March 3, 1953 H. E. BREHM 2,630,518

COMBINED SURFACE AND DEEP WELL COOKER

Filed Feb. 15, 1949 2 SHEETS—SHEET 1

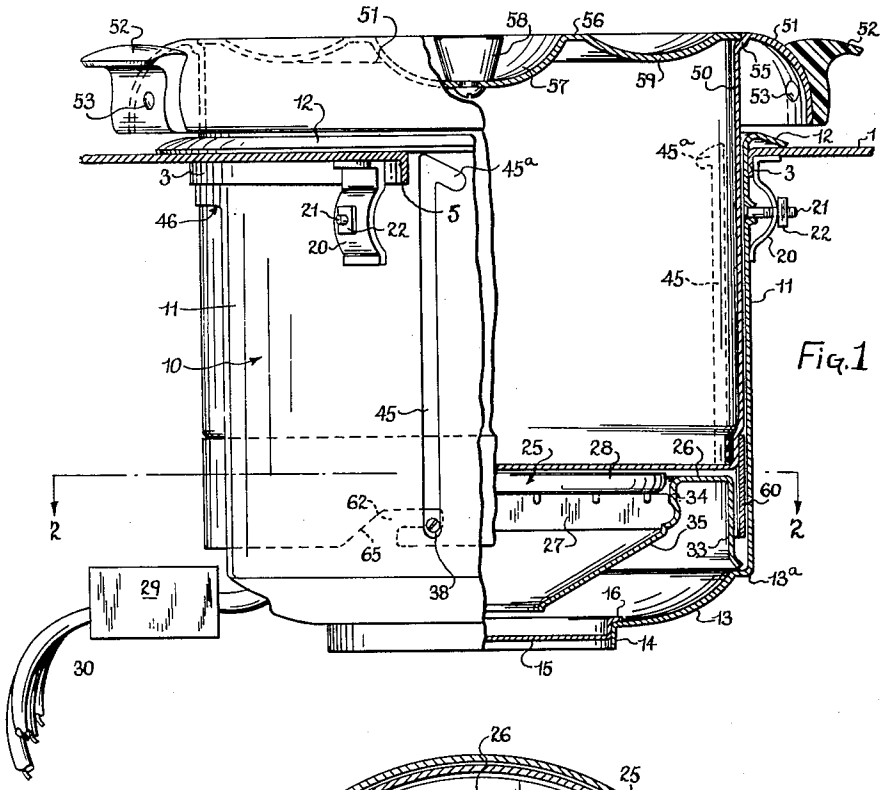


Fig. 1

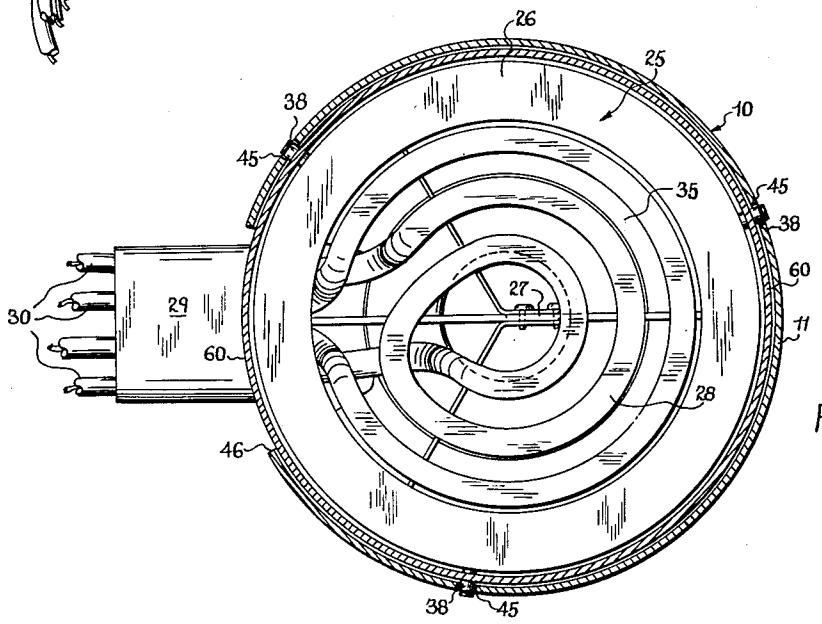


Fig. 2

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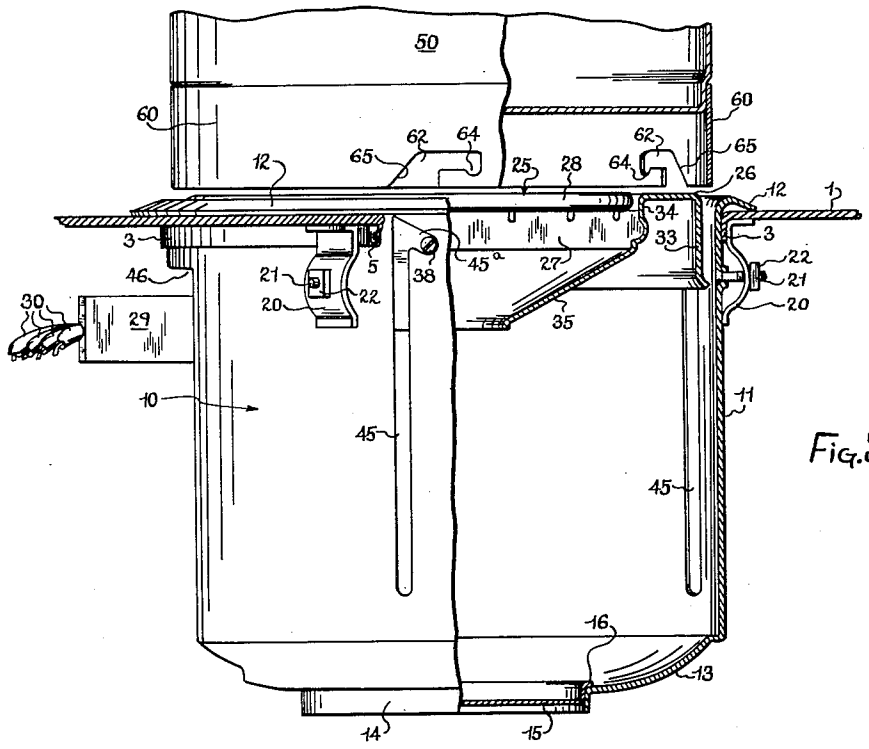


Fig.3

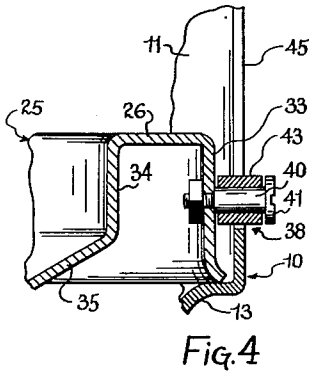


Fig.4

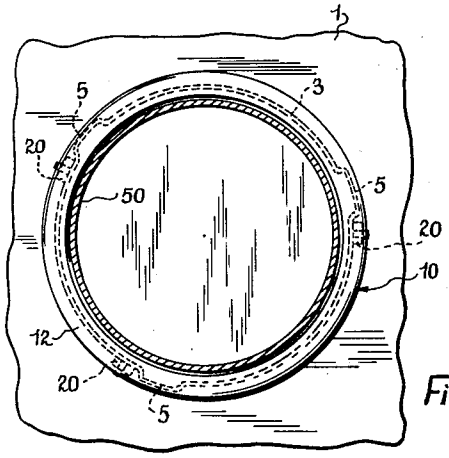


Fig.5

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UNITED STATES PATENT OFFICE

2,630,518

COMBINED SURFACE AND DEEP WELL COOKER

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Application February 15, 1949, Serial No. 76,455

8 Claims. (Cl. 219—37)

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This invention relates to electric cooking appliances, and resides in improvements in combined surface and deep well cookers for electric cooking stoves, ranges, and like apparatus.

Cookers of the kind referred to include a structure defining a well that opens through the top of the apparatus, an electric heating unit that is vertically movable within the well between a low position adjacent the bottom of the well and a high position in which the top surface of the unit is substantially in the horizontal plane of the top of the well, and a vessel that is adapted to occupy the well when the heating unit is in low position.

The fundamental aim of my invention is to improve the construction and operation of a combination of the foregoing character, particularly by providing therein a separable connection between the vessel and the heating unit so that, when it is desired to use the appliance as a deep well cooker, the vessel may be placed upon and conveniently connected to the heating unit and, by means of the vessel, the heating unit may be freed from its sustaining means adjacent the top of the well and lowered to its position at the bottom of the well with the vessel in effective heat exchange relation thereto. When it is desired to use the appliance as a surface cooker, the vessel is withdrawn from the well, and, in the act of withdrawing the vessel and disconnecting it from the heating unit, the latter is elevated to its high position and reengaged with the sustaining means adjacent the top of the well.

