

Feb. 25, 1947.

E. A. RUTENBER

2,416,645

COMBINED DEEP WELL AND SURFACE BURNER ELECTRIC COOKER

Filed Dec. 29, 1943

5 Sheets-Sheet 1

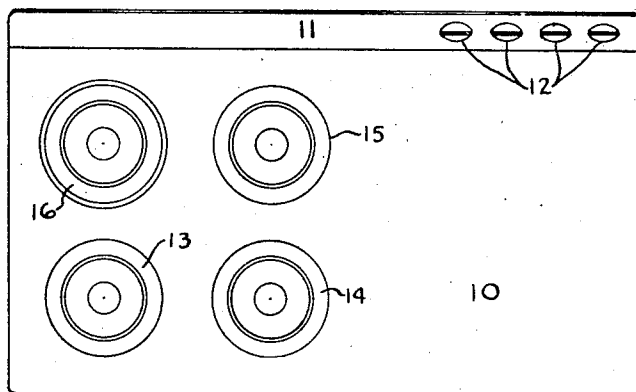


FIG. 1

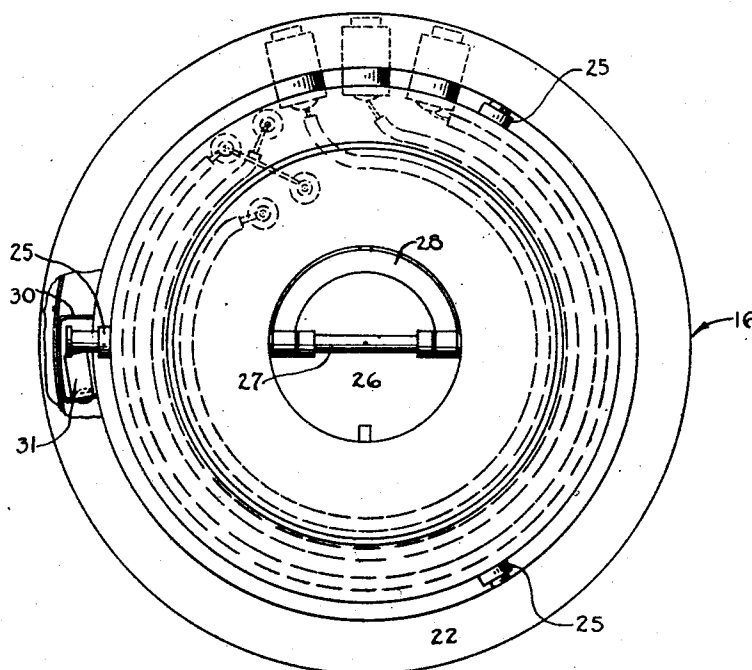


