(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 868 113 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
30.09.1998 Bulletin 1998/40

(51) Int. Cl.[6]: **H05B 6/80**

(21) Application number: **98300523.2**

(22) Date of filing: **26.01.1998**

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **26.03.1997 KR 9710606**

(71) Applicant:
Samsung Electronics Co., Ltd.
Suwon City, Kyungki-do (KR)

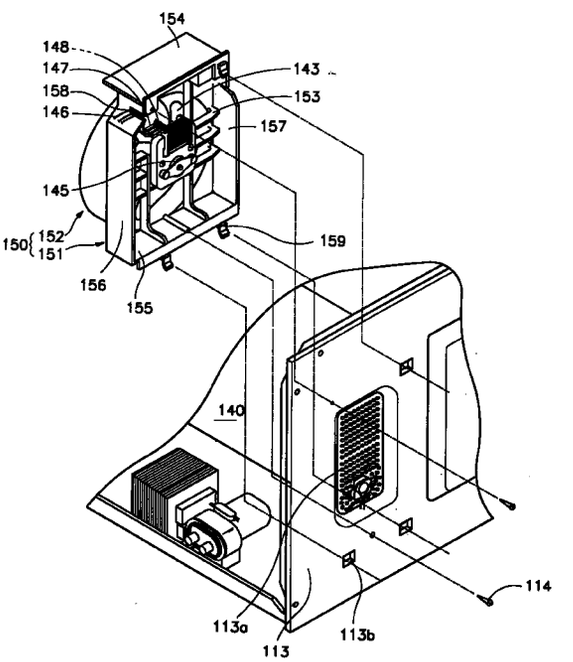
(72) Inventor: **Jeon, Nam-Sik**
Suwon City, Kyungki-do (KR)

(74) Representative:
Read, Matthew Charles et al
Venner Shipley & Co.
20 Little Britain
London EC1A 7DH (GB)

(54) Electrical appliance

(57) An electrical appliance is disclosed and includes a housing (113) and a fan casing (150) supporting a motor (145) attached to the housing (113). The motor (145) is inaccessible without detaching the casing (150) from the housing (113). This prevents repairs to the motor from being attempted without first detaching the casing and damage to the fan motor (145) from occurring when it is inadvertently struck by tools during such attempted repairs.

FIG. 4



EP 0 868 113 A2

Description

The present invention relates to an electrical appliance including a housing and a fan casing supporting a motor, the casing being attached to the housing.

A microwave oven is a cooking appliance which cooks food using microwave energy which causes molecules within the food to vibrate at high speed to generate heat.

A conventional microwave oven is illustrated in Figure 1 and includes an inner case 12 defining a cooking chamber 20, and an outer case 11 forming part of the external housing of the microwave oven. Access to the interior of the cooking chamber 20 is provided by a door 30 hinged to the front of the oven. The front of the oven also includes a control panel 31 to enable various cooking programs and times to be selected.

An electrical component compartment is located adjacent to the cooking chamber 20 and contains a magnetron 41 for generating microwave energy, a high voltage transformer 42 for applying a high voltage across the magnetron 41, a fan 43 capable of drawing external air into the electrical component compartment 40 to cool the various electrical components, and a guide duct 44 for directing the air drawn into the electrical component compartment 40 by the fan 43, into the cooking chamber 20.

A perspective view of a conventional fan motor case is illustrated in Figure 2 and consists of a square shaped fan motor guard 51 having a fan motor 45 installed therein, and a cylindrical fan guard portion 52 surrounding the fan 43. The fan motor guard 51 comprises upper and lower panels 54 and 55 and left and right panels 56 and 57. A portion of the left panel 56 is removed to form a cut-out section.

A plurality of latticed support members 53 extend between the panels 54,55,56,57 and support the fan 43 and the fan motor 45. A circuit board (not illustrated) is mounted on the upper panel 54 of the fan motor case 50 and supplies rectified current to the electrical components. The circuit board includes a choke coil and a fuse to prevent excessive voltage from reaching the electrical components.

