position.

2. In combination with a plate having an opening, a pan having a perforated opening disposed beneath and in register with the opening and secured to the plate, a grooved refractory element in the pan having depending legs seated on the pan bottom to hold the bottom of the element spaced above the pan bottom, heat insulating material in said space between the pan bottom and element, means extending through the legs and pan bottom to secure the element to the pan, resistance means removably mounted in the groove of the element, hollow depending extensions on the element extending through the perforations of the pan bottom, a conductor in each extension, means connected to one end of each conductor and operable from the top of the element to removably
55 secure the resistance means in position, and current conveying means removably connected to the conductors and disposed below the element.

3. In an electric heating unit, a refrac-

tory element grooved on its upper face and
65 formed with a series of depending parts, a pan having perforations in its bottom, some of said parts seating on the pan bottom and other of the parts extending through the perforations in the pan bottom, means to secure the first named of the said parts to the pan bottom, resistance means in the groove of the element, means carried by the other of said parts and operable from the top of the element to removably secure the resist-
70 ance means in the grooves, and means connected to the last named parts to supply current to the resistance means from beneath the element.

4. In an electric heating unit, a refractory body grooved on its upper face, resistance means in the groove, said body having depending hollow parts in register with the groove, metal sleeves in said hollow parts, means operable from the top of the body to connect the resistance means to the sleeves, and combined means to supply current to the sleeves and to hold the latter against upward movement.

5. In an electric heating unit, a refractory body grooved on its upper face, resistance means in the groove, said body having depending hollow parts in register with the groove, metal sleeves in said hollow parts, means operable from the top of the body to connect the resistance means to the sleeves, and means to supply current to the resistance means.

6. In combination with a plate having an opening, a pan of greater diameter than that of the opening secured to and depending from the plate and having a perforated bottom, a refractory grooved body in the opening having a plurality of depending tubular legs which seat upon the pan bottom and register with the perforations in the pan bottom, insulation between the pan and body, resistance means in the groove of the body, means extending through the tubular legs to secure the body to the pan bottom, and means to supply current to the resistance means.

7. In combination with a plate having an opening and a pan registering with the opening and secured to the plate therebeneath, a refractory body in the pan having depending tubular parts and having a grooved upper face in register with the tubular parts, said pan having perforations in its bottom through which said tubular parts project, resistance means in the groove of the body, means in the tubular parts to supply current to the resistance means and means operable from above the body to removably connect the resistance means to the current supplying means.

8. In combination with a plate having an opening and a pan registering with the

opening and secured to the plate therebeneath, a refractory body in the pan having depending tubular parts and having a grooved upper face in register with the tubular parts, resistance means in the groove
5 of the body, current supplying means extending into the tubular parts through the lower ends thereof, and means operable from above the body to removably connect the resistance means to the current supplying means. 10

In testimony whereof I have hereunto subscribed my name to this specification.

LUTHER D. SMITH.