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(54) ELECTRICALLY HEATED CERAMIC UTENSILS

(71) We, RIVAL MANUFACTURING COMPANY, a Corporation organised and existing under the laws of the State of Missouri, United States of America, of 36th and Bennington, 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:—

This invention relates to electrically heated ceramic cooking utensils.
 It is well known to wrap an electric heater around the outside of a vessel for providing heat to partially liquid foodstuff, such as baked beans and soups. In normal construction, the earthenware or ceramic vessel is glazed on the inside of the vessel to provide an impervious coating for preventing the passage of the liquid material therethrough. Usually, this coating is on the side of the earthenware that faces into the vessel, thus prohibiting the flow of electricity from the electric heater, along the electrically conductive foodstuff into the vessel, and possibly to the user of the utensil. However, this construction has a very undesirable characteristic, namely that the coating is made from the refractory material from which the ceramic vessel is constructed. As refractory material is brittle, a sharp rap to the glazed coating could fracture the refractory material and the coating, thus allowing passage of the electrically conducting substance into contact with the electric heater. Further, since a substantial number of users of electric cooking utensils stir the contents of the vessel with a metal spoon or ladle, a possibility always exists that the user will fracture or chip the glaze coating with the stirring utensil. Also the coating may be fractured by jarring the utensil through normal usage, as when the vessel is washed or when placing it in storage. Additionally, thermal shock can easily fracture the coating through thermal expansion and contraction. If for the above

or any other reason, the coating is fractured the refractory material will permit a passage of the electrical conductive liquid food substance into contact with the electric heating element and possibly produce an electrical shock to the user who contacts the food in the vessel.

According to the present invention there is provided a cooking utensil comprising a cup-shaped vessel of ceramic or earthenware material and having an exterior surface, at least one electric heating element arranged adjacent the exterior surface of said vessel and operable to heat the vessel, a container for housing and thermally insulating the vessel and the electric heating element, electrical conductors connected to the electric heating elements for applying electric current to the electric heating element, and a first electrically insulating coating applied to the exterior surface of said vessel, said coating also water-proofing the vessel and being located between the electric heating element and said exterior surface.

Preferably the utensil includes a second electrically insulating coating, said second coating being applied to the heating element and to the first coating to insulate the or each electric heating element.

Conveniently the exterior surface of the vessel may have at least a portion thereof that is unglazed, said first electrically insulating coating having at least a portion thereof that is absorbed by the unglazed exterior surface portion of the vessel.

The invention will be further described, by way of example, with reference to the accompanying drawings, wherein:

Fig. 1 is a front vertical, sectional view of a cooking utensil embodying the invention;

Fig. 2 is an enlarged vertical, sectional view of a detail of the utensil showing the cohesion between refractory material and thermally conductive, electrically insulating material; and

Fig. 3 is a schematic diagram illustrating the relationship between the electrical ap-

paratus employed within the utensil structure and a power supply.

Referring now to the drawing, and more particularly to Fig. 1 thereof, a cooking utensil 10 has a cup shaped vessel 11 with an annular lip 12. It is contemplated that the vessel will be constructed of a lightweight ceramic material that is thermally conductive, such as earthenware or stoneware. The vessel 11 is formed by bottom 14 and upwardly diverging wall 16. Bottom 14 and wall 16 have an inner side 18 (usually glazed) facing into vessel 11 and exterior second side 20. As illustrated, the thickness of bottom 14 and sidewall 16 (distance between inner side 18 and exterior side 20) is usually maintained constant. The exterior side 20 is unglazed and, as can be seen, accommodates and supports one or more electrical heating elements and resin varnish.

The lip 12 of vessel 11 has an inside ridge 22 and a higher outside concentric ridge 24 with a valley 26 located therebetween. This ridged lip construction facilitates the placing of a cover over the food substance within the vessel 11 as same is being cooked or warmed.

The outer and under portion of lip 12 has a smooth arcuate contour. For ease of construction, vessel 11 will be formed such that the ceramic material is provided with a smooth and continuous surface, except for junction edge 28, substantially to eliminate possible thermal stresses within the ceramic material.

As suggested above, the exterior wall 20 of the vessel 11 is unglazed. A silicon varnish will be applied to the entire exterior from junction edge 28 downwardly including the bottom of the vessel 11 and will be absorbed by the ceramic refractory material. The silicone varnish is of the type that is thermally conductive to allow heat passage when heat is applied to the pot by the electric heating elements 36. Additionally, the silicone varnish will waterproof the exterior surface of vessel 11 and, since the silicone varnish actually penetrates into the unglazed surface of the ceramic material, minute cracks and chipped areas will likewise be waterproof. The silicone varnish is built up to a predetermined thickness as a layer 34 on the exterior of the ceramic material sufficient thereby to form an electrically insulating barrier against any leakage current from the heating elements and also holds the heating elements 36 in the proper location. Further, since the coating, when hardened, is elastic in nature it is extremely resistant to fracture and it is unlikely to be chipped as it is fully encapsulated or otherwise protected from direct and damaging blows.

