Aug. 21, 1951 F. E. KIRK 2,565,432

ELECTRIC HOT PLATE HINGE DEVICE

Filed Nov. 4, 1947

Fig. 1.

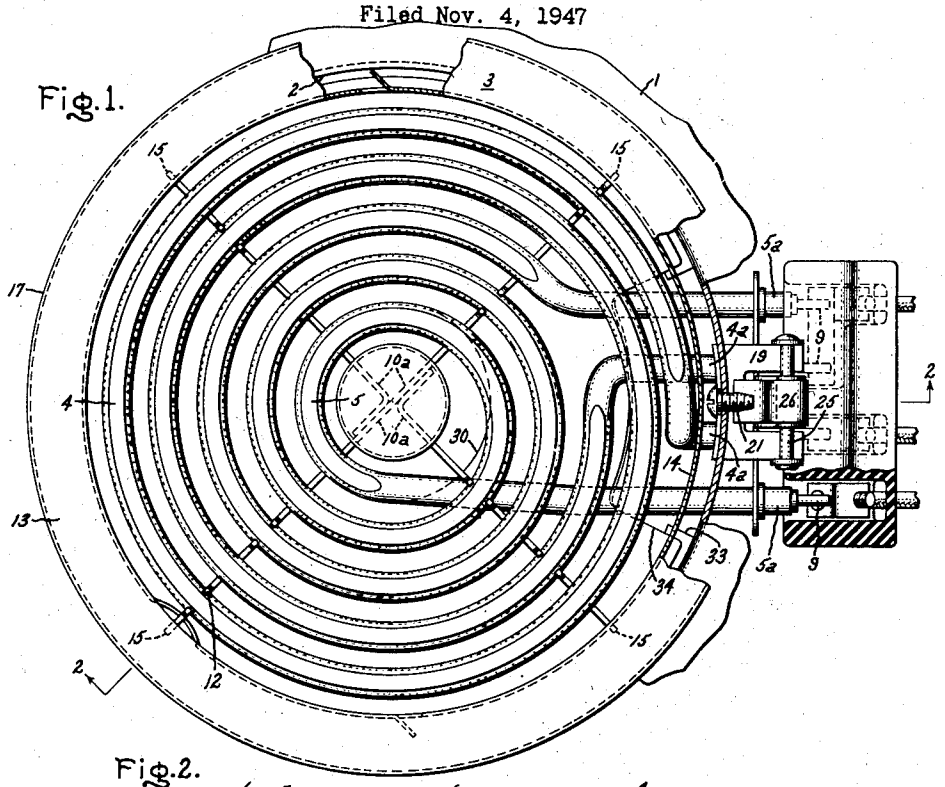


Fig. 2.

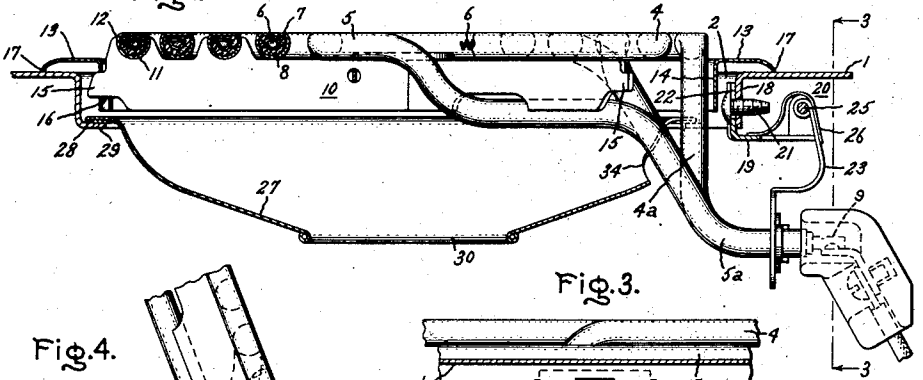


Fig. 3.

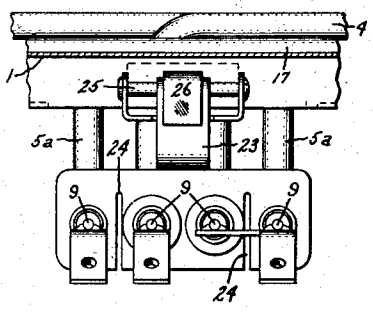
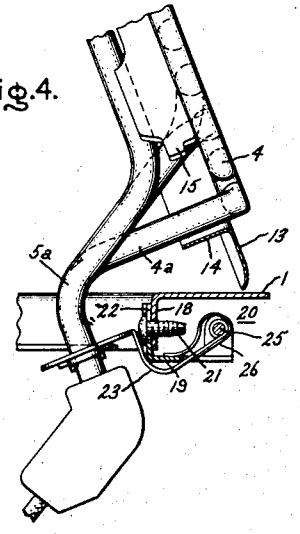


Fig. 4.



