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(54) **Method for treating food in a cooking oven, and a cooking oven**

(57) A method for treating food in a cooking oven (1) of the type comprising a cooking chamber (3) suitable to receive the dishes to be treated, heating means (18) located in a thermal exchange relationship with the interior of the cooking chamber (3), a ventilation system (12, 13,

14, 15, 16) adapted to mix the air inside the cooking chamber (3), wherein said ventilation system comprises a rotor (12) operable through an electrical motor (13), wherein the rotor (12) rotation speed (ω) is alternately increased and decreased in a range between a higher value (ω_1) and a lower value (ω_2).

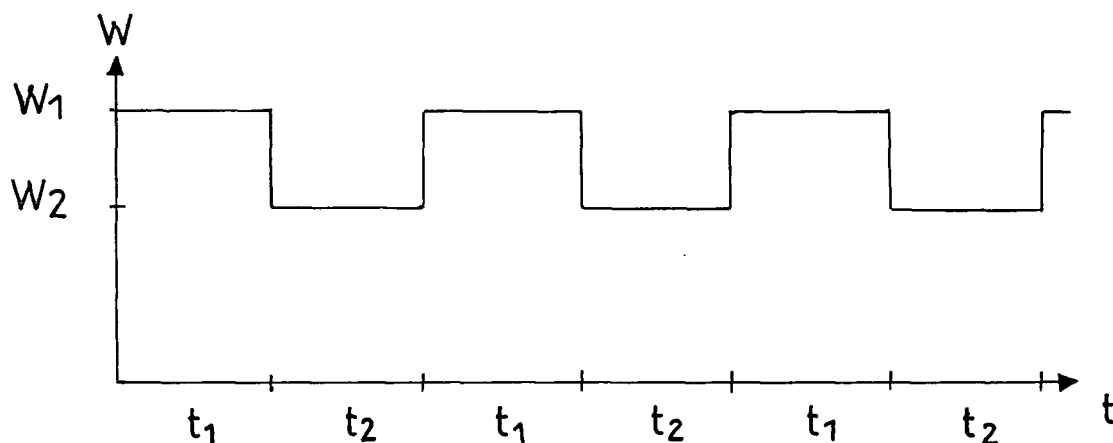


FIG. 4

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Description

[0001] The present invention relates to a method for treating food in a cooking oven, and a cooking oven, particularly an electric oven both of the conventional type and of the self-cleaning pyrolytic type, arranged to implement the treatment method.

[0002] Household cooking ovens usually comprise a cooking chamber which defines therein a cooking space in order to house the dishes to be cooked. The cooking chamber is surrounded by a thermoinsulating material layer, and has an access inlet which is closable through a port hinged to a case which forms the outer shell of the appliance.

[0003] In order to carry out the heating of the cooking space, the cooking chamber is provided with, at the lower and upper walls thereof, heating members typically formed by armoured-tube electric resistors. Usually, the lower heating member is located outside the cooking space, between the lower wall of the cooking chamber and the thermoinsulating layer, so as to heat the dishes, particularly those in the lower portion of the cooking space, through such a lower wall. Instead, the upper heating member is typically formed by a coil-shaped electrical resistor located inside the cooking space, adjacent to the upper wall of the cooking chamber so as to heat the dishes, in particular those in the upper portion of the cooking space, through convection and thermal irradiation.

[0004] The heating members temperature can be adjusted according to the kind of cooking, and particularly the upper resistor, typically very powerful, is intended to reach temperatures of 700°C - 800 °C so to ensure surface toasting of the dishes, for example meat.

[0005] Furthermore, in the so-called pyrolytic ovens, such a resistor serves to rise the cooking space temperature to 400-500°C, in order to induce the pyrolysis of fats and other hydrocarbons molecules, thereby cleaning the oven cooking chamber.

[0006] In order to achieve a preferably even heat distribution, in particular of the hot air inside the cooking chamber, electrical cooking ovens comprise an air ventilation and circulation system. Typically, such an air circulation system provides for a rotor operated by an electrical motor, and in flow communication with the cooking chamber, so as to be able to generate an air circulation in the cooking space. It is further known to arrange one or more further heating members, for example electric resistors, in the pathway of the air flow generated by the rotor, so as to heat the air circulating downstream the cooking chamber and before the air laps against the dishes located in the cooking space.

[0007] A series of tests revealed that, in the light of heat distribution in the cooking space, the air circulation entails two main effects.

[0008] It conveys the heat from areas of the cooking chamber and food surfaces directly exposed to the thermal irradiation and thermal convection towards areas and surfaces not directly reached by convection and thermal

irradiation, for example towards intermediate gaps between more shelves. Thereby, the air circulation promotes a more even heat distribution.

[0009] On the other hand, the same air circulation defines areas with high flow rates and other "shadow" areas in which the flow rate is reduced or stagnant, and thereby add to a not-even heat distribution.

[0010] Since the air flow also conveys considerable vapour quantities, the air circulation also determines a not-even moisture distribution in the cooking space, with very wet or soaked areas, and excessively dry areas.

[0011] Formation and distribution of ventilated and stagnant areas depends on the shape, dimension and distribution of the dishes located in the cooking chamber and on the heat and specific weight distribution of the air-vapour-fumes mixture in the cooking space. The variability in the food which is treated in the cooking ovens, and the sensibility of the flows to small variations in the abovementioned quantities have been indicated as the main cause for the difficulty in predicting or influencing the formation of the ventilated and stagnant areas in the cooking space.

[0012] The object of the present invention is to provide a food treatment method in a cooking oven and a cooking oven having such characteristics as to ensure a more homogeneous heat and moisture distribution in the cooking chamber, and particularly around the dishes to be treated.

[0013] In view of the difficulty or impossibility to completely avoid the formation of shadow or stagnant areas, in which the flow rate and the air exchange with adjacent areas is insufficient to the aim of an homogeneous heat and moisture distribution, the method according to the present invention aims to frequent movements or dimension variations of these stagnant areas. In fact, a series of tests showed that the movement and variation in the shape and dimension of the stagnant areas in the cooking space generates, in addition to a higher turbulence, an air exchange with adjacent areas ("secondary flow", or "transversal flow") which, in the case of a constant repetition, is enough to ensure a more homogeneous heat and moisture distribution around the dishes.

