

Description

The invention relates to a heating and cooking apparatus comprising a heating chamber having heating means for heating an object to be cooked therein, a kneading trough detachably installed in said heating chamber, a kneading vane for kneading the object to be cooked in said kneading trough, and a motor for rotating said kneading vane through a transmission means, the kneading trough being firmly but detachably held on a fitting part of the heating chamber by a holding mechanism preventing rotation of the kneading trough relative to the fitting part.

Recently, an automatic bread baking apparatus has been brought on the market by which, for example, bread can be automatically made through consecutive operation from kneading to baking. Before the arrival of the automatic bread baking apparatus, an oven equipped with a kneading arrangement has been also in the market. In the above-mentioned oven equipped with the kneading arrangement, after a trough special for kneading is accommodated in the oven so as to knead the material, the trough should be taken out of the oven, and the kneaded material should be changed into another trough or plate for fermentation and baking.

The former automatic bread baking apparatus is exclusively used for bread. Therefore, in the case where a variety of breads such as rolls, croissants, etc. are desired, the apparatus can serve only for a part of a series of the baking operation, namely, kneading and fermentation, with requiring an oven to be added which is large enough to bake several rolls or croissants, etc. at one time on a plate.

On the other hand, in the latter oven having a kneading device, in either case where bread is baked, or the other kind of bread is desired, the material after finishing partial fermentation should be changed into another trough for baking operation, thus resulting in complicated and troublesome procedure.

In recent years, it has been the desire that the three cooking operations, that is, kneading, baking and roasting operations, each conventionally fulfilled by the kneading device, automatic bread baking apparatus and oven, respectively, should be performed by a single cooking unit. The cooking unit is achieved simply by adding a special trough into the oven, which is therefore advantageous in space-saving and cost-saving points of view. Accordingly, one becomes able to bake bread automatically whenever he or she wishes. Moreover, although the kneaded material is necessary to be transferred onto the oven plate for baking, a variety of breads can be fully satisfied by the cooking unit.

Not only the kneading operation which has been considerably annoying to a user can be automatically done by the unit, but those kinds of breads that are complicated in shape and frequently required can be really automatically baked.

It is needless to say that the above-described cooking unit is able to be used in combination with an electronic oven range or a toaster range, realizing more highly concentrated cooking apparatus.

The trough exclusive for kneading and baking operations has generally the capacity of 1-2 loaves of bread, which will be apparent from the fact that the automatic bread baking apparatus in the commercial market is rendered capable of baking 1-2 loaves of bread. When the trough is put in or taken out of the center of the heating chamber of the electric oven, many problems are given rise to. In other words, the operation itself is troublesome, causing an erroneous operation which results in accidents or destruction of the oven, burning to the user, etc. In addition, since the kneading operation requires large rotating force with high speeds, it is necessary that the trough and the electric oven be completely secured to each other.

It is clear that the same thing goes with a heating and cooking apparatus, not limited to the above case, which can make rice-cakes, sourdoughs of cakes and cookies or can serve as a juicer or a mixer rotated at high speeds.

Fig. 1 shows an example how a kneading trough is fixed to the heating and cooking apparatus in the conventional manner. The kneading trough 1 has a foot part 2, so that the trough 1 is mounted through the foot part 2 in a to-be-engaged portion 3 formed in a fitting part 5 at the bottom of a heating chamber. Several projections 4 are formed in the foot part 2. Accordingly, when the trough 1 is placed at the bottom of the heating chamber and rotated by predetermined angles, the projections 4 of the foot part 2 are come into secure engagement with the to-be-engaged portion 3 at the bottom of the heating chamber. Since the foot part 2 is formed circular, a lock member 6 is provided so as to prevent the trough 1 from slipping off the to-be-engaged portion 3 during rotation. The lock member 6 is come in position by vertical movement of a lever 7.

A similar embodiment of the mounting of a container forming part of a bread baking machine is disclosed by EP-A 0 131 264. The container is fixedly secured to a mount having a flange with radial cuts at equi-angular intervals therein. The mount can be (dis-)assembled from a cradle by turning the mount to bring its radial cuts into opposing relation to pins which project out inwardly of a limit plate of the cradle, limiting vertical movement of the mount.

According to the above-described method for installing and securing the trough into the apparatus through rotation of the trough, both hands of the user are needed to install or detach the trough. In the case where a series of operations from kneading to baking is consecutively carried out, for example, when bread is baked, the trough should be taken out of the apparatus while the lever of the lock member is manipulated after the bread is completely baked. Particularly, when the trough is desired to be removed from the apparatus immediately after the completion of baking, there exists the danger of burns or injury to the user since the interior of the heating chamber becomes hot.