Another object of the invention is to provide a very simple, durable and reliable means for separably connecting the vessel to the unit, which is manipulated entirely through the medium of the vessel.

The invention, in its present preferred form, contemplates a connection between the vessel and heating unit that is rendered effective by rotation of the vessel in one direction relative to the unit, and is rendered ineffective by reverse rotation of the vessel; and a somewhat similar connection is contemplated between the heating unit and its sustaining means adjacent the top of the well. In operation, the first phase of the rotary movement of the vessel connects the vessel to the unit, and the second phase of such movement dislodges the unit from its sustaining means, preparatory to lowering the vessel and unit in the well. Reversely, when withdrawing the vessel from the well and assuming that the parts have attained their uppermost position, the first phase of the reverse rotary movement of the vessel lodges the unit upon its sustaining means,

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and the second phase disconnects the vessel from the unit. In reality, the two-phase movement is substantially continuous.

Therefore, it is a further object of the invention to provide an arrangement that will enhance the effectiveness of the connection between the vessel and heating unit from the moment the unit is removed from its sustaining means until it is reengaged therewith.

A still further object of the invention is to provide a conveniently removable drip pan or receptacle for the bottom of the well, and to incorporate in the heating unit a downwardly convergent wall which serves the dual purpose of directing any substance that may drop through the unit onto said drip pan, whether the unit is in high or low position, and of conserving and reflecting heat that is radiated downwardly from the heating element of the unit, thus increasing the efficiency of the cooker.

The above objects, with others hereinafter appearing, are attained in the construction of the invention illustrated in the accompanying drawings, and while I shall proceed to describe this construction in detail, it will be understood that the invention is susceptible to such changes and modifications as fall within the purview of the appended claims; and although the invention will be described in association with a stove top, this is to be understood as illustrative, and not as limiting.

In the drawings, Fig. 1 is a side elevational view, partly in central section, of my improved combined surface and deep well cooker, showing it disposed within an opening of a stove top, the heating unit being in low position with the cooking vessel occupying the well; Fig. 2 is a sectional plan on the line 2—2 of Fig. 1; Fig. 3 is a view, similar to Fig. 1, with the heating unit in high position and with the vessel shown, in part, thereabove in proper orientated position to be lowered upon the unit and turned for holding connection therewith; Fig. 4 is a fragmentary sectional detail of the heating unit and the adjacent portion of the well structure, showing one of the projections of the unit in operative relation to guiding and supporting means therefor, and Fig. 5 is a fragmentary plan view of the stove top, on a smaller scale than that to which the former views are drawn, showing certain details of the well structure.

Proceeding with a detailed description of the embodiment of the invention disclosed in the drawings, and using like reference characters to designate like parts in the different views,

denotes the stove top, or the equivalent part of any apparatus in which my improvements are incorporated, and the same is provided with a circular opening that is surrounded by a depending flange 3. For a purpose presently to appear, a plurality of bays 5 are formed by offset portions of the flange 3 and are spaced apart about the opening, three being shown, spaced equal distances apart.

10 designates generally a well structure which, in the present instance, is made up of a cylindrical wall 11, an outwardly and slightly downwardly extending top flange 12, and a convergent bottom wall 13 of annular formation with a depending flange 14 surrounding the central opening thereof. Occupying this opening is a shallow drip pan 15 having a top flange 16 that overlies the adjacent portion of the bottom wall 13 and thus serves to removably support the pan within the opening of the bottom wall.

The cylindrical wall 11 of the well structure 10 is only slightly less in diameter than the internal diameter of the flange 3 and said structure is lowered through the opening surrounded by said flange until the top flange 12 of said structure rests upon the surrounding portion of the stove top and, incidentally, conceals the bays 5. The well structure is secured in position within the opening of the stove top by clamps 20 that have their upper ends confined within the angle between the stove top and flange 3 and their lower ends bearing against the wall 11. The clamps are connected to the wall 11 by bolts 21 and are adapted to be drawn up tightly by nuts 22 that are threaded onto the outer ends of the bolts. As will be seen by reference to Fig. 5, the clamps 20 are located adjacent the bays 5, and in order to hold the well structure 10 against turning within the opening of the stove top, two of said clamps are arranged between adjacent bays 5 with each clamp contiguous to one of said bays.

