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(54) Steam oven with variable vacuum duct for stream extraction

(57) The invention is a new steam oven with ventilation of the outer walls of the cooking chamber (1), comprising a vacuum device with variable cross section between the cooking chamber (1) and the ventilation duct (2.2) suited to extract the steam from the cooking chamber (1) through a hole (1.2) present in the upper wall (1.3) of the cooking chamber (1). The device comprises a mobile wall (3.1b) suited to reduce the ventilation duct (2.2), hinged before said hole (1.2) and positioned above it. The inclination of the mobile wall (3.1b) varies from a completely lowered position, in which it closes said hole (1.2), to a maximum opening position, depending on the temperature and the humidity present inside the cooking chamber and depending on the ventilation speed in the duct (2.2).

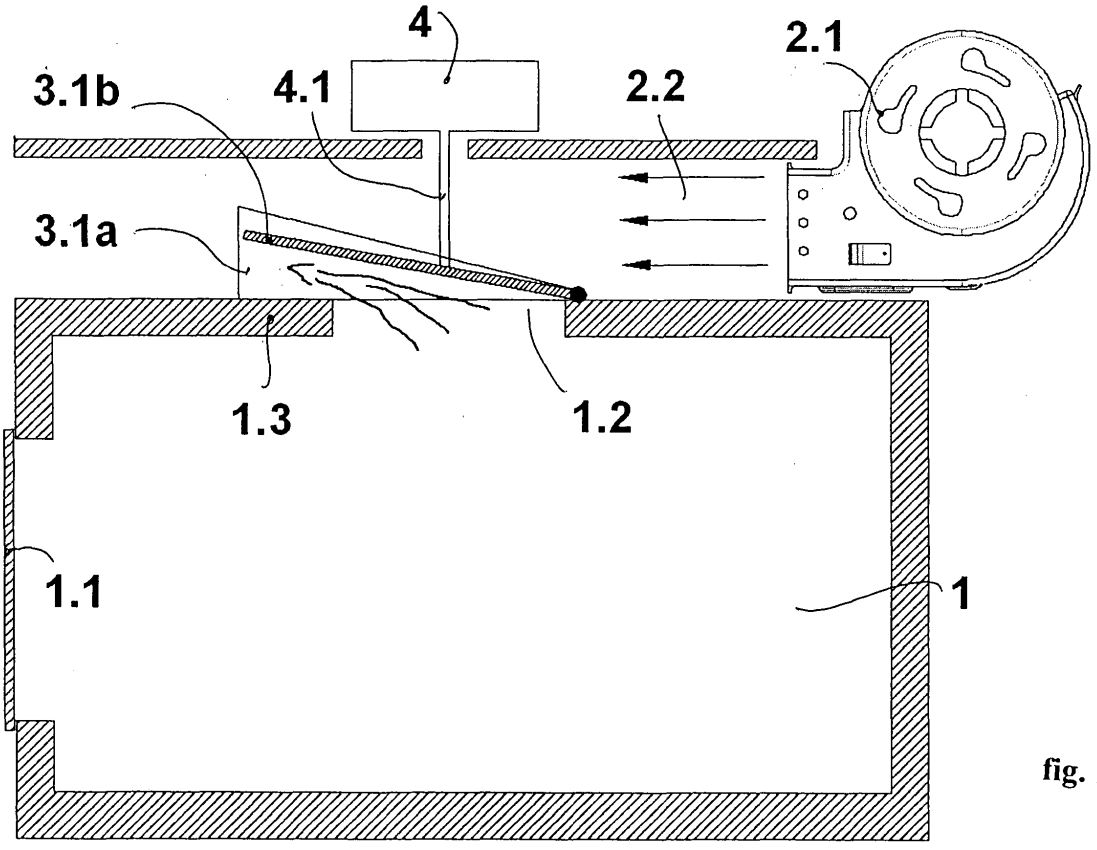

fig. 1

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Description

[0001] The present patent concerns electrical household appliances for the kitchen and in particular steam ovens.

