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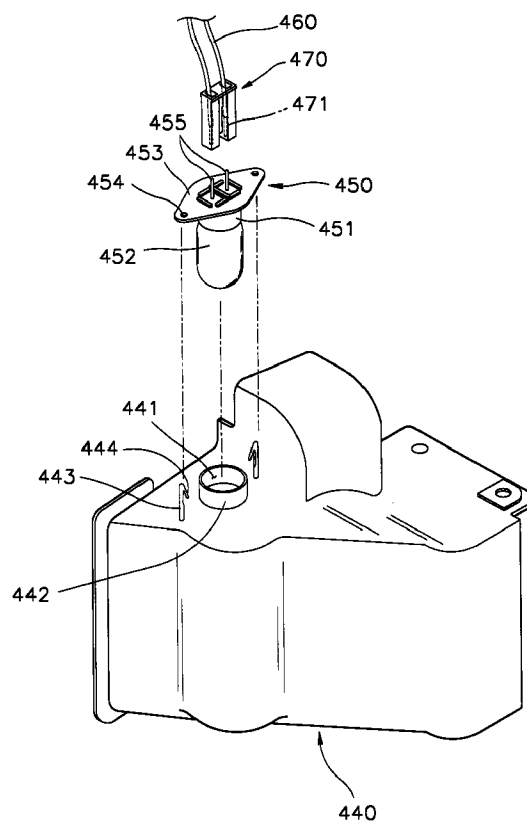
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(54) **Microwave oven**

(57) A microwave oven is disclosed and includes a cooking chamber (400) having an electrical component compartment (400) separated therefrom, an air duct (440) mounted within the electrical component compartment (400) for directing a flow of air into the cooking chamber (300) and a light (450) mounted on the air duct (440) for illuminating the cooking chamber (300). The light (450) can be replaced without de-mounting the air duct (440).

FIG.2



EP 0 868 112 A2

Description

The present invention relates to a microwave oven including a cooking chamber and an electrical component compartment separated therefrom, an air duct mounted within the electrical component compartment for directing a flow of air into the cooking chamber and a light mounted on the air duct for illuminating the cooking chamber.

An exploded perspective view of a conventional microwave oven as illustrated in Figure 4 and generates microwave energy which is absorbed by water and other molecules in food which makes them move at high speeds to create frictional heat which cooks the product evenly in a short space of time.

A conventional microwave oven includes an outer case 10 having an inner case 20 connected thereto defining a cooking chamber 30. A door 31 having a viewing window 31a is hingedly connected to a front panel of the inner case 20 which may be opened to provide access to the interior of the cooking chamber 30. A control panel 32 is mounted adjacent to the door and includes display and control push buttons. The outer case 10 comprises three panels forming the two sides and top of the microwave oven, the front and rear edges of the three panels being connected to the front panel 21 and rear panel 23 respectively of the inner case 20. The inner and outer cases 10,20 together form the main body of the microwave oven.

An electrical component compartment 40 is located between the right side wall panel 22 of the inner case 20 and the outer case 10 and contains a magnetron 41 for generating microwave energy, a high voltage transformer 42 which supplies energy to the magnetron 41, and a fan 43 for cooling the electrical components which generate heat during operation. A plurality of ventilation holes 22a are provided in the side wall panels 22 to allow air to flow between the cooking chamber 30 and the electrical component compartment 40, and a plurality of outlets (not illustrated) are also provided to allow air to flow to the exterior of the outer case 10. A guide duct 44 is mounted on the inner wall of the electrical component compartment 40 to guide a supply of air through the electrical component compartment 40 into the cooking chamber 30 via the ventilation holes 22a and a light 45 which illuminates the cooking chamber 30 during operation, is located inside the guide duct 44. The light 45 will now be described in more detail with reference to Figure 5.

The light 45 consists of a light socket 45a with a protrusion 45c on its upper section, and a light bulb connected to the light socket 45a. The guide duct 44 has a slot 44a of a predetermined length formed in its upper surface into which the light socket 45a is inserted until the protrusion 45c engages the outer end of the guide ducts upper surface to retain the light 45 in position and prevent it from becoming dislodged.