[0014] According to the invention, such an effect is achieved through a variation in the rotor speed according to a continuous cycle, in which the rotation speed is alternately increased and decreased in a range between a higher value and a lower value.

[0015] According to the experimental tests which were performed, the continuous alternation in the increase and decrease of the rotation speed of the rotor is particularly suited to achieve the abovementioned objects. Particularly, the method according to the invention achieves an even temperature and moisture distribution, without the need to consider further values or quantities such as, for example, temperature, weight, and volume of food, the recipe or kind of dish (which would need to be detected or set and processed by a special control programme) or to actively influence the air flow direction by means of

mechanical guide devices or by means of the inversion of the rotor rotation direction, which would entail the use of more expensive motors and controls.

[0016] In fact, according to an aspect of the invention, the rotor speed is varied while keeping the same direction of rotation.

[0017] In accordance with a further aspect of the invention, the lower value of the speed range of the rotor is greater than zero, so as to generate a continuous and monodirectional air flow in the same rotor area and in the heating members area.

[0018] The flow continuity and the direction of the flow constancy in the rotor area allow for a simple positioning of only a few heating members in the monodirectional pathway of the air flow, and the heating members can be powered and turned off simply depending on the powering and turning off of the rotor motor, without the need for complex control systems which account, for example, for rotor downtimes during the continuous cycle and for inversions of the air flow direction. Furthermore, the preservation of the direction of rotation and the continuous rotation without downtime intervals determinate reduced values in the acceleration and deceleration of the rotating masses, with relative energetic savings for a given flow rate.

[0019] In order to better understand the invention and appreciate the advantages thereof, the exemplary and non-limiting description will be set forth herein below of some embodiments thereof illustrated in the annexed drawings, in which:

[0020] Fig. 1 is a perspective view of a household cooking oven;

[0021] Fig. 2 is a top sectional view of the cooking oven in Fig. 1;

[0022] Fig. 3 illustrates a speed control system of a motor for the rotor in a cooking oven according to an embodiment of the invention;

[0023] Fig. 4 illustrates the trend in the rotation speed of the motor for the rotor and of the rotor according to an embodiment of the invention implementable through the control system in Fig. 3;

[0024] Fig. 5 illustrates the trend in the rotation speed of the motor for the rotor and of the rotor according to a further embodiment of the invention implementable through the control system in Fig. 3;

[0025] Fig. 6 illustrates a speed control system of a motor for the rotor in a cooking oven according to a further embodiment of the invention;

[0026] Fig. 7 illustrates the trend in the rotation speed of the motor for the rotor and of the rotor according to an embodiment of the invention implementable through the control system in Fig. 6;

[0027] Fig. 8 illustrates a speed control system of a motor for the rotor in a cooking oven according to a further embodiment of the invention;

[0028] Fig. 9 illustrates the trend in the rotation speed of the motor for the rotor and of the rotor according to an embodiment of the invention implementable through the

control system in Fig. 8;

[0029] Fig. 10 and 11 illustrate further speed control systems of a motor for the rotor in a cooking oven according to further embodiments of the invention.

[0030] With reference to Fig. 1 and 2, a cooking oven 1 comprises an outer case 2, inside which a cooking chamber 3 is located, preferably enveloped in a thermoinsulating material layer 4 and intended to house dishes to be cooked. Said cooking chamber 3 is defined by an upper wall (not shown in the figures), a lower wall 5, a rear wall 6, and side walls 7 provided with sliding guides adapted to slidably support shelves (not shown) of the "grid" or "sheet" type, which can be extracted from the cooking chamber 3 through an access inlet 8, which can be closed through a port 9 preferably secured to the outer case 2 of the oven 1.

[0031] The oven 1 further comprises a suction system in order to suck fumes and vapours from the inside of the cooking chamber 3. The suction system comprises air inlet ports 10 located in the lower portion of the oven 1 outer case 2, and air outlet ports 11 preferably located in the front upper portion of the outer case 2. The inlet 10 and outlet 11 ports are mutually connected through a tubing system (not shown), inside which a so-called "tangential" or "entrainment" air flow is created, by means of ventilator means. Such an entrainment flow creates a windage inside a connecting tube connected to the tubes, one of the ends thereof coming in the cooking chamber.

[0032] The oven 1 is provided with heating means, for example electric resistors or, in the case of gas ovens, with burner units located outside and/or inside the cooking chamber 3.

[0033] In accordance with an embodiment, a lower heating member is located outside the cooking space between the lower wall 5 of the cooking chamber 3 and the thermoinsulating layer 4 so as to heat the dishes, in particular those in the lower portion of the cooking space 3, through this lower wall 5. A further upper heating member, formed by a coil-shaped electrical resistor, is located inside the cooking chamber 3 adjacent the upper wall thereof, so as to heat the dishes, in particular those in the upper portion of the cooking chamber, through convection and thermal irradiation. As an alternative to the coil electrical resistor, the upper heating member comprises an infrared and/or thermal irradiation plate secured to the cooking chamber 3 upper wall.

[0034] In at least one of the walls 5, 6, 7 of the cooking chamber 3, or between one or more of these walls 5, 6, 7 and the thermoinsulating material layer 4, a ventilation space 14 is achieved, which is located in flow communication with the cooking chamber 3 through one or more suction ports 15 and one or more ventilation ports 16 formed in at least one of the walls 5, 6, 7 which define and divide the cooking chamber 3 and the ventilation space 14 one from the other. In the ventilation space 14 a rotor 12 is located, which can be operated by an electrical motor 13 and intended to mix the air inside the cooking chamber 3. To this aim, the rotor 12 is adapted to

suction air from the cooking chamber 3 through the suction ports 15 in the ventilation space 14 and reintroduce air from the ventilation space in the cooking chamber 3 through the ventilation ports 16. Thereby, the rotor 14 generates in the cooking chamber 3 an air flow 17 which extends from the ventilation ports 16 through areas in which the air laps against the dishes located in the oven to the suction ports 15.