25 denotes generally the heating unit which includes an annular sheet metal frame 26 that surrounds and supports a spider 27 which, in turn, supports an electric heating element 28 of common and well known character. The element is suitably attached to the spider 27 and its terminals have connection, within an insulating block 29, with electrical conductors 30. The portion of the frame 26 that surrounds the heating element 28 and spider 27, and to which the latter is connected, is of channel formation, being of inverted U-shape in radial cross section. The outer flange 33 of the frame is spaced a substantial distance from the peripheral wall 11 of the well structure 10 excepting adjacent its lower edge where it is flared outwardly into close proximity to said wall. The inner flange 34 of said frame joins at its lower end an inverted frusto-conical wall 35 which serves the two-fold purpose of conserving and reflecting heat that radiates downwardly from the heating element 28 and also diverts any substance falling thereon to the drip pan 15.

A plurality of projections 38 extend radially from the heating unit, there being three in the present instance, spaced equal distances apart about the unit. Each projection 38, as will be seen by reference to Fig. 4, consists of a stud 40 having a grooved head 41 at its outer end, and being reduced and threaded at its inner end and projected through an aperture in the outer flange 33 of the frame 26 and having applied thereto a nut 42. A roller 43 is mounted for free rotation upon the stud 40.

The heating unit 25 is vertically and, to a limited extent, rotatably movable in the well structure 10 and it is restricted to such movement by guideways or slots 45 in the peripheral wall 11 of the well structure and through which the projections 38 extend. When the heating unit is in low position, as in Fig. 1, the projections 38 are closely adjacent the bottom walls of the slots 45 and the outer flange 33 of the frame of the heating unit 25 rests on a horizontal shoulder 13a through which the bottom wall 13 joins the peripheral wall 11. When said unit is in its high position, wherein the top surface of the unit is substantially in the horizontal plane of the top of the well structure 10 (Fig. 3), the projections 38 are disposed upon rests that are formed by the walls which define the lowermost parts of laterally and downwardly inclined portions 45a of the slots or guideways 45. Throughout the whole range of movement of the heating unit, the insulating block 29 is accommodated by a relatively wide vertical slot 46 in the peripheral wall 11 of the well structure. The previously mentioned bays 5 provide clearance for the projections 38 when operating within the area of the flange 3.

50 designates a cooking vessel that is adapted to occupy the well when the heating unit is in low position, and its upper end is formed with an outwardly and downwardly extended flange 51 to which handles 52 of suitable material, such as plastic, are attached, as by fastening means or rivets 53. At the junction of the flange 51 with the peripheral wall of the vessel 50 there is a depressed seat 55 that receives the edge of a cover 56 having a central depression 57 within which is disposed a knob 58 that is suitably attached to the cover. An annular depression 59 is formed in the cover intermediate the central depression 57 and the edge of the cover. By reason of the formation shown, the cover is relatively stiff, and no part thereof, including the knob 58, projects above the top plane of the vessel so that cooking utensils or other objects may be placed upon the vessel if such should be desirable or convenient during use of the stove or apparatus.

A band 60, that is of substantially the same external diameter as the peripheral wall of the vessel 50, has its upper end overlapped and suitably fastened to a portion of said wall of reduced diameter adjacent the bottom of the vessel, the band extending beyond said bottom a distance approximating the depth of the flange 33 of the frame 26. A plurality of bayonet slots 62 are formed in the band 60 and open through the bottom edge thereof and said slots correspond in number and spacing with the projections 38 of the heating unit. The closed ends of the slots 62 are formed with depressed seats 64, and the walls 65 that define the opposite or entrance ends of the slots are gradually inclined upwardly in the direction of said closed ends.

As will more fully appear hereinafter, the separable connection between the vessel and heating unit is effected through cooperation of the underslot portions of the band 60 with the projections 38 of the unit. While this is the presently preferred manner of detachably connecting the vessel to the unit, and of establishing operative connection between them, other arrangements may be adopted through change or modification without departing from the spirit of the invention so long as they fall within the scope of the appended claims.

Pursuant to common practice, the electrical heating element 28 of the unit 25 may be of the multiple heat variety in that current may be sup-

plied to all, or less than all, of the element at any one time, the supply of current to the element, through the conductors 30, being controlled by the usual switch (not shown). Also, it is obvious that space is provided in the apparatus for self adjustment of the electrical conductors 30 to the movements of the heating unit.

In describing the manner in which the invention is used, it will be assumed that at the start the heating element is in high position, as illustrated in Fig. 3. In this position it may be employed as a surface cooker, and standard kettles, pots and other utensils may be placed directly thereon.

