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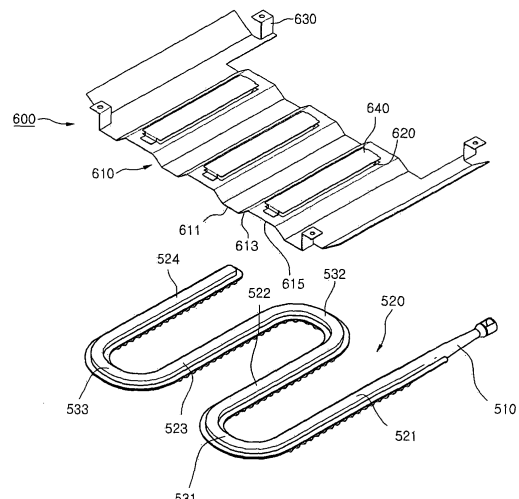
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(54) **Burner and cooking device**

(57) A cooking device is provided. The cooking device includes a cavity and a burner. The cavity provides a cooking chamber. The burner is in the cavity and heats food in the cooking chamber. The burner includes a supply part and a combustion part. The supply part supplies a gaseous fuel mixed with air. The combustion part burns the mixed gaseous fuel and has an open curve shape.

Fig. 2



Description

BACKGROUND

[0001] The present disclosure relates to a burner and a cooking device.

[0002] Cooking devices are used for heating foods using a heat source such as a burner that generates heat by burning a gaseous fuel.

[0003] Such a burner includes a plurality of flame holes for burning a gaseous fuel, and the flame holes are spaced a predetermined distance from each other.

SUMMARY

[0004] Embodiments provide a burner and a cooking device that are configured to uniformly heat food.

[0005] In one embodiment, a burner includes: a supply part receiving a gaseous fuel mixed with air; and a combustion part burning the mixed gaseous fuel supplied from the supply part, the combustion part has an open curve shape with a first end receiving mixed gaseous fuel and a closed second end.

[0006] In another embodiment, a burner includes: first and second combustion parts one of which receiving a gaseous fuel mixed with air and provided with one or more flame holes; and that the other burns the mixed gaseous fuel supplied from the first combustion part and is bent at one or more times.

[0007] In further another embodiment, a cooking device includes: a cavity providing a cooking chamber; and a burner in the cavity, the burner heating food in the cooking chamber, and the burner includes: a supply part supplying a gaseous fuel mixed with air; and a combustion part that burns the mixed gaseous fuel and having an open curve shape.

[0008] The details of one or more embodiments are set forth in the accompanying drawings and the description below. Other features will be apparent from the description and drawings, and from the claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Fig. 1 is a perspective view illustrating a cooking device according to an embodiment.

[0010] Fig. 2 is a perspective view illustrating an oven burner and a reflector of the cooking device of Fig. 1.

[0011] Fig. 3 is a bottom view illustrating the oven burner of Fig. 2.

[0012] Fig. 4 is a side view illustrating flame holes of the oven burner of Fig. 2.

[0013] Fig. 5 is a bottom view illustrating an oven burner according to another embodiment.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0014] Reference will now be made in detail to the embodiments of the present disclosure, examples of which

are illustrated in the accompanying drawings.

[0015] Fig. 1 is a perspective view illustrating a cooking device 1 according to an embodiment, and Fig. 2 is an exploded perspective view illustrating an oven burner 500 and a reflector 600 of the cooking device 1.

[0016] Referring to Figs. 1 and 2, the cooking device 1 includes a cook top part 100, an oven part 200, a drawer part 300, and a control part 400.

[0017] The cook top part 100, the oven part 200, and the drawer part 300 are disposed at upper, middle, and lower regions of a main body 10 of the cooking device 1, respectively. The control part 400 is disposed on the top of the main body 10 at a rear edge portion corresponding to a rear side of the cook top part 100.

[0018] In more detail, the cook top part 100 includes a plurality of cook-top burners 110. Each of the cook-top burners 110 can generate a flame by burning a gaseous fuel to directly heat a container in which food is placed. A plurality of knobs 120 are disposed on a front end portion of the cook top part 100. The knobs 120 are used to close, open, or adjust valves (not shown) for starting, stopping, or adjusting supply of a gaseous fuel to the cook-top burners 110.