In the known electric oven or the electronic oven range which can function also as a kneading device, it is so arranged that the kneading trough is fixedly accommodated into the box-like heating chamber, therefore, into a limited space of the heating chamber. The trough is inserted into the interior of the heating chamber from a lateral window, and placed in the bottom of the heating chamber in such manner as to be pressed down into the bottom of the heating chamber, and then rotated for fixing. Thus, the installation method of the trough in the electric oven or the electronic oven range equipped with the kneading arrangement is quite inconvenient in use. The oven may be operated even though the engagement between the trough and the main body of the oven is insufficient, causing an accident of the oven or taking a fire. Moreover, if the inside surface of the heating chamber is coated with points or undergoes the surface-treatment, the coated or the surface-treated surface may be damaged because of the friction during the engagement, resulting in unfavorable appearance. Further, in the case where the to-be-engaged portion in the bottom of the heating chamber is formed by a sheet metal, the end surface of the sheet metal is exposed and accordingly becomes an obstacle to cleaning, resulting in residual moisture and dregs in the engaging portion. Hands may be cut when the stains or the food residues are removed. Accordingly, the installation method of the trough through rotation is disadvantageous from the viewpoints of operating convenience, cleanliness and safety.

Moreover, according to the above-described installation method of the trough through rotation, when the trough is installed in or taken out of the oven, a large friction force works in the engaging portion, and therefore projections and the to-be-engaged portion are worn out. The engaging force is lessened as the trough is repeatedly installed in or taken out of the oven, resulting in rattlings during the rotation or disengagement of the trough from the oven.

In fact, as described hereinabove, the conventional method for installing the kneading trough into the oven carries such fears as are resulted in a failure of cooking because of the rattling or disengagement of the trough during the operation as well as an accident or a fire of the oven. Further, in the conventional installation method, the user may be burnt or get injured, or receive an electric shock.

From US-A-3 393 900 a food mixer having a container and a base member and means for interconnection of the container and base member is known. The means for interconnection consist in mutually cooperating engagement means provided to limit rotation of the container and to hold the container on the base.

From DE-B-1 001 205 a safety arrangement for an electrically driven household machine, for instance a mixer, a chopper or the like, is known, having a mixing container surrounding a mixing device and being placed on a base of the mixer. Below the base, an electromagnet relay is placed, having an open magnetic circuit. In the bottom of the container a plate of ferromagnetic material is supported, and when the container is placed safely on the base, the magnetic circuit of the relay is closed so that the magnetic flux through the magnetic circuit is able to attract an armature of the relay. Accordingly, the energized relay closes only a safety contact permitting operation of the mixer if the container with the plate of ferromagnetic material is safely placed on the base of the mixer. No means are being disclosed as to how the container is held on the base of the mixer.

It is an object of the present invention to provide a heating and cooking apparatus which is so arranged that a kneading trough is easily installed in or taken out of a heating chamber, and in which a large rotating force from a motor can be transmitted to a kneading vane.

According to the invention, the holding means of such a heating and cooking apparatus consists of

- a) first engagement means having wall portions protruding from the fitting part of the heating chamber and surrounding side faces of a complementary foot part of the kneading trough for preventing rotation of the kneading trough, and
- b) second engagement means for holding down the kneading trough on the fitting part with the side faces of the foot part in engagement with the protruding wall portions after insertion of the trough in to the heating chamber.

Preferable embodiments of the invention are defined in the dependent claims.

These and other objects and features of the present invention will become apparent from the following description taken in conjunction with pre-

ferred embodiments thereof with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of an engaging portion of a kneading trough in a conventional heating and cooking apparatus;

Fig. 2 is a cross sectional view of an essential part of a heating and cooking apparatus according to one preferred embodiment of the present invention;

Fig. 3 is an exploded perspective view of an engaging portion of a kneading trough in the heating and cooking apparatus of Fig. 2;

Fig. 4 is an exploded top plan view of the engaging portion of the kneading trough in the heating and cooking apparatus of Fig. 2;

Fig. 5 is a cross sectional view of the engaging portion of the kneading trough in the heating and cooking apparatus of Fig. 2;

Fig. 6 is views, a plane view (A), a front view (B) and a partial side view (C), of a prime rotary coupling member in the heating and cooking apparatus of Fig. 2;

Fig. 7 is views, a plane view (A), a front view (B) and a partial side view (C), of a driven rotary coupling member in the heating and cooking apparatus of Fig. 2;

Fig. 8 is a schematic view showing the installation method of the kneading trough in the heating and cooking apparatus of Fig. 2;

Fig. 9 is a cross sectional view of an essential part of a heating and cooking apparatus according to a second embodiment of the present invention; and

Fig. 10 is a perspective view of an engaging portion of a kneading trough in the heating and cooking apparatus of Fig. 9.

DESCRIPTION OF PREFERRED EMBODIMENTS

Before the description of the present invention proceeds, it is to be noted here that like parts are designated by like reference numerals throughout the accompanying drawings.