When the oven is in operation, microwave energy is

generated by the magnetron 41 and fresh air is introduced into the electrical component compartment 40 by the fan 43, which flows into the cooking chamber 30 through the ventilation holes 22a via the guide duct 44. Circulation of air is essential to eliminate odours and humidity created during cooking. The light 45 is also turned on to illuminate the cooking chamber 30 through the ventilation holes 22a and the user can observe the cooking of the food through the window 31a in the door 31.

As the light 45 is not firmly secured to the guide duct 44, it may vibrate during operation causing noise. The light bulb 34b may also become dislodged from the light socket 45a. When the light bulb 45b eventually fails after extended use, it must be replaced. Replacement of the light bulb 45b involves the removal of the guide duct 44 from the right side panel 22 of the inner case and the disengagement of the light socket 45a from the slot 44a in the guide duct 44. After replacement of the bulb 45b components must be reassembled. This process is difficult and time consuming. Furthermore, assembly of the light 45 during manufacture of the microwave oven is complicated resulting in a decrease in the number of ovens produced in a given time and an increase in costs.

It is an object of the present invention to overcome or substantially alleviate the problems discussed above.

A microwave oven according to the present invention is characterised in that the light can be replaced without de-mounting the air duct from the electrical component compartment.

In a preferred embodiment, the light comprises a light socket and a bulb, the light socket having a flange and the air duct having a coupling member to engage the flange and maintain the light in position in the air duct.

The air duct preferably has an aperture therein through which the bulb extends from the light socket into the air duct.

Preferably, the coupling member comprises a pair of mounting pins extending from the surface of the air duct on opposite sides of the aperture which locate in mounting holes in the flange.

Preferably, the tips of the mounting pins include resiliently deformable hook portions which prevent the flange from disengaging the mounting pins.

In the preferred embodiment, the light socket includes a pair of electrical input terminals, each of said terminals being received in a respective connector in a terminal housing provided on the end of a power supply lead.

Preferably, the terminal housing includes means for varying the distance between the connectors so as to correspond to the distance between the input terminals and enable electrical connection therewith.

Preferred embodiments of the present invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is an exploded perspective view of the overall structure of a microwave oven in accordance with an embodiment of the present invention; Figure 2 is an exploded perspective view of a lighting device for the microwave oven in accordance with an embodiment of the present invention; Figure 3 is a front view of a terminal housing for the microwave oven in accordance with an embodiment of the present invention; Figure 4 is an exploded perspective view of the overall structure of a microwave oven in accordance with a conventional art; and Figure 5 is an exploded perspective view of the conventional lighting device.

As shown in Figure 1 a microwave oven includes an outer case 100 having an inner case 200 joined thereto defining a cooking chamber 300 having an open front panel 210 through which food may be placed into the oven and an electrical component compartment 400 formed in the outer case 100 separated from the cooking chamber 300. The cooking chamber 300 also comprises a rear panel 230 and side wall panels 220.

A door 310 is hingedly mounted to one side of the front panel 210 by hinge members to enable the cooking chamber 300 to be opened and closed. The door 310 has a viewing window 311, and a control panel 320 is located adjacent to the front panel 210 and the door 310 incorporating a plurality of push buttons and a display.

A plurality of ventilation holes 221 are formed on the right and left side wall panels 220, for introducing air into the cooking chamber 300 via the electrical component compartment 400, and a plurality of outlets (not illustrated) for discharging air from the cooking chamber 300 to the exterior of the outer case 100. These outlets are diagonally arranged. Outside air, introduced into the microwave oven by a fan 430, circulates through the electrical component compartment 400 and the cooking chamber 300 and is subsequently discharged to the exterior of the oven.

The electrical component compartment 400 contains a magnetron 410 for generating microwave energy in the cooking chamber 300, a high voltage transformer 420, a fan 430 for cooling the electrical component compartment during operation, and a light 450 for illuminating the cooking chamber 300. A light bulb 452 is located adjacent to the ventilation holes 221 formed on the right side wall panel 220 of the inner case 200. The mounting structure of the light 450 will now be described in more detail.

A guide duct 440 is mounted in the electrical component compartment 400 and provides a seal around the ventilation holes 221. It also directs the flow of air, introduced to the electrical component compartment 400 by the fan 430, into the cooking chamber 300. A circular hole 441 is formed on the upper surface of the guide duct 440 in which the light 450 is installed. A

socket guide 442 extends upwardly from the circular hole 441.