Current for driving the fan motor 45 is supplied via a wire 46 which includes a terminal housing 47 provided on its end. The terminal housing 47 is connected to an input terminal 48 provided on the fan motor 45. The wire extends through a slot 58 cut into the left panel 56 of the fan motor case 50 which is secured to the inner surface of the rear wall 13 of inner case 12. A plurality of locking members 59 formed on the edge of the fan motor case 50, are received in through holes 13b formed in the rear wall 13 of the inner case 12 and a plurality of screws 14 are used to fasten the fan motor case 50 to the rear panel 13. When the fan motor case 50 together with the fan 43 and the fan motor 45 is fixed to the rear wall 13, operation of the fan causes air to be drawn into the electrical component compartment 40 through a plurality of air holes 13a drilled in the rear wall 13 of the inner case 12 to cool the electrical components.

A disadvantage with a conventional fan motor case of the type described above, is that because of the cut-out portion in the left panel 56 of the fan motor guard 51, a hand or tool may come into contact with and cause damage to the fan motor during repair of the microwave oven. This can largely be avoided by separating the fan motor case from the inner case's rear wall prior to commencing repairs and then reattaching it afterwards. However, in order to save time, a repairman may attempt to carry out repairs whilst the fan motor case is affixed to the rear wall of the inner case by inserting his hand or a tool through the cut-out portion in the left panel 56. This can result in damage being caused to the fan motor and further repairs being required.

It is an object of the present invention to overcome or substantially alleviate the aforementioned disadvantages.

An electrical appliance according to the present invention is characterised in that the motor can only be accessed by detaching the casing from the housing.

Preferably, the casing and the housing completely enclose and surround the fan motor.

In a preferred embodiment the casing includes a front face with openings therein for the passage of air and a peripheral wall depending from the front face having an uninterrupted mating surface in contact with the housing.

Preferably the elecrical appliance is an oven, especially a microwave oven.

Although reference is made specifically to a microwave oven, it should be noted that the invention is not limited to microwave ovens and can also be applied to other electrical appliances.

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

Figure 1 is an exploded perspective view of a microwave oven in accordance with the prior art;
Figure 2 is a perspective view of a conventional fan motor case;
Figure 3 is an exploded perspective view of a microwave oven in accordance with a preferred embodiment of the present invention; and
Figure 4 is a perspective view of a fan motor case for the microwave oven in accordance with a preferred embodiment of the present invention.

As shown in Figure 3, the microwave oven comprises an inner case 112 having a cooking chamber 120 and an outer case 111. The cooking chamber 120 is accessible via a door 130 hinged on one side of the front of the microwave oven which also includes a control panel 131 for selecting different cooking programs and times.

An electrical component compartment 140 is sepa-

rated from the cooking chamber 120 by a side wall, and contains a magnetron 141 for generating microwave energy, a high voltage transformer 142 for applying high voltage across the magnetron 141, a fan 143 to cool the various electrical components, and a guide duct 144 to direct a flow of the air drawn into the electrical component compartment 140 by the fan 143 into the cooking chamber 120. The air drawn into the electrical component compartment 140 cools several electrical components emitting heat, and the heat-exchanged air is introduced to the cooking chamber 120 through the guide duct 144 to remove moisture and cooking smells.

As shown in Figure 4, the fan motor case 150 consists of a square shaped fan motor guard 151 in which a fan motor 145 is mounted, and a cylindrical fan guard 152 surrounding the fan 143. The fan motor guard 151 formed from upper and lower panels 154 and 155 and left and right panels 156 and 157.

The fan motor guard 151 supports the fan 143 and fan motor 145 between a plurality of latticed support members. A circuit board (not illustrated) is mounted on the upper panel 154 of the fan motor case 150, and includes a choke coil and a fuse to prevent excessive voltage from being supplied to the electrical components. The circuit board furnishes rectified current to the electrical components in the electrical component compartment 140.

The current for driving the fan motor 145 is supplied via a wire 146 having a terminal housing 147 on its end. The wire is coupled via the terminal housing 147 to an input terminal 148 provided on the fan motor 145. The wire extends into the fan motor case 150 via a slot in the left panel 156.

The fan motor case 150 is affixed to the inner surface of the rear wall 113 of the inner case 112. The upper, lower, left and right panels 154, 155, 156 and 157, forming the fan motor guard 151 of the fan motor case 150, completely enclose and surround the fan motor 145 leaving no openings between the fan motor case 150 and the rear wall 113.

To attach the fan motor case 150 to the rear wall 113, a plurality of locking members 159 provided on the upper and lower panels 154 and 155 of the fan motor case 150, are inserted through holes 113b provided in the rear wall 113 corresponding to the locking members 159. A plurality of screws 114 are subsequently inserted into screw holes formed in the fan motor case 150 and the rear wall 113, to retain the fan motor case 150 in position.

