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(54) Device for the condensing reduction in the cooking space of a microwave oven

(57) A device for the condensing reduction in the cooking space of a microwave oven, including a magnetron (1) fed through a transformer (2) and cooled by means of a fan (3), consists of a manifold (4) installed on the magnetron (1) so as to capture the cooling-air coming from the magnetron (1) and to convey it, through a pipe (5), into the cooking space (7) of the oven. The device also includes an electric mechanism for adjusting the speed of fan (3) which is operated with a reduced voltage taken from the secondary winding of transformer (2) when the oven does not use microwaves.

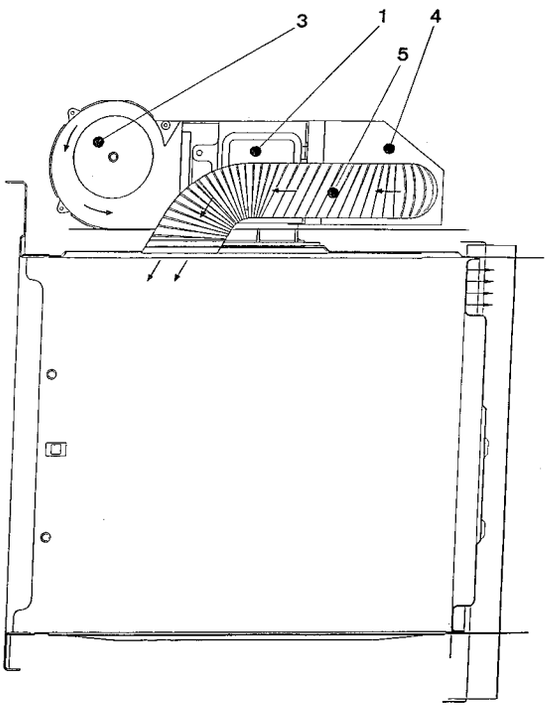

Fig.2

EP 0 686 814 A1

The present invention relates to microwave ovens, and in particular to a device for the condensing reduction inside the cooking space.

It is known that in microwave cooking only the food heats up from inside under the action of microwaves, while the cooking space remains cold. For such a reason, when water evaporating from the food during the cooking gets in touch with the walls having a lower temperature, it condenses thereon. Such an effect is obviously undesirable for many reasons, such as steaming up of the door glass, backwater on the bottom of the cooking space, etc.

In the traditional microwave ovens the condensing is limited by generating a high change of air inside the cooking space. This occurs thanks to an exhaust fan which pumps air from the cooking space through an opening, thus causing the suction of fresh air from outside the oven. It is evident that such a solution involves the presence of a specific exhaust fan. This implies not only manufacturing and installing costs, but also the presence of a potential cause of malfunction which affects the maintenance and the global reliability of the apparatus.

Furthermore, in the case of combined ovens having, for instance, a resistor which can be operated alone or together with microwaves, the exhaust fan works only when the cooking mode includes the microwaves. Therefore, in this case it is necessary to provide also a shutter which closes the exhaust opening when the exhaust fan does not work, so as to avoid heat dissipation and smoke deposit on the exhaust fan.

Therefore, the object of the present invention is to provide a device for the condensing reduction inside the cooking space which overcomes the above-mentioned drawbacks.

Said object is achieved by means of a device having the features described in claim 1.

The first evident advantage of the device according to the present invention is the elimination of the exhaust fan with substantial advantages in terms of costs and reliability.

This also gives the further advantage of the elimination of the shutter for the exhaust opening in the combined ovens.

Another advantage of the present invention is that air having a temperature higher than room temperature is introduced in the cooking space, therefore causing a greater condensing prevention effect.

These and other advantages and features of the device according to the present invention will be evident to those skilled in the art from the following detailed description of an embodiment thereof with reference to the attached drawings wherein:

Fig. 1 is a schematic top plan view of a microwave oven including the present device; and

Fig. 2 is a schematic side view of the oven of Fig. 1.

Referring to Fig. 1, there is seen that a microwave oven includes a magnetron 1 fed through a transformer 2 and cooled by means of a centrifugal fan 3. These elements are present in any combined or simple microwave oven. In particular, according to the present invention, the illustrated oven also includes a device consisting of a manifold 4 which collects the hot air coming from magnetron 1 and conveys it into the cooking space of the oven through a flexible pipe 5. As the air coming from magnetron 1 is captured by manifold 4, it is preferable to provide, in addition to fan 3, a second fan 6 which provides the cooling of transformer 2.

Thanks to the present device, a hot current of air which notably reduces condensing is set up in cooking space 7. Steam traditionally comes out of said room 7 through one or more openings provided on the rear side of the oven, as indicated by the arrows at the bottom of Fig. 1, on the right.

It should be noted that the position of the outlet of pipe 5 into room 7 can be selected at will in so far as the other elements of the oven allow. In particular, as more clearly illustrated in Fig. 2, the hot air can be directed towards the front part of cooking space 7 so as to particularly keep free from condensing the door glass, in order to favour the visual control of the various cooking steps from outside. Similarly, the position of the steam exhaust opening on the rear wall can be chosen at will.