The light 450 includes a light bulb 452, and a light socket 451 to which external power is applied. The light bulb 452 is passed through the circular hole 441 and is positioned within the guide duct 440. The light socket 451 contacts the upper section of the socket guide 442, so that the light bulb 452 can not fall into the interior of the guide duct 440 and has an outward extending flange 453. The flange 453 is securely fastened to the upper surface of the guide duct 440 using coupling members.

Each of the coupling members includes a coupling hole 454 provided in the flange 453 and a coupling bar 443 extending upwardly from the surface of the guide duct 440 which fit in the coupling hole 454. Accordingly, as the socket 451 is inserted into the hole 441 and the light bulb 452 is positioned within the guide duct 440, the light socket 451 is securely connected to the upper surface of the guide duct 440. An elastic hook 444 is formed at the tip of each of the coupling bars 443 so that as the light 450 is inserted into the circular hole 441, the hooks 444 engage with the upper surface of the outward flange 453 thereby retaining the light 450 in position. The light 450 can be disconnected from the guide duct 440 by lifting the light socket 451 and by simultaneously depressing the hooks 444.

A terminal housing 470 is connected to the ends of wires 460 which supply power to the light socket 451. The light socket 451 has a pair of input terminals 455 extending from its upper surface equidistantly spaced from each other. The terminal housing 470 has a pair of connecting holes 471, into which the input terminals 455 are inserted to provide an electrical connection. The distance between the connecting holes 471 is the same size as the distance between the input terminals 455.

The distance between the connecting holes 471 can be varied in size, as shown in Figure 3, to match the distance between the input terminals 455 which may alter during production, thereby making them easy to insert into the terminal housing 470. When the distance between the input terminals is smaller than normal, the sides of the terminal housing 470 can be depressed to reduce the gap between the connecting holes 471. Similarly, the distance between the connecting holes 471 of the terminal housing 470 can be increased to facilitate the insertion of the input terminals 455 into the connecting holes 471.

The operation of the microwave oven in accordance with an embodiment of the present invention will now be described.

When food is placed in the cooking chamber 300 the door is closed and the ovens controls are operated, the fan 430 operates to cool the heat generated by the electrical components, it also introduces air into the cooking chamber 300 through the guide duct 440 and the ventilation holes 221. The air in the cooking chamber 300 is discharged to the outside through the outlets

(not illustrated), thus eliminating food odour and humid air. Microwave energy is generated by the magnetron 410 to perform cooking. The light bulb 452 of the lighting device 450 illuminates the cooking chamber 300 through the ventilation holes 221, so as to allow observation of the cooking process.

The light 450 located in the guide duct 440 is contained in the electrical component compartment 400. To replace a failed light bulb 452, the lighting device 450 is removed from the guide duct 440 by lifting the light socket 451 while simultaneously depressing the hooks 444. After replacement of the light bulb 452, these parts are assembled in reverse order so that the coupling members securely fasten the light socket 451 to the upper surface of the guide duct 440. Only the light 450 needs to be removed without disassembling the guide duct 440, thereby reducing the time it takes to repair.

A terminal housing 470 retaining wires 460 is connected to the input terminals 455 of the light socket 451 to provide an electrical connection, the input terminals 455 being completely inserted into the interior of the terminal housing 470 to prevent electrical shock. When the electrical components in the electrical component compartment are repaired direct contact of the input terminals 455 across which electric current flows is prevented as they are completely inserted into the connecting holes 471. Even if the distance between the input terminals 455 changes, the space between the connecting holes 471 is also variable. Therefore, it is still possible to insert the input terminals 455 into the connecting holes 471.

As described above, the lighting device is designed to be directly attached and detached from the upper surface of the guide duct. The terminal housing, to which the upwardly protruding input terminals on the top of the light socket are electrically connected, is fitted to the end of the wires connected to an external power source. This makes it easy to assemble the lighting device and replace the light bulb. In addition, the input terminals of the light socket are completely inserted into the connecting holes thereby preventing the possibility of an electrical shock.

Claims

1. A microwave oven including a cooking chamber (300) and an electrical component compartment (400) separated therefrom, an air duct (440) mounted within the electrical component compartment (400) for directing a flow of air into the cooking chamber (300) and a light (450) mounted in the air duct (440) for illuminating the cooking chamber (300), **characterised in that** the light (450) can be replaced without de-mounting the air duct (440) from the electrical component compartment.
2. A microwave oven according to claim 1 wherein the light (450) comprises a light socket (451) and a bulb

(452), the light socket (451) having a flange (453) and the air duct having a coupling member (454,443) to engage the flange and maintain the light (450) in position in the air duct.