FIG. 2

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5 Sheets-Sheet 2

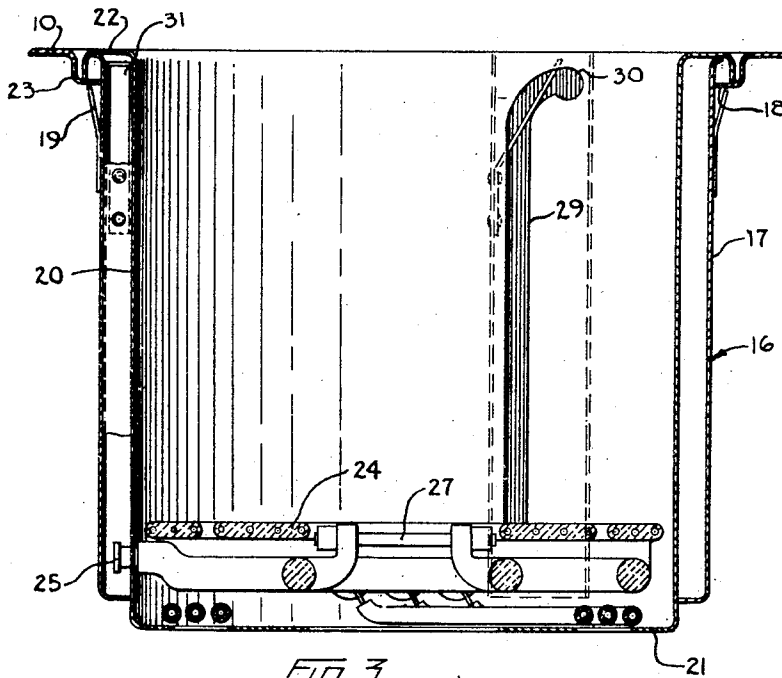


Fig. 3

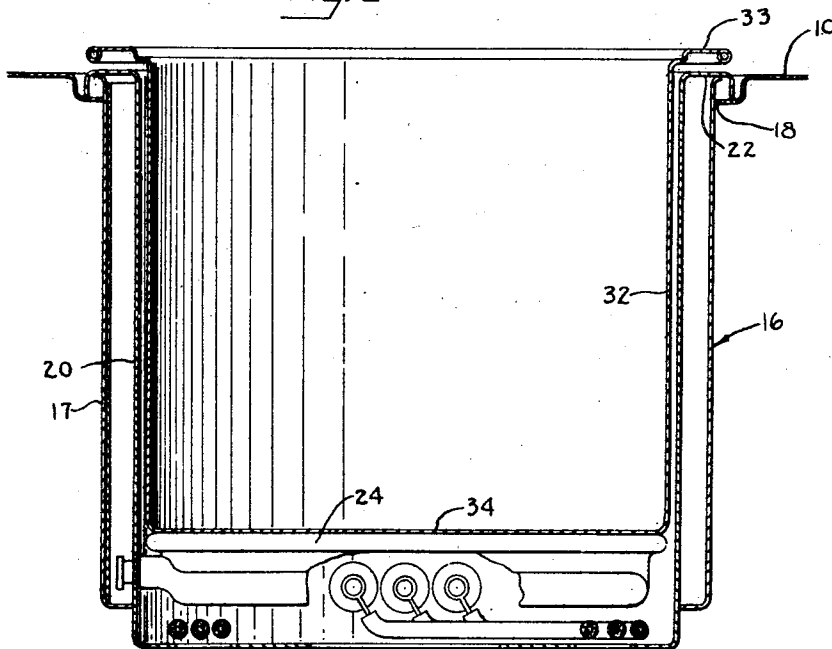


Fig. 4

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5 Sheets-Sheet 3

