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(54) ELECTRIC COOKING UTENSIL HAVING A REMOVABLE CERAMIC VESSEL

(71) We, RIVAL MANUFACTURING COMPANY, a corporation organized and existing under the laws of the State of Missouri, United States of America, of 36th and Bennington Streets, Kansas City, Missouri 64129, United States of America,

do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:—

Electric cooking utensils having heater wire wrapped about the outside of a vessel for the heating of foodstuffs contained therein are well known in the art. However, these devices are subject to various deficiencies.

If the ceramic utensil were to break it is possible that the user thereof could sustain serious electrical shocks if the foodstuff were to contact the "hot" electrical wiring. It is possible that even a small unseen crack in the porcelain or earthenware container may allow enough seepage of liquid foodstuffs to creat a dangerous electrical shock hazard.

Accordingly, it is a primary object of the present invention of eliminate or reduce the potential electrical shock hazard in an electric cooking utensile which normally results when the earthenware vessel breaks. The heater wires are encased in a separate metallic wall which is separate from the earthenware vessel. The metallic wall is electrically insulated, and if the vessel were to break or develop a small unseen crack, resultant liquid seepage would not result in a shock hazard. In fact, with the present invention, the liquid is precluded from entirely contacting the heater wires.

According to the invention, therefore, there is provided an electric cooking utensil including a vessel composed of ceramic or earthenware material, a metallic container receiving said vessel in its interior, the container being substantially separated from said vessel by an air chamber located therebetween, at least one electric heating element operable to supply heat to the utensil contents, said heating element being located adjacent the circumferential exterior surface of said metallic container, means securing and attaching said heating element in an electrically insulating manner to the exterior surface of said metallic container, and means for applying electric current to said electric heating element thereby effecting the heating of said heating element.

In the prior art, thermally induced expansions and contractions of the heater wires will promote the susceptibility of the earthenware vessel to cracking or deterioration, because of the physical contact of the wire, Also, since the wire is glued or otherwise fixedly attached to the earthenware vessel, expansions of contractions of the wire itself may ultimately result in a deterioration of the heater circuit as the wire consequently may break or become loose.

In a preferred embodiment of the present invention the preceding difficulties are avoided through the utilization of a particular heater wire attaching means. As mentioned previously, the heater wires are not wound around the earthenware vessel, so that the vessel itself will not be subject to the strains of expansions or contractions thereof.

The wires are encapsulated by glass fiber insulation and are held in place about the outer surface of the separate metallic wall within the grooves in an independent mounting unit. A spring connects the ends of the heater wire mounting unit so as to compensate for expansions and contractions. Varying spring tension thus ensures that the wires will adjustably be held within the circumferential grooves of the mounting unit.

Since no wires are attached to the earthenware vessel, removability is allowed and washing may thus be accomplished by

completely immersing the earthenware vessel in water. The vessel itself is completely waterproof since it is glazed on both sides. Prior art devices are not immersible in water because damage to the electrical circuitry would be likely to occur, and cleaning of the cooking surfaces thus becomes difficult.

If the cooking vessel should break no damage will occur to the heater, and the user may simply insert a replacement vessel. In prior art devices however, breakage of the earthenware vessel will necessitate expensive and time consuming factory repair. This is avoided by the aforementioned construction.

In prior art device having the heater wires attached directly to the exterior surface of the cooking vessel "hot spots" will develop along the heater wire region. Food contacting these areas may be burned under certain conditions. In the present invention the heater wires are attached to a separate metallic wall. Between the other side of this metallic wall and the outer surface of the earthenware cooking vessel is an air pocket, which facilitates the uniform distribution of heat to the vessel. The vessel is thus uniformly heated and hot spots which may operate to burn the contents thereof are avoided.

The utilization of the aforementioned construction in which an air pocket operates to uniformly distribute heat is particularly suited to slow cooking applications. Slow cooking operations are particularly vulnerable to burning from "hot spots", which, as mentioned, are eliminated in the subject design.

Other and further objects of the invention will appear in the course of the following description.