3. A microwave oven according to claim 2 wherein the air duct (440) has an aperture (441) therein through which the bulb (452) extends from the light socket (451) into the air duct (440).
4. A microwave oven according to claim 3 wherein the coupling member (454,443) comprises a pair of mounting pins (443) extending from the surface of the air duct (440) on opposite sides of the aperture (441) which locate in mounting holes (454) in the flange (453).
5. A microwave oven according to claim 4 wherein the tips of the mounting pins (443) include resiliently deformable hook portions (444) which prevent the flange (453) from disengaging the mounting pins (443).
6. A microwave oven according to any preceding claim wherein the light socket (451) includes a pair of electrical input terminals (455) each of said terminals (455) being received in a respective connector (471) in a terminal housing (470) provided on the end of a power supply lead.
7. A microwave oven according to claim 6 wherein the terminal housing (470) includes means for varying the distance between the connectors (471) so as to correspond to the distance between the input terminals (455) and enable electrical connection therewith.
8. A microwave oven having an inner case with a cooking chamber and a plurality of ventilation holes for directing the inflow of outside air, an outer case joined to the inner case and containing an electrical component compartment separated from the cooking chamber, a guide duct guiding the flow of air inside the electrical component compartment to the cooking chamber through the ventilation holes, and a lighting device with a light socket and a light bulb for illuminating the cooking chamber through the ventilation holes, comprising a circular hole formed on one side of the guide duct and allowing the light bulb to be installed within the guide duct, an outward flange attached to the light socket and caught by one side of the guide duct, and coupling members connecting the outward flange of the light socket to the guide duct.
9. A microwave oven as set forth in claim 8 wherein each of the coupling members comprises a coupling hole formed on the outward flange, and a cou-

pling bar protruding upward from the upper surface of the guide duct to fit in the coupling hole.

10. A microwave oven as set forth in claim 9 wherein the coupling bar has on its front end an elastic hook at an acute angle and contacting the top surface of the outward flange. 5
11. A microwave oven as set forth in claim 8 wherein the light socket includes a pair of input terminals protruding upward and equidistantly spaced from each other to which power is applied and a pair of connecting holes formed at the front end of each of wires, connected to external power source into which the input terminals are inserted. 10 15
12. A microwave oven as set forth in claim 11 wherein one end of the terminal housing is divided into two parts so that an interval between the connecting holes is variable. 20