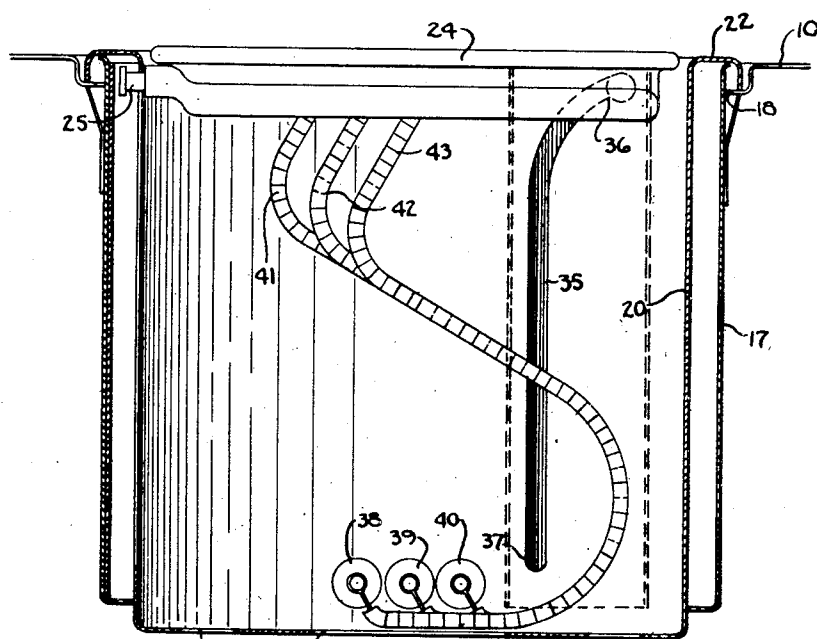


FIG. 5

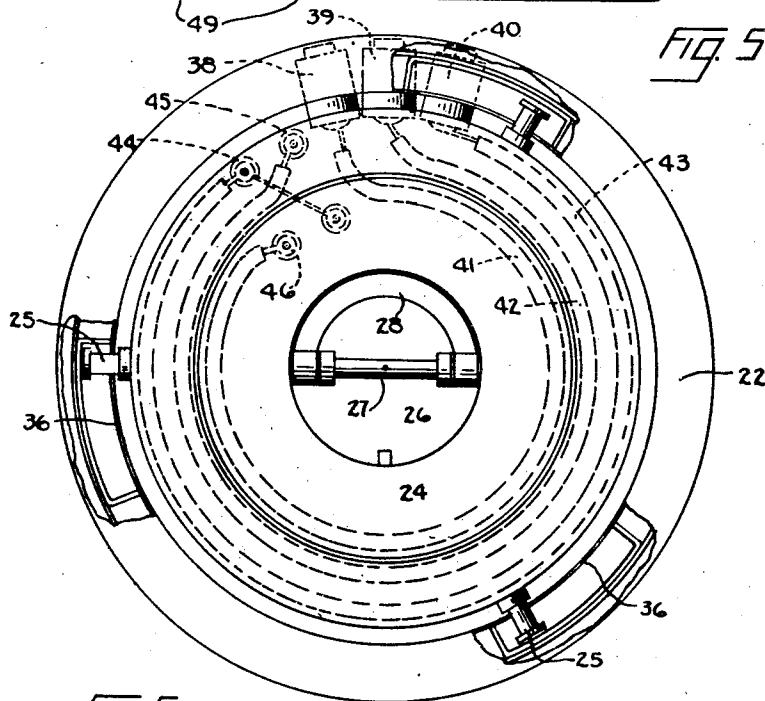


FIG. 6

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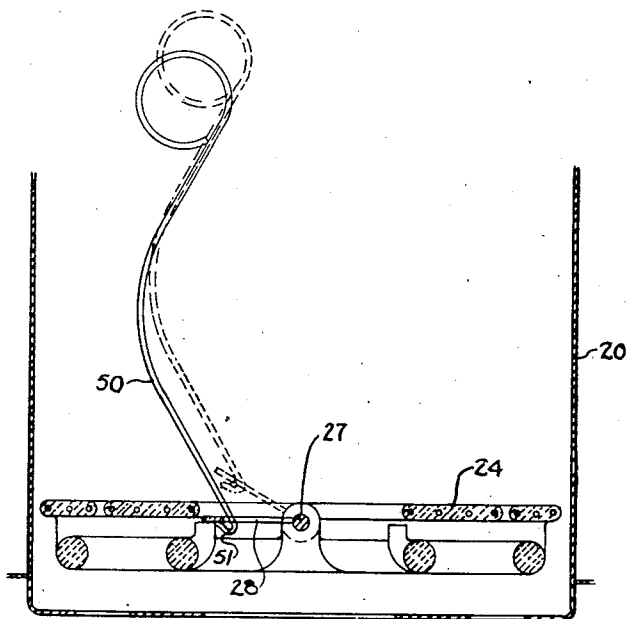


