

March 6, 1928.

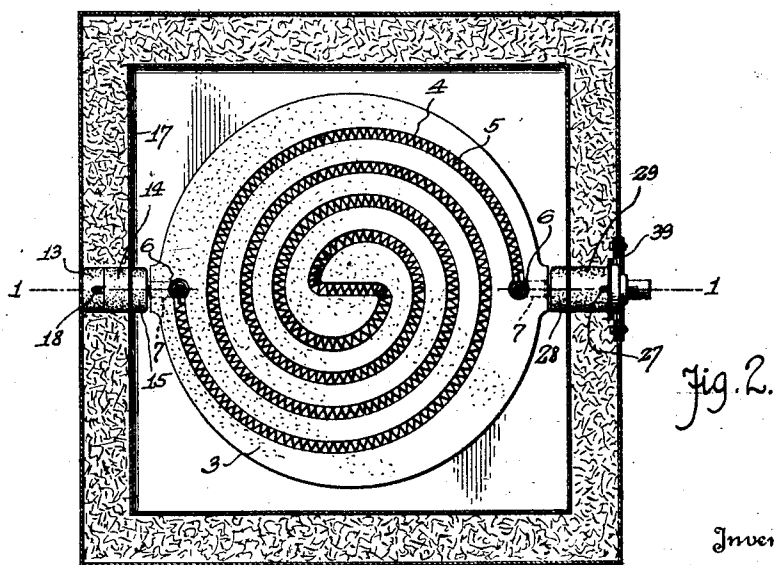
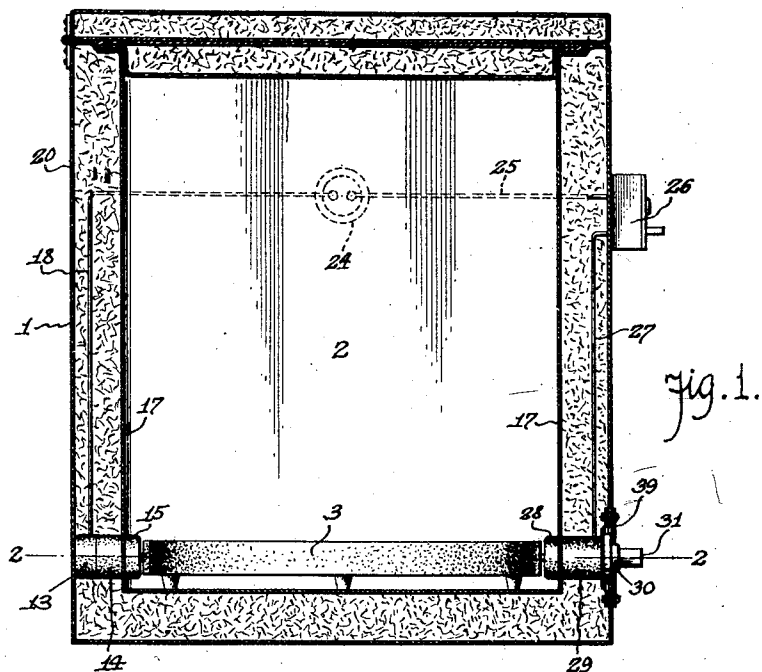
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1,661,464

HEATING ELEMENT SUPPORT

Filed Aug. 13, 1923

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

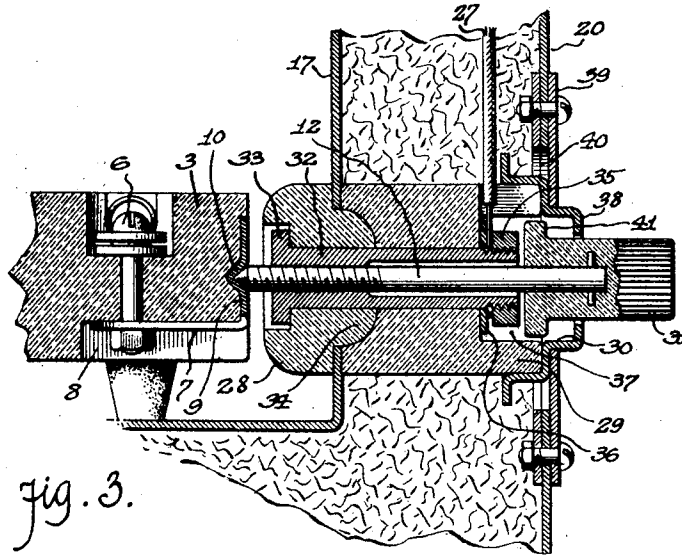


Fig. 3.