[0019] The oven part 200 includes a cavity 210 that provides a cooking chamber 211 for cooking food. The oven burner 500 is disposed in the cavity 210 to heat food in the cooking chamber 211. The reflector 600 above the oven burner 500 is also disposed in the cavity 210. Other than the oven burner 500, an additional heat source (not shown) may be provided within or without the cavity 210 to heat food in the cooking chamber 211.

[0020] The cooking chamber 211 can be selectively closed and opened by using a door 220. The door 220 is a pull-down door of which the top end can be rotated up and down about the lower end. A handle 221 is provided on a front upper portion of the door 220 so that a user can easily rotate the door 220 using the handle 221.

[0021] A container in which food is contained can be stored in the drawer part 300 at a predetermined temperature. The drawer part 300 includes a drawer 310 in which a container can be placed.

[0022] A manipulation signal can be input (generated) through the control part 400 for operating the cooking device 1, specifically, at least one of the cook top part 100, the oven part 200, and the drawer part 300. In addition, the control part 400 displays information about operational conditions of the cooking device 1.

[0023] The oven burner 500 is disposed on an inner upper side of the cavity 210. The oven burner 500 is used to burn a gaseous fuel to directly heat food placed in the cooking chamber 211 by radiant heat.

[0024] Fig. 3 is a bottom view illustrating the oven burner 500. Fig. 4 is a side view illustrating flame holes 541 of the oven burner 500.

[0025] Referring to Figs. 2 to 4, the oven burner 500 includes a supply part 510 supplying a gaseous fuel mixed with air, and a tubular combustion part 520 having an end connected to the supply part 510 to burn the mixed

gaseous fuel supplied from the supply part 510.

[0026] The supply part 510 provides the combustion part 520 with a gaseous fuel supplied from a nozzle (not shown), and air supplied together with the gaseous fuel. The supply part 510 may pass through a sidewall of the cavity 210, or the nozzle may pass through the sidewall of the cavity 210. The supply part 510 is aligned with the nozzle in the state where the supply part 510 is spaced apart from the nozzle.

[0027] The combustion part 520 is horizontally disposed within the cavity 210. The combustion part 520 includes first through fourth straight portions 521, 522, 523, and 524, and first through third connection portions 531, 532, and 533 that connect the first through fourth straight portions 521, 522, 523, and 524 to each other.

[0028] The first through fourth straight portions 521, 522, 523, and 524 are parallel to each other.

[0029] The supply part 510 is connected to the first straight portion 521. The supply part 510 may extend along the first straight portion 521 or be tilted from the first straight portion 521. In the present embodiment, the supply part 510 is disposed along the first straight portion 521.

[0030] The first connection portion 531 connects a first end of the first straight portion 521 to a first end of the second straight portion 522. The second connection portion 532 connects a first end of the third straight portion 523 to a second end of the second straight portion 522. The third connection portion 533 connects a second end of the third straight portion 523 to the fourth straight portion 524.

[0031] Thus, the tubular combustion part 520 is bent at a plurality of times in a zigzag shape or S-shape as a whole. The fourth straight portion 524, at which a mixed gaseous fuel finally arrives, has a closed end.

[0032] That is, the combustion part 520 has an open curve shape that is opposite to a loop shape (closed curve shape) in the present embodiment.

[0033] Although the combustion part 520 includes the first through fourth straight portions 521, 522, 523, and 524, and the first through third connection portions 531, 532, and 533 in the present embodiment, the combustion part 520 may include two straight portions and a single connection portion. Alternatively, the combustion part 520 may include a single straight portion and a single connection portion.

[0034] The first through third connection portions 531, 532, and 533 may be round to improve the flow of a mixed gaseous fuel in the first through third connection portions 531, 532, and 533. Thus, the first through third connection portions 531, 532, and 533 may be called curve portions.

[0035] Both sides of each of the first through fourth straight portions 521, 522, 523, and 524 are provided with first through fourth flame holes 541, 542, 543, and 544 that are spaced apart from each other.

[0036] Along the flow path of a mixed gaseous fuel, the first straight portion 521 is closer to the combustion part 520 than the fourth straight portion 524. Thus, flames

generated from the first through fourth flame holes 541, 542, 543, and 544 may decrease from the first straight portion 521 toward the fourth straight portion 524.

[0037] Thus, the fourth flame holes 544 are greater than the third flame holes 543, and the third flame holes 543 are greater than the second flame holes 542, and the second flame holes 542 are greater than the first flame holes 541, so as to uniformly generate flames at the first through fourth straight portions 521, 522, 523, and 524.

