

DESCRIPTION

HEATING COOKER AND ASSEMBLING METHOD THEREFOR

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TECHNICAL FIELD

The present invention relates to a heating cooker including a top plate adapted to have an object, such as a pot, placed thereon, and to a method for assembling the heating cooker.

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BACKGROUND ART

Fig. 26 is a perspective view of conventional heating cooker 5001 disclosed in patent document 1. Fig. 27 is a sectional view of heating cooker 5001 at line 27-27 shown in Fig. 26.

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As is shown in Fig. 26, top plate 502 is provided at the upper portion of housing 501 and is adapted to have an object, such as a pot and a pan, placed thereon. Four sides of square top plate 502 are covered with metallic frame members 503A to 503D having sections having substantially squared U-shape. Two ends of frame members 503A to 503D adjacent to each other are connected with coupler 504 made of resin. As is shown in Fig. 27, protrusion 504B is provided substantially at a middle point of coupler 504. Both sides of protrusion 504B of coupler 504 are inserted into ends of two of the frame members adjacent to each other. Top plate 502, frame members 503A to 503D, and coupler 504 are sealed with each other to prevent water spilt on top plate 502 from entering into housing 501. Frame members 503A to 503D protect a periphery of top plate 502.

In conventional heating cooker 5001, coupler 504 is inserted into two frame members, for example, members 503A and 503C. In order to

assemble top plate 502, frame members 503A to 503C, and coupler 504, first, an adhesive is applied to frame members 503C and 503D and coupler 504, and they are attached to top plate 502. Then, frame members 503A and 503B with the adhesive applied inside are attached to top plate 502 while
5 sliding along coupler 504 so that coupler 504 is fitted into frame members 503A and 503B. At this moment, the adhesive applied to frame members 503A and 503B is often squeezed out and sticks to an unintended area, reducing efficiency of the assembling work. Besides, variations in assembling frame members 503A to 503D and coupler 504 may cause a
10 clearance between the frame members and the coupler, detracting from the appearance of heating cooker 5001.

Patent Document 1: JP 2006-59743A

SUMMARY OF THE INVENTION

15 A heating cooker includes a top plate having an upper surface and an outer periphery, the upper surface being adapted to have an object placed thereon, a frame covering a portion of the outer periphery of the top plate, a front plate covering a portion of the outer periphery of the top plate other than the portion of the outer periphery covered with the frame, and a coupler
20 connecting the frame and the front plate. The coupler includes a protrusion contacting an end of the frame and an end of the front plate. The protrusion covers at least one of the end of the frame and the end of the front plate.

In the heating cooker, even if variations occur in assembling processes with the coupler, a jointing section is not visible.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1A is a perspective view of a heating cooker in accordance with

Exemplary Embodiment 1 of the present invention.

Fig. 1B is a sectional view of the heating cooker at line 1B-1B shown in Fig. 1A.

5 Fig. 2 is a sectional view of the heating cooker at line 2-2 shown in Fig. 1A.

Fig. 3A is an exploded perspective view of the heating cooker in accordance with Embodiment 1.

Fig. 3B is a sectional view of the heating cooker at line 3B-3B shown in Fig. 3A.

10 Fig. 3C is a sectional view of another coupler of the heating cooker in accordance with Embodiment 1.

Fig. 4 is a perspective view of a heating cooker in accordance with Exemplary Embodiment 2 of the invention.

15 Fig. 5 is a sectional view of the heating cooker at line 5-5 shown in Fig. 4.

Fig. 6 is a perspective view of a heating cooker in accordance with Exemplary Embodiment 3 of the invention.

Fig. 7 is a sectional view of the heating cooker at line 7-7 shown in Fig. 6.

20 Fig. 8 is a perspective view of a heating cooker in accordance with Exemplary Embodiment 4 of the invention.

Fig. 9 is a sectional view of the heating cooker at line 9-9 shown in Fig. 8.

25 Fig. 10 is a perspective view of an essential part of a heating cooker in accordance with Exemplary Embodiment 5 of the invention.

Fig. 11A is a perspective view of an essential part of a heating cooker in accordance with Exemplary Embodiment 6 of the invention.

Fig. 11B is a sectional view of the heating cooker at line 11B-11B shown in Fig. 11A.

Fig. 12A is an exploded perspective view of an essential part of the heating cooker in accordance with Embodiment 6.

5 Fig. 12B is a sectional view of an essential part of another heating cooker in accordance with Embodiment 6.

Fig. 13 is a rear view of a heating cooker in accordance with Exemplary Embodiment 7 of the invention.

10 Fig. 14A is an exploded perspective view of the heating cooker in accordance with Embodiment 7.

Fig. 14B is a sectional view of the heating cooker at line 14B-14B shown in Fig. 14A.

Fig. 15 is a perspective view of a heating cooker in accordance with Exemplary Embodiment 8 of the invention.

15 Fig. 16 is a perspective view of an essential part of a heating cooker in accordance with Embodiment 8.

Fig. 17 is a plan view of an essential part of the heating cooker shown in Fig. 16.

