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Multiply Rice Cooker Pot



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Field of Invention

- 5 The present invention relates to a rice cooker pot and more particularly to a rice cooker pot with improved heat conducting properties. This invention can also be used to cook or heat foods other than rice.

10 Background of the Invention

- The process of cooking rice usually requires an enclosed container with a breath-hole for excess steam to exit. Uncooked rice is placed inside a rice cooker together with an amount of water and is then heated until boiling. The rice is simmered until most of the
15 water has evaporated and the rice is cooked.

- Currently, commercial rice cookers typically use a pot on the inside that holds the rice during the cooking process. Heating elements on the underside provide the heating to the pot. The material used for the inner pot is typically aluminum. Whilst this is a good
20 conductor of heat, and therefore uses less energy to heat and cook an amount of rice, it does not disperse the heat evenly from the localized heating elements on the underside. This results in 'hot patches' that may burn parts of the rice. Furthermore, it has been suggested that aluminum contaminates the food and is therefore not as safe for the use of heating and cooking foods as other materials, such as stainless steel.

- 25 There is currently a small percentage of manufactured rice cooker pots that are made from stainless steel, and addresses the problem of contamination. It also addresses the problem of uneven heating, as stainless steel disperses heat better than aluminum. However, although stainless steel is a strong, safe and durable material, it is not as good a
30 heat conductor as aluminum. More energy is therefore required to cook an amount of rice compared to a rice cooker pot made from aluminum.

It is therefore an objective of this invention to increase the heat conducting properties of a rice cooker pot whilst maintaining its structural strength, durability and food compatibility by using a layer combination of two or more different materials. This could
5 be a combination of stainless steel which has good strength and durability qualities, and aluminum which has high heat conducting properties.

Summary of the Invention

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The invention described herein is an article of manufacture used for cooking rice. It is the pot of a rice cooker, and is heated by heating elements usually attached to the external casing of the rice cooker. The invention described herein is constructed with two or more layers of at least two different materials. The combination of materials and arrangement
15 of the layers are designed to increase the overall heat conducting properties of the pot whilst maintaining its structural strength, durability and food compatibility. This will reduce the energy required to heat and thus cook the rice within. It will also reduce the likelihood of 'hot patches' which may result in burnt areas of rice.

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The manufacturing process is given a brief description here. Two or more square shaped layers of stainless steel and aluminum are bonded together by a cladding process. This multiply combination is then shaped into circles by a blanking process. The circles are then cold-pressed into a pot like shape by recessing the middle of the circle to form the floor of the pot and the outer edge of the circle to form the wall of the pot. Lastly a lip is
25 formed at the top of the pot walls by a flanging process. The main purpose of the lip is to enable a lid to rest on top of the pot.

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In one embodiment of the invention described herein, a layer of aluminum which comprises the outer layer of the pot is bonded to a layer of stainless steel, which
30 comprises the inner layer of the pot. The layer of aluminum will conduct heat more efficiently to the layer of stainless steel. The layer of stainless steel is still required to

maintain the strength, durability and hygienic qualities of the pot. The outer layer of aluminum is covered with a high heat resistant coating to protect it and prolong its operational lifespan. This is called the two-ply inner pot embodiment.

- 5 In another embodiment, a layer of aluminum is sandwiched between two layers of stainless steel. In this embodiment, the external layers of stainless steel will protect the layer of aluminum and increase the operational lifespan of the invention. The internal layer of aluminum will increase the overall heat conducting properties of the pot.
- 10 In yet other embodiments of this invention more layers of these different materials are used with appropriate thicknesses to improve the overall heat conducting properties of the pot.

- In all of the above embodiments, the layered combination of these two materials will
- 15 increase the heat dispersion and reduce localized heating. This will lower the chances of the rice being burnt by 'hot patches'.

Brief Description of the Drawings

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The invention will be fully understood by reference to the following drawings, which are for illustrative purposes only:

Figure 1 shows a cross-sectional view of the invention in one of its embodiments.

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Figure 2 shows an enlarged cross-sectional view of the invention in one of its embodiments.

- Figure 3 shows an enlarged cross-sectional view of the invention in another one of its
- 30 embodiments.

Figure 4 shows the cross-sectional view of an embodiment with a bottom comprising 2 layers of different materials.

Detailed Description of the Invention

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Referring more specifically to the drawings, for illustrative purposes, the present invention is embodied in the apparatus shown cross-sectionally in Figure 1, Figure 2 and Figure 3. It will be appreciated that the actual design may vary as to configuration and as to details of the part, and the method may vary as to the specific steps and sequence, without departing from the basic concepts as disclosed herein.

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Figure 1 shows a cross-sectional view of the rice cooker pot in one of its embodiments. The floor 7 is circular in shape and is joined at the outer edges by the side walls 2 which, together with the floor 7 forms a cylindrical pot-like shape. Both the floor 7 and side walls 2 are formed when a circular sheet is cold-pressed. The lip 4 of the pot is formed by a flanging process and has an indentation on the inside circumference on which a lid may rest.

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Figure 2 is an enlarged cross-sectional view of the layered combination of materials in one of its embodiments. This particular embodiment is called the 3-ply pot whereby a middle layer of aluminum 17 is sandwiched in between an outer layer of stainless steel 12 and an inner layer of stainless steel 14. The outer and inner layers of stainless steel will improve heat dispersion whilst maintaining the structural strength and food compatibility qualities of the pot.