[0038] Alternatively, the first and second flame holes 541 and 542 may be the same in size, and the third and fourth flame holes 543 and 544 may be the same in size, and the third flame holes 543 may be greater than the second flame holes 542.

[0039] That is, according to the present embodiment, distant one of the flame holes 541 through 544 along the flow path of a mixed gaseous fuel from the supply part 510 may be greater than close one thereof to the supply part 510.

[0040] Thus, even when the amount of a mixed gaseous fuel provided to the fourth straight portion 524 is less than that of the first straight portion 521, since the fourth flame holes 544 are greater than the first flame holes 541, flames at the first through fourth flame holes 541, 542, 543, and 544 are uniform.

[0041] The first through third connection portions 531, 532, and 533 are respectively provided with first through third flame holes 545, 546, and 547 to transfer flames between adjacent two of the first through fourth straight portions 521, 522, 523, and 524. The first through third flame holes 545, 546, and 547 may be disposed on first sides of the first through third connection portions 531, 532, and 533, respectively. Alternatively, the first through third flame holes 545, 546, and 547 may be disposed on both sides of the first through third connection portions 531, 532, and 533, respectively.

[0042] Each of the first through third connection portions 531, 532, and 533 includes inner and outer connection portions 535 and 536. For example, the first through third flame holes 545, 546, and 547 may be provided to the inner connection portions 535. In this case, the number of the first through third flame holes 545, 546, and 547 is less than that when providing the first through third flame holes 545, 546, and 547 to the outer connection portions 536.

[0043] A distance between each group of the first through third flame holes 545, 546, and 547 is greater than a distance between each group of the first through fourth flame holes 541, 542, 543, and 544 to prevent interference between flames generated from the first through third flame holes 545, 546, and 547.

[0044] According to the present embodiment, the single combustion part 520 is bent at one or more times, flame areas are increased. Particularly, since the combustion part 520 is bent in a zigzag shape, food can be uniformly heated.

[0045] Flames are uniformly generated at the first

through fourth straight portions 521, 522, 523, and 524 by varying the sizes of the first through fourth flame holes 541, 542, 543, and 544 according to the distance from the supply part 510.

[0046] Although the combustion part 520 includes the first through fourth straight portions 521, 522, 523, and 524, and the first through third connection portions 531, 532, and 533 in the present embodiment, the combustion part 520 may be round as a whole.

[0047] Referring to Fig. 4, the oven burner 500 includes a lower case 501 and an upper case 502, and the first flame holes 541 are exemplified. Hereinafter, the reference numerals of the second through fourth flame holes 542, 543, and 544 will be omitted.

[0048] For example, the lower case 501 may be coupled to the upper case 502 through a screw. Alternatively, the lower case 501 may be coupled to the upper case 502 through a rivet. However, the coupling of the lower case 501 and the upper case 502 is not limited thereto. Thus, the lower case 501 and the upper case 502 coupled to each other form the tubular combustion part 520.

[0049] At least one of the lower case 501 and the upper case 502 is provided with a plurality of flame hole forming regions 505 for forming the flame holes 541. In the present embodiment, the lower case 501 is provided with the flame hole forming regions 505.

[0050] The flame hole forming regions 505 are formed by partially processing the lower case 501. Adjacent two of the flame hole forming regions 505 are connected through a connection region 504.

[0051] When the lower case 501 is coupled to the upper case 502, a gap 508 for transferring a flame is disposed between at least adjacent two of the flame holes. That is, the lower case 501 is spaced apart from the upper case 502 except for a region where the upper case 502 is coupled to the lower case 501. To space the lower case 501 apart from the upper case 502, a gap forming region 503 may be provided to the upper case 502. When the upper case 502 is provided with the flame hole forming regions 505, the gap forming region 503 may be provided to the lower case 501.

[0052] That is, when the lower case 501 is coupled to the upper case 502, the connection region 504 is spaced apart from the gap forming region 503 that faces the connection region 504.

[0053] The vertical distance of the gap 508 is less than those of the flame holes 541.

[0054] According to the present embodiment, the gap 508 efficiently transfers a flame between at least adjacent two of the flame holes.

[0055] Particularly, even when the oven burner 500 is in a low operation mode (where flames are weak), flames can be efficiently transferred between the flame holes.

[0056] Since a flame is efficiently transferred between the flame holes, flame intensities (flame hole load) of the flame holes are substantially uniform, so as to uniformly heat food.