In case of a combined oven, fan 3 is also provided with an automatic electric speed regulator. When the microwave cooking is switched off, said regulator switches the fan feeding to a reduced voltage, for instance 120 V, taken from the secondary winding of transformer 2 which is not used. The current of air flowing through pipe 5 is thus just sufficient for preventing the cooking smokes from going up towards magnetron 1, but does not cause in cooking space 7 a current which sensibly dissipates heat.

In another embodiment of the device according to the invention, manifold 4 can be directly connected to cooking space 7 without having the air pass through flexible pipe 5.

Claims

1. Device for the condensing reduction in the cooking space (7) of a microwave oven including a magnetron (1) fed through a transformer (2) and cooled by means of a fan (3), characterized in that it consists of a manifold (4) installed on the magnetron (1) so as to capture

the cooling-air coming from the magnetron (1) and to convey it, preferably through a pipe (5), into the cooking space (7) of the oven.

2. Device according to claim 1, characterized in that it further includes means suitable to automatically switch the feeding of the fan (3) to a reduced voltage taken from the secondary winding of the transformer (2) when the oven does not use microwaves.

3. Device according to claim 1 or 2, characterized in that the outlet of the pipe (5) into the cooking space (7) is arranged so that hot air is directed towards the front part of said room (7).

4. Microwave oven characterized in that it includes a device according to one of claims 1 to 3.

5. Microwave oven according to claim 4, characterized in that it includes a second cooling-fan (6) coupled with the fan (3).