The heating elements mentioned above

will be comprised of a plurality of electrical resistor elements 36 and will be wrapped in a spiral fashion around the exterior wall 20 of vessel 11 and on the outside of the silicone varnish layer 34. It is contemplated that the size, number and shape of the heating elements may be varied in accordance with the size of the vessel construction.

A second coat of silicone varnish 38 will be applied to the exterior of first coat 34 onto the exterior of the heating elements 36. For convenience of illustration, the second coat has been shown and indicated as being substantially similar to the silicone varnish applied directly to the exterior surface of the vessel itself. However, it is really only necessary that the second coat be electrically insulating and does not necessarily have to be thermally conductive. Actually, if the type of later described insulating material that surrounds the exterior of the heating elements is suitably chosen, it is possible to eliminate the second application of the silicone varnish. However in the preferred embodiment, utilization of the second coat of silicone varnish further insulates the electrical heating elements and eliminates potentially harmful shocks, and helps hold the heating elements 36 in place.

The vessel 11 is supported in a plastic container 40 that is cylindrical in shape with feet 50 located on the bottom portion thereof. It is contemplated that the container diameter will be such that the upper peripheral edge of the container will be flat and contact and bear against the substantial horizontal planar underportion of the lip 12 (diagrammatically indicated by the numeral 28). A heat insulating material 46 will be inserted inside of the container 40 and will fill the space between the exterior of the vessel 11 and the interior of the container 40. This insulating material will have the necessary properties of prohibiting the transfer of heat away from the vessel 11. Further, the heat insulating properties of material 46 will enable a user to grasp handles 48 (which extend outwardly from container 40 as shown in Fig. 1) without a danger of being burned.

It is contemplated that the insulating material 46 will be poured or otherwise formed of a suitable contour during the construction of the entire cooking utensil device and will provide a suitable receptacle to receive the vessel with the varnish coating on the exterior, so as to substantially support the weight of the pot and to reduce the effect of any mechanical shocks applied to the side of the container 40. Further, it is possible to cause the insulating material to adhere directly to the exterior of the vessel thereby precluding the vessel from being removed from the container. Alternatively, of course, the insulating material can be integrally formed with the container, with

the vessel removable for cleaning purposes and the like. However, with the present structure both vessel and container may be placed in water and washed without fear of damage to the electrical heating elements.

In operation, electrical heating elements 36 are connected to a conventional wall outlet plug 52 through a rheostat 56. Current through conductors 58 heats the heating elements 36 and eventually vessel 11 by conducting the heat from elements 36 through the coating 34 and into the ceramic material. Rheostat 56 controls the amount of heat that is being emitted from the elements 36, and as such may vary the operation of the vessel so that selectively it may be used both as a "warmer" or slow cooker and as fast cooker.

20 WHAT WE CLAIM IS:—

1. A cooking utensil comprising a cup-shaped vessel of ceramic or earthenware material and having an exterior surface, at least one electric heating element arranged adjacent the exterior surface of said vessel, and operable to heat the vessel, a container for housing and thermally insulating the vessel and the electric heating element, electrical conductors connected to the electric heating element for applying electric current to the electric heating element, and a first electrically insulating coating applied to the exterior surface of said vessel, said coating also

waterproofing the vessel and being located between the electric heating element and said exterior surface. 35

2. The utensil claimed in claim 1, wherein the exterior surface of the vessel has at least a portion thereof that is unglazed, said first electrically insulating coating having at least a portion thereof that is absorbed by the unglazed exterior surface portion of the vessel. 40

3. The utensil claimed in claim 1 or 2, including a second electrically insulating coating, said second coating being applied to the heating element and to the first coating to insulate the or each electric heating element. 45

4. The utensil claimed in any preceding claim, wherein the vessel has an annular lip with a portion of said lip occupying a substantially horizontal plane, said container having a substantially flat upper peripheral edge for engaging said horizontal portion of the lip to provide a supporting surface for the vessel. 50 55

5. A cooking utensil constructed and arranged to operate substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings. 60

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waterproofing the vessel and being located between the electric heating element and said exterior surface.

2. The utensil claimed in claim 1, wherein the exterior surface of the vessel has at least a portion thereof that is unglazed, said first electrically insulating coating having at least a portion thereof that is absorbed by the unglazed exterior surface portion of the vessel.

3. The utensil claimed in claim 1 or 2, including a second electrically insulating coating, said second coating being applied to the heating element and to the first coating to insulate the or each electric heating element.

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