When the microwave oven is operational, the magnetron 141 produces microwave energy which is directed into the cooking chamber 120 to cook the food. The fan motor 145 drives the fan 143 which draws air into the electrical component compartment 140 through a plurality of air holes 113 to cool the electrical components. The heat exchanged air is continuously drawn into the cooking chamber 120 and is subsequently discharged outside to remove moisture and cooking smells.

The microwave oven in accordance with the preferred embodiment described above is designed to fully enclose the fan motor to avoid contact with it when electrical components are being repaired and prevent damage to the fan motor.

Claims

1. An electrical appliance including a housing (113) and a fan casing (150) supporting a motor (145), the casing being attached to the housing (113), **characterised in that** the motor (145) can only be accessed by detaching the casing (150) from the housing (113).

2. An electrical appliance according to claim 1, wherein the casing (150) and the housing (113) completely enclose and surround the fan motor(145).

3. An electrical appliance according to claim 1 or 2, wherein the casing (150) includes a front face with openings therein for the passage of air and a peripheral wall (154,155,156,157) depending from the front face (153) having an uninterrupted mating surface in contact with the housing (113).

4. An oven according to any preceding claim.

5. An oven according to claim 4, wherein it is a microwave oven.

6. A microwave oven having an electrical component compartment, a fan installed in the electrical component compartment to draw external air into the electrical component compartment and cool electrical components, and a fan motor driving the fan, said microwave oven comprising:

   a fan motor case secured to a rear wall of the microwave oven for housing the fan motor and formed by upper, lower, left and right panels to be square in shape, said panels being attached to the rear wall without any gap.

FIG. 1
(PRIOR ART)