20 Fig. 18 is a sectional view of the heating cooker at line 18-18 shown in Fig. 17.

Fig. 19 is a sectional view of an essential part of a heating cooker in accordance with Exemplary Embodiment 9 of the invention.

Fig. 20 is a perspective view of a coupler of the heating cooker in accordance with Embodiment 9.

25 Fig. 21 is an exploded perspective view of a heating cooker in accordance with Exemplary Embodiment 10 of the invention.

Fig. 22 is a sectional view of an essential part of the heating cooker in

accordance with Embodiment 10.

Fig. 23 is a sectional view of an essential part of a heating cooker in accordance with Exemplary Embodiment 11 of invention.

Fig. 24 is a sectional view of an essential part of a heating cooker in
5 accordance with Exemplary Embodiment 12 of invention.

Fig. 25 is a perspective view of an essential part of a heating cooker in accordance with Exemplary Embodiment 13 of invention.

Fig. 26 is a perspective view of a conventional heating cooker.

Fig. 27 is a sectional view of the conventional heating cooker at line
10 27-27 shown in Fig. 26.

REFERENCE NUMERALS

11	Top Plate
12	Frame
15 13	Front Plate
14	Coupler
14A	Insert Section
15	Protrusion
19	Supporting Plate
20 24	Sealing Material
512	Top Plate
513	Frame
515	Front Plate
517	Coupler
25 517A	Insert Section
517B	Joint Section
617C	Inclining Surface

517D Stepped Section

518 Supporting Plate

518A Supporting Section

518B Contacting Section

5 519 Fixing Section

520 Protrusion

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

EXEMPLARY EMBODIMENT 1

10 Fig. 1A is a perspective view of heating cooker 1001 in accordance with Exemplary Embodiment 1 of the present invention. Fig. 1B is a sectional view of heating cooker 1001 at line 1B-1B shown in Fig. 1A. Heating cooker 1001 includes top plate 11, frame 12 covering an outer periphery of top plate 11, front plate 13 covering an outer periphery of top plate 11, and coupler 14
15 connecting frame 12 with front plate 13. Top plate 11 has top surface 911E adapted to have an object, such as a pot, placed thereon, and is made of heat-resistance material, such as ceramic. Top plate 11 has substantially a rectangular shape having four sides 911A through 911D surrounding the plate. Sides 911A and 911C are located opposite to each other, and sides
20 911B and 911D are opposite to each other. Frame 12 covers sides 911B to 911D of top plate 11, and has a cross section having a squared U-shape. Front plate 13 covers side 911A and is separate from frame 12. Coupler 14 is made of resin. Heating cooker 1001 is built in cabinet 16. Frame 12 covers a portion of the outer periphery of top plate 11, while front plate 13
25 covers a portion of the outer periphery other than the portion covered with frame 12.

Fig. 2 is a sectional view of heating cooker 1001 at line 2-2 shown in Fig.

1A. Fig. 3A is an exploded perspective view of heating cooker 1001. Fig. 3B is a sectional view of heating cooker 1001 at line 3B-3B shown in Fig. 3A. Frame 12 is formed by bending a straight material at two positions. Front plate 13 has substantially a rectangular shape surrounded by sides 13C to 13F. Sides 13C and 13E are opposite to each other while sides 13D and 13F are opposite to each other. Cover 13B is provided at side 13C of front plate 13 and covers side 911A and upper surface 911E of top plate 11. Operating section 13A provided on upper surface 13G of front plate 13 includes touch keys for operating heating cooker 1001. Sides 13D to 13F except for 13C of front plate 13 are bent downward to have a squared U-shape.

As shown in Figs. 2 and 3A, coupler 14 has protrusion 15 contacting end 12A of frame 12 and end 13H of front plate 13. End 12A of frame 12 faces end 13H of front plate 13 across protrusion 15. Protrusion 15 covers end 13H of front plate 13. Protrusion 15 protrudes by a height ranging from about 1mm to 5mm and covers a portion of upper surface 13G. Coupler 14 has insert section 14A that is fitted through end 12A into frame 12.

A method of assembling heating cooker 1001 will be described below.

First, frame 12 is attached to top plate 11. Insert section 14A of coupler 14 is press-fitted into frame 12. Protrusion 15 of coupler 14 contacts end 12A of frame 12, and protects the edge of end 12A. Front plate 13 is attached to side 911A of top plate 11. Then, sides 911B and 911C of top plate 11 are nipped with frame 12 having coupler 14 press-fitted therein so as to assemble top plate 11 with frame 12. Then, frame 12 is slid on sides 911B and 911D of top plate 11 toward front plate 13 until coupler 14 contacting end 13H of front plate 13. Coupler 14 includes protrusion 15 protruding beyond end 13H of front plate 13 and partly covering front plate 13. This structure allows coupler 14 to be easily assembled with front plate

13. Protrusion 15 of coupler 14 covers end 13H of front plate 13. Coupler 14 may not entirely contact end 13H due to variations in the press-fitting to provide a gap between end 13H and coupler 14. Even in this case, protrusion 15 covers end 13H of front plate 13 and allows frame 12 to be
5 attached to front plate 13 while preventing the gap from being seen from outside.