Fig 7

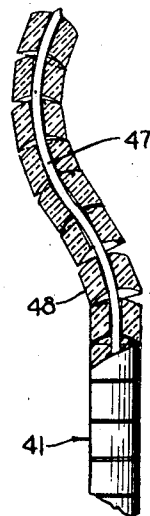


Fig 9

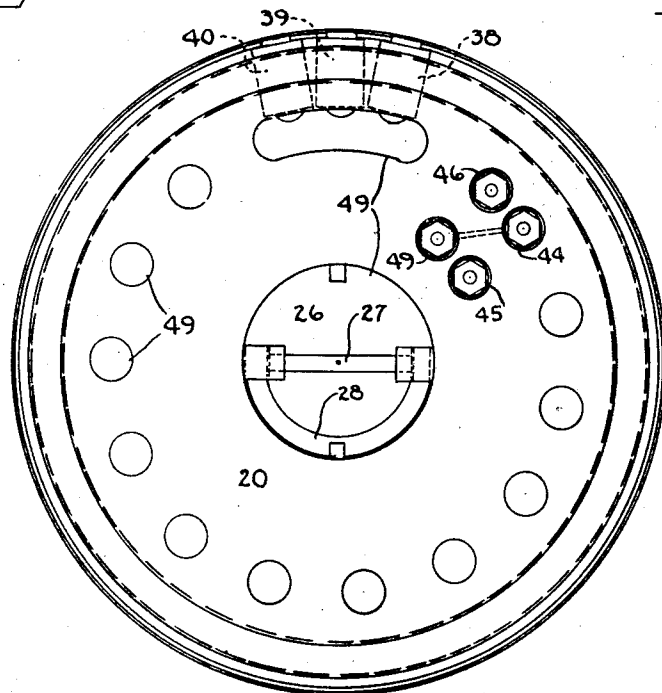


Fig 8

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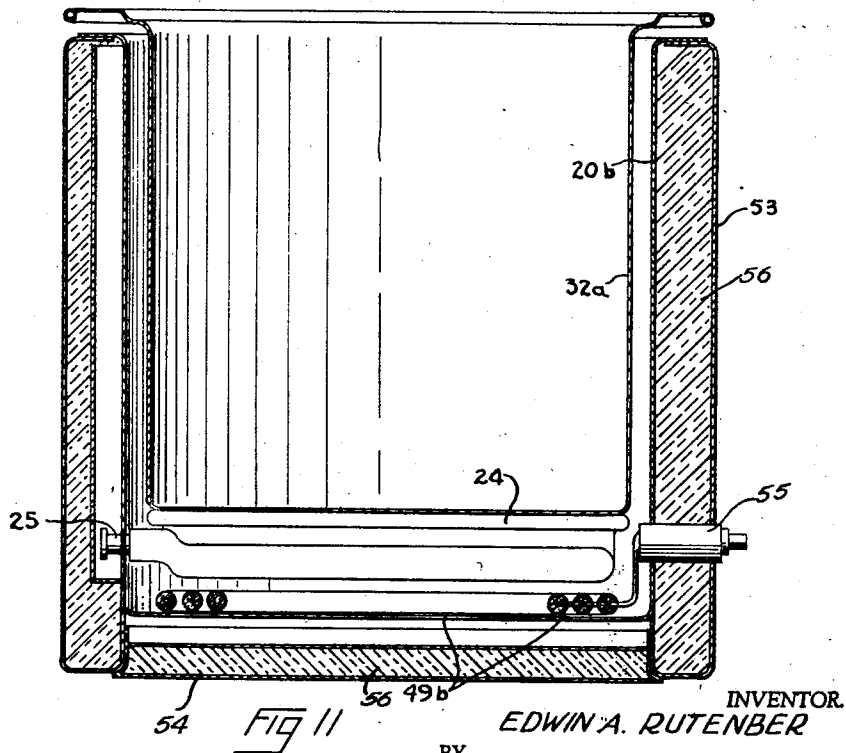
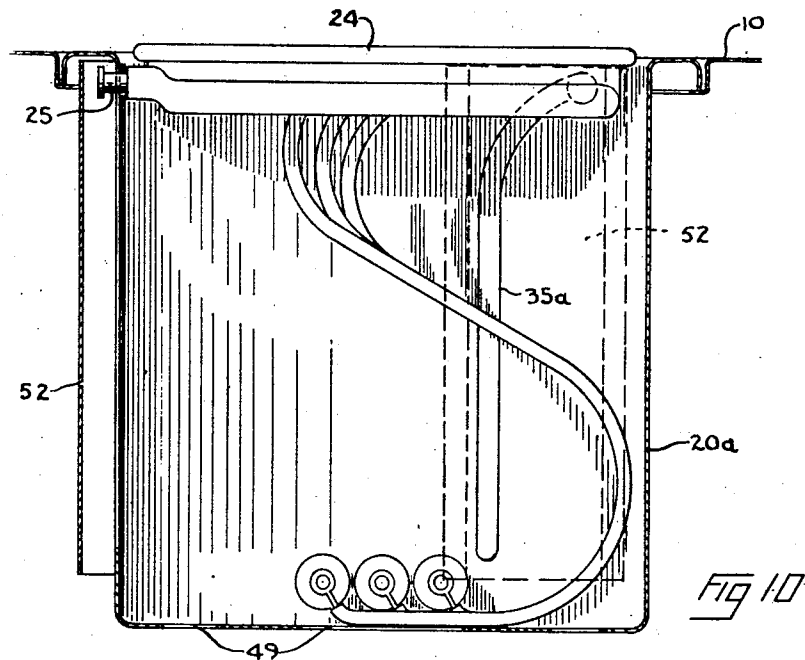
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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

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COMBINED DEEP WELL AND SURFACE
BURNER ELECTRIC COOKER

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Application December 29, 1943, Serial No. 516,017

13 Claims. (Cl. 219—37)

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This invention relates to cooking ranges and more particularly to electric cooking ranges of the type which includes a deep well cooker.

Deep well cookers are special purpose devices which are conventionally provided on the better electric ranges. A common burner arrangement for such a range is to provide three surface burners and one deep well cooking burner. Those skilled in the art will understand that the cooking characteristics of the two types of burners are radically different so that generally speaking they are not interchangeable in use. Likewise, the deep well cooker being a special purpose burner, is not used as frequently as are the regular surface burners. Consequently, it has heretofore been necessary to sacrifice the space which might have been used for another surface burner in order to include in a range the special purpose deep well cooker.

For example, in a conventional range equipped with three surface burners and one deep well cooker, if the latter could also be used as a surface burner, it would increase the general usefulness of the range one third. The importance of this consideration will be immediately appreciated by housewives who normally use the deep well cooker only at intervals and who could most conveniently use an additional surface burner daily.