When it is desired to use the invention as a deep well cooker, the special vessel 50 is placed upon the heating unit with the band 60 projected downwardly into the space between the outer cylindrical flange 33 of the frame 26 and the adjacent portion of the peripheral wall 11 of the deep well structure. When so applying the vessel to the heating unit, the open ends of the slots 62 are arranged in vertical alignment with the projections 38 of the unit so that said projections will enter the slots when the vessel is lowered. In case the inclined walls 65 of the slots engage the projections, a camming action will result that will tend to rotate the vessel in a direction to cause the projections to approach the horizontal portions of the slots 62. The operator now rotates the vessel in a clockwise direction according to the present arrangement of the slots until the wall defining the closed ends of the slots engage the projections 38, whereupon the operator will lift the vessel and cause the projections to engage the depressed seats 64. Continued rotative and vertical movement of the vessel will dislodge the projections from the rests defined by the closed ends of the laterally and downwardly inclined portions 45a of the guideways or slots 45, and during this action the projections will be held in the depressed seats 64 by the pressure resulting from their contact with the upper walls of said inclined portion 45a. When the projections leave said inclined portions and assume a position at the top of the vertical parts of the guideways or slots, both rotative and upward movement of the vessel will be arrested, thus indicating to the operator that the vessel may now be lowered into the well. The downward movement of the vessel and unit is stopped when the flange 33 of the unit engages and rests upon the shoulder 13a. So long as the vessel remains in the well a connection is maintained between it and the heating unit. However, although there is seldom occasion for doing so, the vessel may, if desired, be disengaged from the projections 38 and lifted from the well independently of any movement of the heating unit.

In returning the heating unit to its high position (assuming that the vessel is still attached thereto), the vessel is lifted by means of the handles 52 until the projections 38 engage the upper ends of the vertical portions of the guideways or slots 45, this occurrence indicating to the operator that it is time to rotate the vessel in the reverse direction from that previously described. During this reverse rotation of the vessel the projections 38 are held against the depressed seats 64 by engagement of the projections with the top walls of the inclined portions 45a of the guideways or slots, thus insuring against accidental disconnection of the heating unit from the vessel, and this condition continues until the projections come to rest within the closed ends of said inclined portions 45a. Further rotation of the vessel in a counterclockwise direction automatically disconnects it from the heating unit, as will be readily understood, leaving the unit supported in high position and permitting the vessel to be carried away.

Having thus described my invention, what I claim is:

1. In a combined surface and deep well cooker of the kind comprising a structure defining an open top well, a heating unit that is movable between a low position adjacent the bottom of the well and a high position at the top thereof, and sustaining means permanently incorporated in said structure for supporting the unit in high position; a vessel capable of use with the heating unit when the latter is in either of said positions means on the vessel and on the unit, respectively, that cooperate to separably connect the vessel and unit together so that the vessel may be removed from the unit, or, through the medium of the vessel, the unit may be alternately disengaged from said sustaining means and lowered into the well, and lifted to high position and reengaged with said sustaining means.

2. In a combined surface and deep well cooker of the kind comprising a structure defining an open top well incorporating guiding means, a heating unit having parts cooperating with said guiding means and movable between a low position adjacent the bottom of the well and a high position at the top thereof, sustaining means permanently incorporated in said structure for supporting the unit in high position, and a vessel usable with the heating unit when the latter is in high position and adapted to occupy the well in operative relation to said unit when the unit is in low position; means on the vessel for separably connecting it to the unit so that the vessel may be removed from the unit, or, through the medium of the vessel, the unit may be alternately disengaged from said sustaining means and lowered into the well, and lifted to high position and reengaged with said sustaining means, the aforesaid parts of the unit coacting with parts of said guiding means in such manner as to enhance the connection between the vessel and unit.

3. In a combined surface and deep well cooker of the kind comprising a structure defining an open top well, a heating unit movable within the well between a low position adjacent the bottom thereof and a high position at the top of the well, projections extending outwardly from the peripheral portion of said unit, said structure including guideways traversed by said projections during movement of the unit, and a vessel adapted to occupy the well when the unit is in low position, said guideways being characterized by laterally and downwardly inclined portions at the top thereof, the terminals of said inclined portions providing rests for the aforesaid projections when the unit is in high position, and means on the vessel for cooperation with said projections to separably connect the vessel and unit together whereby the vessel may be removed from the unit, or, through the medium of the vessel when connected to the unit, the unit may be alternately rotated in one direction to remove said projections from said inclined portions of the guideways and lowered to low position, and lifted and reversely turned to dispose said projections within the terminals of said inclined portions of the guideways.