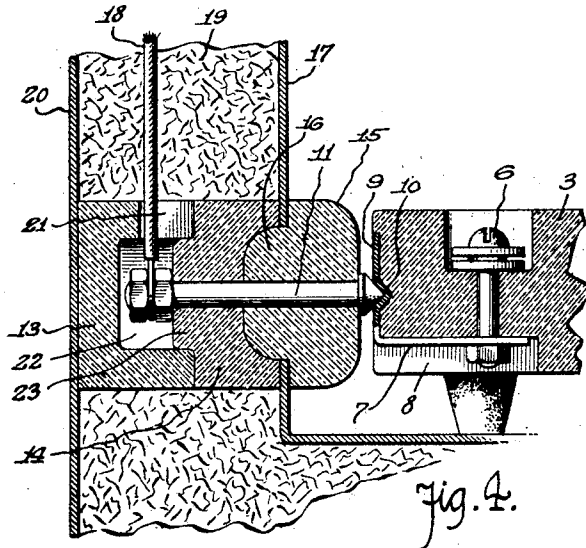


Fig. 4.

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HEATING-ELEMENT SUPPORT.

Application filed August 13, 1923. Serial No. 656,994.

This invention relates to a detachable holder or mounting for electrical heating elements and more particularly to a holder and contact device for the heating elements of electrically heated fireless cookers. An object of the invention is to provide means for securely positioning and holding an electrically heated element within a closed receptacle so that it may be quickly and readily detached and removed for the purpose of cleaning or repair.

A further object is to provide efficiently insulated terminals for an electrical heating element which are constructed so as to insure a proper electrical connection and so arranged as to guard against accidental short circuiting or fouling of the terminals.

A further object is to provide a holding device for electrically heated elements of fireless cookers and the like which are located within the bottom of a closed chamber and to so construct such holding device that it may be readily manipulated from the exterior of the chamber for the purpose of releasing the heating unit that it may be readily detached and removed. It is also an object to construct a holding device for the purpose, which holding device embodies electric terminals or contacts for the heating element or unit and which devices and terminals are so arranged as to insure proper electrical connection and which terminals are operable from the exterior of the receptacle to insure such electrical connection, all arranged in a manner to provide proper insulation and prevent short circuiting by water of condensation and injury to the operator through contact with electrically charged exposed parts.

The invention further consists in the several advantages of the construction and arrangement, all as hereinafter more fully set forth.

With the above and other ends in view the invention consists in the matters hereinafter set forth and more particularly pointed out in the appended claims, reference being had to the accompanying drawings, in which

Figure 1 is a central vertical section substantially upon the line 1—1 of Fig. 2, through a fireless cooker showing a heating element or unit in elevation therein and held in place by means illustrative of the invention;

Fig. 2 is a horizontal section substantially upon the line 2—2 of Fig. 1;

Fig. 3 is an enlarged sectional detail of the front end portion of a holding device illustrative of the invention showing the device in operative position within the wall of the cooker and in operative relation to a portion of a heating unit, and

Fig. 4 is a sectional view similar to Fig. 3 showing the rear end portion of the holding device.

In the construction of electrical heating devices it is desirable that the heating element be detachably held in place and that such holding device embody contacts for making the electrical connection between the element and the leading-in wire, and this is particularly true in the construction of fireless cookers and the like where the heating element or unit is placed in the bottom of a chamber and is therefore not readily accessible for its removal.

While the present invention may be applicable to other uses than in connection with a fireless cooker, yet it is particularly applicable to such use, and is shown as embodied in such construction.

In the accompanying drawings, 1 indicates a suitable receptacle which may take the form as shown, of a fireless cooker provided with double walls with the space between the walls filled with a suitable insulating material. 2 indicates the chamber or space within the box or receptacle and in the bottom of which an electrically heated heating unit 3 is positioned. This heater 3 may be constructed in any suitable manner but as shown, it comprises a cast body of suitable insulating material formed with a spiral groove 4 in the upper face thereof within which groove a coiled wire 5 of high resistance metal is laid, said coil forming the heating element which is heated by the passage of current therethrough. The ends of this coil are electrically connected to terminal posts 6 embedded within the body and terminal plates 7 are connected to these posts within grooves or recesses 8 in the lower side of the body, the outer ends of these plates being upturned and embedded within the outer face of the body as shown at 9. A depression or notch 10 is formed in the upturned end portion 9 of each terminal plate and into these notches the pointed ends of terminal rods 11 and 12 are engaged when