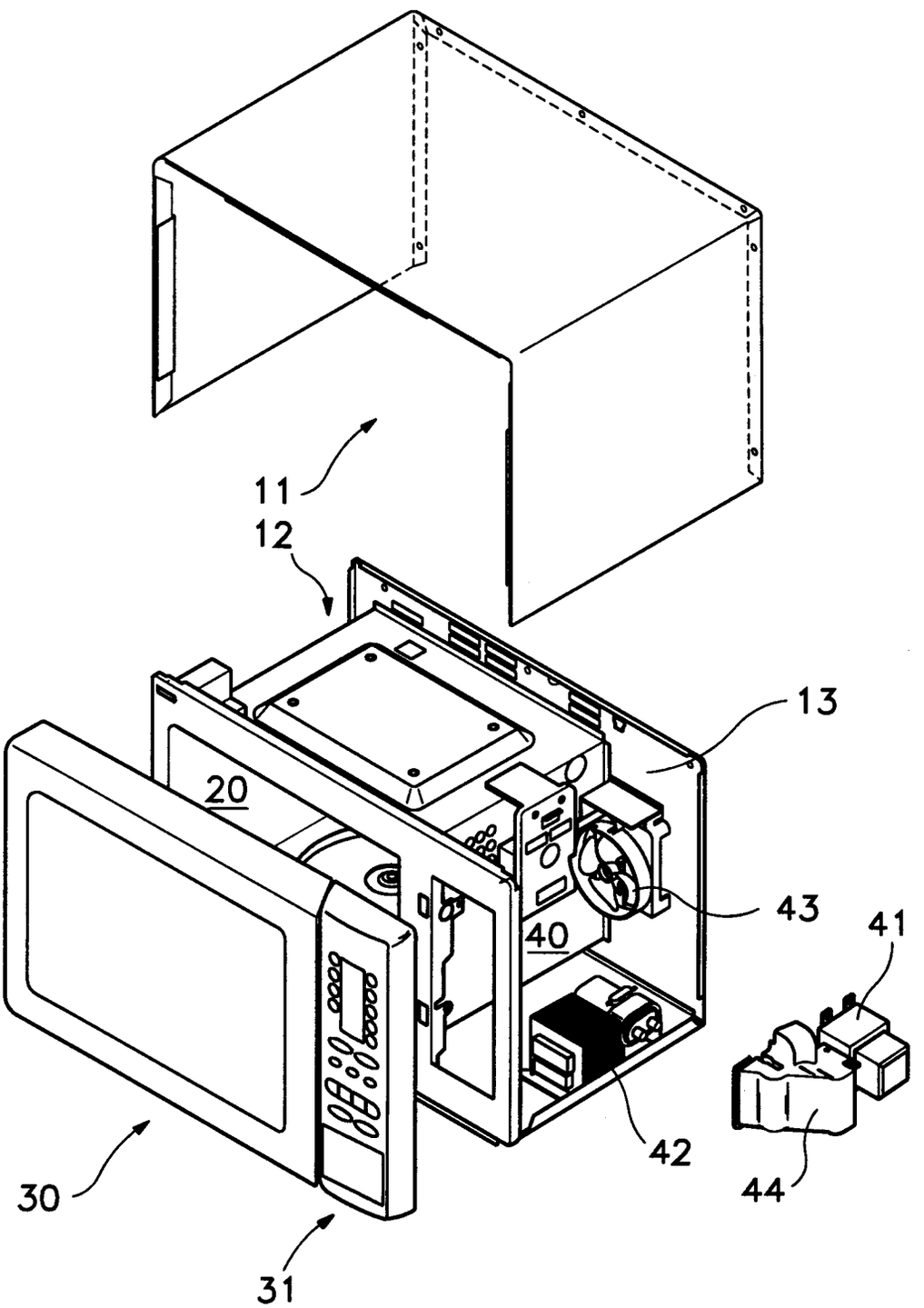


FIG. 2
(PRIOR ART)