Heretofore, attempts have been made to so design the deep well cooker as to permit the vertical adjustment of the burner forming a part thereof so as to make it available as a surface burner when the deep well cooker was not in use. The constructions which have heretofore been proposed for this purpose have not been commercially practical and therefore, have not found favor with the public, because of the complicated and expensive mechanism employed for raising the deep well burner and supporting it in a position to make it available for use as a surface burner.

The principal object of this invention is to provide a simple and economical multiple purpose (deep well cooker or surface cooker) construction which can be incorporated in a range or which can be used independently.

This and other objects are attained, in part, by providing, in combination, a movable burner and a stationary burner support defining a vertical well, the support cooperating with the burner to support the burner in a plurality of vertically spaced positions within the well. The principal and other objects of the invention are also attained, in part, by the provision of a novel construction and arrangement of the electrical conductors which supply current to the burner.

For a full explanation of the invention and its other objects and advantages, reference should now be had to the accompanying drawings, wherein:

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Figure 1 is a schematic top view of a range embodying the present invention;

Figure 2 is an enlarged top view of the deep well cooker shown in Figure 1 with parts broken away to show the means for securing the burner in its elevated position;

Figure 3 is a vertical sectional view of the construction shown in Figure 1;

Figure 4 is a view similar to Figure 3 showing a deep well cooking utensil installed in the deep well cooker;

Figure 5 is a view similar to Figure 3 but showing a burner in its elevated position and showing an alternative construction for securing the burner in its elevated position;

Figure 6 is a top plan view of the construction shown in Figure 5 with portions broken away to illustrate the manner of securing the burner in its elevated position;

Figure 7 is a fragmentary vertical sectional view generally similar to Figure 3 and illustrating the application of a tool for raising the burner to its elevated position;

Figure 8 is a bottom plan view of the construction shown in Figure 7;

Figure 9 is an enlarged fragmentary view partly in section of the electrical conductors which supply current to the burner;

Figure 10 is a vertical sectional view of a construction generally similar to that of Figure 5 but designed for use independently of an enclosure such as 17 of Figure 5; and

Figure 11 is a vertical sectional view of a construction generally similar to that of Figure 5 but adapted for use as a portable or self-contained unit independently of a range.

The range schematically illustrated in Figure 1 includes a range top 10 having a splash panel 11 along the rear edge thereof upon which are mounted control switches 12.

The left hand side of the range top is provided with three surface burners 13, 14 and 15, and deep well cooker 16. The deep well cooker embodies the subject matter of the present invention and a construction similar to the cooker 16 may conveniently be substituted for all or any of the surface burners 13, 14 and 15, if desired.

The right hand side of the range top overlies the oven and constitutes a work table surface.

As best shown in Figures 2 and 3, the deep well cooker 16 includes a cylindrical sleeve 17 which is mounted within an opening 18 formed in the range top 10. The sleeve 17 may be secured in place within the opening 18 in any convenient manner. It is here shown as being located in place by a plurality of locking elements 19 in such manner as to locate the upper edge of the sleeve 17 substantially in the plane with the upper surface of the top wall 10.

Within the sleeve 17 there is disposed a member

20 which includes a tubular side wall disposed in spaced relation to the sleeve 17, and a perforated bottom wall 21. The upper edge of the member 20 is flanged outwardly and downwardly as at 22 to overlie the upper edge of the sleeve 21 and to rest upon the seat 23 formed by providing a depressed flange in the top wall 10 around the opening 18 therein. The member 20 defines a deep well cooking compartment and serves as a stationary support for a movable burner element 24. The burner element 24 is of generally conventional form with two notable exceptions. At its periphery it is provided with a plurality of radially outwardly extending projections 25. Three such projections are here shown, although more or less may be employed, if desired. Centrally the burner is provided with an opening 26 across which extends a stationary shaft 27 and to which is pivotally secured a handle element 28, whose purpose will be described hereinafter.

From an inspection of Figure 3 it will be observed that the projections 25 which extend radially outwardly from the perimeter of the burner element 24 extend through the cylindrical side wall of member 20. For this purpose the latter is provided with three vertically elongated slots or guideways 29 which terminate at their upper extremity in lateral extensions 30 which form seats to receive the peripheral projections 25 when the burner element 24 is raised upwardly and rotated in a clockwise direction, as viewed in Figure 3. The manner in which the burner element 24 is raised and lowered will be described presently. It is shown in its uppermost position in Figure 5.