[0057] The reflector 600 may be disposed between a ceiling 212 of the cavity 210 and the oven burner 500.

[0058] When a gaseous fuel is burned at the oven burner 500, the reflector 600 reflects flames and heat downwardly toward food placed in the cooking chamber 211. In addition, combustion gas generated while burning a gaseous fluid at the oven burner 500 is introduced upwardly between the ceiling 212 of the cooking chamber 211 and the top of the reflector 600 by the reflector 600.

[0059] Referring again to Fig. 1 and 2, the reflector 600 includes a reflection part 610, exhaust parts 620, cover parts 640, and fixing flanges 630. The reflection part 610 includes first connection surfaces 611, oblique surfaces 613, and second connection surfaces 615.

[0060] Each of the first connection surfaces 611 has a predetermined lateral width and is located directly above the combustion part 520. The number of the first connection surfaces 611 is determined according to the number of the straight portions. The oblique surfaces 613 are sloped upwardly from ends of the first connection surfaces 611 at a predetermined angle. The second connection surface 615 is disposed between neighboring two of the oblique surfaces 613 to connect ends of the oblique surfaces 613. When a gaseous fuel is burned at the oven burner 500, combustion gas is collected in a space formed by the second connection surface 615 and two oblique surfaces 613 connected to the second connection surface 615.

[0061] The fixing flanges 630 are disposed on corners of the top surface of the reflection part 610. The fixing flanges 630 are used to fix the reflection part 610 to the ceiling 212 of the cooking chamber 211. The fixing flanges 630 may be formed at the corners of the reflection part 610 by partially cutting and upwardly bending the first connection surfaces 611 and the oblique surfaces 613.

[0062] When a gaseous fuel is burned at the oven burner 500, combustion gas is collected between the oven burner 500 and the reflection part 610, that is, in spaces formed by the second connection surfaces 615 and the oblique surfaces 613 connected to the second connection surfaces 615. Then, the combustion gas is discharged to a space between the ceiling 212 of the cooking chamber 211 and the reflection part 610 through the exhaust parts 620. For this end, the exhaust parts 620 are formed into an elongated shape by partially cutting out the second connection surfaces 615 in a front-to-back direction.

[0063] Furthermore, owing to the cover parts 640, combustion gas generated by combustion of gas at the oven burner 500 can be uniformly distributed through the space between the top surface of the reflector 600 and the ceiling 212 of the cooking chamber 211.

[0064] For this end, the cover parts 640 have a plate shape with a size corresponding to the size of the exhaust parts 620. The cover parts 640 are disposed directly above the exhaust parts 620. Owing to this structure, flames and heat generated by combustion of gas at the

oven burner 500 are not transferred through the exhaust parts 620 to the space between the top surface of the reflector 600 and the ceiling 212 of the cooking chamber 211 but are reflected by the cover parts 640 downwardly toward the inside of the cooking chamber 211. In addition, combustion gas discharged through the exhaust parts 620 can be uniformly distributed forward, backward, leftward, and/or rightward by the cover parts 640.

[0065] Fixing ribs are provided at front and rear end portions of each cover part 640. The fixing ribs are provided to fix the cover part 640 to the reflection part 610. In the present embodiment, the fixing ribs have an approximate L-shape and disposed at the front and rear end portions of each cover part 640. For example, the fixing ribs and the cover part 640 may be formed in one piece. Furthermore, the cover part 640 and the reflector 600 may be formed in one piece. In this case, the exhaust part 620 and the cover part 640 may be formed by forming two parallel lines in the second connection surface 615 in the length direction of the second connection surface 615, by cutting the second connection surface 615 along the parallel lines, and by upwardly bending a portion of the second connection surface 615 disposed between the parallel lines.

[0066] Hereinafter, operation of the cooking device 1 will now be described.

[0067] A user can input a manipulation signal by using the control part 400 for cooking food using the oven part 200. If a manipulation signal is input through the control part 400, the oven burner 500 is operated to cook food in the cooking chamber 211.

[0068] In detail, gas and air are supplied to the oven burner 500, and flames are generated by combustion of the gas and air. Then, food is cooked in the cooking chamber 211 by flames and heat generated at the oven burner 500. At this time, the reflector 600 reflects flames and heat generated by combustion of gas at the oven burner 500, toward the food placed in the cooking chamber 211.