4. In a combined surface and deep well cooker

of the kind comprising a structure defining an open top well, a heating unit movable within the well between a low position adjacent the bottom thereof and a high position at the top of the well, projections extending outwardly from the peripheral portion of the heating unit, the structure including guideways within which the projections travel during movement of the unit, and a vessel adapted to occupy the well when the unit is in low position; said guideways being characterized by laterally and downwardly inclined portions at their upper ends, the terminals of said inclined portions constituting rests for said projections, means extending below the bottom of the vessel substantially in line with the peripheral wall thereof and having bayonet slots that open through the bottom of said means and thence extend circumferentially of the vessel in a corresponding direction to that of the laterally and downwardly inclined portions of the guideways, said bayonet slots being arranged to receive said projections so that, after application of said means to the projections, the vessel may be rotated in a given direction through one phase to cause the projections to be disposed at the closed ends of said bayonet slots and through a further phase to remove the projections from the inclined portions of the guideways thereby to permit the vessel to be lowered into the well and dispose the heating unit in low position, and so that, through the medium of the vessel, the heating unit may be subsequently lifted and reversely rotated through one phase to move the projections into and along the inclined portions of the guideways to the beforementioned rests and through a further phase to disengage the aforesaid means on the vessel from said projections.

5. The combination defined by claim 4, wherein the closed ends of the bayonet slots are extended downwardly to provide depressed seats for said projections, engagement of the projections with the top walls of the inclined portions of the guideways tending to maintain the projections in said seats.

6. In a combined surface and deep well cooker of the kind comprising a cylindrical wall defining an open top well, a heating unit movable within the well between a low position adjacent the bottom thereof and a high position adjacent the top of the well, said wall being provided with substantially vertical guideways, and a vessel adapted to occupy the well when the unit is in low position; said heating unit including a frame having a substantially cylindrical outer surface flared adjacent its lower end into close proximity to the aforesaid cylindrical wall, projections secured to and extending radially from said frame for cooperation with the aforesaid guideways, and a band surrounding the lower end of the vessel and extending a substantial distance beyond the bottom thereof and of a diameter slightly greater than that of the frame so that when the vessel is applied to the heating unit, said band will occupy the space between said cylindrical surface of the frame and said cylindrical wall, the band having bayonet slots opening through the lower edge thereof for the reception of said projections.

7. In a cooking appliance having a top wall provided with a circular opening and with a depending cylindrical flange about said opening and formed with bays spaced apart circumferentially of the flange, a combined surface and deep well cooker including a cylindrical wall defining the well and having a top flange extending outwardly from the upper end thereof, the wall being projected downwardly through said opening and said top flange overlying the surrounding portion of the top of the appliance and concealing said bays, clamps attached to the outer side of said peripheral wall and bearing at their upper ends within the angle between the top of the appliance and said cylindrical flange, two of said clamps being arranged between adjacent bays, one contiguous to each bay to thereby hold the peripheral wall against turning, said peripheral wall having vertical slots provided with laterally and downwardly inclined branches at their upper ends within the areas of the bays, a heating unit within the well, and projections extending radially therefrom through the slots of the peripheral wall, said unit being movable between a low position wherein said projections repose within the bottoms of the slots and a high position wherein said projections occupy the closed ends of the branches of the slots.

8. In a combined surface and deep well cooker of the kind comprising a cylindrical wall defining an open top well, a heating unit movable within the well between a low position adjacent the bottom thereof and a high position adjacent the top of the well, said wall being provided with substantially vertical guideways, and a vessel adapted to occupy the well when the unit is in low position; said heating unit having a substantially cylindrical peripheral surface that is materially less in diameter than the interior of the aforesaid cylindrical wall, means on the heating unit below said peripheral surface for contact with said wall to position the unit with said surface in spaced substantially concentric relation to the wall, projections extending radially from the heating unit for cooperation with the aforesaid guideways, and a band attached to the lower end of the vessel and extending a substantial distance below the bottom of the vessel and of a diameter slightly greater than that of the aforesaid peripheral surface of the heating unit so that when the vessel is applied to said unit the band will occupy the space between said peripheral surface and said cylindrical wall, the band having bayonet slots opening through the lower edge thereof for the reception of said projections.

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