In order to securely position the burner element 24 in its upper position with the projections 25 thereof disposed within the seats 30 at the upper extremity of the slots 29, a spring element 31 is provided which serves to press the projections 25 home onto the seat 30 when the element 24 is raised to the uppermost limit of slots 29. In order to unseat burner element 24 from its uppermost position to lower it to its lowermost position, it is necessary to rotate the element 24 in a counter-clockwise direction against the resistance of the springs 31, whereupon the weight of the element will cause the element to drop to its lowermost position, as shown in Figure 3.

When the heating element 24 is in its lowermost position, as shown in Figures 3 and 4, the construction illustrated in those figures constitutes a substantially conventional form of deep well cooker adapted to receive a deep well cooking utensil, such as the member 32 shown in Figure 4. The utensil 32 is provided at its upper extremity with an outwardly extending peripheral flange 33. The under surface of the bottom wall 34 of the utensil 32 is adapted to seat upon the upper surface of the burner element 24, as shown in Figure 4.

An alternative construction for securing the burner element 24 in its uppermost position is shown in Figures 5 and 6. This construction differs from the construction shown in Figures 2 to 4 inclusive only by the elimination of the spring elements 31, and by the provision in lieu thereof of a greater radius at the upper extremity of the guide slots 35. In this modification the guide slots are curved laterally at their upper extremity through a relatively wide arc which terminates in a seat 36. With this modification, as shown in Figure 5, the burner element 24 can be securely seated in its uppermost position merely by raising the burner vertically, the curvature

of the guide slots imparting a clockwise rotation sufficient to cause the projections 25 to engage the seats 36. The seats 36 are disposed laterally to a sufficient extent and so formed as to hold the burner element in its uppermost position by gravity when the projections 25 are seated upon the seats 36. Then in order to lower the burner element 24 to its lowermost position, all that it is necessary to do is to raise the burner slightly, rotate it in a counter-clockwise direction and then lower it to its lowermost position. As clearly shown in Figure 5, the lower extremity of the slot 35 forms a seat 37 upon which the projections 25 rest when the burner is disposed in its lowermost position (as shown in Figure 3). Thus, it will be seen that the member 20 is a stationary support which through the guide slots 35 and the seats 36 and 37 serves to support the burner element 24 in a plurality of vertically spaced positions.

Adjacent its lower extremity the deep well compartment member 20 is provided with a plurality of stationary electrical contacts or terminals 38, 39 and 41. Electric current is supplied to these contacts by a source not shown in a conventional manner. Current is supplied from the contacts to the burner element 24 through three conductors 41, 42 and 43. One extremity of the conductors being connected to the stationary contacts 38, 39 and 40, and the other extremities of the conductors being connected to contacts 44, 45 and 46 on the under side of burner element 24. See Figure 8.

It will be understood from the description thus far that when the burner element is disposed in its lower position, as illustrated in Figures 3 and 4, it is adapted to supply heat in the characteristic manner of a deep well cooker; and that when the burner is disposed in its uppermost position, shown in Figure 5, it is adapted to supply heat in the characteristic manner of a surface burner. That is to say, by providing these alternative positions for the burner the cooking characteristics thereof may be changed. Thus, the present invention provides a dual purpose cooking element which can be at will used either as a deep well cooker burner or as a surface burner.

It will be recognized that provision must be made to prevent injuring the electrical conductors 41, 42 and 43 as a consequence of the raising and lowering of the burner element 24. To that end, a special form of wire is employed which has sufficient flexibility to permit the raising and lowering of the burner without breaking the wire, and which also has sufficient rigidity to cause the same disposition whenever the burner is disposed in its lowermost position and the same position each time the burner is disposed in its upper position. I have discovered that wire composed of commercially pure nickel has these characteristics. Therefore, it is contemplated that wire of such composition will be employed in practicing this invention, although any other wire having the characteristics described above and being a good conductor of electricity may be employed.

Having in mind the foregoing, the wire is initially bent to the shape shown in Figures 2 and 6, so that when the burner element 24 is in its lowermost position the conductors 41, 42 and 43 will be nested as shown in those figures. In order to make that possible it will, of course, be recognized that the internal circumference of the deep well cooking compartment 22 must be slightly

greater than the overall length of the conductors and likewise greater than the overall height of the deep well cooking compartment 20. When the burner element 24 is raised to its upper position and rotated so as to engage the seats 36 of Figure 5 or the seats 30 of Figure 3, the electrical conductors 41, 42 and 43 assume substantially the position shown in Figure 5, that is, a spiral extending from approximately the bottom of the compartment 20 to the top of the compartment 20.