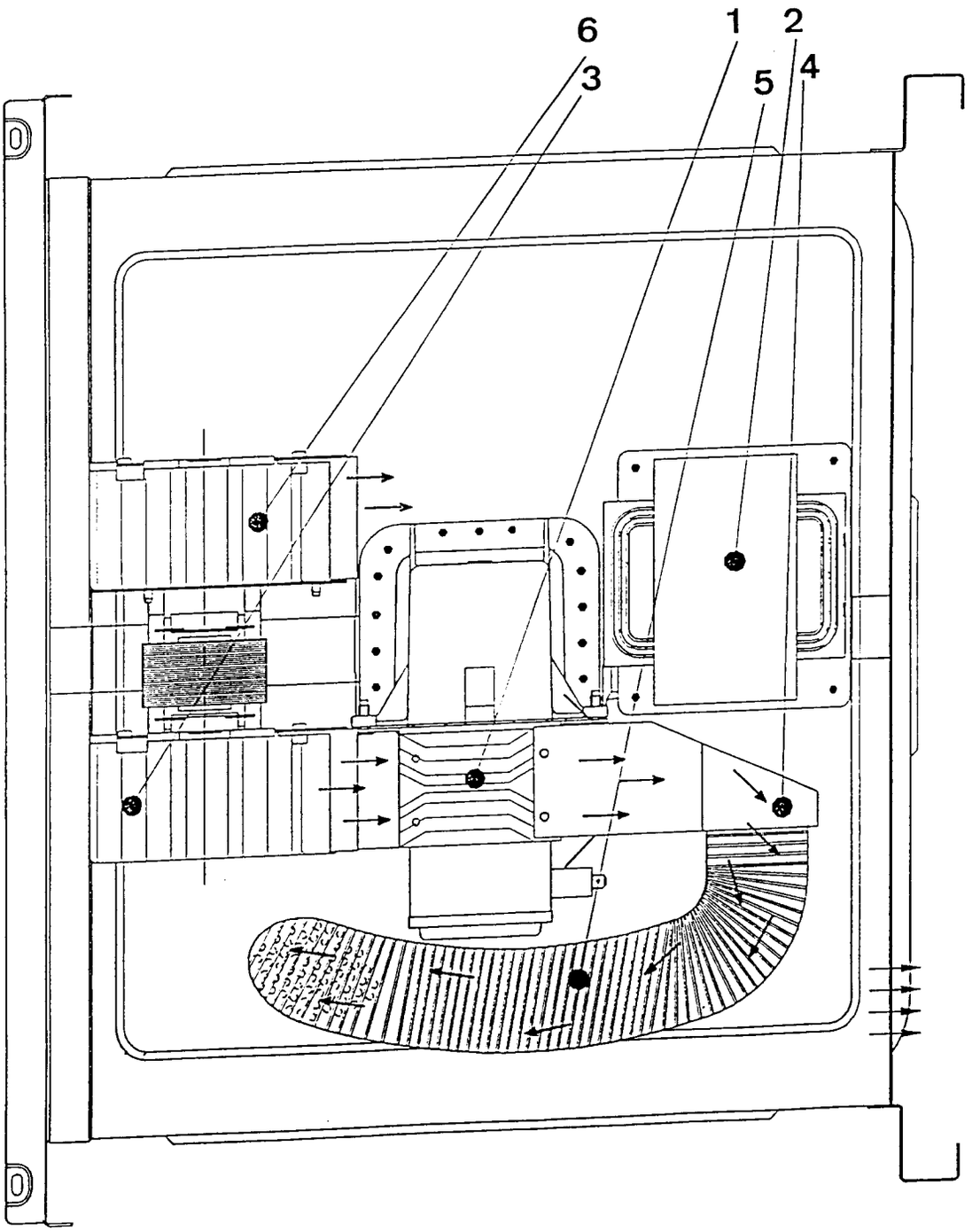

Fig.1

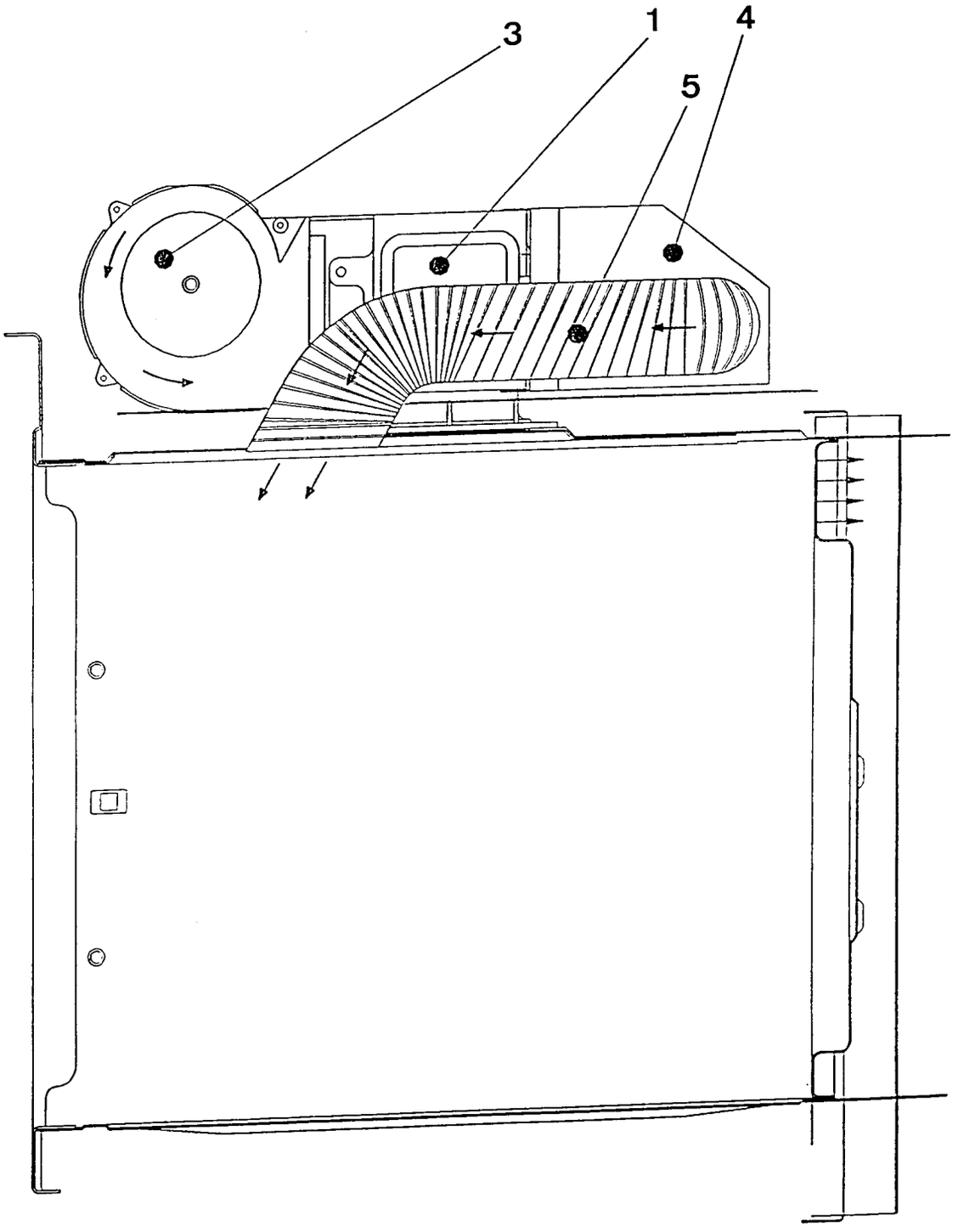

Fig.2

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EUROPEAN SEARCH REPORT

Application Number EP 95830236.6

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 6)
X	DE - A - 3 144 493 (BOSCH) * Page 2, paragraphs 2,3; page 4, lines 12-24; fig. 2 * --	1,3	F 24 C 7/02 H 05 B 6/64
A	EP - A - 0 584 933 (KABUSHIKI) * Column 4, lines 5-26; fig. 1 * --	1	
A	DE - A - 3 521 924 (SHARP) * Claims 1,4; fig. 1 * --	1	
A	EP - A - 0 584 934 (KABUSHIKI) * Abstract; claim 1; fig. 2,3 * ----	1,5	

TECHNICAL FIELDS SEARCHED (Int. Cl. 6)

F 24 C 7/00
H 05 B 6/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	14-09-1995	TSILIDIS

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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