[0069] Meanwhile, combustion gas generated as a result of combustion of gas at the oven burner 500 is guided to the space between the ceiling 212 of the cooking chamber 211 and the reflector 600 through the reflector 600. In more detail, the combustion gas is collected at the space formed by the second connection surface 615 and two oblique surfaces 613 connected to the second connection surface 615. Then, the collected combustion gas flows upward, that is, to the space between the ceiling 212 of the cooking chamber 211 and the reflection part 610 through the exhaust part 620.

[0070] Fig. 5 is a bottom view illustrating an oven burner 600 according to another embodiment.

[0071] Hereinafter, the oven burner 600 will now be described. A description of the same parts as the previous embodiment will be omitted.

[0072] Referring to Fig. 5, the oven burner 600 includes first and second tubular combustion parts 610 and 620 that may be parallel to the bottom of the cavity 210 of Fig. 1.

[0073] Particularly, the first combustion part 610 has at least one straight portion. In the present embodiment, the first combustion part 610 has a straight shape as a whole.

[0074] The first combustion part 610 extends in a back-and-forth direction of the cavity 210 with the oven burner 600 installed. The oven part 200 of Fig. 1 includes the nozzle (not shown) supplying gas to the first combustion part 610. For example, the nozzle may pass through the sidewall of the cavity 210, and be aligned with the first combustion part 610 in the state of being apart from the nozzle.

[0075] The first combustion part 610 may be disposed on the line halving the ceiling 212 of Fig. 1 of the cook chamber 211 of Fig. 1. The rear end of the first combustion part 610 is adjacent to the rear end of the ceiling 212, and the front end of the first combustion part 610 is disposed in the middle of the ceiling 212.

[0076] A passage (not shown) is disposed in the first combustion part 610 to mix a supplied gaseous fuel and air. Both sides of the first combustion part 610 are provided with a plurality of flame holes 612.

[0077] A mixed gaseous fuel flowing in the passage of the first combustion part 610 is burned at the flame holes 612.

[0078] The second combustion part 620 has an open curve shape that is partially open. The second combustion part 620 may be symmetrical with respect to the line halving the ceiling 212.

[0079] An opening of the second combustion part 620 faces the front side of the cook chamber 211.

[0080] A passage (not shown) is disposed in the second combustion part 620 to communicate with the passage of the first combustion part 610. That is, a mixed gaseous fuel flowing in the passage of the first combustion part 610 is supplied to the passage of the second combustion part 620. The mixed gaseous fuel supplied from the first combustion part 610 is branched to both sides of the second combustion part 620.

[0081] That is, the second combustion part 620 includes a distribution part 621 receiving a mixed gaseous fuel supplied from the first combustion part 610, and first and second branches 622 and 623 that are separated at the distribution part 621. The first and second branches 622 and 623 respectively have first ends that are connected to the distribution part 621, and second ends that are closed and spaced apart from each other.

[0082] The first and second branches 622 and 623 each may have at least one round portion. Alternatively, the second combustion part 620 may have at least one straight portion, as a whole (not shown).

[0083] The first and second branches 622 and 623 each includes an outer part 624 and an inner part 625. A mixed gaseous fuel flows between the outer part 624 and the inner part 625.

[0084] The outer part 624 includes a plurality of outer flame holes 626 that are spaced apart from each other. The inner part 625 includes a plurality of inner flame holes

that include a plurality of first flame holes 627 and a plurality of second flame holes 628.

[0085] The first flame holes 627 are disposed in straight portions of the inner parts 625, and the second flame holes 628 are disposed in curve portions of the inner parts 625. A distance between the second flame holes 628 is greater than a distance between the first flame holes 627 to prevent flame interference in the curve portion of the inner part 625.

[0086] The distance between the first flame holes 627 is the same as a distance between the outer flame holes 626 of the outer parts 624.

[0087] According to the present embodiment, the first combustion part functions as the supply part of the previous embodiment. In addition, the supply part of the previous embodiment may be provided with flame holes, so that the supply part can function as combustion part.

[0088] According to the embodiments, since the single combustion part is bent at a plurality of times, flame areas are increased. Particularly, since the combustion part is bent in a zigzag shape, food can be uniformly heated.

[0089] Flames are uniformly generated at the straight portions by varying sizes of the flame holes according to the distance from the supply part.