Referring to the heating and cooking apparatus shown in Figs. 2-8, an outer block 10 of the apparatus has a heating chamber 11 at the bottom of which is mounted a fitting part 5 formed of aluminum through die casting so as to fix a kneading trough 1. There is formed a to-be-engaged part 3 in a generally square shape in the fitting part 5. The to-be-engaged part 3 has a hole portion 12 in which a projected portion 4 of a foot 2 of the kneading trough 1 is inserted. When the projected portion 4 is inserted in the hole portion 12, a permanent magnet 13 built in the lower part of the fitting part 5 is securely adhered to a metal plate 14 which is made of a ferromagnetic material in a position corresponding to the permanent magnet

13 at the bottom of the foot part 2. It may be possible that the metal plate 14 is built in the lower part of the fitting part 5 and the permanent magnet 13 is provided in the foot 2 of the kneading trough 1. A handle 15 is provided in the lateral surface of the kneading trough 1, so that the kneading trough 1 can be easily installed in or removed from the heating and cooking apparatus, or carried out. Inside the kneading trough 1 is detachably and rotatably placed a kneading vane 16 for kneading the material. A driving motor 17 transmits the rotating force, through a small pulley 18, a belt 19 and a large pulley 20, to a first rotary shaft 21. A prime rotary coupling member 32 is fixedly mounted in the first rotary shaft 21, which is meshed with a driven rotary coupling member 33 integrally formed with a second rotary shaft 34 of the kneading trough 1. Therefore, the rotating force transmitted to the first rotary shaft 21 is transmitted to the second rotary shaft 34, thereby rotating the kneading vane 16. The motor 17 is controlled by a control unit 22, so that the motor 17 is rotated in a reversed direction or in an intermittent manner. Moreover, the heating and cooking apparatus includes an upper heater 23 in the upper part of the heating chamber 11 and a lower heater 24 in the lower part of the heating chamber. Those heaters 23 and 24 are operated in the fermentation and baking operations, and the temperatures of the heaters 23 and 24 are also controlled by the control unit 22. Moreover, the upper and lower heaters 23 and 24 are respectively covered with an upper insulative member 29 and a lower insulative member 30 for the purpose of improving the thermal efficiency. A magnetron 25 which is employed in the high frequency heating operation emits high frequency waves through an opening 31 formed in the lateral wall of the heating chamber into the heating chamber 11.

As is described hereinabove, since the kneading trough 1 and the to-be-engaged portion 3 in the heating chamber 11 are formed generally square in the heating and cooking apparatus of the present invention, the conventional locking mechanism 6 is not required, with no necessity for securing the kneading trough in pressed contact with the to-be-engaged portion. On the contrary the kneading trough can be installed in or taken out of the heating chamber 11 with great ease. Moreover, the force in the rotating direction is received by the corners, and accordingly the kneading trough 1 is prevented from rattling due to the wearing-out or slipping off the to-be-engaged portion 3.

In order to install the kneading trough 1 into the heating chamber 11, first, the projected portion 4 of the foot part 2 of the kneading trough 1 which is formed corresponding to the hole portion 12 is inserted into the hole portion 12 of the to-be-

engaged portion 3 in the depth inside the heating chamber, with the help of the handle 15 mounted in the lateral side of the kneading trough 1. At this time, the to-be-engaged portion 3 serves also as a guide frame, so that the projected portion 4 of the kneading trough 1 can be easily inserted into the hole portion 12 as the kneading trough 1 is being slid. Thereafter, upon placing down the kneading trough 1 onto the fitting part 5 in the heating chamber 11, the permanent magnet 13 provided in the lower part of the fitting part 5 is securely adhered to the metal plate 14 made of a ferromagnetic material and provided at the bottom of the foot part 2 confronting to the permanent magnet 13, because of the magnetic force.

When the kneading trough 1 is desired to be taken out of the heating chamber, the operation in a reversed order of the foregoing procedure should be carried out.

If the width of the to-be-engaged portion 3 at the side of the opening window of the heating chamber is made larger than that at the deep side of the heating chamber, and the foot part 2 of the kneading trough 1 is formed in the corresponding shape, there may be found sufficient room between the to-be-engaged portion 3 and the kneading trough 1 at the initial stage of the installation of the kneading trough 1. Accordingly, even if the kneading trough 1 is installed without severe attention given to the position of the to-be-engaged portion 3, the to-be-engaged portion 3 serves as the guide frame, so that the room between the to-be-engaged portion 3 and the kneading trough 1 is gradually reduced as the kneading trough 1 is inserted along the guide frame while the kneading trough is being slid. Thus, when the kneading trough 1 is completely installed, it can be fixedly secured to the to-be-engaged portion 3. Therefore, the user is never required to give full attention to the position of several projections when he or she fixes the kneading trough as in the conventional case. The installation and detachment of the kneading trough is made much simpler according to the present invention.