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UNITED STATES PATENT OFFICE

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ELECTRIC HOT PLATE HINGE DEVICE

Francis E. Kirk, Oak Park, Ill., assignor to Hotpoint Inc., Chicago, Ill., a corporation of New York

Application November 4, 1947, Serial No. 783,961

3 Claims. (Cl. 219—37)

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The present invention relates to heating devices and more particularly to heating devices such as hot plates in electric ranges and it has as its object the provision of an improved device of this character which is constructed and arranged to provide a simplified hinging and positive electrical grounding circuit between the heating device and the range and moreover, is adapted to simple manufacturing assembly, easy servicing, adjustment and replacement.

In one form of the invention, the range is provided with a top wall defining a cooking surface or area that has an opening for receiving a heating unit. The heating unit has a heat generating element and a support for the heat generating element that holds it in the cooking position in the opening in the cooking surface. The heat generating element comprises a sheathed electric heating element attached to a grid-like frame mounted in a ring which is supported by the top wall of the range.

A reflector formed of a single piece of reflecting material is supported by the top wall as a separable part under the heat generating element. To withdraw the reflector for cleaning, repair, or replacement, the heating element and its support may be elevated or removed from the opening in the top wall. In order to facilitate the removal of the reflector, the heating device comprising the heat generating element, grid and supporting ring are pivotally secured to the top wall of the range by a hinge so that the heating element, the grid and support ring can be swung upwardly as a unit from the opening to provide ready access to the reflector which is supported beneath it. The hinge is provided with a positive electrical circuit connection between the hinge arms to insure the electrical grounding of the heating element to the top wall at all times.

Preferably, the heating element will be provided with terminals arranged at the side and adjacent the pivotal connection hinge between the heating unit and the top wall and will extend downwardly through the supporting ring and through the reflector which is provided with a recess through which the terminals extend to a position under the top wall so that the top wall provides protection against spillage on the terminals. The terminal ends are provided with suitable means for protecting them from contact with spillage.

For a better understanding of my invention reference may be had to the accompanying drawings in which Fig. 1 is a plan view of one example

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of an electric heating device embodying the present invention, parts being shown in section and parts broken away to more clearly illustrate certain details of construction; Fig. 2 is a vertical sectional view taken through the heating unit of Fig. 1 generally along the lines 2—2; Fig. 3 is a fragmentary view taken along the lines 3—3 of Fig. 2; and Fig. 4 is a fragmentary view similar to Fig. 2 but illustrating certain elements in different positions.

Referring to the drawing, the present invention has been shown in one form as applied to an electric range provided with a heating unit having an electric sheathed heat generating element. As shown, the range comprises a top wall or heating surface 1 which is provided with a circular opening 2 that is adapted to receive the heating unit 3.

This heating unit 3 comprises a pair of sheathed heating elements 4 and 5 lying in a common plane that is substantially parallel to the top wall 1 of the range. Preferably, these elements will be constructed as described in the United States patent to C. C. Abbott, No. 1,367,341 dated February 1, 1921. As there described each heating element is provided with a coiled resistance conductor 6 housed in a metallic sheath 7 and supported in spaced relationship to the sheath by a highly compacted layer 8 formed of a suitable heat conducting electrically insulating material, such as powdered magnesium oxide. The heating elements 4 and 5 are shaped to form flat spirals of several turns having the terminal sections or ends 4a and 5a located at one side of the heating unit adjacent the pivoting hinge attaching the heating unit to the top wall. Both of the terminal sections 4a and 5a extend downwardly and outwardly from the plane of the elements 4 and 5 as shown in Fig. 2. The terminal sections 4a and 5a of the two elements are provided with terminals 9 which have their inner ends electrically connected with the resistance conductors 6 and their outer ends protruding a suitable amount from the sheath in which they are housed.

The two heating elements 4 and 5 are mounted on a grid 10 which as illustrated comprises three pieces forming four arms 10a joined at the center of the unit 3 and extending radially outwardly at angles of 90° to each other. These arms are provided with notches 11 in which the elements 4 and 5 are received and which are provided with peened-over sections 12 that firmly grip the turns and hold them in their proper relation to each other. The outer ends of the arms 10a

are mounted in a supporting member 13 which as shown is provided with a vertically positioned circular flange 14. The grid arms 10*a* are provided with outwardly projecting tongues 15 at their ends which are received in apertures 16 provided for them in the circular flange 14.

The flange 14 is adapted to be inserted in the opening 2 of the top wall 1 so as to support the heating elements 4 and 5 in proper cooking position in the top wall. For this purpose the support 13 is provided with a substantially horizontal circular flange 17 extending outwardly from the upper edge of circular flange 14 and adapted to overlap the area of the top wall 1 around the opening 2 as shown in Figs. 1 and 2. It is to be understood that the heating elements 4 and 5 project upwardly above the adjacent upper edges of the grid arms 10*a* and also above the highest section of the flange 17 so that cooking vessels can be placed upon and in direct thermal contact with the sheaths 7 of the heating elements 4 and 5.