In order to electrically insulate the wires forming a part of the conductors 41, 42 and 43, and to thermally insulate them from the burner element 24 without interfering with the flexibility thereof or the nesting arrangement previously described, the wires are covered by a series of small tubular sections herein referred to for lack of a better term as vertebrae. The details of one of the conductors is shown in Figure 9. By reference to that figure it will be seen that the nickel wire 47 is encased within a series of vertebrae 48 which are provided at their adjacent ends with cooperating ball and socket formations. The vertebrae 48 may be composed of any material which will have the characteristics described above and which is also resistant to deterioration as a result of food or liquids being spilled thereon. I have found that vertebrae composed of porcelain serve adequately in these respects.

As best shown in Figure 8, the bottom wall of the deep well compartment 20 is provided with a series of apertures 49 which serve to permit the circulation of air upwardly through the deep well cooker compartment 20 and to thereby provide convection currents around the cooking utensil (Figure 4) when the construction of the present invention is being used as a deep well cooker. The opening 49 also provides for drainage of waste products from the well 20—onto the drip pan conventionally disposed below the range top.

In order to confine the heat within the deep well cooking compartment, the side walls thereof are, as previously mentioned, disposed in spaced relation to the cylindrical sleeve 17, thus providing a dead air space between the two cylindrical members which affords adequate insulation to confine the heat and to permit the circulation of heated air around the utensil 32.

An extremely simple means is provided for raising and lowering the burner element 24 within the deep well cooking compartment 20 so as to dispose the burner in its alternative position. This means is illustrated in Figure 7. It consists of a curved handle element 50 having a hook 51 on its lower extremity which is adapted to engage the handle 28 pivotally secured upon the shaft 27 disposed in the central opening 26 of the burner element 24. Through the handle 50 the burner element 24 may be moved to its alternative positions by force applied from above the burner. Of course, when the burner is cold, it can be raised and lowered by hand without the necessity of using tool 50.

It will be understood from what has been said heretofore that to move the burner from its lowermost position shown in Figure 7 to its uppermost position shown in Figure 5, the handle 28 is engaged by the tool 50 and is then lifted vertically, the curvature of the guide slots or the springs 31, as the case may be, imparting a clockwise rotation which causes the projections 25 on the perimeter of the burner to be seated upon

the seats 36 of Figure 5 or the seats 30 of Figure 3. In order to lower the burner from its uppermost position shown in Figure 5 to the lowermost position shown in Figures 3, 4 and 7, the handle 28 is engaged by the tool 50; the burner is rotated in a counterclockwise direction; and is then lowered to its lowermost position.

The modified construction shown in Figure 10 is generally similar to that shown in Figure 5, differing therefrom in two important respects. First, the interior of the deep well compartment 20a is provided with a heat reflective surface such as polished metal, or the like. This eliminates the necessity of employing an enclosing sleeve similar to 17 of Figure 5, for the purpose of holding heat within the compartment. Second, provision is made for sealing the guide slots 35a against the escape of heat from within the compartment 20a. This is accomplished by securing a closure member 52 to the exterior of compartment 20a adjacent each of the slots 35a so as to enclose the slots without interfering with the movement of burner projections 35 in the slots 35a.

The construction shown in Fig. 11 is also generally similar to that shown in Figure 5, except for changes now to be described which adapt it for use independently of a range as a portable self-contained unit.

According to the modification of Figure 11, the deep well cooking compartment 20b is mounted upon and partially enclosed by an outer supporting shell or casing 53. Casing 53 is provided with an opening in its bottom adapted to receive a movable closure member 54 which serves as a drip pan to collect drip resulting from spillage in the deep well compartment 20b.

Preferably the outer shell 53 and the shell 20b defining the deep well compartment are permanently secured together with insulation 56 therebetween, as shown in Figure 11. Likewise, the removable closure member 54 is preferably formed of spaced apart inner and outer members with insulation 56 therebetween.

The burner 24 is supported within and by the deep well compartment 20b in exactly the same manner as the burner of Figure 5 is supported within the deep well compartment 20 of that figure.

The principal difference between the construction of Figure 11 and that of Figure 5, other than those mentioned above, is the provision of a plug 55 extending through the wall of the casing 53 and the compartment 20b to the inner end of which is permanently connected the electrical conductors through which current is supplied to the burner. Plug 55 is adapted to be connected in a conventional way to a cooperating female plug connection carried by a suitable source of electric current.