[0002] Steam ovens are known in which water is vaporised and blown inside the oven.

[0003] These steam ovens comprise a tank for the water to be vaporised, a pump for lifting the water, a vaporiser.

[0004] A ventilation system extracts the steam from inside the cooking chamber so as to prevent saturation inside said cooking chamber.

[0005] Current ovens also comprise a ventilation system suited to cool the outer walls of the cooking chamber so that the heat is not transmitted to the outer walls of the oven or to the walls of the furniture unit that contains the oven.

[0006] The cooling ventilation system and the steam extraction system are integrated together so that the ventilation system also extracts the steam.

[0007] Steam ovens made in this way present various drawbacks and problems.

[0008] The ventilation system which extracts the steam from the cooking chamber and cools the outer walls of the cooking chamber involves no regulation, except for the fan rotation speed. In this way the extraction of steam from the cooking chamber and the ventilation of the outer walls of said cooking chamber are connected to each other.

[0009] Consequently, an excessive extraction of steam from the cooking chamber takes place to favour the cooling of the outer walls of the cooking chamber, or the extraction of less steam affects the heating of the outer walls of the cooking chamber.

[0010] Alternatively another solution is used, which is rather expensive and bulky, since it comprises two separate systems for ventilating the outer walls and extracting the steam.

[0011] To overcome all the above-mentioned drawbacks, a new steam oven has been studied and implemented, provided with a variable depression duct for extracting the steam.

[0012] The aim of the new oven is to modulate the extraction of steam from the cooking chamber while maintaining adequate ventilation of the outer walls of the cooking chamber itself.

[0013] Another aim of the new oven is to properly cool the outer walls of the cooking chamber and at the same time adequately extract the steam from the inside of said cooking chamber with a single ventilation system.

[0014] These and other aims, both direct and complementary, are achieved by the new steam oven, which comprises a mechanism suited to vary the opening for the suction of steam from the inside of the cooking chamber by means of a wall that can be rotated with variable suction effect in the duct through which the cooling air passes.

[0015] Steam oven with ventilation of the outer walls of the cooking chamber, equipped with a vacuum device with variable section between the cooking chamber and the ventilation duct, suited to extract the steam from the cooking chamber through a hole present in the upper wall of said cooking chamber. Said variable system forms a wedge-shaped tunnel, arranged above and around said hole and suited to reduce the ventilation duct, or inversely suited to reduce said hole.

[0016] The characteristics of the new steam oven with vacuum system for steam extraction will be explained in greater detail in the following description with reference to the enclosed drawings, which are attached by way of a non-restrictive example.

[0017] The figure 1 schematically represents a cross section of the new steam oven, in which it is possible to identify the cooking chamber (1) with the system for ventilation and steam extraction.

[0018] The cooking chamber (1) is equipped with a front access panel or door (1.1) and has an opening (1.2) on its upper wall (1.3).

[0019] The ventilation system comprises a fan (2.1) and a duct (2.2) or jacket around said cooking chamber (1).

[0020] In particular, said duct (2.2) laps and conveys the air blown by the fan (2.1) onto the upper wall (1.3) of the cooking chamber (1).

[0021] Inside said duct (2.2), above the hole (1.2) in the upper wall (1.3) of the cooking chamber (1) there is the wedge-shaped tunnel with a mobile wall (3.1).

[0022] The wedge-shaped tunnel (3.1) (Fig. 2) is composed of two fixed walls in the shape of a right-angle triangle (3.1 a) parallel to each other and connected by a third rectangular mobile wall (3 .1 b) so as to form a hollow ramp shape whose inclined mobile wall (3.1 b) forms, in the ventilation duct (2.2), a first compression segment for the air blown in by the fan (2.1). Substantially, said wedge-shaped tunnel (3.1) gradually reduces the opening for the passage of the air blown in by the fan (2.1).