To provide more uniform heat distribution when a cooking vessel is placed upon the unit and to protect the individual coils of the heating elements from permanent distortion the heating elements are spaced and attached to the grid arms 10*a* and otherwise supported in accordance with the invention of a copending application of Oliver G. Vogel and Francis E. Kirk, Serial No. 783,986, filed November 4, 1947, assigned to the same assignee as the prersent application.

The top wall 1 is provided with a flange 18 depending downwardly from the top wall 1 and in substantial concentric relation with the flange 14 of the support 13 when the heating unit is in the proper cooking position. The diameter of the opening 2 is somewhat larger than the diameter of the flange 14 of the support 13 so that the flange 18 is spaced somewhat from the flange 14, as clearly shown in Figs. 1 and 2. Mounted within the space between the flanges 14 and 18 is one arm 19 of a hinge 20. This arm is adjustably secured to the flange 18 by any suitable means, as for example, a screw threaded member 21. To provide for vertical adjustment of the unit 3 in the aperture 2, the hinge arm 19 is provided with an oblong aperture or open slot 22. The cooperating arm 23 of the hinge is fixedly attached to the outer terminal ends 5*a* of the heating element 5 and slidably attached to the inner terminal ends 4*a*. The lower end of hinge arm 23 is additionally provided with slots 24 to provide means for the terminal ends 4*a* and 5*a* to expand without permanent distortion of the hinge arm 23. Hinge arms 19 and 23 are pivotally attached through the hinging pin 25. An electrical ground means as for example a flexible and resilient strap 26 of some suitable conducting material is fixedly attached to hinge arms 19 and 23 thereby providing a positive grounding circuit between the heating unit and the top wall of the range. The grounding strap 26 being of a resilient material additionally provides means to position the two hinge arms angularly with respect to each other thereby making assembly or replacement of the unit a simple mechanical operation.

Preferably and as shown, the hinge connection means between the heating unit and the top plate is adjacent the terminal sections or ends 4*a* and 5*a* and in the form of the invention shown in the drawing the terminal sections extend directly below the hinge.

Positioned under the heat generating elements 4 and 5 and under the grid 10 which supports them and also the support 13 which supports the grid is a reflector 27. The reflector is roughly parabolic in shape, and has at its marginal edge an outwardly extending flange 28 which is mounted on a seat 29. The seat 29, as shown, extends inwardly laterally from the depending flange 18. At the center the reflector 32 is provided with a drawn opening 30. The seat 29 and reflector 30 are provided respectively with notched sections 33 and 34 through which the terminal sections or ends of the heating elements 4 and 5 pass downwardly and outwardly to the hinge arm 23.

Suitable electrical supply leads 35 are provided for the heating elements 4 and 5. These leads are electrically connected with the terminals 9 by connector members.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. An electric range comprising a top wall formed with an opening therein for receiving a movable heating unit and a flange depending downwardly from said opening, an electric heating element of the sheathed resistance conductor type, a support for said heating element, said support being adapted normally to fit into said opening, means securing said heating element to said support, means for securing said heating unit to said top wall in pivotal relationship comprising a hinge arm secured to said flange in good electrical contact therewith and a cooperating hinge arm secured to the sheath of said heating element in good electrical contact therewith in order to permit said heating unit to be pivoted upwardly with respect to said top wall so that said support is moved out of said opening, and a resilient metallic member fixedly attached to said hinge arms in good electrical contact therewith, said member being adapted to ground said heating unit to said top wall electrically and to bias said hinge arms to a position for attachment to said flange.

2. An electric range comprising a top wall formed with an opening therein for receiving a movable heating unit and a flange depending downwardly from said opening, an electric heating element of the sheathed resistance conductor type, a support for said heating element, said support being adapted normally to fit into said opening, means for securing said heating element to said support, means for securing said heating unit to said top wall in pivotal relationship comprising a hinge arm adapted to be adjustably secured to said flange in good electrical contact therewith and a cooperating hinge arm secured to the sheath of said heating element in good electrical contact therewith in order to permit said heating unit to be pivoted upwardly with respect to said top wall so that said support is moved out of said opening, and a resilient metallic member fixedly attached to said hinge arms in good electrical contact therewith, said member being adapted to bias said heating unit against upward pivotal movement and to ground said heating unit electrically to said top wall.

3. An electric range comprising a top wall formed with an opening therein for receiving a movable heating unit and a flange depending downwardly from the edge of said opening, an electric heating element of the sheathed resistance conductor type, a support for said heating element, said support being adapted normally to fit into said opening, means for securing said heating unit to said top wall in pivotal relation-

ship in order to permit said heating unit to be pivoted upwardly with respect to said top wall so that said support is moved out of said opening, said means comprising a hinge arm having an elongated opening therein and adapted to be adjustably secured to said flange in good electrical contact therewith through said opening, an attaching member cooperating with said flange and a cooperating hinge arm secured to the sheath of said heating element in good electrical contact therewith and a resilient metallic member fixedly attached to said arms in good electrical contact therewith, said member being adapted to bias said heating unit against upward pivotal movement and to provide an electrical ground circuit between said heating unit and said top wall.

FRANCIS E. KIRK.

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