The kneading trough can be installed even in the case of a box-shaped heating chamber by sliding the kneading trough from the front of the chamber. Accordingly, the installation arrangement of the present invention is convenient in use and free from such dangers as hurts or burns to the user.

It is to be noted here that the to-be-engaged portion 3 may be formed with a groove, not the hole portion, functioning in the same manner.

Since the handle 15 is provided in the lateral wall of the kneading trough 1, it is greatly convenient that the user can hold the kneading trough with one hand. Moreover, since the handle is se-

cured to the kneading trough at at least the opposite ends thereof, the kneading trough is consequently reinforced and becomes solid, resulting in improved durability.

In the foregoing embodiment, the to-be-engaged portion 3 is made of aluminum through die casting, and therefore the to-be-engaged portion 3 is ready to be formed into various other configurations. Also, the outer peripheral surface of the to-be-engaged portion 3 can be rendered smooth R. Accordingly, such fears as cutting of a finger, etc. will be avoided. The to-be-engaged portion 3 made through aluminum die casting is sufficiently strong, and the size of the engaging portion of the to-be-engaged portion 3 can be made as small as possible, assuring easiness for cleaning.

In the case where the to-be-engaged portion 3 is made of a sheet metal, the end surface of the to-be-engaged portion 3 may be subjected to R treatment or the like, and the foot part 2 of the kneading trough 1 may be formed into a polygonal shape such as a hexagonal shape, etc. to be strong.

Further, both the fitting part 5 and the to-be-engaged portion 3 may be formed by a sheet metal reducing work through stamping.

The description hereinbelow is directed to a detection unit which is provided so as to detect the presence of the kneading trough thereby to prevent the imperfect engagement of the kneading trough.

When the projected portion 4 formed in the foot part 2 of the kneading trough 1 is positively inserted into the hole portion 12 of the to-be-engaged portion 3, a detection pin 26 is pressed down. The depressed detection pin 26 adds to a detection lever 27 provided below the detection pin 26 the force in the rotating direction, thereby to turn ON a detection switch 28 provided in the lever 27 confronting the detection pin 26. The presence or absence of the kneading trough 1 is detected by a signal from the detection switch 28. In the arrangement as above, the driving motor 17 can be prevented from rotating at high speeds when the kneading trough 1 is not present in the heating chamber. On the other hand, when the kneading trough 1 is installed in the heating chamber, an abnormal heater heating or high-frequency heating operation can be prevented. Moreover, it can be also prevented that the heating and cooking apparatus starts operating when the kneading trough is not positively secured with the to-be-engaged portion 3 in the heating chamber, or the engagement of the kneading trough is erroneously released during the rotation because of the insufficient engagement.

Since the detection pin 26 is provided in the fitting part 5 in the direction towards the depth at the bottom of the heating chamber 11 according to the present embodiment, the engagement of the

kneading trough 1 with the to-be-engaged portion 3 becomes remarkably strong in the vertical direction when the projected portion 4 in the foot part 2 of the kneading trough 1 is inserted into the hole portion 12 of the to-be-engaged portion 3. Consequently, the detection pin 26 can positively function at the side of the projected portion 4. Since the detection pin 26 is provided in the direction towards the depth of the heating chamber 11 as described above, the heating and cooking apparatus does not start operating unless the kneading trough 1 is perfectly installed in the heating chamber, realizing a highly safe apparatus.

Fig. 9 is a cross section of an engaging portion of a heating and cooking apparatus according to a second embodiment of the present invention in the state where an object 35 in the kneading trough 1 which is finished cooking is being taken out of the heating chamber 11 with the use of a protective glove 37 by a user 36. The foot part 2 of the kneading trough 1 is now fixedly secured to the to-be-engaged portion 3 in the heating chamber 11 through engagement therebetween. A lower end 41 of an operating lever 40 which forms a part of the handle 15 fixedly provided with the kneading trough 1 is entered into a second hole portion 43 formed in the to-be-engaged portion 3 and also into a through-hole 38 formed in the foot part 2 of the kneading trough 1 correspondingly to the second hole portion 43. The upper part of the operating lever 40 is supported rotatably at a fulcrum 9 in the handle 15. Moreover, the operating lever 40 is urged by a leaf spring 42 in a counterclockwise direction at the center of the fulcrum 9. The operation lever 40 which passes through a guide groove 39 formed in the handle 15 slides in the handle 15 along the guide groove 39. In the to-be-engaged portion 3, the projected portion 4 provided opposite to the handle 15 in the foot part 2 of the kneading trough 1 is fixedly inserted in the hole portion 12 in the depth of the heating chamber 11. When the user 36 takes the handle 15 and holds the operating lever 40 of the kneading trough, the end portion 41 of the operating lever 40 comes out from the through-hole 38 and the second hole portion 43 of the to-be-engaged portion 3. In the above-described state, when the user 36 takes the handle 15 upwards and pulls frontwards, the engagement of the hole portion 12 in the to-be-engaged portion 3 with the projected portion 4 in the foot part 2 of the kneading trough 1 is released, so that the user 36 can easily get the kneading trough 1 outside the heating chamber of the apparatus with much safety. If the kneading trough 1 is desired to be installed in the heating chamber 11, it is enough that the above-described sequence of operations be carried out in the reverse order. In this case, the to-be-engaged portion 3 functions as a guide frame,