[0090] Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the spirit and scope of the principles of this disclosure. More particularly, various variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

Claims

1. A burner for heating food in a cooking chamber of cooking device, comprising:

a supply part supplying a gaseous fuel mixed with air; and

at least one tubular combustion part that burns the mixed gaseous fuel; the at least one tubular combustion part has an open curve shape with a first end receiving the mixed gaseous fuel and the other end closed.

2. The burner according to claim 1, wherein the combustion part is bent at one or more times.

3. The burner according to claim 1 or 2, wherein the at least one combustion part comprises:

a plurality of straight portions spaced apart from each other; and
one or more connection portions connecting the straight portions.

4. The burner according to claim 3, wherein the straight portions are in parallel with each other and the connection portion is round.

5. The burner according to claim 3 or 4, wherein the straight portions each is provided with a plurality of flame holes for generating flames, and the flame hole of the straight portion distant from the supply part along a flow path of the mixed gaseous fuel is greater than the flame hole of the straight portion close to the supply part along the flow path of the mixed gaseous fuel.

6. The burner according to claim 2, 4 or 5, wherein the connection portion comprises a plurality of flame holes that transfers a flame between adjacent two of the straight portions.

7. The burner according to claim 6, wherein a distance between the flame holes of the connection portion is greater than a distance between the flame holes of the straight portion.

8. The burner according to claim 1 or 2, comprising a further combustion part provided with one or more flame holes; the further combustion part receives a gaseous fuel mixed with air and supplies the mixed gaseous fuel to the at least one combustion part that burns the mixed gaseous fuel.

9. The cooking device according to claim 1, 2 or 8, wherein the at least one combustion part comprises:

a distribution part receiving the mixed gaseous fuel from the supply part or the further combustion part; and

a plurality of branches connected with each other by the distribution part, wherein ends of the branches are closed and spaced apart from each other.

10. The burner according to claim 9, wherein the further combustion part and the at least one combustion part both are provided with a plurality of flame holes, and a distance between the flame holes at least in a curve portion of the at least one combustion part is greater than a distance between the flame holes of the further combustion part.

11. The burner according to any one of claims 1 to 7, wherein the at least one combustion part has a first end connected to the supply part.

12. The burner according to any one of the preceding claims, wherein the supply part is provided with one or more flame holes.

13. A cooking device comprising:

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a cavity providing a cooking chamber; and
a burner according to any one of the preceding claims provided in the cavity to heat food in the cooking chamber.

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14. The cooking device according to claim 13, wherein the combustion part of the burner is disposed horizontally in the cavity.

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15. The cooking device according to claim 13 or 14, further comprising a reflector that is disposed between a ceiling of the cavity and the burner to reflect heat generated from the burner to food within the cooking chamber.