According to Embodiment 1, as described above, coupler 14 has protrusion 15 that contact end 12A of frame 12 and end 13H of front plate 13. Protrusion 15 covers end 13H. Even if a gap is produced between coupler 14
10 and front plate 13, this structure prevents the gap from being seen from outside.

Insert section 14A of coupler 14 is inserted to frame 12. This structure allows coupler 14 to be assembled with front plate 13 after insert section 14A of coupler 14 is inserted into frame 12, hence allowing heating cooker 1001 to
15 be assembled easily.

Fig. 3C is a sectional view of another heating cooker 1002 in accordance with Embodiment 1. In Fig. 3C, components identical to those of heating cooker 1001 shown in Figs. 2 and 3 are denoted by the same reference numerals, and their description will be omitted. Heating cooker 1002
20 shown in Fig. 3C includes coupler 114 instead of coupler 14 of heating cooker 1001. Protrusion 115 of coupler 114 covers end 12A of frame 12, not end 13H of front plate 13. Insert section 114A of coupler 114 is inserted through end 13H into front plate 13.

Heating cooker 1002 is assembled by the following procedure. Frame
25 12 is assembled with top plate 11. Insert section 114A of coupler 114 is press-fitted into front plate 13. Protrusion 115 of coupler 114 contacts end 13H of front plate 13, thereby protecting the edge of end 13H. Front plate

13 having coupler 114 inserted thereto is attached to side 911A of top plate 11 while end 12A of frame 12 contacts protrusion 115 of coupler 114 so that frame 12 is nipped with protrusion 115. Coupler 114 includes protrusion 115 protruding beyond end 12A of frame 12 and partly covering frame 12, and is easily assembled to frame 12. Protrusion 115 of coupler 114 covers end 12A of front frame 12. End 12A may not sufficiently contact coupler 114 due to variations in press-fitting, and may produce a gap between end 12A and coupler 114. Even in this case, protrusion 115 covering end 12A of frame 12 prevents the gap from being visible from outside, thus allowing frame 12 to be attached to front plate 13 without a gap visible from outside.

According to Embodiment 1, as described above, coupler 114 has protrusion 115 contacting end 12A of frame 12 and end 13H of front plate 13. End 12A is covered with protrusion 115. Even if a gap is produced between frame 12, coupler 114, and front plate 13, coupler 114 prevents the gap from being visible from outside.

Insert section 114A of coupler 114 is inserted into front plate 12. This structure allows coupler 114 to be assembled with frame 12 after coupler 114 to be fitted to front plate 12, thereby allowing heating cooker 1002 to be assembled easily.

According to Embodiment 1, frame 12 is formed by bending a straight member at two positions. Frame 12 may be composed of separate pieces attached to sides 911B to 911D of top plate 11. In that case, the pieces of the frame are connected with couplers each having a structure identical to that of coupler 14 or 114, providing the same effects.

Protrusions 115 and 115 of couplers 14 and 114 have widths as small as possible. This arrangement provides heating cookers 1001 and 1002 with flat appearances at the connecting sections.

Couplers 14 and 114 may not necessarily be made of resin, and may be made of rubber. In this case, couplers 14 and 114 can seal front plate 13, frame 12 and top plate 11 reliably.

Heating cookers 1001 and 1002 may not necessarily be a structure in combination with cabinet 16, but may be a standalone type, providing the same effects.

EXEMPLARY EMBODIMENT 2

Fig. 4 is a perspective view of heating cooker 1003 in accordance with Exemplary Embodiment 2 of the present invention. Fig. 5 is a sectional view of heating cooker 1003 at line 5-5 shown in Fig. 4. In Figs. 4 and 5, components identical to those of heating cooker 1001 shown in Figs. 1A to 3B are denoted by the same reference numerals, and their description will be omitted.

According to this embodiment, heating cooker 1003 further includes adhesive 18 disposed in space 17 between top plate 11 and frame 12. Adhesive 18 made of heat-resistant material, such as silicone is applied entirely into space 17 to seal between top plate 11 and frame 12. Sealing tightly between top plate 11 and frame 12, adhesive 18 prevents water from entering from outside through space 17. Adhesive 18 may not necessarily be liquid, such as silicone, but may be composed of a sealing tape. This prevents water from entering wherever the water is spilt on top plate 11.

Adhesive 18 is provided between top plate 11 and frame 12. The adhesive may be further applied between top plate 11 and front plate 13, particularly between top plate 11 and cover 13B. The adhesive may be applied between coupler 14 and top plate 11, between coupler 14 and frame 12, and between coupler 14 and front plate 13, thereby sealing between these

components reliably and providing the heating cooker with high reliability.

