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(54) ELECTRICALLY HEATED FOOD CONTAINERS

(71) We, IMANISHI KINZOKU KOGYO KABUSHIKI KAISHA, a Japanese Body Corporate, of 22, 13-ban, 3-chome, Higashinakamoto, Higashinari-ku, Osaka, Japan, 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 food containers, such as stewpans and saucepans, which may be used for making stew or other dishes and keeping them hot.

Known electric stewpans and saucepans include a heating element which is sheathed in an electrically nonconducting material, and embedded in the bottom of the pan. Two steps are involved in making them, firstly to fabricate the sheathed element and secondly to fix the sheathed element in the bottom of the pan.

According to the present invention there is provided an electrically-heated food container comprising a cylindrical pan of porcelain or other non-metallic material, a bare heating element helically wound around the cylindrical outer surface of the pan, which surface is unglazed, an intermediate plate of heat-proof, electrically insulating material from and to which the heating element starts and returns, the intermediate plate being located between the unglazed cylindrical surface of the pan and the heating element and the heating element being covered with a coating of varnish, a casing housing and spaced from the pan, means supporting the pan in the casing, said means comprising a bar fastened to the bottom of the casing and having opposite ends bent inwardly so that they face each other, the bent ends of the bar being fitted into the side wall of the pan so as to hold the pan in the casing, the pan including a flange portion having a ring-shaped depression receiving the upper end of the side wall of the casing, thereby enabling the pan to rest on the side wall of the casing, and a lid covering the opening of the pan.

The varnish is preferably a silicon compound which may conveniently be applied by means of a brush or a spray gun. After application of the varnish, the pan is heated so as to harden the coating of varnish, thereby enabling the heating element to be anchored therein.

The heating element is protected against becoming damp and against being damaged by external shocks. In fabricating the container the heating element may be simply wound around the trunk of the pan, for example, with the use of a rotating vice. Advantageously, the winding process is carried out automatically.

In order that the invention may be more clearly understood, the following description is given, merely by way of example, with reference to the accompanying drawing, in which:

Figure 1 is a vertical cross-section through an electric stewpan embodying the present invention; and

Figure 2 is a horizontal cross-section through the stewpan in Figure 1, taken along the line A—A¹ thereof.

As shown in the drawing, a stewpan 3 is housed in a cylindrical metal casing 1 which has a pressed bottom plate 2. The stewpan 3 is made of a ceramic material such as porcelain or a similar material, and its open end is provided with a flange 4 intended to engage the upper end of the casing 1. In addition, the stewpan 3 is provided with a pair of exterior blind holes 5 and 5¹ near its bottom in which are received bent end portions 7 and 7¹ of a supporting bar 6, which is threadedly engaged with a screw 8 in its centre. The supporting bar 6 is attached to the bottom plate 2 of the casing 1 by means of the screw 8 projecting through an aperture 9 in the bottom plate 2 and being threaded into a nut 10 below the plate 2. In this way the stewpan 3 is supported in the casing 1 with some resilience, owing to the supporting bar 6, and with a minimal amount of contact therewith.

The inside surfaces of the stewpan and the flange portion 4 are glazed, whereas the outside thereof remains unglazed until a heating element 11 is completely wound around the outside of the stewpan 3. In the embodiment illustrated, the heating element comprises two lengths of wire of nickel-chromium alloy, which are helically wound in parallel with a given space therebetween round the outside of the pan. A heat resistant insulator plate 12 is located against the pan surface under the lengths of wire so as to provide an intermediate base for connecting the lengths of wire to electrical terminals (not shown). The insulator plate 12 may be located under the heating element 11 without the use of any jig or adhesive, and the unglazed rough surface of the stewpan is helpful in holding it in place. Preferably, the insulator 12 is made of mica, and it is provided with terminal lugs 13 in its lower part, to which the ends of the lengths of wire are connected.

After the lengths of wire have been wound upon the pan, they are covered with a coating of varnish, which is selected from among silicon compounds. The coating may be effected by a brush or a spray gun. Subsequently, the stewpan is heated at a temperature of about 150°C for about five minutes, thereby causing the coated varnish to form into a film V over the heating element 11.

The casing 1 is provided with three legs 14 at its bottom, and handles 15 at its top. The legs 14 and handles 15 are preferably plastics mouldings. The opening of the stewpan 3 is as shown and is covered with a lid 16 of transparent material, such as glass.

In the embodiment illustrated, the flange portion 4 on the pan is provided with a ring-shaped groove 17 in which a heat-proof elastic packing 18 is inserted so as to secure the top edge of the side wall of the casing 1 therein.

The pan 3 as such is made of porcelain or a similar non-metallic material, and therefore, it is dielectric and heat-resistant, so that it is not liable to corrosion by the boiling of acidic and salty food therein. Since the heating element is wound around the outside of the pan, in direct contact therewith, the power consumption can be reduced to the minimum. In addition, since there is an air space between the pan and the casing, little heat is transferred to the casing, thereby protecting a user against a burning accident and conserving energy. The contents of the pan may be cooked by long simmering at relatively low temperatures with the lid on, whereby vaporization of the water content is immensely reduced, thereby avoiding producing burnt food owing to a shortage of water. Also, the nutritional value and flavour of the food can be maintained.

The heating element of the stewpan described above is simply wound around the unglazed surface of the pan, and is then covered with a coating of heat-proof insulating substance. Thus, the manufacturing process is considerably simplified, thereby saving labour costs, material costs also being reduced. In addition, the stewpan reduces the danger of burns to a user because of the space between the pan and the casing, which serves as an insulator of heat. A further advantage is that an increased heating efficiency is obtained by virtue of the direct contact of the heating element with the pan, thereby reducing the power consumption. In the event of a possible breakage of the heating element, the coating stops the heating element from falling off the pan.