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Fig. 1

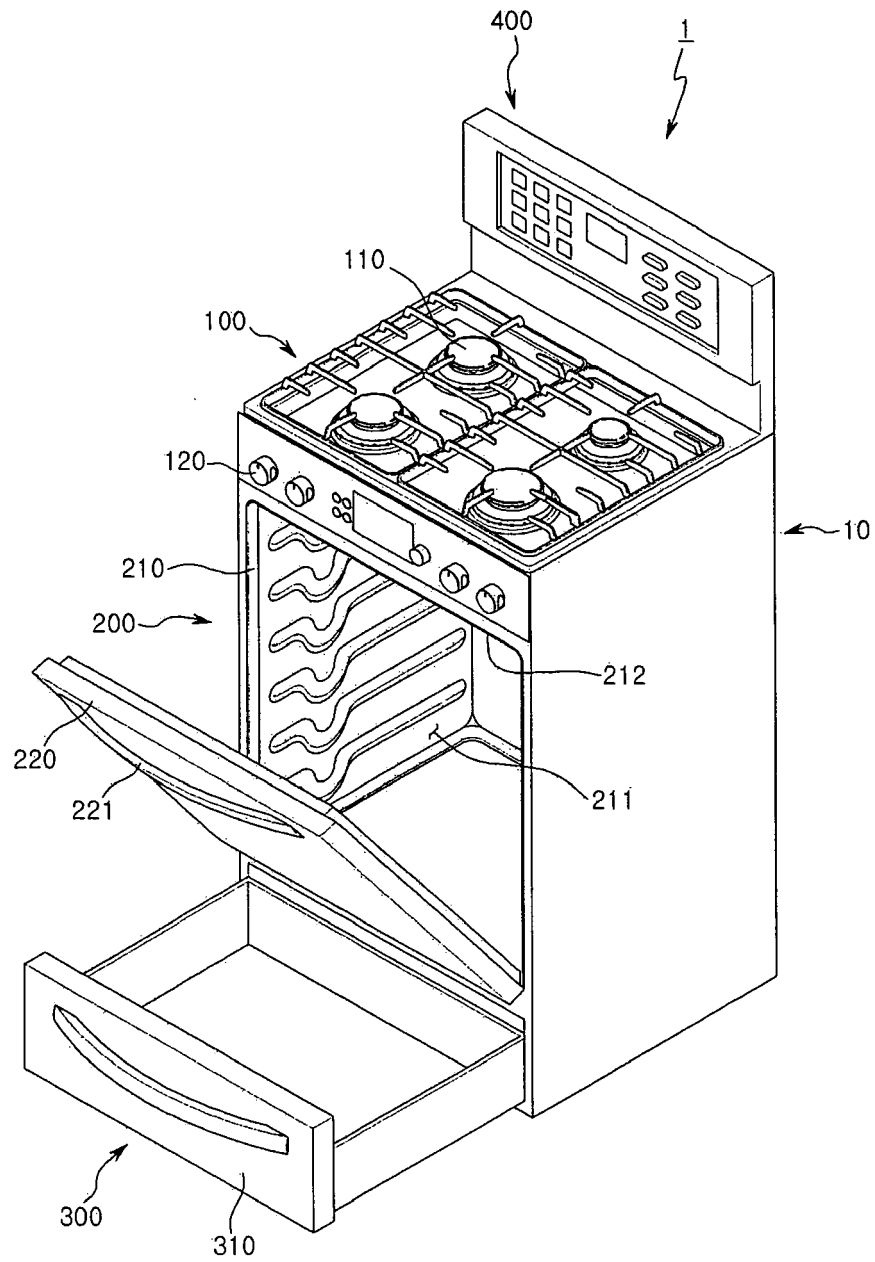


Fig. 2