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FIG. 1

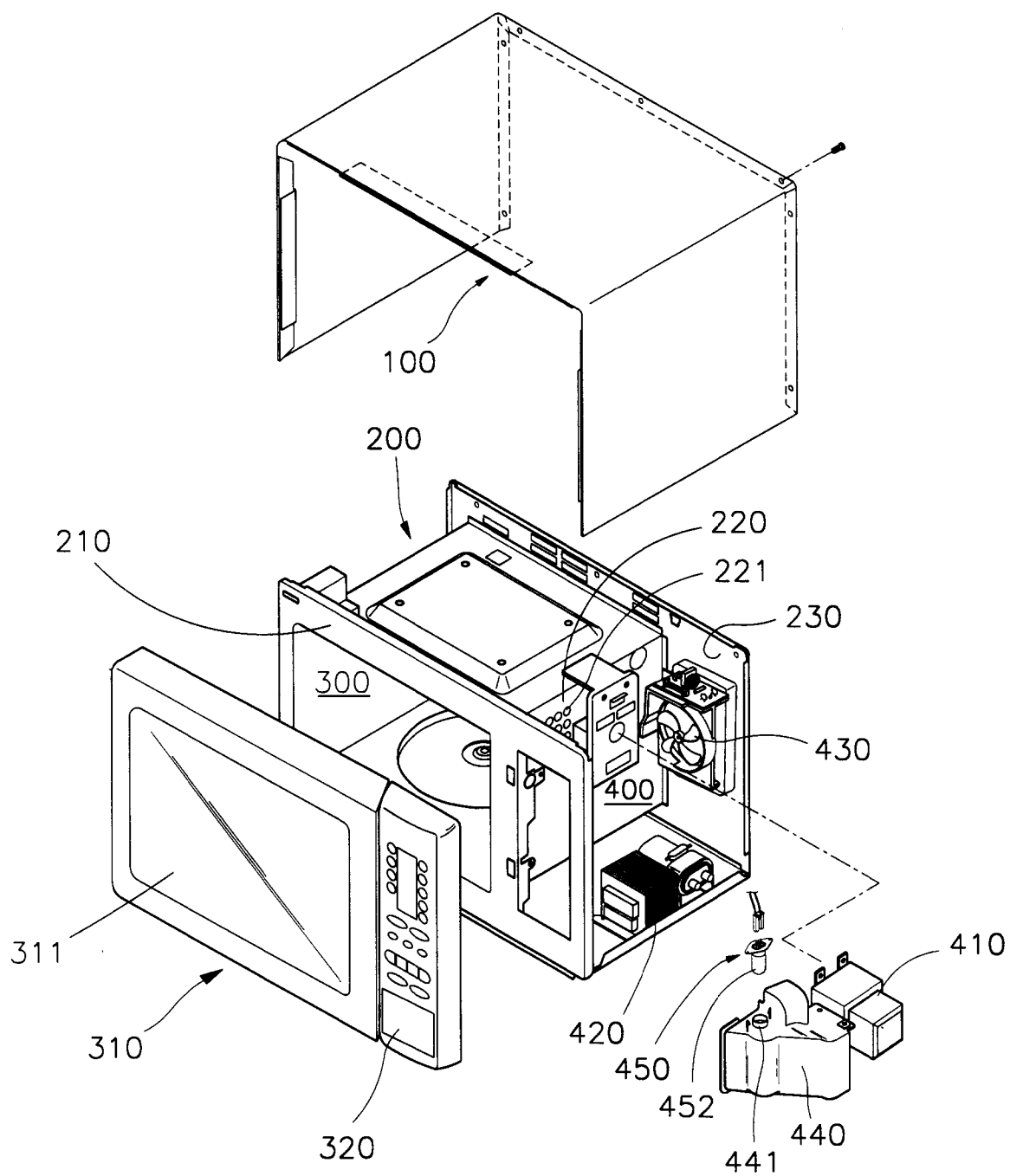


FIG.2