In the accompanying drawings which form a part of the specification and are to be read in conjunction therewith, and in which like reference numerals are employed to indicate like parts in the various views;

FIG. 1 is an exploded view of the utensil showing the lid, the earthenware vessel, and the enclosure means;

FIG. 2 is a sectional and fragmentary view of the cooking utensil; and

FIG. 3 is a schematic diagram of the electrical wiring utilized by the present device.

In FIG. 1, numeral 10 depicts a glazed earthenware cooking vessel that removably fits within the metallic shell structure 11 and which has a lid 13 removably located thereon. The outer edge 14 of the lid will engage circumferential inner surfaces 15 of lip structure 16 in vessel 10, thereby locating the lid. A bowl shaped metallic inner container 19 is positioned within the shell 11 with its upper circumferential edge 17 contacting the outside circumferential edge 18 on the underside of lip 16 on vessel 10. In this manner vessel 10 is located and retained within the metallic shell 11. It is significant to note that the only physical connection between the vessel 10 and the shell 11 occurs at the interface of edges 17 and 18 and that elsewhere an inner air chamber 21 (FIG. 2) separates container 19 from the earthenware vessel.

As seen in FIG. 2, inner container 19 has an upper portion 23 that is crimped around the top of shell wall 25 to hold container 19 in place. Bolt 27 depends from the bottom of the inner container 19 and serves to further retain same by its connection to shell bottom 28. Pin 29 extends from the bottom of container 19 through wall 28 to thereby prevent container 19 from rotating with respect to shell 11. Bolt 27 also has solderless connector 30 mounted therethrough which facilitates the grounding of metallic container 19 and the metal shell walls 28 and 25 to further significantly reduce electrical shock hazards. Finally, feet F support the entire unit in the usual manner.

Electric current enters the device through cable 31, and is delivered via switch 32 to one or both of the heater wires, which are generally indicated at 36*a* and 36*b*. The rotary knob 34 actually facilitates the switching operation as indicated in FIG. 3. The heater wires comprise electrically resistive conductors 37*a* and 37*b* which are encapsulated by vinyl or silicone insulation 38*a* and 38*b*. The heater wires are located exteriorly of the substantially vertical wall of container 19 within grooves 41 which form a portion of the generally cylindrical heater wire mounting unit 40. This heater wire mounting unit serves to compressively retain and locate the wires against the side wall of the container 19.

It is to be noted that the disclosed construction is facilitated by the utilization of suitably insulated heater wire such as that which is commercially available from Springfield Wire, Inc., of Springfield, Massachusetts, and which is described in a Sale Bulletin entitled "Springfield Wire", and printed in the U.S.A. in October, 1969.

Heater wire mounting unit 40 does not extend completely around the circumference of container 19. A spring 42 extends through the gap 43 between the ends of the mounting unit and holds same in place by the exertion of pressure. Also, the lower edge of unit 40 rests upon pins 40*a* which extend horizontally from container 19. This construction enables the mounting unit to compensate for thermally induced expansion of the heater wires and container 19 since the spring 42 will expand when necessary and at the same time maintain

sufficient pressure on the mounting unit to ensure appropriate heater wire position. If the heater wires were simply glued to the surface of wall 19, for example, thermal expansion would destroy the glued interface, ultimately causing the heater wires to detach and fall toward the inner bottom of the cooking utensil.

In operation, heat generated by the heater wires is conducted by adjacent wall 19 into the inner chamber 21. This causes a mass of hot air of substantially uniform temperature to contact the surface 12 of the earthenware vessel 10, and heat is conducted therethrough to accomplish the cooking of foodstuffs within the vessel.

It is to be noted that the utilization of the air pocket virtually eliminates the "hot spots" which are characteristic of devices having heater wires attached directly to the cooking vessel. Since the construction as shown lessens the likelihood of "hot spot" burning of foodstuffs, it is particularly adapted for slow cooking operations.

The circuit as shown in FIG. 3 discloses the electrical circuitry utilized in the present device. The center conductor of plug 46 is grounded as shown and connected to the metallic inner container to guard against shock hazards. When switch 32 is rotated counterclockwise one position, wire 47 will be electrically connected to heater wire 36*a* thereby generating heat in the distributed resistance 37*a*. When rotated an additional position, wires 36*a* and 36*b* will both be electrically connected to conductor 47 and both heater elements will be working. The latter position corresponds to the "high" setting of switch 32.