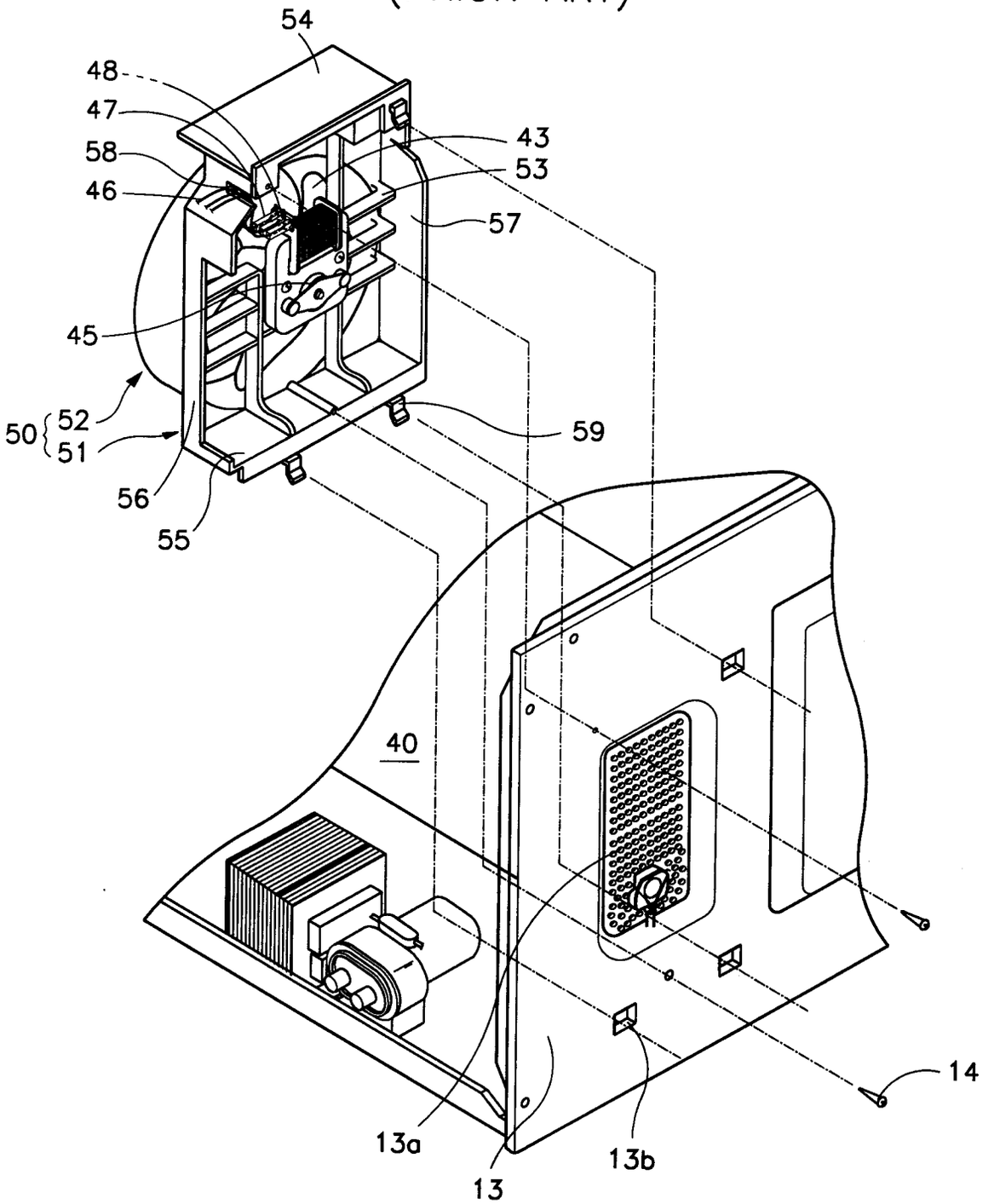


FIG. 3

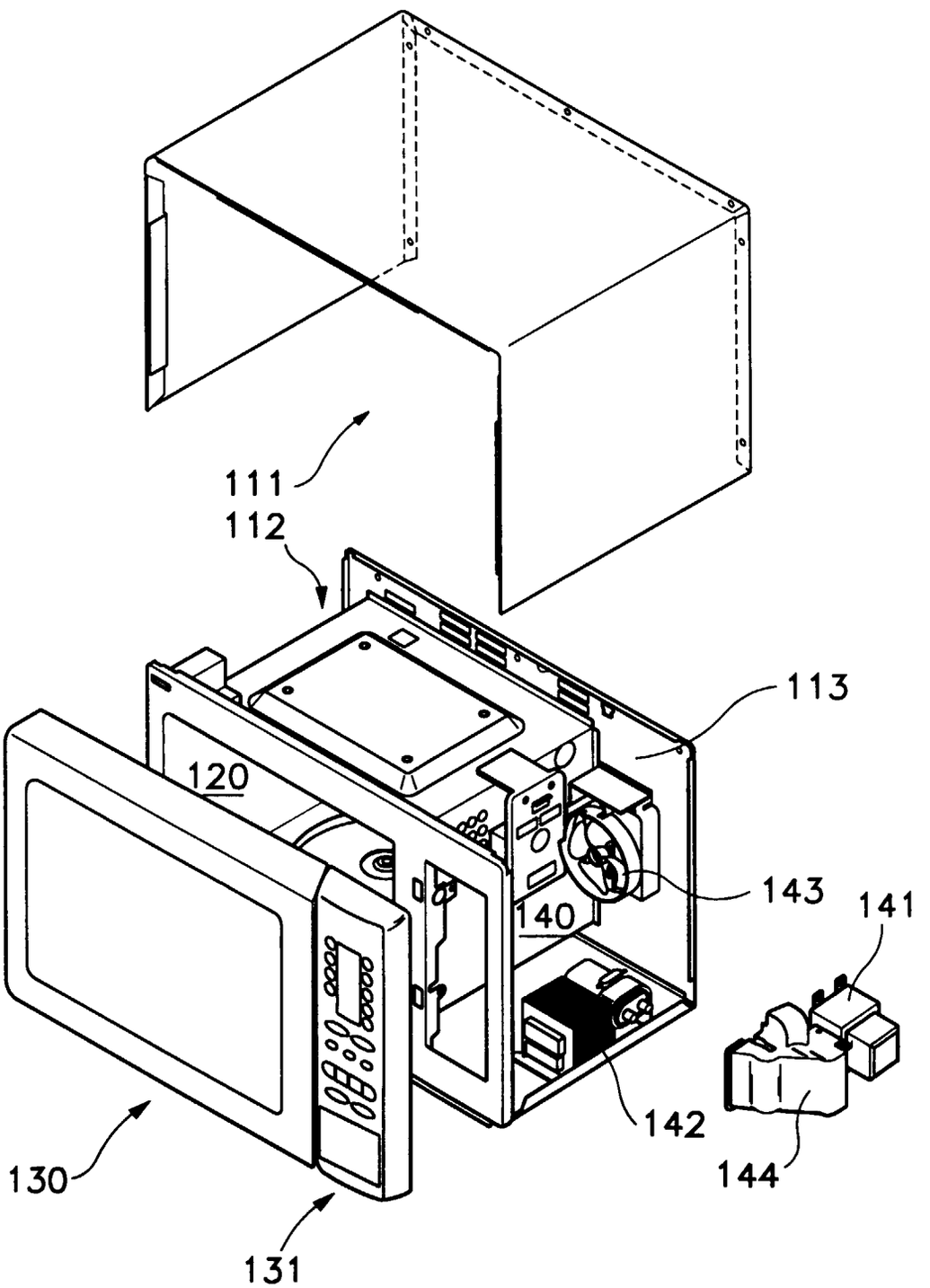