Adhesive 18 may be applied insufficiently onto insert section 14A of coupler 14 which is press-fitted to frame 12. Even in that case, adhesive can seal reliably between insert section 14 of coupler 14 and frame 12, thereby eliminating a gap between insert section 14A and frame 12. Thus, adhesive 18 can entirely seal an outer periphery of frame 12. Adhesive 18 may be applied to portions, such as spaces between coupler 14 and front plate 13 and between coupler 14 and top plate 11, covered with coupler 14, thereby reliably sealing between coupler 14 and front plate 13 and between coupler 14 and top plate 11.

EXEMPLARY EMBODIMENT 3

Fig. 6 is a perspective view of heating cooker 1004 in accordance with Exemplary Embodiment 3 of the present invention. Fig. 7 is a sectional view of the heating cooker at line 7-7 shown in Fig. 6. In Figs. 6 and 7, components identical to those of heating cooker 1003 shown in Figs. 4 and 5 according to Embodiment 2 are denoted by the same reference numerals, and their description will be omitted.

Heating cooker 1004 further includes supporting plate 19 provided under top plate 11 to support top plate 11, and adhesive 118 for bonding top plate 11 with supporting plate 19. Supporting plate 19 and adhesive 118 are provided entirely along an outer periphery of frame 12. Adhesive 118 is applied onto stepped portion 20 formed entirely along an outer periphery of supporting plate 19.

An operation of heating cooker 1004 will be described below.

Adhesive 18 is applied into space 17 between frame 12 and top plate 11. Even if water spills on upper surface 911E of top plate 11 and reaches

between frame 12 and top plate 11, adhesive 18 prevents the water from entering inside the heating cooker. If a portion of adhesive 18 is cut, the water may flow along the outer periphery of frame 12. Adhesive 118 prevents the water from entering the inside of the heating cooker.

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EXEMPLARY EMBODIMENT 4

Fig. 8 is a bottom perspective view of heating cooker 1005 in accordance with Exemplary Embodiment 4 of the present invention. Fig. 9 is a sectional view of the heating cooker at line 9-9 shown in Fig. 8. In Figs. 8 and 9, components identical to those of heating cooker 1004 shown in Figs. 6 and 7 according to Embodiment 3 are denoted by the same reference numerals, and their description will be omitted. Fig. 8 illustrates heating cooker 1005 upside down.

In heating cooker 1005 according to this embodiment, lower surface 21 of frame 12 is substantially flush with lower surface 22 of front plate 13 and lower surface 23 of coupler 14. Sealing material 24 is provided continuously on outer peripheries of lower surfaces 21, 22 and 23.

Sealing material 24 is made of foam silicone, sealing tape, or rubber packing.

Water spilt over upper surface 1E of top plate 11 may enter between frame 12 and cabinet 16. In heating cooker 1005, however, sealing material 24 provided between frame 12 and cabinet 16 prevents the water from entering into cabinet 16. Similarly, sealing material 24 seals lower surface 22 of front plate 13 and lower surface 23 of coupler 14, and prevents the water from entering into cabinet 16. A connecting section between lower surface 21 of frame 12 and lower surface 23 of coupler 14 can be entirely sealed reliably by allowing frame 12 and coupler 14 to overlap or by allowing

sealing material 24 to filling the connecting section. Thus, heating cooker 1005 prevents water from entering into cabinet 16, thus having high reliability.

5 EXEMPLARY EMBODIMENT 5

Fig. 10 is a perspective view of heating cooker 1006 in accordance with Exemplary Embodiment 5 of the present invention. In Fig. 10, components identical to those of heating cooker 1001 shown in Fig. 1 according to Embodiment 1 are denoted by the same reference numerals, and their description will be omitted. In heating cooker 1006, protrusion 15 of coupler 14 is chamfered and has inclining portion 25 that inclines with respect to frame 12 and front plate 13. When a user wipes top plate 11, frame 12, and coupler 14 with a tablecloth, the tablecloth is not scratched at inclining portion 25 of coupler 14, hence preventing dust from collecting at coupler 14. A smooth shape of inclining portion 25 prevents coupler 14 from being noticeable.

EXEMPLARY EMBODIMENT 6

Fig. 11A is a perspective view of heating cooker 1007 in accordance with Exemplary Embodiment 6 of the present invention. Fig. 11B is a sectional view of heating cooker 1007 at line 11B-11B shown in Fig. 11A. Fig. 12A is an exploded perspective view of heating cooker 1007. In Figs. 11A, 11B and 12A, components identical to those of heating cooker 1001 shown in Fig. 1 according to Embodiment 1 are denoted by the same reference numerals, and their description will be omitted.

Heating cooker 1007 according to this embodiment includes coupler 26 instead of coupler 14 of heating cooker 1001 shown in Fig. 1. Coupler 26

has insert section 26A and protrusion 15 corresponding to insert section 14A and protrusion 15 of coupler 14, respectively. Coupler 26 further has protrusion 15A covering a portion of frame 12. Coupler 26 covers end 12A of frame 12 and end 13H of front plate 13. Insert section 26A of coupler 26 is fitted to frame 12. Protrusions 15 and 15A cover front plate 13 and frame 12, respectively to have overlapping width ranging from 1mm to 5mm on front plate 13 and frame 12.