[0023] The wedge-shaped tunnel (3.1) has dimensions and positions such as to stand completely above the hole (1.2) in the upper wall (1.3) of the cooling chamber (1).

[0024] The mobile wall (3.1b) is hinged close to the edge of said hole (1.2) in said cooking chamber (1) so as to pass from a closed position of said hole (1.2) to an inclined position of maximum opening of the wedge-shaped tunnel (3.1).

[0025] Substantially, said mobile wall (3.1b), modifying its inclination, gradually closes and opens the hole (1.2) in the cooking chamber (1).

[0026] A step-by-step motor (4), or other equivalent regulating mechanism, modifies and regulates the inclination of said mobile wall (3.1b), directly or by means of linkages (4.1).

[0027] The wedge-shaped tunnel (3.1) produces inside the ventilation duct (2.2) a vacuum effect, which acts

in a variable way, depending on the position of the mobile wall (3.1 b), on the extraction of steam from the cooking chamber.

[0028] The new steam oven constituted as described above presents considerable advantages.

[0029] The extraction of steam from the cooking chamber (1) is variable and regulated by the mobile wall (3.1b), depending on the temperature and humidity measured by special sensors.

[0030] It is thus possible to use a single ventilation system (2.1, 2.2) which cools the outer walls of the cooking chamber (1) and takes away the steam. The speed and capacity of the ventilation system (2.1, 2.2) depend on the cooling effect needed by the outer walls of the cooking chamber (1), while steam extraction is regulated by said mobile wall (3 .1 b), depending on the capacity/ventilation of the ventilation system (2.1, 2.2) and on the temperature/humidity in the cooking chamber (1).

Claims

1. Steam oven with ventilation of the outer walls of the cooking chamber (1), **characterised in that** it comprises a vacuum device with variable cross section between the cooking chamber (1) and the ventilation duct (2.2), suited to extract the steam from the cooking chamber (1) through at least one hole (1.2) present in the upper wall (1.3) of said cooking chamber (1), and wherein said variable vacuum device comprises a mobile wall (3.1b), suited to reduce the ventilation duct (2.2), hinged before said hole (1.2) and positioned above it.

2. Steam oven with ventilation of the outer walls of the cooking chamber (1) according to claim 1, **characterised in that** said vacuum device also comprises two substantially triangular fixed walls (3.1 a) parallel to each other, and wherein said mobile wall (3.1b) is located between said two triangular walls (3.1a) and hinged close to a vertex of said triangular walls (3.1a) so as to constitute a ramp whose inclined mobile wall (3.1b) forms, in the ventilation duct (2.2), an inclined compression segment for the air blown in by the fan (2.1).

3. Steam oven with ventilation of the outer walls of the cooking chamber (1) according to claims 1, 2, **characterised in that** the inclination of the mobile wall (3.1b) varies from a completely lowered position, in which it closes said hole (1.2), to a maximum opening position corresponding to the upper edge of said triangular walls (3.1a).

4. Steam oven with ventilation of the outer walls of the cooking chamber (1) according to the previous claims, **characterised in that** the mobile wall (3.1 b) is rotated by a step-by-step motor (4), or other equivalent regulating mechanism, depending on the temperature and the humidity present inside the cooking chamber and depending on the ventilation speed in the duct (2.2).

5. Steam oven according to the previous claims, **characterised in that** it controls the steam contained in the cooking chamber (1) by varying the output section (1.2) obtained by means of the mobile wall (3.1b) of the wedge-shaped tunnel (3.1) located in the channel (2.2) through which the air that cools the outer walls of the oven passes, in such a way as to create a variable vacuum effect owing to their combination.

6. Steam oven according to the previous claims, **characterised in that** the mobile wall (3.1b) is regulated by a step-by-step electric motor (4), and wherein the position of said mobile wall (3.1b) is controlled by an electronic card by means of a signal produced by temperature and humidity sensors which monitor the quantity of steam contained in the cooking chamber (1).