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Figure 3 is an enlarged cross-sectional view of the layered combination of materials in one of its embodiments. This particular embodiment is called the 5-ply pot whereby a 3-ply aluminum middle portion comprising two layers of pure aluminum 117 on the outside and one layer of aluminum alloy 119 in the middle to further increase rigidity is sandwiched in between an outer layer of stainless steel 112 and an inner layer of stainless

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steel 114. The outer and inner layers of stainless steel will improve heat dispersion whilst maintaining the structural strength and food compatibility qualities of the pot.

5 The cross section of the most preferred embodiment is shown in Figure 4. The bottom of the pot 7 has two layers made of different metals. The outer layer, made of aluminum 17, receives heat from the rice-cooker's heating element. This heat is transferred to the inner layer 14 through heat conduction. The inner layer 14, made of stainless steel, is a weaker conductor of heat in comparison to the outer aluminum layer. As such, the heat is able to spread more evenly on the inner layer 14 before coming in contact with the foodstuffs
10 contained within the pot. This results in a more even cooking of food at the bottom of the pot 7 and eliminates 'hot patches'.

In one embodiment of the invention described herein, a layer of aluminum which comprises the outer layer of the pot is bonded to a layer of stainless steel, which
15 comprises the inner layer of the pot. The layer of aluminum will conduct heat more efficiently to the layer of stainless steel. The layer of stainless steel is still required to maintain the strength, durability and hygienic qualities of the pot. The outer layer of aluminum is covered with a high heat resistant coating to protect it and prolong its operational lifespan. This is called the two-ply inner pot embodiment.

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In one preferred embodiment of the present invention, only the pot bottom of the rice cooker pot is made of two layers of different materials, with the inner layer made of high strength and durable material which is suitable for contact with food and on outer layer made of high heat-conducting materials, which is bonded to the outside of the inner layer.

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In another embodiment, a layer of aluminum is sandwiched between two layers of stainless steel. In this embodiment, the external layers of stainless steel will protect the layer of aluminum and increase the operational lifespan of the invention. The internal layer of aluminum will increase the overall heat conducting properties of the pot.

Preferably, the inner layer of the pot has a thickness between 0.4 – 2.0mm to assist in an even distribution of heat and eliminate hot patches in the pot.

5 In yet other embodiments of this invention more layers of these different materials are used with appropriate thicknesses to improve the overall heat conducting properties of the pot.

10 In all of the above embodiments, the layered combination of these two materials will increase the heat dispersion and reduce localized heating. This will lower the chances of the rice being burnt by 'hot patches'.

Accordingly, it will be seen that this invention can be implemented in a variety of ways. Although the description above contains many specifics, these should not be construed as limiting the scope of this invention. Thus the appended claims and their legal equivalents
15 should determine the scope of this invention.

Claims

1. A rice cooker pot comprising:
 - an inner layer, made of a high strength and durable material and suitable for contact with food; and
 - an outer layer, made of a high heat-conducting material, which is bonded to the outside of the inner layer;
 - wherein the outer layer of the pot bottom receives heat from a heat source and transmits the heat to the inner layer, which heat is spread uniformly throughout the inner layer contacting with food;
 - wherein the inner layer has a thickness between 0.4 – 2.0 mm;
 - wherein the outer layer is made from aluminum; and
 - wherein the inner layer is made from stainless steel or titanium.
2. A rice cooker pot as mentioned in claim 1, further comprising an additional layer of a high -resistant coating to enhance durability of said aluminum layer.
3. A rice cooker pot as mentioned in claim 1 or 2, further comprising a plurality of layers disposed between the inner and outer layers of the pot bottom, said layers of the pot bottom alternating between a layer made of the high strength and durable material and a layer made of the high heat-conducting material,
 - wherein the alternating layers assist in spreading the heat uniformly across the pot bottom.
4. A rice cooker pot as mentioned in claim 1, further comprising an additional layer of a high strength and durable material, bonded to the outside of the inner layer.
5. A rice cooker pot as mentioned in claim 5, wherein the additional layer is made of stainless steel.
6. A rice cooker pot as mentioned in claim 1, further comprising additional layers of the high heat-conducting materials and high strength and durability materials.
7. A rice cooker pot as mentioned in claim 1, wherein the outer and inner layers are bonded

together by a cladding process.

8. A rice cooker pot with a pot bottom comprising:

an inner layer, made of a high strength and durable material and suitable for contact with food;

5 an outer layer, made of a high heat-conducting material, which is bonded to the outside of the inner layer;

wherein the outer layer of the pot bottom receives heat from a heat source and transmits the heat to the inner layer, which heat is spread uniformly throughout the inner layer contacting with food;

10 wherein the inner layer has a thickness between 0.4 – 2.0 mm;

wherein the outer layer is made from aluminum; and

wherein the inner layer is made from stainless steel or titanium.

9. A rice cooker pot as mentioned in claim 8, further comprising an additional layer of a high

15 resistant coating to enhance durability of said aluminum layer.

10.A rice cooker pot as mentioned in claim 8 or 9, further comprising a plurality of layers disposed between the inner and outer layers of the pot bottom, said layers of the pot bottom alternating between a layer made of the high strength and durable material and a layer made of

20 the high heat-conducting material,

wherein the alternating layers assist in spreading the heat uniformly across the pot bottom.

11.A rice cooker pot as mentioned in claim 8, further comprising an additional layer of a high strength and durable material, bonded to the outside of the inner layer.

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12.A rice cooker pot as mentioned in claim 11, wherein the additional layer is made of stainless steel.

13.A rice cooker pot as mentioned in claim 8, further comprising additional layers of the high heat-conducting materials and high strength and durability materials.

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14.A rice cooker pot as mentioned in claim 8, wherein the outer and inner layers are bonded together by a cladding process.