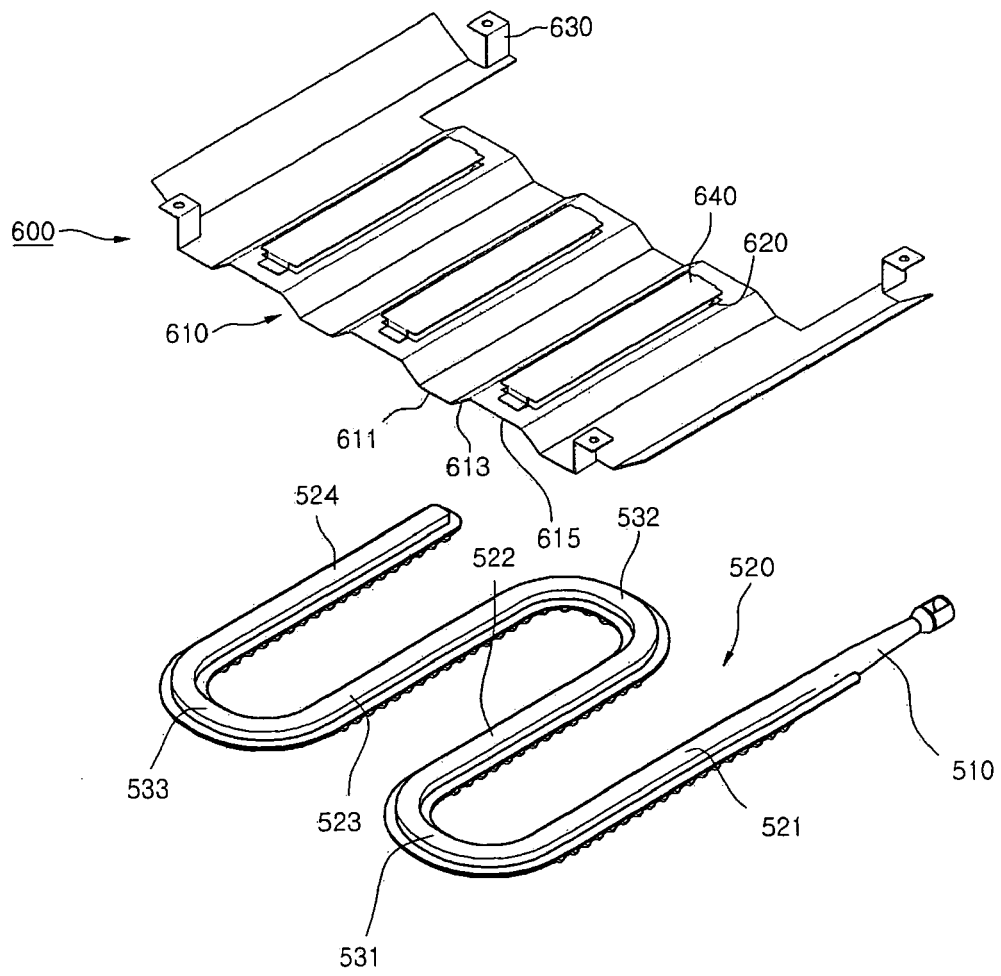


Fig. 3

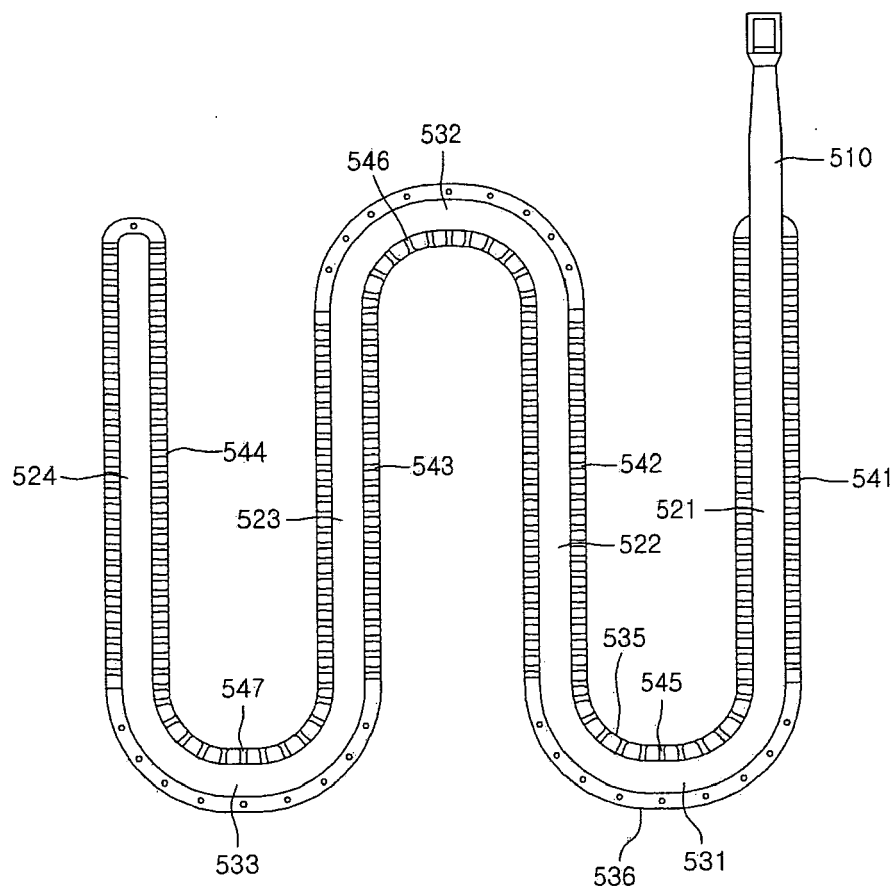


Fig. 4

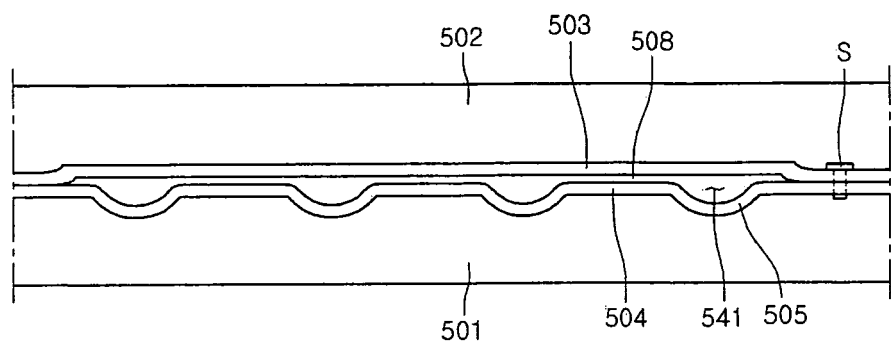


Fig. 5