[0035] In order to heat the air flow 17 during the recirculation, one or more further heating members 18 can be provided, for example electric resistors located in the pathway of the air flow 17 generated by the rotor 12.

[0036] According to the invention, in at least an operational mode or cooking program of the oven 1, the rotor 12 rotation speed ω is varied according to a continuous cycle, in which such a rotation speed ω is alternately increased and decreased in a range between a higher value ω_1 and a lower value ω_2 (Fig. 4).

[0037] Thereby, a more even temperature and moisture distribution in the cooking chamber 3 is achieved.

[0038] In accordance with an embodiment, the rotor 12 rotation speed ω is changed, while always keeping the same direction of rotation and, preferably, the lower value ω_2 of the rotor 12 speed range is greater than zero, so as to generate a continuous and monodirectional air flow in the same rotor 12 area, and preferably also in the heating members 18 area.

[0039] The flow continuity and the direction constancy of the flow in the rotor 12 area allows for a simple positioning of only a few heating members 18 in the monodirectional pathway of the air flow, and the same heating members 18 can be powered and turned off simply depending on the powering and turning off of the rotor 12 motor 13, without the need for complex control systems. Furthermore, the preservation of the direction of rotation, and the continuous rotation without downtime intervals determine reduced acceleration and deceleration values of the rotating masses with relative energetic savings for a given flow rate.

[0040] In accordance with an embodiment, illustrated in figure 2, the rotor 12, preferably a rotor with radial conveying effect, is located in the ventilation space 14 at the rear wall 6 of the cooking chamber 3. The suction ports 15 are preferably provided in the rear wall 6 in the radial projection area of the rotor 12 on such a rear wall 6, and the ventilation ports 16 can be provided both in the rear wall 6 and the side walls 7 of the cooking chamber 3.

[0041] In the embodiment illustrated in Fig. 2, the ventilation space 14, i.e. the tubing system of the recirculating air, extends from behind the rear wall 6 (where the rotor 12 is located), laterally towards the outside and along the side walls 7. In this embodiment, the ventilation ports 16 for air reintroduction in the cooking chamber 3 can be located in the side walls 7 and in the outer areas of the rear wall 6. Such a configuration of the ventilation circuit allows the air to envelop the dishes from more sides, and to directly lap against a major portion of the surface thereof.

[0042] The heating members 18 are advantageously located radially outside the rotor 12, so as to heat the air flow downstream the rotor and upstream the ventilation ports 16, hence just before the air reintroduction in the cooking chamber 3.

[0043] In accordance with an embodiment, the rotor 12 speed, and thus the flow rate and speed of the air flow, is varied through an electrical powering variation of the electrical motor 13, which entails a speed variation for the rotor 12 between said rotation speed higher value ω_1 and said lower value ω_2 .

[0044] Preferably, the higher ω_1 and lower ω_2 values of the rotation speed ω are substantially constant, and the same rotation speed ω follows a rectangular-wave trend (Fig. 4).

[0045] Advantageously, the ratio t_1/t_2 of the duration t_1 at the higher speed ω_1 to the duration t_2 at the lower speed ω_2 ranges from 0.05 to 19.0, preferably from 0.05 to 1.0, and most preferably this ratio t_1/t_2 is about 0.45.

[0046] Alternatively, the rotation speed of the rotor follows a rectangular-wave or impulse trend (Fig. 5) in which the duration t_1 in which the rotor 12 rotates at the higher speed ω_1 is much shorter than the duration t_2 in which the rotor 12 rotates at the lower speed ω_2 . In this case, the ratio t_1/t_2 of the duration t_1 at the higher speed ω_1 to the duration t_2 at the lower speed ω_2 advantageously ranges between 0.05 and 0.45. Such a variation of the fan 12 speed proved to be very advantageous for treatments of delicate foods which do not tolerate an intense ventilation, but which however require a very even heating.

[0047] As an example, the higher speed ω_1 can be 1800 rpm, and the lower speed ω_2 can be 1600 rpm. The relative variation cycles can provide, as preset values, a duration t_1 at the higher speed ω_1 of 10 - 20 seconds and a duration t_2 at a lower speed ω_2 of 10 - 20 seconds.

[0048] A delicate food program, which can be set by the user, can provide as variation cycles of the same 1800 rpm higher ω_1 and 1600 rpm lower ω_2 speeds, a duration t_1 at the higher speed ω_1 of about 10 - 20 seconds, and a duration t_2 at a lower speed ω_2 of about 2 - 5 seconds.

[0049] According to an embodiment of the invention (Fig. 3), in order to achieve the above-mentioned variation of rotor 12 speed, the oven control unit comprises a thermal switch 19, connected in parallel to a resistor 20 in the electrical motor 13 powerline for the rotor 12, which is preferably, but not necessarily, a single phase asynchronous motor.

[0050] When the thermal switch 19 is closed, the current passes through the same switch and powers the motor 13, which rotates at the higher speed ω_1 . A resistor inside the thermal switch 19 generates a heating which causes the switch 19 to open at the end of the duration t_1 , thereby the current which powers the motor 13 passes through the resistor 20, with the result that the motor rotates to a lower speed ω_2 . Thereby, a robust and inexpensive control is achieved, which determinates a peri-

odic change of the rotor 12 speed.

[0051] In accordance with a further embodiment, the control unit of the cooking oven 1 is arranged to power the motor 13 of the rotor 12, so as to change the rotor 12 rotation speed and, consequently, the speed and flow rate of the air flow in the cooking chamber 3 through a periodic and repeated switching between three distinct and substantially constant rotational speeds. Particularly, it can be provided to impose to the rotor 12 a periodic step speed trend in which, after a time frame t_1 at the higher speed ω_1 , the speed is lowered to the lower value ω_2 and, after a time frame t_2 at a lower speed ω_2 , the speed is increased to an intermediate speed value ω_3 . In the end, after a time frame t_3 at the intermediate speed ω_3 , the speed is increased again to the higher value ω_1 , and so on.