A method of assembling heating cooker 1007 will be described below. First, frame 12 is assembled with top plate 11. Insert section 26A of coupler 26 is press-fitted into frame 12 to allow protrusion 15 of coupler 26 to contact end 12A of frame 12, thus protecting edges of end 12A. Front plate 13 is attached to side 911A of top plate 11. Then, frame 12 with couplers 26 press-fitted thereto is assembled with top plate 11 such that frame 12 nips sides 911B and 911C of top plate 11. Frame 12 is slid on sides 911B and 911D of top plate 11 toward front plate 13 until coupler 26 contacts end 13H of front plate 13. Coupler 26 has protrusion 15 protruding beyond end 13H of front plate 13 and partly covering front plate 13, being assembled easily with front plate 13. Protrusion 15 of coupler 26 covers end 13H of front plate 13. Even if coupler 26 insufficiently contacts end 13H due to variations in press-fitting and produces a gap between end 13H and coupler 26, protrusion 15 covers end 13H of front plate 13 and prevents the gap from being visible from outside, and thus, assembles frame 12 with front plate 13.

According to Embodiment 6, as described above, coupler 26 has protrusion 15 contacting end 12A of frame 12 and end 13H of front plate 13. Protrusions 15 and 15A cover ends 13H and 12A, respectively. Even if a gap is produced between coupler 26 and frame 12 or between coupler 26 and front plate 13, this structure prevents the gap from being visible from

outside.

Insert section 26A of coupler 26 is fitted to frame 12. This structure allows coupler 26 to be assembled with front plate 13 after coupler 26 is fitted to frame 12, thus allowing heating cooker 1007 to be assembled easily.

5 Fig. 12B is a sectional view of another heating cooker 1008 in accordance with Embodiment 6. In Fig. 12B, components identical to those of heating cooker 1007 shown in Figs. 11A, 11B, and 12A are denoted by the same reference numerals, and their description will be omitted. Heating cooker 1008 shown in Fig. 12B includes coupler 126 instead of coupler 26 of
10 heating cooker 1001. Coupler 126 has protrusions 115 and 115A corresponding to protrusions 15 and 15A, respectively, shown in Fig. 11B. Protrusion 115 covers end 13H of front plate 13. Protrusion 115A covers end 12A of frame 12. Insert section 126A of coupler 126 is fitted through end 13H to front plate 13.

15 Heating cooker 1008 is assembled by the following procedure. First, frame 12 is assembled with top plate 11. Insert section 126A of coupler 126 is press-fitted to front plate 13, and allows protrusion 115 of coupler 126 to contact end 13H of front plate 13, thus protecting edges of end 13H. Then, front plate 13 with couplers 126 press-fitted thereto is attached to side 911A
20 of top plate 11 to allow end 12A of frame 12 to contact protrusion 115A of coupler 126, and protrusion 115A nips frame 12 to allow coupler 26 to contact end 12A of frame 12. Coupler 126 has protrusion 115A protruding beyond end 12A of frame 12 and partly covering frame 12. This structure allows coupler 126 to be easily assembled with frame 12. Even if coupler 126 does
25 not entirely contact end 12A due to variations in press-fitting and produced a gap between coupler 126 and end 12A, protrusion 115 of coupler 126 covers end 12A of front frame 12 and prevents the gap from being visible from

outside. Thus, frame 12 is assembled with front plate 13 without a gap visible from outside.

According to Embodiment 6, as described above, coupler 126 has protrusion 115 contacting end 12A of frame 12 and end 13H of front plate 13, and covers end 12A. Even if a gap is produced between frame 12, coupler 126, and front plate 13, coupler 126 prevents the gap from being visible from outside.

Insert section 126A is fitted to front plate 13. This structure allows coupler 126 is assembled with frame 12 after coupler 126 is fitted to frame 12, allowing heating cooker 1008 to be assembled easily.

Protrusions 15, 15A, 115, and 115A of couplers 26 and 126 have widths as small as possible, hence allowing heating cookers 1007 and 1008 to have flat appearances at connecting sections.

15 EXEMPLARY EMBODIMENT 7

Fig. 13 is a perspective view of heating cooker 1009 in accordance with Exemplary Embodiment 7 of the present invention for illustrating a rear side thereof. Fig. 14A is an exploded perspective view of heating cooker 1009. Fig. 14B is a sectional view of heating cooker 1009 ay 14B-14B shown in Fig. 14A. In Figs. 13, 14A and 14B, components identical to those of heating cooker 1007 shown in Figs. 11A, 11B, and 12A are denoted by the same reference numerals, and their description will be omitted.