and therefore if only the kneading trough 1 is installed, while being slid, into the heating chamber without confirming the position of the to-be-engaged portion 3, the hole portion 12 of the to-be-engaged portion 3 can be easily engaged with the projected portion 4 of the foot part 2 of the kneading trough 1. The kneading trough 1 should then be placed down onto the to-be-engaged portion 3, with the user's hand off, and the end portion 41 of the operating lever 40 passes through the second hole portion 43 of the to-be-engaged portion 3 to be fixedly inserted into the through-hole 38 of the kneading trough 1.

Accordingly, as has been described hereinabove, the following advantages can be achieved by the present invention.

(1) The kneading trough and the to-be-engaged portion in the heating chamber are respectively formed into a polygonal shape, and therefore the engagement between the kneading trough and the to-be-engaged portion in the heating chamber can be easily accomplished with increased strength in the rotating direction, without any possibilities of rattlings or disengagement resulting from the friction therebetween. No complicated mechanism such as the lock mechanism or the like can be dispensed with for the reverse rotation of the kneading vane.

(2) The one side of the kneading trough is fixedly secured through the engagement or insertion of the projected portion into the hole portion of the to-be-engaged portion in the heating chamber, while the other side of the kneading trough is arranged to be fixed to the heating chamber by magnetic force. Accordingly, the kneading trough is able to be easily installed or taken from the heating chamber even in a box-shaped heating and cooking apparatus, so that a dangerous injury or burn may be avoided when it is too hot in the heating chamber immediately after cooking. If a handle is provided in the lateral wall of the kneading trough, the kneading trough can be held by one hand of the user, enhancing the using efficiency.

(3) If the to-be-engaged portion in the heating chamber is formed by molded components made, for example, by aluminum die casting, the strength of the to-be-engaged portion is increased, and the bottom of the heating chamber can be less rough with little projections, thereby to increase the convenience in cleaning and maintenance from the hygienic viewpoint. The molded component can be smooth R, reducing the danger of a finger cutting or the like in cleaning.

(4) The detection unit provided at the side of the projected portion of the kneading trough ensures correct and positive operation of the detection

switch. Therefore, the high-speed rotation when the kneading trough is not present in the heating chamber and/or the abnormal use when the kneading trough is present can be prevented, thus advantageously improving the safety of the apparatus.

(5) The kneading trough which can be put into the heating chamber directly with the raw materials for breads, cakes, etc. kneaded therein has the handle, so that the user can hold the kneading trough by one hand. Accordingly, the kneading trough is easy to be installed in or taken out of the heating chamber. Particularly, for example, when the heating chamber is high in temperatures immediately after cooking, it might be awfully dangerous that the user holds the kneading trough by both hands so as to release the engagement of the kneading trough with the main body of the apparatus through necessary manipulations such as twisting or the like. Therefore, the heating and cooking apparatus of the present invention can be said to be highly safe and convenient for use.

(6) The kneading trough having the handle provided in the lateral wall thereof is convenient for use when it is cleaned after use. Moreover, the handle of the kneading trough is made of so rigid material and secured to the kneading trough at at least opposite ends thereof that the kneading trough becomes accordingly solid and durable, realizing a long-life of the apparatus.

Although the present invention has been fully described by way of example with reference to the accompanying drawings, it is to be noted here that various changes and modifications will be apparent to those skilled in the art.