Reference is hereby made to our co-pending Patent Application No. 13517/76 (Serial No. 1,473,132), which was divided out of the present Application and which includes claims directed to methods of making electrically-heated food containers.

WHAT WE CLAIM IS:—

1. An electrically-heated food container comprising a cylindrical pan of porcelain or other non-metallic material, a bare heating element helically wound around the cylindrical outer surface of the pan, which surface is unglazed, an intermediate plate of heat-proof, electrically insulating material from and to which the heating element starts and returns, the intermediate plate being located between the unglazed cylindrical surface of the pan and the heating element and the heating element being covered with a coating of varnish, a casing housing and spaced from the pan, means supporting the pan in the casing, said means comprising a bar fastened to the bottom of the casing and having opposite ends bent inwardly so that they face each other, the bent ends of the bar being fitted into the side wall of the pan so as to hold the pan in the casing, the pan including a flange portion having a ring-shaped depression receiving the upper end of the side wall of the casing, thereby enabling the pan to rest on the side wall of the casing, and a lid covering the opening of the pan.

2. A container according to claim 1, wherein the casing has three legs.

3. A container according to claim 1 or claim 2, wherein the casing has opposed exterior handles.

4. A container according to claim 1, claim 2 or claim 3, wherein the varnish is a heat-set silicon compound.

5. A container according to any one of the preceding claims, wherein the heating element comprises two lengths of wire of nickel-chromium alloy, the two lengths of



(11)

The inside surfaces of the stewpan and the flange portion 4 are glazed, whereas the outside thereof remains unglazed until a heating element 11 is completely wound around the outside of the stewpan 3. In the embodiment illustrated, the heating element comprises two lengths of wire of nickel-chromium alloy, which are helically wound in parallel with a given space therebetween round the outside of the pan. A heat resistant insulator plate 12 is located against the pan surface under the lengths of wire so as to provide an intermediate base for connecting the lengths of wire to electrical terminals (not shown). The insulator plate 12 may be located under the heating element 11 without the use of any jig or adhesive, and the unglazed rough surface of the stewpan is helpful in holding it in place. Preferably, the insulator 12 is made of mica, and it is provided with terminal lugs 13 in its lower part, to which the ends of the lengths of wire are connected.

After the lengths of wire have been wound upon the pan, they are covered with a coating of varnish, which is selected from among silicon compounds. The coating may be effected by a brush or a spray gun. Subsequently, the stewpan is heated at a temperature of about 150°C for about five minutes, thereby causing the coated varnish to form into a film V over the heating element 11.

The casing 1 is provided with three legs 14 at its bottom, and handles 15 at its top. The legs 14 and handles 15 are preferably plastics mouldings. The opening of the stewpan 3 is as shown and is covered with a lid 16 of transparent material, such as glass.

In the embodiment illustrated, the flange portion 4 on the pan is provided with a ring-shaped groove 17 in which a heat-proof elastic packing 18 is inserted so as to secure the top edge of the side wall of the casing 1 therein.

The pan 3 as such is made of porcelain or a similar non-metallic material, and therefore, it is dielectric and heat-resistant, so that it is not liable to corrosion by the boiling of acidic and salty food therein. Since the heating element is wound around the outside of the pan, in direct contact therewith, the power consumption can be reduced to the minimum. In addition, since there is an air space between the pan and the casing, little heat is transferred to the casing, thereby protecting a user against a burning accident and conserving energy. The contents of the pan may be cooked by long simmering at relatively low temperatures with the lid on, whereby vaporization of the water content is immensely reduced, thereby avoiding producing burnt food owing to a shortage of water. Also, the nutritional value and flavour of the food can be maintained.

The heating element of the stewpan described above is simply wound around the unglazed surface of the pan, and is then covered with a coating of heat-proof insulating substance. Thus, the manufacturing process is considerably simplified, thereby saving labour costs, material costs also being reduced. In addition, the stewpan reduces the danger of burns to a user because of the space between the pan and the casing, which serves as an insulator of heat. A further advantage is that an increased heating efficiency is obtained by virtue of the direct contact of the heating element with the pan, thereby reducing the power consumption. In the event of a possible breakage of the heating element, the coating stops the heating element from falling off the pan.

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1. An electrically-heated food container comprising a cylindrical pan of porcelain or other non-metallic material, a bare heating element helically wound around the cylindrical outer surface of the pan, which surface is unglazed, an intermediate plate of heat-proof, electrically insulating material from and to which the heating element starts and returns, the intermediate plate being located between the unglazed cylindrical surface of the pan and the heating element and the heating element being covered with a coating of varnish, a casing housing and spaced from the pan, means supporting the pan in the casing, said means comprising a bar fastened to the bottom of the casing and having opposite ends bent inwardly so that they face each other, the bent ends of the bar being fitted into the side wall of the pan so as to hold the pan in the casing, the pan including a flange portion having a ring-shaped depression receiving the upper end of the side wall of the casing, thereby enabling the pan to rest on the side wall of the casing, and a lid covering the opening of the pan.

2. A container according to claim 1, wherein the casing has three legs.

3. A container according to claim 1 or claim 2, wherein the casing has opposed exterior handles.

4. A container according to claim 1, claim 2 or claim 3, wherein the varnish is a heat-set silicon compound.

5. A container according to any one of the preceding claims, wherein the heating element comprises two lengths of wire of nickel-chromium alloy, the two lengths of

wire being helically wound around the pan parallel to one another.

6. An electrically-heated food container substantially as herein described with reference to the accompanying drawing.

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