the heater is in place within the chamber. The terminal rod 11 is carried by a suitable insulating member preferably formed of porcelain and comprising inner parts 13 and 14 which are located between the inner and outer walls of the double walled receptacle. The insulator also includes an inner end member 15 which projects into the chamber 2 and has an end projection 16 to engage a correspondingly shaped recess in the adjacent end of the member 14, said projection 16 fitting within and extending through an opening in the inner wall 17 of the receptacle. A leading-in wire 18 is embedded within the insulating material 19 between the inner wall 17 and the outer wall 20 and this wire extends through a notch 21 in the member 13 into a recess 22 in said member where it is secured in any suitable manner to the outer end of the terminal rod 11. The member 14 of the insulator is formed with an axial boss 23 which fits into the open end of the chamber 22, this intermediate member 14 and the inner member 15 being formed with an axial bore to receive the terminal rod. The three members or parts comprising the insulator are therefore interlocked and by such interlocking are held in alinement and the end member 15 is held in position by being secured to the intermediate member 14 by the rod 11 with the inner wall 17 firmly clamped between the parts 14 and 15 to hold the insulator firmly in position upon the wall and within the space between the inner and outer walls. A firm and rigid terminal is thus provided for the leading-in wire which terminal is thoroughly insulated from the metal walls of the receptacle and with only the pointed end of the terminal rod projecting through the end face of the insulator. The body of the heater 3 may therefore be rigidly held and a good electrical connection made by the engagement of this pointed end of the terminal rod with the notch in the terminal plate carried by the body of the heater. Only the pointed end of the rod is exposed and fits within a very narrow space between the end of the insulator and the body of the heater so that the liability of short circuiting the current is obviated and the fouling of the electrical connection by dirt or particles getting in between the terminal plate and the terminal rod is prevented.

From the terminal rod 11 the wire 18 leads through the insulation 19 of the container between its walls 17 and 20 to a suitable plug or socket 24 indicated in dotted lines in Fig. 1 for the connection thereto of wires leading from the usual house wiring or other source of electric current, and from this socket a second wire 25 leads to a suitable automatic cut-out switch mounted in a suitable casing 26 on the front wall of the container, said automatic switch being of any suitable form and construction and if found desirable may also embody a suitable electrical connection for the current supply wires which connection would obviate the necessity for the socket 24. From the switch 26 a leading-in wire 27 extends to an insulating member mounted in the front wall of the container and embodying the terminal rod 12. This insulator comprises an inner end member 28, an intermediate member 29, a cap 30 and a handle 31 connected to the outer end of the rod 12 by means of which this rod may be turned. The members 28 and 29 are formed with an axial bore to receive a sleeve 32 having a head 33 at its inner end and being internally screw-threaded throughout a portion of its length to receive the screwthreaded inner end portion of the rod 12. The inner end or head 28 of the insulator is formed with a recess to receive the head 33 of the rod and is also provided with an end projection 34 to extend through an opening in the inner wall 17 of the casing and fit within a correspondingly formed socket or recess in the inner end of the member 29. The outer end of the sleeve 32 is screwthreaded to receive a nut 35 and the leading-in wire 27 is electrically connected to the sleeve by being clamped by the nut against a washer 36 interposed between the nut and an end wall of a recess 37 in the outer end of the member 29. The nut and washer are therefore enclosed within the recessed outer end of the member 29 and by turning up the nut on the sleeve the parts 28 and 29 of the insulator are secured together with the boss or projection 34 of the part 28 engaged in the opening of the wall 17 to hold the insulator firmly in place and also projecting into the socket or recess in the end of the member 29 to hold the two members of the insulator in alinement and rigidly secured in place. The cap 30 fits closely over the outer end of the member 29 and closes the outer end of the chamber or recess 38 therein and this cap has a tubular extension 38 which projects through an opening in a cover plate 39 which forms a closure for an opening 40 in the outer wall 20 of the receptacle. The handle 31 which is rigidly secured in any suitable manner to the outer end of the rod 12, is formed of suitable insulating material and projects through an axial opening in the extension 38 of the cap. Upon the inner end of the handle 31 a flange 41 is formed to limit the outward movement of the handle within the cap and prevent the complete withdrawal of the rod 12 and handle through the opening in the front wall of the casing. Ready access may, however, be had to the insulator and connections by removing the cover plate 39, when the cap may be removed through the opening 40

in the casing wall and the other parts adjusted or taken out through said opening.

The inner end of the terminal rod 12 is pointed to engage a notch or depression in a terminal plate on the heating unit 2, which plate is of the same form and construction as the terminal plate 9 and is mounted in a like manner upon the body of the heating unit.