Claims

1. A heating and cooking apparatus comprising a heating chamber (11) having heating means (23, 24) for heating an object (35) to be cooked therein, a kneading trough (1) detachably installed in said heating chamber (11), a kneading vane (16) for kneading the object (35) to be cooked in said kneading trough (1), and a motor (17) for rotating said kneading vane through a transmission means (18, 19, 20); the kneading trough (1) being firmly but detachably held on a fitting part (5) of the heating chamber (11) by a holding mechanism preventing rotation of the kneading trough (1) relative to the fitting part (5); characterized in that the holding means consists of
 - a) first engagement means having wall portions (3) protruding from the fitting part (5) of the heating chamber (11) and surrounding side faces of a complementary foot part (2) of the kneading trough (1) for preventing rotation of the kneading trough (1), and
 - b) second engagement means (4, 12; 13, 14; 40, 43) for holding down the kneading trough (1) on the fitting part (5) with the side faces of the foot part (2) in engagement with the protruding wall portions (3) after insertion of the trough (1) in to the heating chamber (11).
2. An apparatus according to claim 1, characterized in that the foot part (2) of the trough (1) is of polygonal shape, preferably having four corners with rounded edges.
3. An apparatus according to claim 1 or 2, characterized in that the protruding wall portions (3) are in the form of guide walls having a larger distance from each other at the entrance side than at the inner side of the heating chamber (11) for receiving the complementary foot part (2) of the kneading trough (1) inserted from the entrance of the heating chamber.
4. An apparatus according to any preceding claim, characterized in that the second engagement means comprise projected portions (4) at the front end of the trough (1) and corresponding hole portions (12), or grooved portions, at the fitting part (5) of the heating chambers, and means (13, 14; 40, 43) for holding down the trough (1) within the protruding wall portions (3).
5. An apparatus according to claim 4, characterized in that the means for holding down comprise a permanent magnet (13) at the fitting part (5) of the heating chamber (11) and a metal plate (14) of ferromagnetic material at the bottom of the trough (1), or vice versa.
6. An apparatus according to claim 4, characterized in that the kneading trough is provided with a handle (15) at its side, and an operating lever (40) at the handle for releasable engagement of an opening (43), on the fitting part (5) at the opening side of the heating chamber (11).
7. An apparatus according to any preceding claim, characterized by a detection unit (27, 28, 29) for detecting the presence of the kneading trough on the fitting part (5) in properly locked manner.



switch. Therefore, the high-speed rotation when the kneading trough is not present in the heating chamber and/or the abnormal use when the kneading trough is present can be prevented, thus advantageously improving the safety of the apparatus.

(5) The kneading trough which can be put into the heating chamber directly with the raw materials for breads, cakes, etc. kneaded therein has the handle, so that the user can hold the kneading trough by one hand. Accordingly, the kneading trough is easy to be installed in or taken out of the heating chamber. Particularly, for example, when the heating chamber is high in temperatures immediately after cooking, it might be awfully dangerous that the user holds the kneading trough by both hands so as to release the engagement of the kneading trough with the main body of the apparatus through necessary manipulations such as twisting or the like. Therefore, the heating and cooking apparatus of the present invention can be said to be highly safe and convenient for use.

(6) The kneading trough having the handle provided in the lateral wall thereof is convenient for use when it is cleaned after use. Moreover, the handle of the kneading trough is made of so rigid material and secured to the kneading trough at at least opposite ends thereof that the kneading trough becomes accordingly solid and durable, realizing a long-life of the apparatus.

Although the present invention has been fully described by way of example with reference to the accompanying drawings, it is to be noted here that various changes and modifications will be apparent to those skilled in the art.

Claims

1. A heating and cooking apparatus comprising a heating chamber (11) having heating means (23, 24) for heating an object (35) to be cooked therein, a kneading trough (1) detachably installed in said heating chamber (11), a kneading vane (16) for kneading the object (35) to be cooked in said kneading trough (1), and a motor (17) for rotating said kneading vane through a transmission means (18, 19, 20); the kneading trough (1) being firmly but detachably held on a fitting part (5) of the heating chamber (11) by a holding mechanism preventing rotation of the kneading trough (1) relative to the fitting part (5); characterized in that the holding means consists of
 - a) first engagement means having wall portions (3) protruding from the fitting part (5) of the heating chamber (11) and surrounding side faces of a complementary foot part (2) of the kneading trough (1) for preventing rotation of the kneading trough (1), and
 - b) second engagement means (4, 12; 13, 14; 40, 43) for holding down the kneading trough (1) on the fitting part (5) with the side faces of the foot part (2) in engagement with the protruding wall portions (3) after insertion of the trough (1) in to the heating chamber (11).
2. An apparatus according to claim 1, characterized in that the foot part (2) of the trough (1) is of polygonal shape, preferably having four corners with rounded edges.
3. An apparatus according to claim 1 or 2, characterized in that the protruding wall portions (3) are in the form of guide walls having a larger distance from each other at the entrance side than at the inner side of the heating chamber (11) for receiving the complementary foot part (2) of the kneading trough (1) inserted from the entrance of the heating chamber.
4. An apparatus according to any preceding claim, characterized in that the second engagement means comprise projected portions (4) at the front end of the trough (1) and corresponding hole portions (12), or grooved portions, at the fitting part (5) of the heating chambers, and means (13, 14; 40, 43) for holding down the trough (1) within the protruding wall portions (3).
5. An apparatus according to claim 4, characterized in that the means for holding down comprise a permanent magnet (13) at the fitting part (5) of the heating chamber (11) and a metal plate (14) of ferromagnetic material at the bottom of the trough (1), or vice versa.
6. An apparatus according to claim 4, characterized in that the kneading trough is provided with a handle (15) at its side, and an operating lever (40) at the handle for releasable engagement of an opening (43), on the fitting part (5) at the opening side of the heating chamber (11).
7. An apparatus according to any preceding claim, characterized by a detection unit (27, 28, 29) for detecting the presence of the kneading trough on the fitting part (5) in properly locked manner.