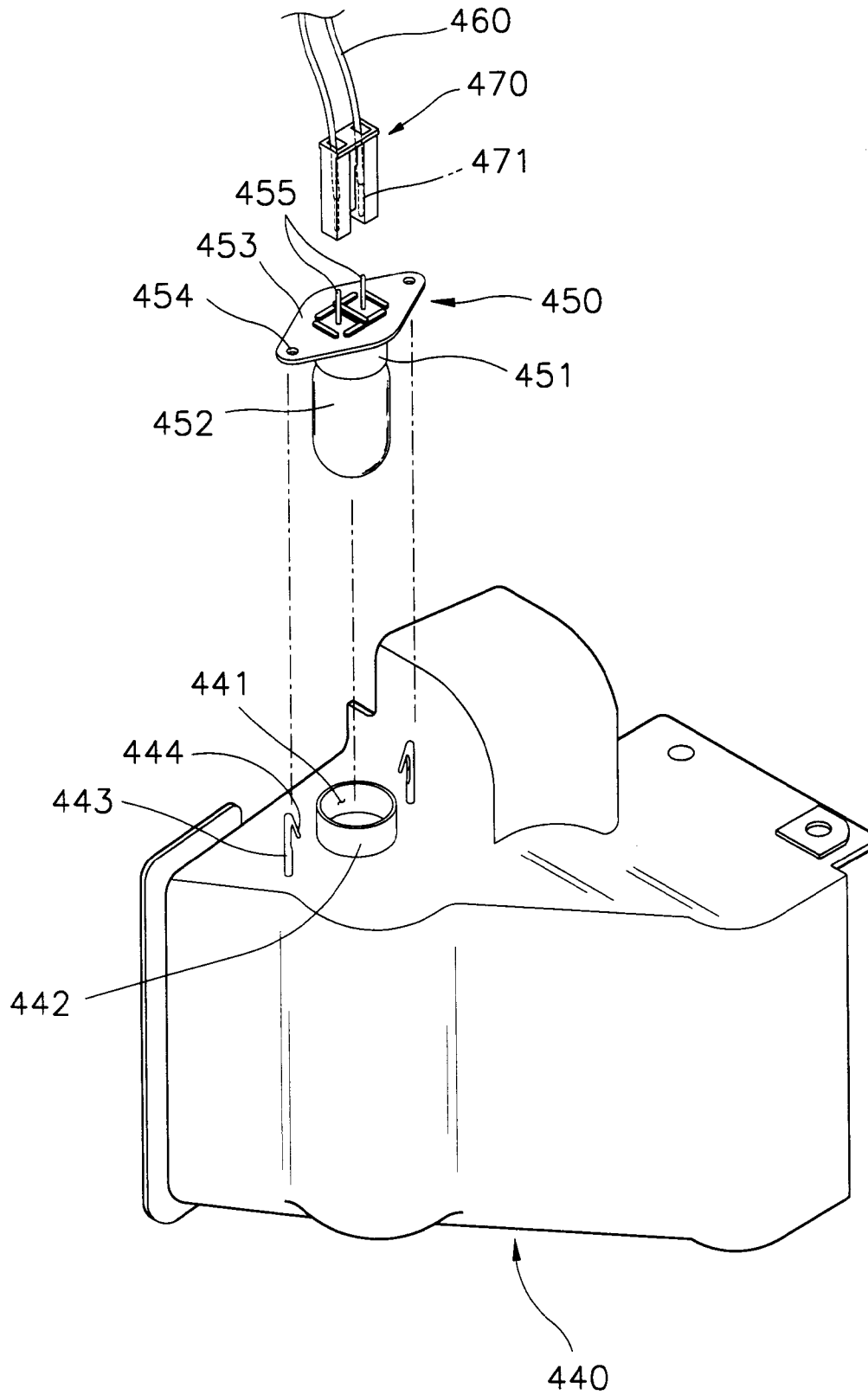


FIG.3

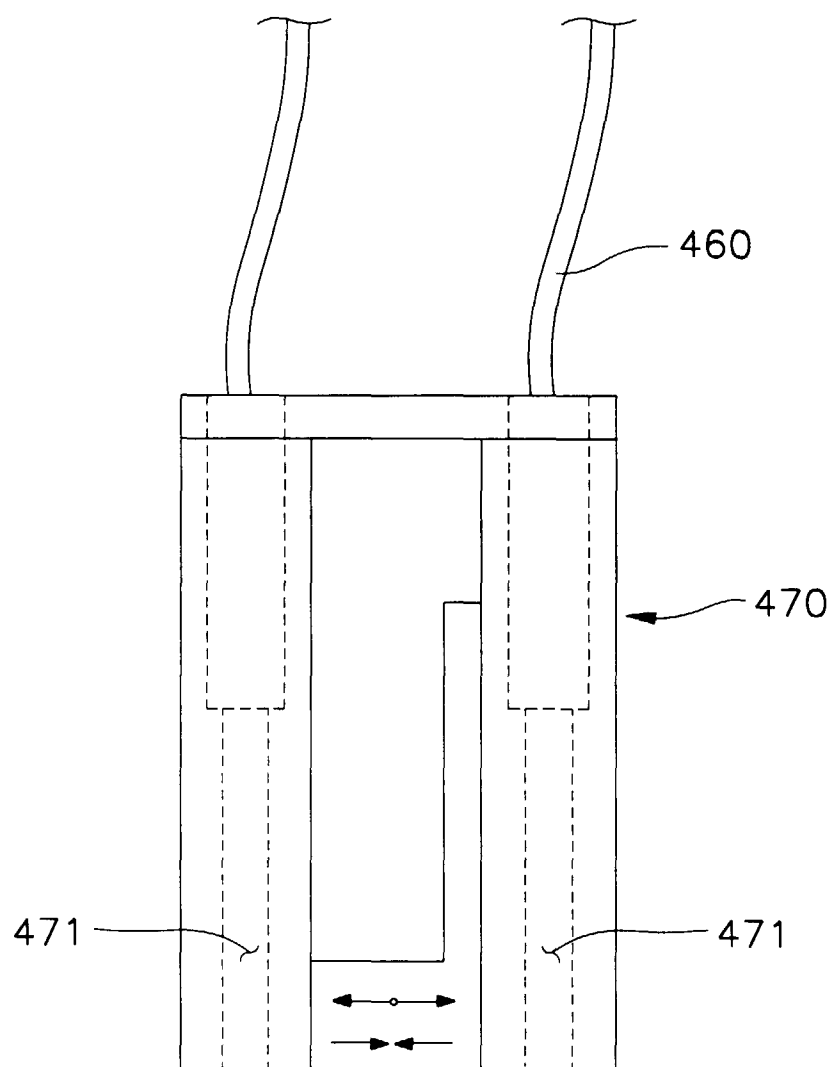


FIG.4
(PRIOR ART)