In addition to heating cooker 1007 according to Embodiment 7, heating cooker 1009 further includes supporting plate 19. Supporting plate 19 is fixed, with an adhesive, to lower surface 911F of top plate 11 opposite to upper surface 911E of top plate 11. Supporting plate 19 overlaps and is adhered to only first portion 29A of side surface 29 around coupler 29, while

supporting plate 19 is located away from second portion 29B of side surface 29 other than first portion 29A of side surface 29. That is, side surface 28 of support plate 19 faces side surface 29 with a distance in between, and is located inner than side surface 29 of front plate 13.

5 A method of assembling heating cooker 1009 will be described below. Top plate 11 is placed and bonded onto supporting plate 19. Adhesive 30 is applied to a bonding surface of front plate 13 on which supporting plate 19 is bonded, and front plate 13 is adhered onto top plate 11 and supporting plate 19.

10 Since side surface 28 of supporting plate 19 is located inner than side surface 29 of front plate 13, front plate 13 is easily attached to top plate 11 and supporting plate 19 while front plate 13 is laid over supporting plate 19 from above supporting plate 19. Lower surface 27 of supporting plate 19 overlaps lower surface 22 of front plate 13 near coupler 26, and front plate 11
15 is slid toward top plate 11 to attach front plate 13 to supporting plate 19. Front plate 13 is slid by only 5mm to reach top plate 11, and is adhered easily without displacing adhesive 38. If front plate 13 overlaps a large area of supporting plate 19, front plate 13 is slid over supporting plate 19 by a long distance, and thereby, may cause adhesive 38 to spread to an
20 undesired area. However, plate 19 overlaps a small area of front plate 13 to prevent front plate 13 from being peeled off.

Front surface 13J of front plate 13 overlaps front surface 19A of supporting plate 19. Front plate 13 may be fastened to supporting plate 19 with screws, thereby increases structural strength.

25 Heating cookers according to Embodiments 1 to 7 are applicable to a stand-alone type cooker and to various types of heating sources, such as induction heating and gas heating.

EXEMPLARY EMBODIMENT 8

Fig. 15 is a perspective view of heating cooker 2001 in accordance with Exemplary Embodiment 8 of the present invention. Fig. 16 is a perspective view of an essential portion of heating cooker 2001. Heating cooker 2001 is an induction heating cooker, and includes housing 511 accommodating an induction heating coil and a controller therein. The upper part of housing 511 is covered with top plate 512 made of heat-resistant material, such as glass ceramics. Top plate 512 has upper surface 512F adapted to have object 601, such as a pot and a pan, placed thereon. Top plate 512 has a rectangular shape having outer periphery 512A having four sides 512B to 512E. Frame 513 covers three sides 512C to 512E of the four sides and has a cross section having substantially a C-shape. Side 512B is covered with front plate 515 having operating section 514. Front plate 515 has contact section 515A contacting top plate 512 and upper surface 515B higher than contact section 515A. Upper surface 515B has cutout 516 therein facing end 513A of frame 513. Coupler 517 having a cross section having substantially a C-shape is attached to end 513A of frame 513. That is, frame 513 covers a portion of outer periphery 512A of top plate 512, while front plate 515 covers a portion of outer periphery 512A other than the portion covered with frame 513.

Fig. 17 is a plan view of an essential portion of heating cooker 2001. Fig. 18 is a sectional view of heating cooker 2001 at line 18-18 shown in Fig. 17. Coupler 517 has insert section 517A to be inserted into frame 513 and joint section 517B filling a gap between cutout 516 and end 513A of frame 513. End 513A of frame 513 and joint section 517B are fitted in cutout 516. Joint section 517B is surrounded by frame 513 and upper surface 515B.

Joint section 517B is substantially flush with or lower than surface 513B of frame 513 and upper surface 515B of front plate 515. When a user wipes top plate 512, front plate 515, and frame 513 with a tablecloth, this structure prevents the tablecloth from being scratched at top plate 512, front plate 515, and frame 513. Frame 513, front plate 515, and coupler 517 are bonded with adhesive.

A method of assembling heating cooker 2001 will be described below. Adhesive is applied to insert section 517A of coupler 517, and inserting insert section 517A is filled into frame 513. Adhesive is applied to insides of frame 513 and insert section 517A, and frame 13 and insert section 517A are fitted to top plate 512 to cover outer periphery 512A. Top plate 512, frame 513, and coupler 517 are bonded and sealed with the adhesive to be assembled with top plate 512. Adhesive is applied to a portion of front plate 515 to cover top plate 512, and front plate 515 is placed on top plate 512 from above top plate 512. The adhesive bonds and seals top plate 512, front plate 513, and coupler 517, thus assembling front plate 515 with top plate 512. Thus, in order to assemble front plate 515 with top plate 512, front plate 515 is just placed on top plate 512 while it is not necessary to slide front plate 515 toward coupler 517, thus allowing heating cooker 2001 to be assembled easily. Joint section 517B is surrounded by frame 513 and front plate 515, and does not protrude from surface 513B of frame 513 and upper surface 515B of front plate 515. When the user wipes frame 513 and front plate 515 with a tablecloth, this structure prevents the tablecloth and a hand from being scratched at joint section 517B, and prevents joint section 517B from being taken out of.