8. A method of installing a kneading trough (1) into the heating chamber (11) of a heating and cooking apparatus having first engagement means (2, 3) for preventing rotation and second engagement means (4, 12; 13, 14; 40, 43) for holding down the kneading trough (1) on a fitting part (5) of the heating chamber (11), as claimed in anyone of claims 4 to 6, characterized by the steps of

- inserting the kneading trough (1) through an opening of the heating chamber (11) with its projected portions (4) into the hole portions (12) or grooved portions at the fitting part (5),
- lowering down the remaining foot part (2) of the trough (1) between the protruding wall portions (3), and
- holding the kneading trough (1) on the fitting part (5) by the means (13, 14; 40, 43) for holding down.

Patentansprüche

1. Gerät zum Erhitzen und Garen mit einer Heizkammer (11), die zum Erhitzen eines darin zu garenden Objektes (35) Heizvorrichtungen (23, 24) aufweist; mit einer Knetschüssel (1), die in der Heizkammer (11) herausnehmbar installiert ist; mit einer Knetschaufel (16) zum Kneten des zu garenden Objektes (35) in der Knetschüssel (1) und mit einem Motor (17) zum Rotieren der Knetschaufel mit Hilfe von Transmissionsmitteln (18, 19, 20); wobei die Knetschüssel (1) auf einem Halterungsteil (5) der Heizkammer (11) fest aber herausnehmbar von einer Halterungsvorrichtung gehalten wird, die ein Rotieren der Knetschüssel (1) gegenüber dem Halterungsteil (5) verhindert, dadurch gekennzeichnet, daß die Halterungsmittel bestehen aus
 - a) ersten angreifenden Mitteln mit Wandabschnitten (3), die von dem Halterungsteil (5) der Heizkammer (11) vorspringen, und umgebenden Seitenflächen eines komplementär ausgebildeten Fußteils (2) der Knetschüssel (1) zum Verhindern einer Rotation der Knetschüssel (1) und
 - b) zweiten angreifenden Mitteln (4, 12; 13, 14; 40, 43) zum Niederhalten der Knetschüssel (1) auf dem Halterungsteil (5), wobei die Seitenflächen des Fußteils (2) nach dem Einsetzen der Knetschüssel (1) in die Heizkammer (11) an den vorspringenden Wandabschnitten (3) angreifen.
2. Gerät nach Anspruch 1, dadurch gekennzeichnet, daß der Fußteil (2) der Knetschüssel (1) eine polygonale Form aufweist, vorzugsweise eine viereckige Form mit abgerundeten Kanten.
3. Gerät nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die vorspringenden Wandabschnitte (3) als Führungswände zur Aufnahme des komplementär ausgebildeten Fußteils (2) der von der Einschuböffnung in die Heizkammer her eingesetzten Knetschüssel (1) ausgebildet sind, die an der Einschubseite weiter voneinander entfernt sind als im rückwärtigen Teil der Heizkammer (11).
4. Gerät nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die zweiten angreifenden Mittel vorspringende Abschnitte (4) am vorderen Ende der Knetschüssel (1) und entsprechende Öffnungsabschnitte (12) oder Nutenabschnitte am Halterungsteil (5) der Heizkammer enthalten sowie Mittel (13, 14; 40, 43) zum Niederhalten der Knetschüssel (1) innerhalb der vorspringenden Wandabschnitte (3).
5. Gerät nach Anspruch 4, dadurch gekennzeichnet, daß die Mittel zum Niederhalten einen Dauermagneten (13) am Halterungsteil (5) der Heizkammer (11) und eine Metallplatte (14) aus ferromagnetischem Material am Boden der Knetschüssel (1) oder eine umgekehrte Anordnung umfassen.
6. Gerät nach Anspruch 4, dadurch gekennzeichnet, daß an einer Seite der Knetschüssel eine Handhabe (15) vorgesehen ist und daran ein Betätigungshebel (40) zum lösbaren Eingriff in eine Öffnung (43) im Halterungsteil (5) an der Einschubseite der Heizkammer (11).
7. Gerät nach einem der vorhergehenden Ansprüche, gekennzeichnet durch eine Detektoreinheit (27, 28, 29) zum Feststellen des Vorhandenseins der Knetschüssel auf dem Halterungsteil (5) in wirksam festgesetzter Weise.
8. Verfahren zum Einführen einer Knetschüssel (1) in die Heizkammer (11) eines Gerätes zum Erhitzen und Garen mit ersten angreifenden Mitteln (2, 3) zum Verhindern einer Rotation und zweiten angreifenden Mitteln (4, 12; 13, 14; 40, 43) zum Niederhalten der Knetschüssel (1) auf einem Halterungsteil (5) der Heizkammer (11), wie er in einem der Ansprüche 4 bis 6 beansprucht wird,