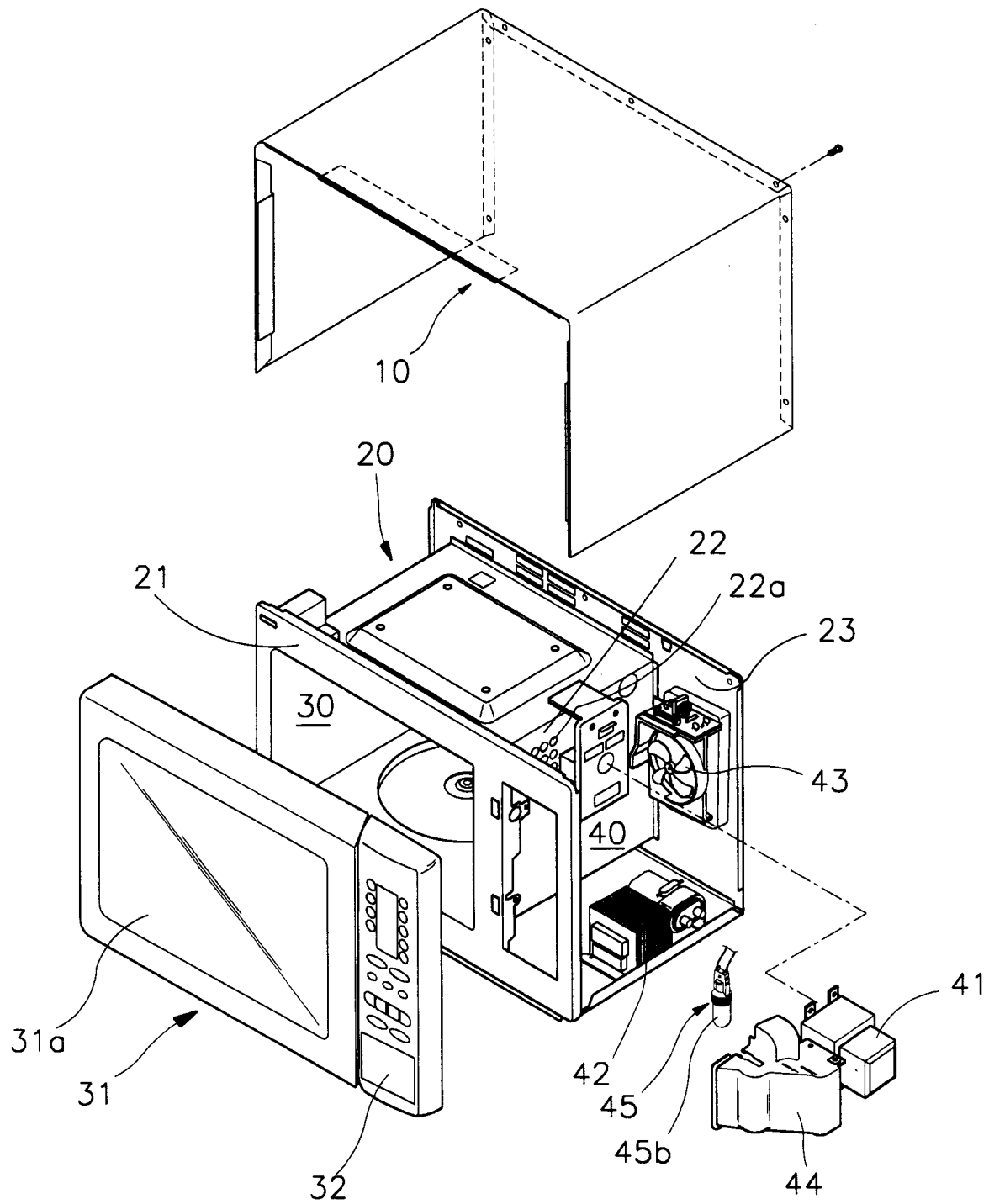


FIG.5
(PRIOR ART)