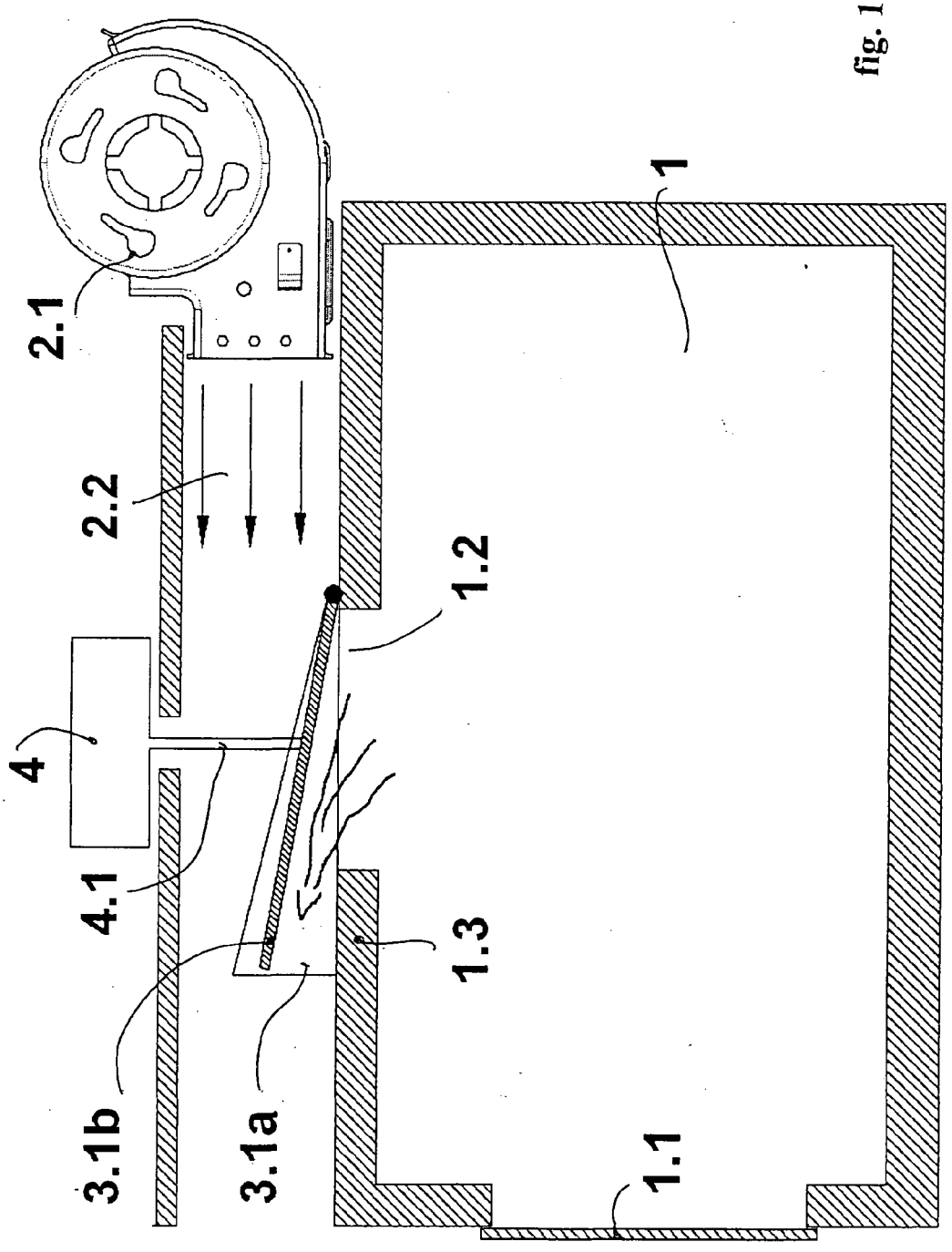

fig. 1

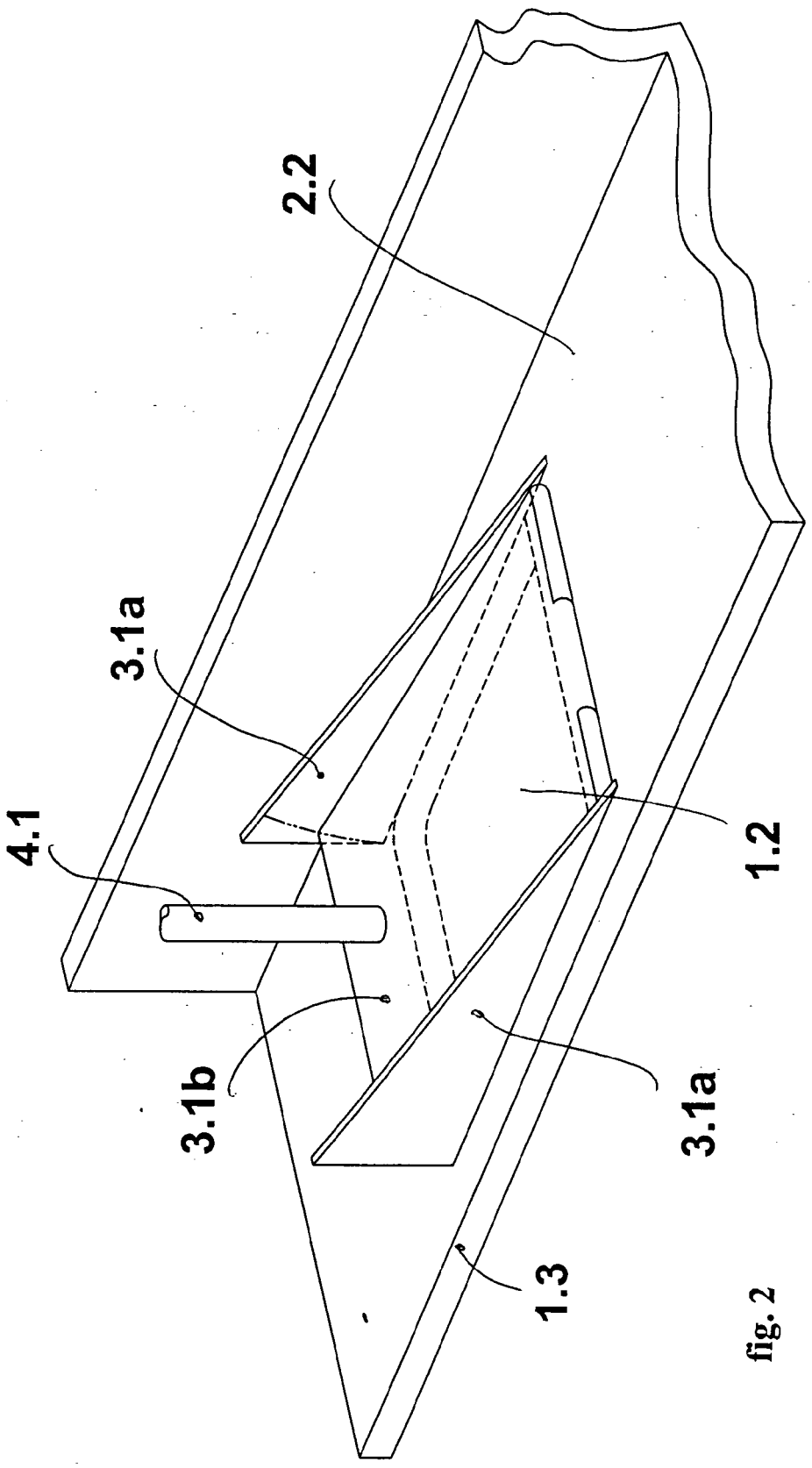

fig. 2

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 42 5239

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Y	* column 2, line 41 - column 4, line 3; figures *	3	

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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A47J
F24C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	22 September 2005	Cianci, S

CATEGORY OF CITED DOCUMENTS

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82