From the foregoing, it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations.

As many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

WHAT WE CLAIM IS:—

1. An electric cooking utensil including a vessel composed of ceramic or earthenware material, a metallic container receiving said vessel in its interior, the container being substantially separated from said vessel by an air chamber located therebetween, at least one electric heating element operable to supply heat to the utensil contents, said heating element being located adjacent the circumferential exterior surface of said metallic container, means securing and attaching said heating element in an electrically insulating manner to the exterior surface of said metallic container, and means for applying electric current to said electric heating element thereby effecting the heating of said heating element.

2. An electric cooking utensil according to claim 1 wherein said vessel has an annular upper lip with a portion of said lip occupying a substantially horizontal plane, said metallic container having a substantially flat upper peripheral edge, said upper peripheral edge engaging said horizontal portion of said lip and providing a supporting surface for said vessel, said vessel thereby being removable from said utensil for cleaning or replacement purposes.

3. An electric cooking utensil according to claim 1 or claim 2 wherein said heating element comprises an electrically resistive conductor which is encapsulated by a non-conducting insulating material.

4. An electric cooking utensil according to any one of claims 1 to 3 wherein said heating element attaching means includes a part-cylindrical metallic mounting unit extending only partly around the circumference of said metallic container, the mounting unit having ends connected by a spring, said spring compressively securing and locating the mounting unit on said metallic container while at the same time compensating for thermally induced expansions or contractions of said mounting unit.

5. An electric cooking utensil according to claim 4 wherein said utensil includes a means removably locating said vessel in proximity to said metallic container, said vessel thereby being easily removable for cleaning or replacement purposes without manipulating a fastening device.

6. An electric cooking utensil according to claim 1 including means removably locating said vessel in proximity to said metallic container, said vessel thereby being easily removable for cleaning or replacement purposes.

7. An electric cooking utensil constructed and arranged substantially as hereinbefore described with reference to the accompanying drawings.

sufficient pressure on the mounting unit to ensure appropriate heater wire position. If the heater wires were simply glued to the surface of wall 19, for example, thermal expansion would destroy the glued interface, ultimately causing the heater wires to detach and fall toward the inner bottom of the cooking utensil.

In operation, heat generated by the heater wires is conducted by adjacent wall 19 into the inner chamber 21. This causes a mass of hot air of substantially uniform temperature to contact the surface 12 of the earthenware vessel 10, and heat is conducted therethrough to accomplish the cooking of foodstuffs within the vessel.

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From the foregoing, it will be seen that this invention is one well adapted to attain all of the ends and objects hereinabove set forth together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and subcombinations are of utility and may be employed without reference to other features and subcombinations.

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2. An electric cooking utensil according to claim 1 wherein said vessel has an annular upper lip with a portion of said lip occupying a substantially horizontal plane, said metallic container having a substantially flat upper peripheral edge, said upper peripheral edge engaging said horizontal portion of said lip and providing a supporting surface for said vessel, said vessel thereby being removable from said utensil for cleaning or replacement purposes.

3. An electric cooking utensil according to claim 1 or claim 2 wherein said heating element comprises an electrically resistive conductor which is encapsulated by a non-conducting insulating material.

4. An electric cooking utensil according to any one of claims 1 to 3 wherein said heating element attaching means includes a part-cylindrical metallic mounting unit extending only partly around the circumference of said metallic container, the mounting unit having ends connected by a spring, said spring compressively securing and locating the mounting unit on said metallic container while at the same time compensating for thermally induced expansions or contractions of said mounting unit.

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6. An electric cooking utensil according to claim 1 including means removably locating said vessel in proximity to said metallic container, said vessel thereby being easily removable for cleaning or replacement purposes.

7. An electric cooking utensil constructed and arranged substantially as hereinbefore described with reference to the accompanying drawings.

* C L M S *

GERALD CARTER & COMPANY,
Chartered Patent Agents,
11 Altior Court,
74 Shepherds Hill,
London N.6.
Agents for the Applicants.

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