When it is desired to remove the heating unit 3 from the chamber 2, it is only necessary to turn the handle 31 which projects through the front wall of the receptacle, thus retracting the terminal rod 12 from engagement with the heating unit, when said unit may be lifted out. In replacing the heating unit it is only necessary to set the unit upon the bottom of the chamber and then turn the handle 31 to screw the terminal rod 12 inwardly into engagement with the unit which will thus be forced into engagement with the terminal rod 11 at the opposite side, when the unit will be securely held by the engagement of the pointed ends of the terminal rods with the terminal plates mounted on the unit. Proper electrical connection with the unit is insured by the engagement of the pointed ends of the terminal rods with the terminal plates and good contact is insured as the rod 12 may be screwed inward until such contact is obtained. The construction of the insulator insures against short circuits and also provides for its ready installation or removal and for access to the terminal connection and the terminal rod.

As usually constructed and applied to fireless cookers, the heating unit is held in place within the chamber of the cooker by means located within the chamber and therefore in order to operate such connection and release the unit, it is necessary to operate the connection from within the chamber and as the unit is located at the bottom of the chamber, it is often unhandy and difficult to make the proper electrical connection. With the present construction the holding means which also forms the electrical connection with the heating element, extends through the wall of the casing so that it may be operated from outside of the casing where it is handy to get at and where its operation is made positive and certain.

Changes in the size, proportion, and arrangement of parts are contemplated and all changes or modifications which fall within the scope of the appended claims may be made without departing from the spirit of the invention.

Having thus fully described my invention, what I claim is:—

1. The combination with a receptacle, an electrical heating unit in said receptacle, insulators mounted in opposite side walls of the receptacle, electrical terminal members

mounted within said insulators to engage and make electrical connection with the heating unit, one of said terminal members being adjustable into and out of engagement with the heating unit to detachably clamp said heating unit between said terminals and to make and break electrical connection therewith, said adjustable terminal being extended through the wall of the receptacle in which it is mounted and being adjustable from outside of the receptacle.

2. The combination with a double walled receptacle and an electrical heating unit in said receptacle, of insulators mounted upon the walls of the receptacle at opposite sides of the heating unit, terminals carried by said insulators to engage the heating unit and make electrical connection therewith, leading-in wires between the inside and outside walls of the double walled receptacle and connected to said terminals, said insulators being formed with chambers to receive the ends of the wires and within which chambers said wires are connected to said terminals, and means upon the outer end of one of said terminals and extending through the outer wall of the casing for operating said terminal from the exterior of the casing to move it into and out of engagement with the heating unit.

3. The combination with a receptacle and an electrical heating unit in said receptacle comprising a body of insulating material and a heating element carried by said body and having terminals at opposite sides of the body; of an insulator mounted upon a wall of the receptacle and supporting a terminal to engage one of the terminals on the heating unit, an insulator mounted in the wall of the receptacle, at the opposite side of the heating unit, a terminal rod carried by said last mentioned insulator and adjustable longitudinally therein into engagement with the terminal of the unit, and an insulating handle on the outer end of said terminal rod, said handle extending through the wall of the container and operable from the exterior thereof to adjust the terminal rod into and out of engagement with the heater unit to release the unit and permit its removal from the container.

4. The combination with a receptacle having parallel walls and insulating material between said walls and an electrical heating unit within the receptacle and comprising a body of insulating material with the heating element carried by the body having terminals at opposite sides of the body; of insulators mounted upon opposite walls of the receptacle and extending through the inner wall of the double walls of the receptacle, said insulators each comprising a plurality of parts having interlocking portions, terminal rods in said insulators and holding the parts of the insulators in interlocked relation, the

inner ends of said rods projecting through the inner ends of the insulators to engage and make electrical connection with the heating unit, one of said rods being adjustable longitudinally into and out of engagement with the heating unit to detachably secure the unit in place within the receptacle.

5. The combination with a double walled receptacle and an electrical heating unit in the receptacle; of a terminal carried by one wall of the receptacle at one side of the unit to engage the unit and form electrical connection therewith, an insulator mounted in openings in the inner and outer walls of the double walled receptacle at the side of the heating unit opposite that engaged by said terminal, a sleeve mounted in an axial bore of the insulator and provided with an internal screw thread, a terminal rod screw-

threaded to engage the screw thread of the sleeve and extend therethrough to engage the heating unit at its inner end, and an insulating handle on the outer end of the terminal rod extending through the opening in the outer wall of the receptacle and operable from the exterior of the receptacle to turn the rod and move the same into and out of engagement with the heating unit.

6. A device as characterized in claim 5, and including a cap on the outer end of the insulator which cap has an axial opening through which said handle extends, and a closure plate detachably secured to the outer wall of the receptacle over the opening therein.

In testimony whereof I affix my signature.

WILLIAM CAMPBELL.