By the arrangement of parts described in connection with the construction of Figure 11 it will be understood that the construction there shown is self-contained and may be used as a portable unit independently of a range or other cooking appliance. It may be used either as a deep well cooker when the burner is in the position shown in Figure 11, or as a surface cooker when the burner is elevated to its uppermost position, as previously described in connection with Figure 5. When the construction of Figure 11 is used as a deep well cooker it is adapted to receive a deep well cooking utensil 32a similar to that shown at 32 in Figure 4.

From the foregoing description it will be ap-

parent that the present invention provides a novel and extremely simple and economical construction for quickly converting a deep well cooker burner into a surface burner and for again quickly reconverting the surface burner into a deep well cooker burner—which may be used either as a part of a range or independently as a self-contained unit.

The scope of the invention is indicated in the appended claims.

I claim:

1. In an electric cooking appliance, the combination with a deep well cooking compartment of a burner disposed therein for vertical movement relative thereto, a plurality of stationary electrical contacts adjacent the bottom of and within the compartment, a plurality of electrical conductors connecting the contacts to the burner, said conductors being disposed in an annularly nested position when the burner is in its lowermost position.

2. The combination defined in claim 1 wherein the length of said electrical conductors is less than the inner perimeter of the deep well cooking compartment wherein the conductors are nested without the opposite ends thereof overlapping.

3. The combination defined in claim 1 wherein the length of the inner perimeter of the deep well cooking compartment is greater than the distance between the extreme upper and lower positions of the burner within the compartment.

4. The combination defined in claim 1 wherein the electrical conductors are constructed to have sufficient rigidity to assume the same nesting position whenever the burner is disposed in its lowermost position.

5. The combination defined in claim 1 wherein the electrical conductors include a flexible covering of thermal and electrical insulation which is resistant to deterioration by contact with moisture or foodstuffs.

6. A cooking appliance comprising, in combination, a movable burner, a stationary burner support defining a vertical well and provided with vertically elongated guideways having an arcuate formation adjacent the upper extremities thereof terminating in seats disposed laterally of the vertical portion of the guideways, said burner having projections extending into said guideways and slidable therein, said burner projections being caused to engage said seats and support the burner thereon when an upward vertical force is applied to the burner.

7. A cooking appliance including combined receptacle and supporting means, said means having upper and lower vertically spaced burner supporting seats thereon, a guideway on said support connecting said seats, a burner vertically movable within said means, a guide on said burner movably engaging said guideway, and means adjacent the upper end of said guideway for deflecting said burner guide onto the upper burner seat when a vertically upward force is applied to the burner.

8. A cooking appliance comprising combined receptacle and supporting means, said means being provided with generally vertically extending guideways having arcuate formations adjacent the upper extremities thereof terminating in seats disposed laterally of the lower portions

of said guideways, a burner mounted for vertical movement relative to said support and having guides thereon movably engaging said guideways, said burner guides being caused to engage said seats and support the burner thereon when an upward vertical force is applied to the burner.

9. A cooking appliance as defined in claim 8 wherein there are three of said guideways which are equally spaced circumferentially from each other throughout their entire extents and which are disposed parallel to each other throughout a substantial portion of their extents.

10. A cooking appliance comprising combined receptacle and supporting means, said means including vertically spaced upper and lower burner seats, a burner vertically movable within said means, said burner and said support having cooperating guide means, said guide means being constructed and arranged in relation to each other and to said burner seats to cause the burner to engage its upper seat when a vertically upward force is applied to the burner.

11. A cooking appliance as defined in claim 10, wherein the upper surface of the burner is substantially flush with the top of said combined means when the burner is in its uppermost seated position.

12. A cooking appliance comprising combined receptacle and supporting means, said means having vertically spaced upper and lower burner seats thereon, a burner mounted for vertical movement relative to said support, said upper burner seat being constructed to prevent displacement of the burner therefrom by gravity, and means associated with the perimeter of the burner to cause the burner to engage said upper burner seat when a vertical upward force is applied to the burner.

13. A cooking appliance comprising combined receptacle and supporting means, said means being provided with at least three substantially equally spaced apart generally vertically extending guideways, a burner mounted for vertical movement relative to said combined means and having guides thereon movably engaging said guideways, the upper portion of each of said guideways being disposed laterally of the lower portion thereof and terminating at its upper end in an offset seat, an intermediate portion of each guideway adjacent said seat being cam-like, whereby when an upward vertical force is applied to the burner said burner is rotated thereby about its vertical axis and caused to engage said seat.

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