[0052] In this embodiment, the intermediate speed value ω_3 is lower than the higher speed value ω_1 and higher than the lower speed value ω_2 . The particular step trend with three discrete speeds entails a ventilation variation which is well tolerated by delicate foods, and which is however suitable for the generation air turbulences and for altering the position, extension and shape of the stagnation areas, such as to generate the above-mentioned transversal and secondary currents, which promote a better air mixing in the various oven areas.

[0053] Fig. 7 and 9 show illustrative and non-limiting examples of periodic step trends with three speeds for the rotor 12.

[0054] In accordance with an embodiment, schematically illustrated in Fig. 6, the oven control unit comprises three different resistors 22, 23, 24 with switches 21 associated therewith, which are electro-mechanically operable (for example, by means of cams) and connected in parallel in the powerline of the electrical motor 13 for the rotor, which is preferably, but not necessarily, a single phase asynchronous motor. Thereby, a robust and inexpensive control is achieved, which determinates a periodic step change with three distinct speeds of the rotor 12.

[0055] Fig. 8 illustrates an alternative embodiment, in which the switches function is performed by electronic components, for example TRIACs 25 driven by the oven control unit 26 through a control current for each TRIAC 25.

[0056] In accordance with a further embodiment (Fig. 10, Fig. 11), the electrical motor 13 is a motor with two or three windings with different pole-pairs numbers and the motor rotation speed variation occurs through a selective powering respectively of one of the windings.

[0057] According to still a further embodiment, the rotor speed variation is achieved through a sequential turning on and off of the motor 13, in which the sequential turning on and off frequency, i.e. of the motor power supply and power supply interruption which determinates the rotation number of the rotor 12, is driven by the oven control unit, for example through electromechanical or electronic switches driven by the control unit according to the cook-

ing program which was preset or which can be set by the user.

[0058] The food treatment method and the cooking oven according to the present invention has a number of advantages. They allow avoiding the formation of air stagnation areas and promote an even heat and moisture distribution in the various areas of the cooking chamber, and in particular in the various areas of the surface of the dishes being treated. The above-mentioned advantageous effects are achieved without the need to detect, set or process quantities which are indicative of the type, quantity, shape, and volume of the food located in the oven. The method implementation through the cooking oven according to the invention is characterized by a particular simplicity and robustness of the rotor 12 control system.

[0059] It should be understood that those skilled in the art, aiming at meeting contingent and specific needs, will be able to make further modifications and variations to the method and the cooking oven according to the present invention, which are however included in the scope of protection of the invention, such as defined by the following claims.

Claims

1. A method for treating food in a cooking oven (1) of the type comprising:

- a cooking chamber (3) adapted to receive the dishes to be treated;
- heating means (18) located in a thermal exchange relationship with the inner portion of the cooking chamber (3);
- a ventilation system (12, 13, 14, 15, 16) adapted to mix the air inside the cooking chamber (3), wherein said ventilation system comprises a rotor (12) operable through an electrical motor (13),

said method being characterized by changing the rotor (12) rotation speed (ω), wherein the rotation speed (ω) is alternately increased and decreased in a speed range between a higher value (ω_1) and a lower value (ω_2).

2. The method according to claim 1, wherein the rotor (12) rotation speed (ω) is varied, while keeping the same direction of rotation.

3. The method according to claim 2, wherein the speed lower value (ω_2) is greater than zero, such as to generate a continuous and monodirectional air flow in the rotor (12) area.

4. The method according to any preceding claim, wherein the higher (ω_1) and lower (ω_2) values of the

rotor (12) rotation speed (ω) are substantially constant, and the rotation speed (ω) follows a substantially rectangular-wave trend.

5. The method according to any preceding claim, wherein the ratio ($t1/t2$) of the duration ($t1$) in which the rotor (12) rotates at the higher speed ($\omega1$) to the duration ($t2$) in which the rotor (12) rotates at the lower speed ($\omega2$) ranges between 0.05 and 0.19, preferably between 0.05 and 1.0, and most preferably such a ratio ($t1/t2$) is about 0.45. 5
6. The method according to the preceding claim, wherein the duration ($t1$) at the higher speed ($\omega1$) is 10 - 20 seconds and the duration ($t2$) at the lower speed ($\omega2$) is 10 - 20 seconds. 10
7. The method according to any preceding claim, wherein the rotor (12) rotation speed (ω) follows an impulse trend, wherein the duration ($t1$) in which the rotor (12) rotates at the higher speed ($\omega1$) is much shorter than the duration ($t2$) in which the rotor (12) rotates at a lower speed ($\omega2$). 15
8. The method according to any preceding claim, wherein the ratio ($t1/t2$) of the duration ($t1$) at the higher speed ($\omega1$) to the duration ($t2$) at a lower speed ($\omega2$) ranges between 0.05 and 0.45. 20
9. The method according to claim 1, comprising the step of changing the rotor (12) rotation speed (ω) through a periodical and repeated switching between three distinct and substantially constant rotational speeds ($\omega1$, $\omega2$, $\omega2$). 25
10. The method according to the preceding claim, comprising the step of changing the rotor (12) rotation speed (ω) according to a periodical step speed trend. 30
11. The method according to the preceding claim, comprising the step of cyclically repeat the following step sequence: 35
 - rotating the rotor (12) for a time frame ($t1$) at the higher speed ($\omega1$) ; 40
 - then, decreasing the rotor (12) speed (ω) to a lower speed ($\omega2$) and rotate the rotor (12) for a time frame ($t2$) at the lower speed ($\omega2$) ; 45
 - then, increasing the rotor (12) speed (ω) to an intermediate speed ($\omega3$) lower than the higher speed and greater than the lower speed, and rotate the rotor (12) for a time frame ($t3$) at the intermediate speed ($\omega3$) ; 50
 - then, increasing the rotor (12) speed (ω) to the higher speed ($\omega1$). 55
12. The method according to any preceding claim, comprising the step of heating the air flow generated by

the rotor (12).