EXEMPLARY EMBODIMENT 9

Fig. 19 is a sectional view of heating cooker 2002 in accordance with Exemplary Embodiment 9 of the present invention. Fig. 20 is a perspective view of coupler 617 of heating cooker 2002. In Figs. 19 and 20, components identical to those of heating cooker 2001 shown in Figs. 15 to 18 according to Embodiment 8 are denoted by the same reference numerals, and their description will be omitted.

Heating cooker 2002 according to this embodiment includes coupler 617 instead of coupler 517 of heating cooker 2001 according to Embodiment 8. Coupler 617 has insert section 617A to be inserted in frame 513 and joint section 617B that fills a gap between cutout 516 and end 513A of frame 513, as well as coupler 517. Inclining surface 617C is provided at a portion of joint section 617B of coupler 617 contacting front plate 515. Inclining surface 617C inclines toward front plate 515. When front plate 515 is attached to the top plate, front plate 515 contacts and covers inclining surface 617C.

Joint section 617B of coupler 617 contacts front plate 515 on inclining surface 617C. Upon cleaning, a tablecloth is not scratched at joint section 517B. Joint section 617B is covered with front plate 515, and is not taken out. Inclining surface 617C is covered with front plate 515. Even if a gap is produced between top plate 512, frame 513, and front plate 515 due to variations of connection, top plate 512 is not seen through cutout 516, being invisible from cutout 516 and provide a smooth joint sections.

EXEMPLARY EMBODIMENT 10

Fig. 21 is an exploded perspective view of heating cooker 2003 in accordance with Exemplary Embodiment 10 of the present invention. Fig. 22 is a sectional view of an essential portion of heating cooker 2003. In Figs.

21 and 22, components identical to those of heating cooker 2001 shown in Figs. 15 to 18 according to Embodiment 8 are denoted by the same reference numerals, and their description will be omitted.

Heating cooker 2003 according to Embodiment 10 further includes
5 supporting plate 518 for supporting lower surface 512G of top plate 512 opposite to upper surface 512F of top plate 512. Supporting plate 518 has supporting section 518A protruding toward front plate 515 to support front plate 515. Front plate 515 is engaged with a tip of supporting section 518A, and covers top plate 512 while supporting section 518A functions as a
10 fulcrum, thereby allowing front plate 515 to be assembled easily and properly with top plate 512. Front plate 515 has contact section 515A, contacting top plate 512, and upper surface 515B higher than contact section 515A.

15 EXEMPLARY EMBODIMENT 11

Fig. 23 is a sectional view of heating cooker 2004 in accordance with Exemplary Embodiment 11 of present invention. In Fig. 23, components identical to those of heating cooker 2003 shown in Figs. 21 and 22 according to Embodiment 10 are denoted by the same reference numerals, and their
20 description will be omitted.

Heating cooker 2004 according to Embodiment 11 includes supporting plate 618 instead of supporting plate 518 of heating cooker 2003 shown in Figs. 21 and 22 according to Embodiment 10. Supporting plate 618 includes fastening section 619 fixing supporting plate 618 to frame 513 and
25 contacting section 618B contacting a rear side of coupler 517. When frame 513 is fixed to supporting plate 618 at fastening section 619, coupler 517 contacts contacting section 618B, thereby positioning frame 513 regardless of

the position of top plate 512. This structure allows contacting section 518B to support coupler 517 regardless of variations in width of top plate 512, thus preventing coupler 517 from being taken off toward top plate 512

5 EXEMPLARY EMBODIMENT 12

Fig. 24 is a sectional view of heating cooker 2005 in accordance with Exemplary Embodiment 12 of present invention. In Fig. 24, components identical to those of heating cooker 2004 shown in Fig. 23 according to Embodiment 11 are denoted by the same reference numerals, and their
10 description will be omitted.

In heating cooker 2005 according to Embodiment 12, contacting section 618B contacting a rear side of coupler 517 has a length shorter than that of insert section 517A of coupler 517. Further, insert section 517A has stepped section 517D to be engaged with contacting section 618B. When frame 513
15 is attached to supporting plate 618, stepped section 517D is engaged with contacting section 618B. This structure prevents coupler 517 from being taken off even if a force along a direction in which coupler 517 is taken out from frame 513 is applied to coupler 517.

20 EXEMPLARY EMBODIMENT 13

Fig. 25 is a perspective view of an essential portion of heating cooker 2006 in accordance with Exemplary Embodiment 13 of present invention. In Fig. 25, components identical to those of heating cooker 2001 shown in Fig. 15 according to Embodiment 8 are denoted by the same reference numerals,
25 and their description will be omitted.

In to heating cooker 2006 according to Embodiment 13, protrusion 520 extending linearly provided on upper surface 515B of front plate 515 extends

close to joint section 517B. When object 601 placed on upper surface 512F of top plate 512 is moved toward coupler 517, protrusion 520 lifts up object 601 from upper surface 512F of top plate 512 so as to prevent object 601 from contacting joint section 517B. The shape and the position of protrusion 520
5 may not be limited as long as protrusion 520 is located near coupler 517. Protrusion 520 may includes plural protrusions, and may be provided on top plate 512 or frame 513.