gekennzeichnet durch die Schritte

- Einführen der Knetschüssel (1) durch eine Öffnung in der Heizkammer (11) mit ihren vorspringenden Abschnitten (4) in die Öffnungs- oder Nutenabschnitte des Halterungsteils (5),
- Niedersetzen des übrigen Fußteils (2) der Knetschüssel (1) zwischen die vorspringenden Wandabschnitte (3) und
- Haltern der Knetschüssel (1) auf dem Halterungsteil (5) mit Hilfe der Mittel (13, 14; 40, 43) zum Niederhalten.

Revendications

1. Dispositif de chauffage et de cuisson comprenant une chambre de chauffe (11) équipée de moyens chauffants (23, 24) destinés à chauffer un objet (25) qu'il s'agit d'y cuire, un godet malaxeur (1) montée de façon détachable dans ladite chambre de chauffe (11), une palette de malaxage (16) servant à malaxer l'objet (35) qu'il s'agit de cuire dans ledit godet malaxeur (1), et un moteur (17) servant à faire tourner ladite palette de malaxage par l'intermédiaire de moyens de transmission (18, 19, 20); le godet malaxeur (1) étant fixé solidement mais de façon démontable sur une monture (5) de la chambre de chauffe (11) par un mécanisme de blocage qui empêche le godet malaxeur (1) de tourner par rapport à la monture (5);

caractérisé en ce que

les moyens de blocage comprennent

- (a) des premiers moyens ayant des parties de parois (3) qui font saillie sur la monture (5) de la chambre de chauffe (11) et qui entourent des faces latérales d'une partie pied complémentaire (2) du godet malaxeur (1) pour empêcher le godet malaxeur (1) de tourner, et
- (b) des deuxièmes moyens de prise (4, 12; 13, 14; 40, 43) servant à retenir le godet malaxeur (1) sur la monture (5) avec les faces latérales de la partie pied (2) en prise avec les parties de parois saillantes (3) après l'introduction du godet (1) dans la chambre de chauffe (11).

2. Dispositif selon la revendication 1, caractérisé en ce que la partie pied (2) du godet (1) est d'une forme polygonale qui présente de préférence quatre angles à arêtes arrondies.
3. Dispositif selon la revendication 1 ou 2, caractérisé en ce que les parties de parois saillantes (3) se présentent sous la forme de parois de guidage ayant une plus grande distance

d'écartement mutuel au droit du côté d'entrée que sur le côté intérieur de la chambre de chauffe (11) pour recevoir la partie pied complémentaire (2) du godet malaxeur (1) introduite par l'entrée de la chambre de chauffe.

4. Dispositif selon une quelconque des revendications précédentes, caractérisé en ce que les deuxièmes moyens de prise comprennent des parties saillantes (4) à l'extrémité avant du godet (1) et des trous correspondants (12), ou des rainures correspondantes, sur la monture (5) de chambre de chauffe, et des moyens (13, 14; 40, 43) servant à retenir le godet (1) dans les parties de parois saillantes (3).
5. Dispositif selon la revendication 4, caractérisé en ce que les moyens de retenue comprennent un aimant permanent (13) dans la monture (5) de la chambre de chauffe (11) et une plaque métallique (14) en matière ferromagnétique au fond du godet (1), ou inversement.
6. Dispositif selon la revendication 4, caractérisé en ce que le godet malaxeur est muni d'une poignée (15) sur son côté, et d'un levier de commande (40) au droit de la poignée pour coopérer de façon séparable avec une ouverture (43) de la monture (5) sur le côté d'ouverture de la chambre de chauffe (11).
7. Dispositif selon une des revendications précédentes, caractérisé par une unité de détection (27, 28, 29) destinée à détecter la présence du godet malaxeur sur la monture (5) d'une façon convenablement verrouillée.
8. Procédé de montage d'un godet malaxeur (1) dans la chambre de chauffe (11) d'un appareil de chauffage et de cuisson, possédant des premiers moyens de prise (2, 3) servant à empêcher la rotation et des deuxièmes moyens de prise (4, 12; 13, 14; 40, 43) servant à retenir le godet malaxeur (1) sur une monture (5) de la chambre de chauffe (11) selon une quelconque des revendications 4 à 6, caractérisé par les phases consistant à :
 - introduire le godet malaxeur (1) à travers l'ouverture de la chambre de chauffe (11), en plaçant ses parties saillantes (4) dans les trous (12) ou les rainures de la monture (5),
 - abaisser la partie pied restante (2) du godet (1) entre les parties de parois saillantes (3); et
 - retenir le godet malaxeur (1) sur la monture (5) à l'aide des moyens de retenue



(13, 14 ; 40, 43).

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