13. A cooking oven (1) comprising:

- a cooking chamber (3) adapted to receive the dishes to be treated;
- heating means (18) located in a thermal exchange relationship with the inner portion of the cooking chamber (3);
- a ventilation system (12, 13, 14, 15, 16) adapted to mix the air inside the cooking chamber (3), wherein said ventilation system comprises a rotor (12) operable through an electrical motor (13) driven by a control unit,

characterized in that the control unit is configured such that, in at least an oven (1) use mode, said control unit automatically determines a rotor (12) rotation speed (ω) variation, wherein the rotation speed (ω) is alternately increased and decreased in a speed range between a higher value ($\omega1$) and a lower value ($\omega2$).

14. The cooking oven (1) according to claim 13, wherein said use mode is preset or can be set by the user.
15. The cooking oven (1) according to claim 13 or 14, wherein, in said oven (1) use mode, the rotation speed (ω) of the rotor (12) is changed, while keeping the same direction of rotation.
16. The cooking oven (1) according to one of claims 13 to 15, wherein, in said oven (1) use mode, the speed lower value ($\omega2$) is greater than zero, such as to generate a continuous and monodirectional air flow in the rotor (12) area.
17. The cooking oven (1) according to one of claims 13 to 16, wherein, in said oven (1) use mode, the higher ($\omega1$) and lower ($\omega2$) values of the rotor (12) rotation speed (ω) are substantially constant, and the rotation speed (ω) follows a substantially rectangular-wave trend.
18. The cooking oven (1) according to one of claims 13 to 17, wherein, in said oven (1) use mode, the ratio ($t1/t2$) of the duration ($t1$) in which the rotor (12) rotates at the higher speed ($\omega1$) to the duration ($t2$) in which the rotor (12) rotates at a lower speed ($\omega2$) ranges between 0.2 and 5.0, preferably between 0.8 and 1.5, and most preferably, such a ratio ($t1/t2$) is about 1.0.
19. The cooking oven (1) according to one of claims 13 to 17, wherein, in said oven (1) use mode, the rotor (12) rotation speed (ω) follows an impulse trend, wherein the duration ($t1$) in which the rotor (12) rotates at the higher speed ($\omega1$) is shorter than the

duration (t2) in which the rotor (12) rotates at the lower speed (ω_2).

20. The cooking oven (1) according to the preceding claim, wherein, in said oven (1) use mode, the ratio (t1/t2) of the duration (t1) at the higher speed (ω_1) to the duration (t2) at a lower speed (ω_2) ranges between 0.1 and 0.5, preferably 0.2. 5
21. The cooking oven (1) according to claim 13, wherein, in said oven (1) use mode, the rotor (12) rotation speed (ω) is changed through a periodical and repeated switching between three distinct rotational and substantially constant speeds (ω_1 , ω_2 , ω_3). 10 15
22. The cooking oven (1) according to the preceding claim, wherein, in said oven (1) use mode, the rotor (12) rotation speed (ω) follows a periodical step trend. 20
23. The cooking oven (1) according to one of claims 13 to 22, wherein said heating means comprise one or more heating members (18) located in the pathway of the air flow (17) which can be generated by the rotor (12). 25
24. The cooking oven (1) according to one of claims 13 to 23, wherein said control unit comprises one or more thermal switches suitable to automatically open and close alternately one or more electrical connections in the powerline of the rotor (12) motor (13). 30

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FIG.1

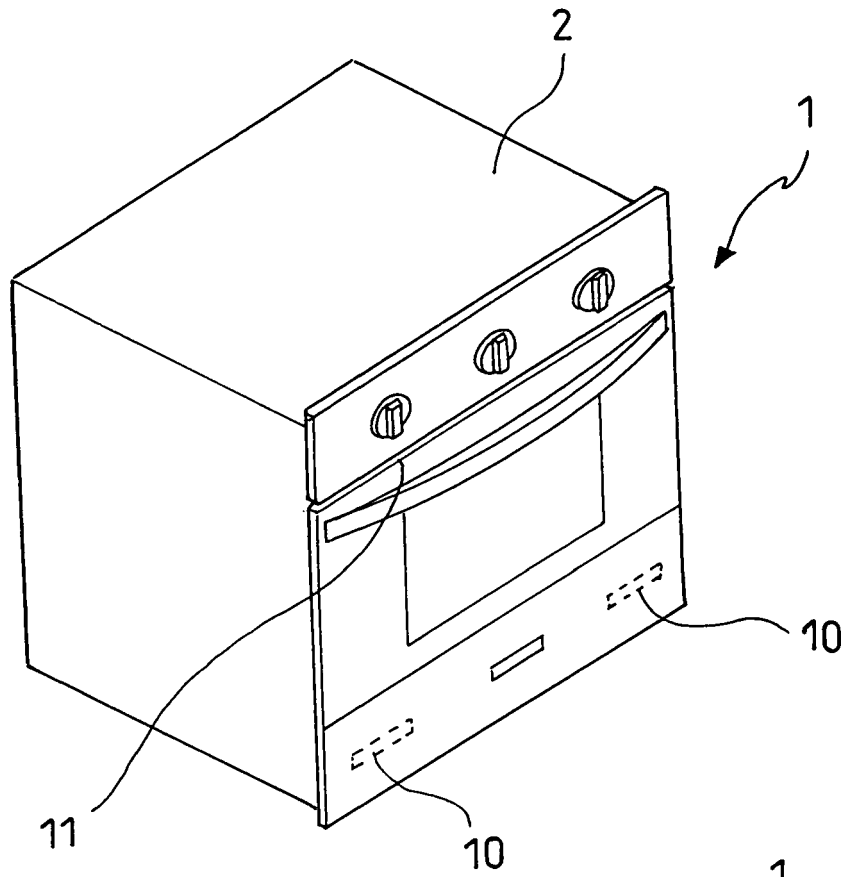
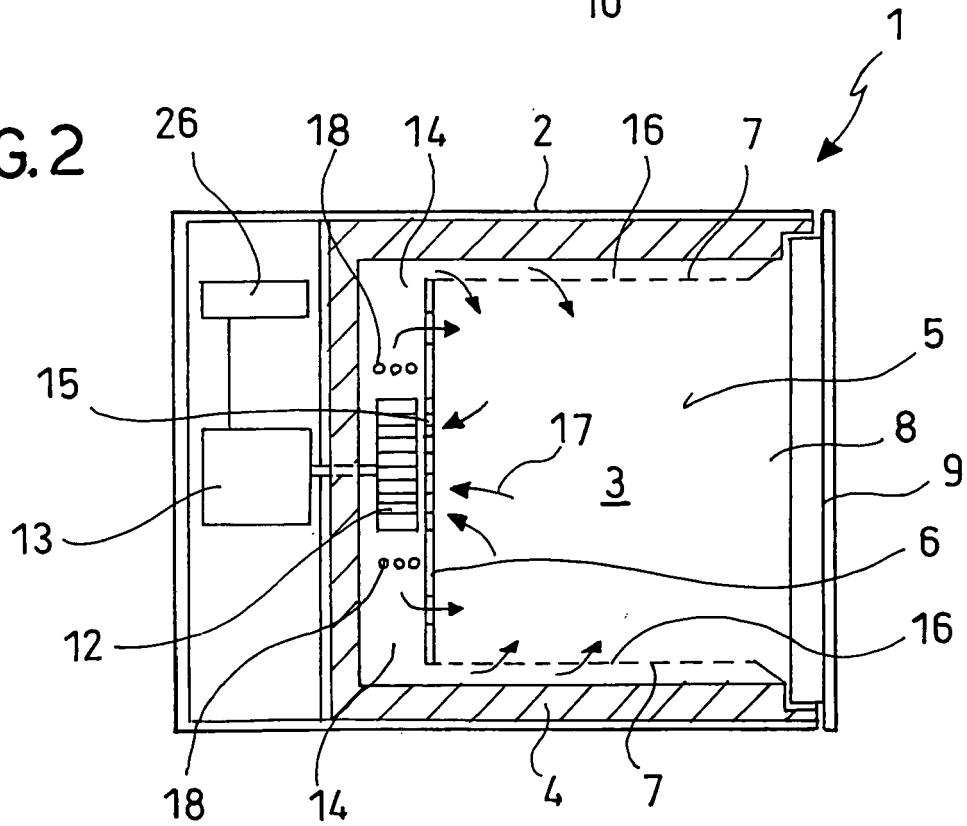