In heating cooker 2006 of Embodiment 13, as described above, protrusion 520 prevents joint section 517B from contacting object 601 having
10 high temperatures, thereby protecting joint section 517B from deforming and discoloring.

EXEMPLARY EMBODIMENT 14

In a heating cooker according to Embodiment 14, coupler 517 of heating
15 cookers 2001 to 2006 according to Embodiments 8 to 13 is made of elastic material. Coupler 517 press-contacts top plate 512 and frame 513. The elasticity of coupler 517 reliably seals between top plate 512 and coupler 517, and between frame 513 and coupler 517 even when they are bonded insufficiently. The material of coupler 517 is not limited as long as the
20 material is heat resistant.

The present invention is not limited to Exemplary Embodiments described above.

INDUSTRIAL APPLICABILITY

25 In a heating cooker according to the present invention, even if variations occur in assembling processes with the coupler, a jointing section is not visible. The heating cooker is applicable to a heating cooker including

a top plate and a frame.

CLAIMS

1. A heating cooker comprising:

a top plate having an upper surface and an outer periphery, the upper surface being adapted to have an object placed thereon;

5 a frame covering a portion of the outer periphery of the top plate;

a front plate covering a portion of the outer periphery of the top plate other than the portion of the outer periphery covered with the frame; and

10 a coupler connecting the frame and the front plate, the coupler including a protrusion contacting an end of the frame and an end of the front plate, the protrusion covering at least one of the end of the frame and the end of the front plate.

2. The heating cooker of claim further including:

15 an adhesive for adhering the top plate to the frame so as to seal between the top plate and the frame;

an adhesive for adhering the top plate to the front plate so as to seal between the top plate and the front plate;

20 an adhesive for adhering the coupler to the top plate so as to seal between the coupler and the top plate; and

an adhesive for adhering the frame to the front plate so as to seal between the frame and the front plate.

3. The heating cooker of claim 1 further including:

25 a supporting plate provided on a lower surface of the top plate; and

an adhesive for adhering the supporting plate to the top plate.

4. The heating cooker of claim 3, wherein the front plate has a side surface, the side surface including

- 5 a first portion overlapping the supporting plate and the coupler
around the supporting plate and the coupler, and
a second portion located away from the supporting plate.

5. The heating cooker of claim 1,

10 wherein a lower surface of the frame is flush with a lower surface
of the front plate and a lower surface of the coupler,

said heating cooker further comprising a sealing material
provided entirely on an outer periphery of the lower surface of the frame, the
lower surface of the front plate, and the lower surface of the coupler.

15 6. The heating cooker of claim 1, wherein the protrusion of the coupler
is chamfered so as to incline toward the frame or the front plate.

7. The heating cooker of claim 1, wherein the coupler further includes
an insert section fitted into one of the frame and the front plate.

20

8. A heating cooker comprising:

a top plate having an upper surface and an outer periphery, the
upper surface being adapted to have an object placed thereon;

a frame covering a portion of the outer periphery of the top plate;

25 a front plate covering a portion of the outer periphery of the top
plate other than the portion of the outer periphery cover with the frame, the
front plate having a cutout provided therein, the cutout facing an end of the

frame; and

a coupler including

an insert section inserted inside the frame, and

a joint section filling a gap provided between the end of

5 the frame and the cutout, wherein

the front plate covers the other portion of the outer periphery of the top plate, and

the joint section is flush with or lower than the frame and an upper surface of the front plate.

10

9. The heating cooker of claim 8, wherein:

the joint section of the coupler has an inclining surface inclining down toward the front plate, and

the front plate contacts and covers the inclining surface.

15

10. The heating cooker of claim 8, further comprising

a supporting plate for supporting a lower surface of the top plate,

wherein the supporting plate includes a supporting section protruding toward the front plate and supporting the front plate.

20

11. The heating cooker of claim 10, wherein the supporting plate further includes

a fastening section that fixes the supporting plate to the frame,

and

25

a contacting section that contacts a rear side of the coupler.

12. The heating cooker of claim 11, wherein

the contacting section of the supporting plate has a length shorter than a length of the insert section of the coupler, and

the coupler further includes a stepped section provided at the insert section and being engaged with the contacting section.

5

13. The heating cooker of claim 8, further comprising a protrusion that prevents the object from contacting the joint section of the coupler.

14. The heating cooker of claim 8, wherein the coupler is made of elastic
10 material and press-contacts the top plate and the frame.

15. A method for assembling a heating cooker, comprising:

providing a top plate having an upper surface and lower surface,
the upper surface being adapted to have an object placed thereon;

15 providing a supporting plate for supporting the lower surface of
the top plate; and

allowing the front plate to cover a portion of an outer periphery of
the top plate while the supporting plate functions as a fulcrum.