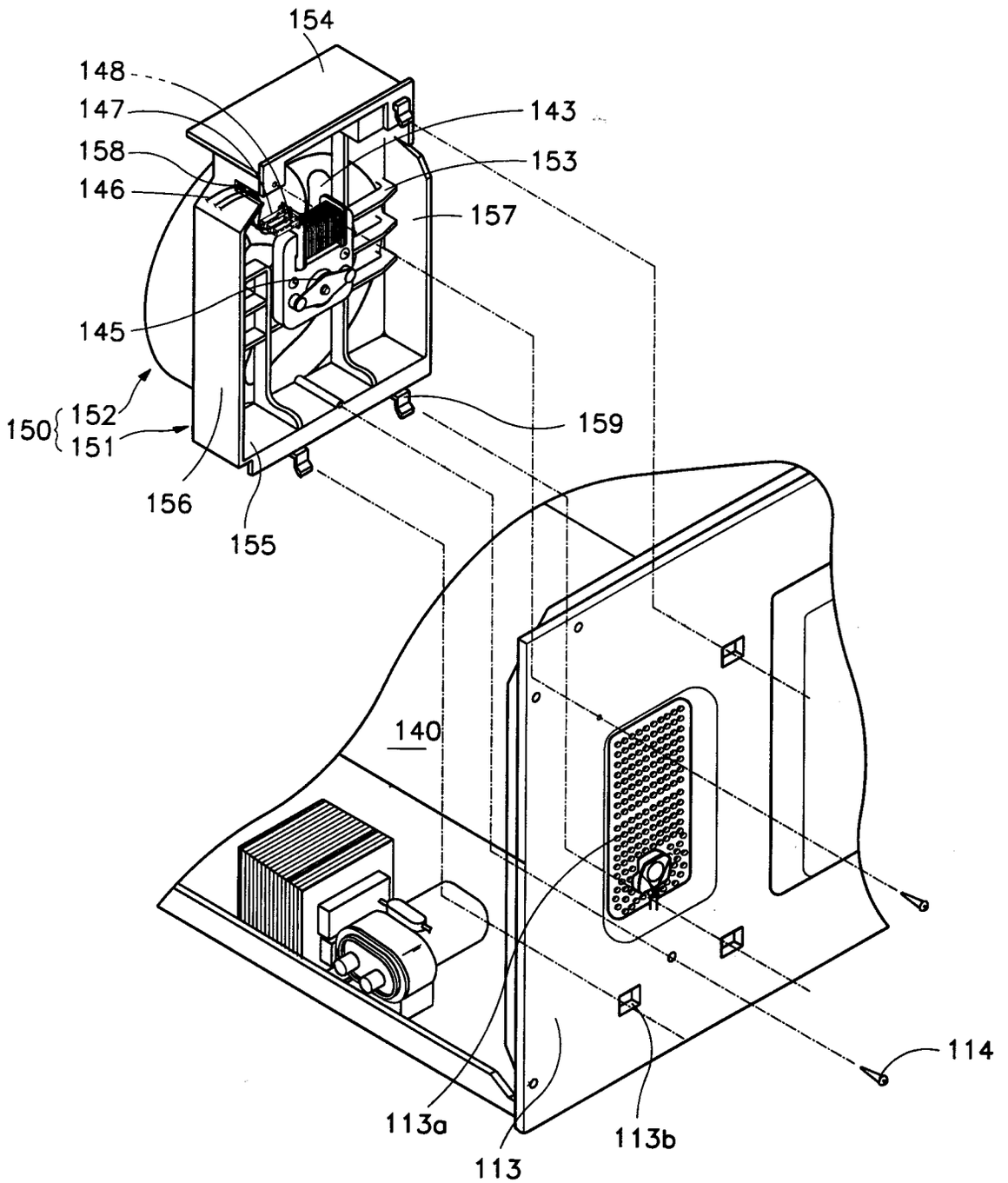


FIG. 4


154
148
147
158
146
143
153
157
145
150
152
151
159
156
155
140
114
113a
113b
113