FIG.2



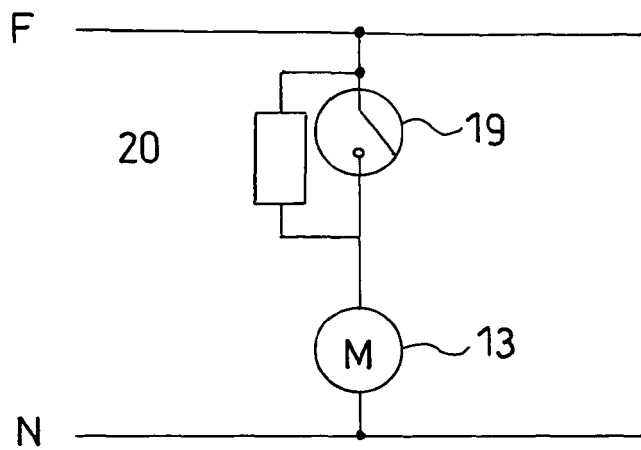


FIG.3

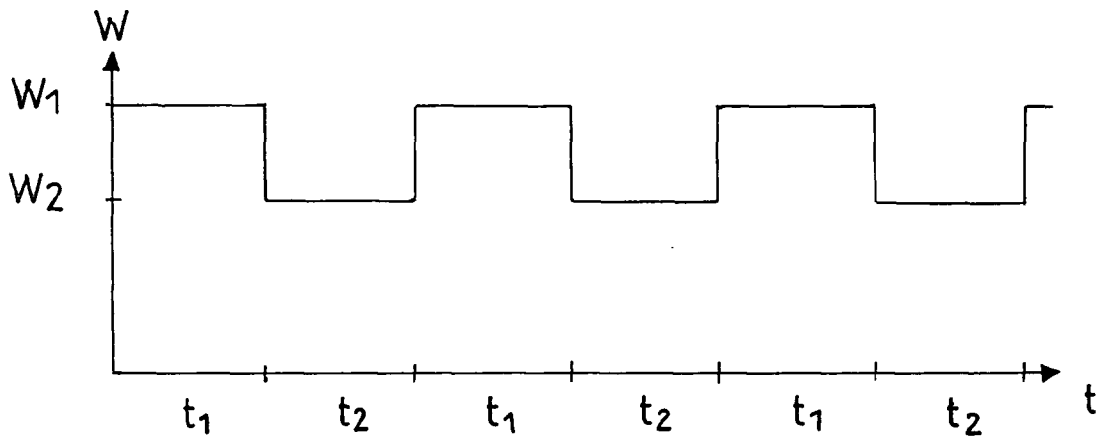


FIG.4

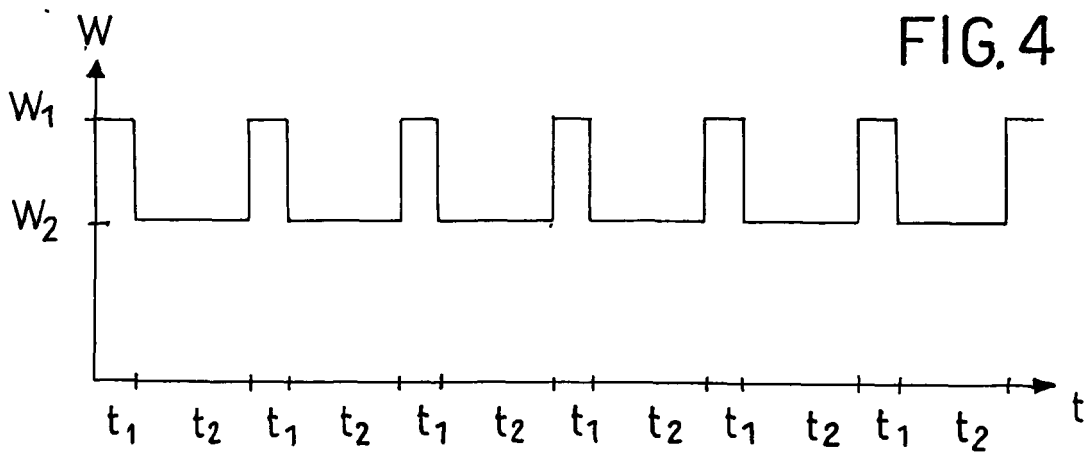


FIG.5

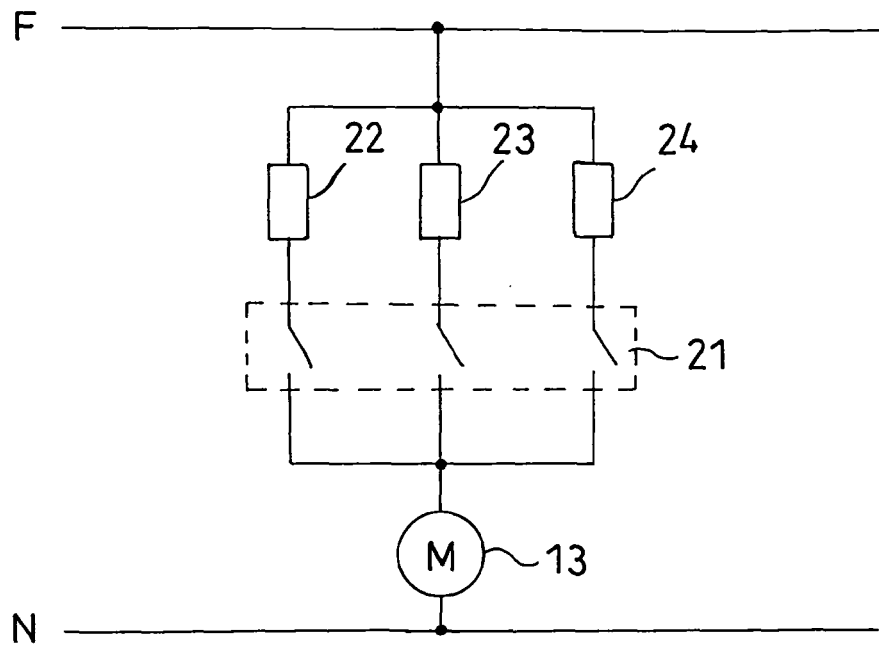


FIG.6

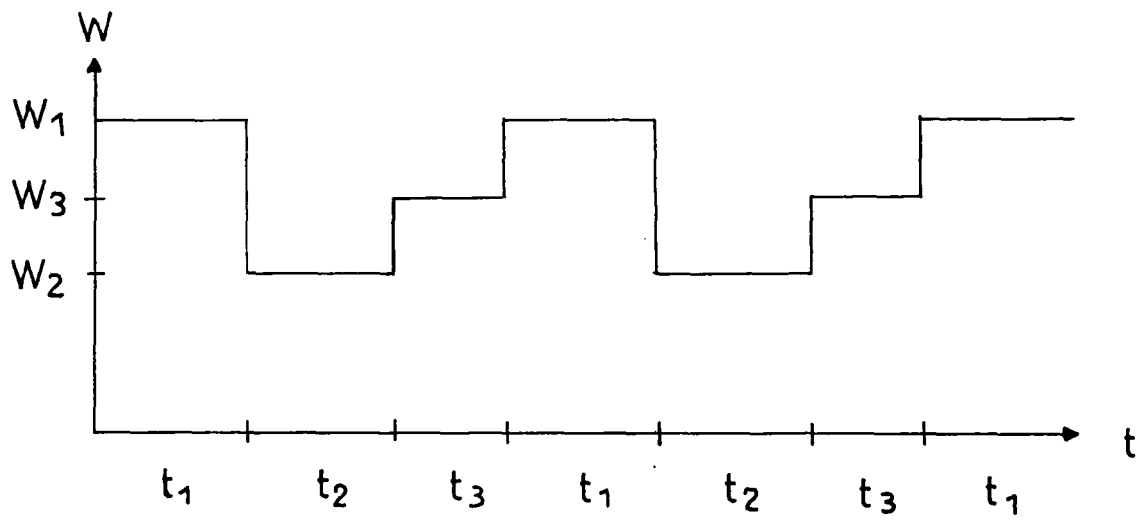


FIG.7

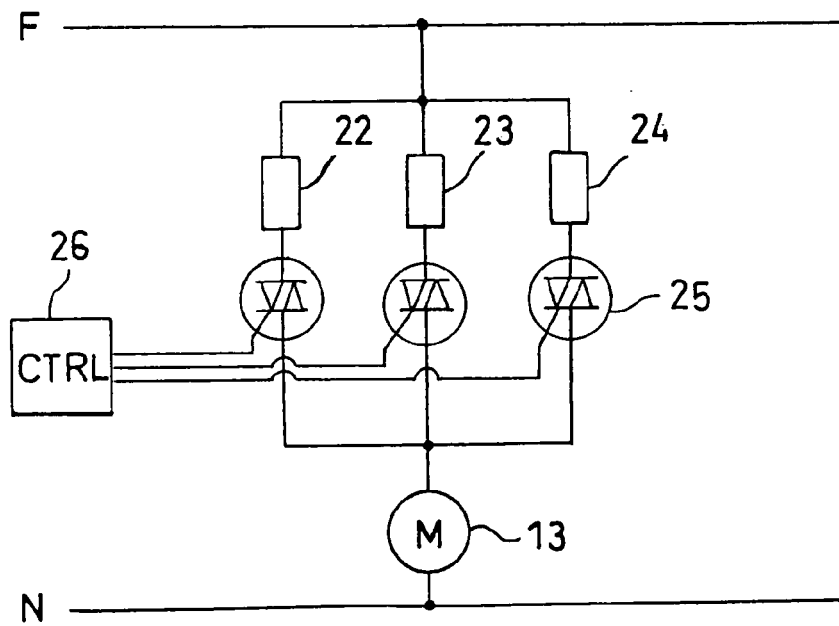


FIG.8

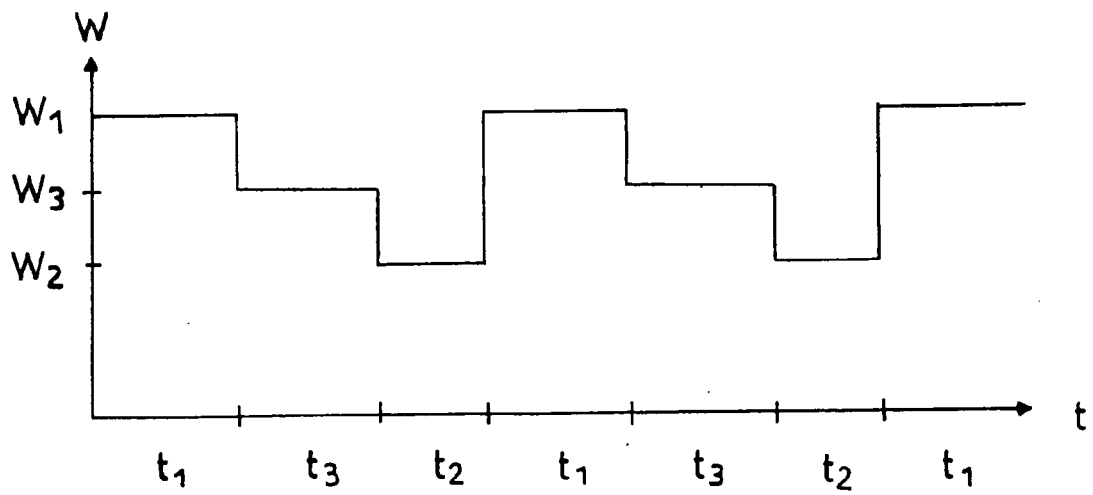


FIG.9

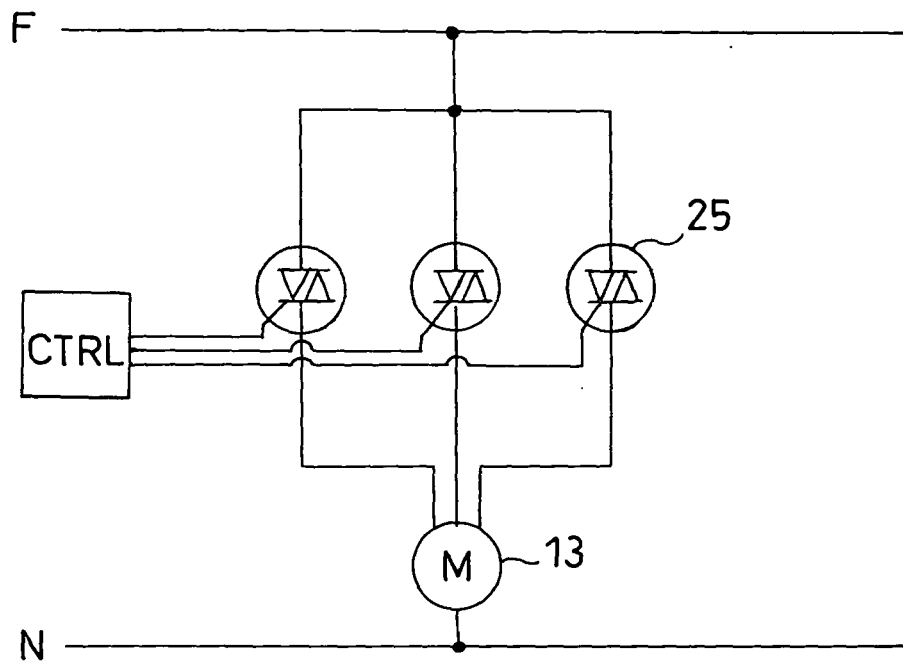


FIG.10

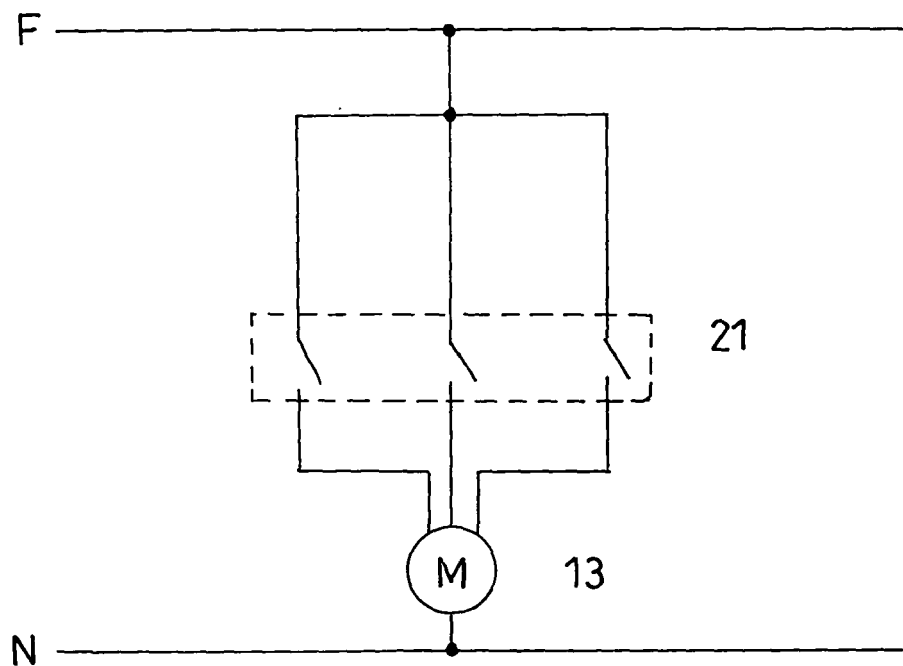


FIG.11



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 07 42 5119

DOCUMENTS CONSIDERED TO BE RELEVANT			
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Place of search Munich		Date of completion of the search 5 September 2007	Examiner VON MITTELSTAEDT, A
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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