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(54) **Oven having a pull out door with integral heating element and cooking grids**

(57) The invention is an electric kitchen oven comprising a muffle (M), heating elements and internal ventilation devices, a front door (S) sliding in horizontal direction on guides (D) integral with said muffle (M), wherein a horizontal bottom element (P) is integral with said door (S), said horizontal bottom element sliding integrally with said door (S) and comprising at least one heating element (R), like an electric resistance or an induction plate, with a support and cooking plate (A) positioned over it. Said horizontal bottom element (P), also comprises a lower support box (T) containing one or more layers of heat insulating material (I) interposed between said heating element (R) and said lower support box (T).

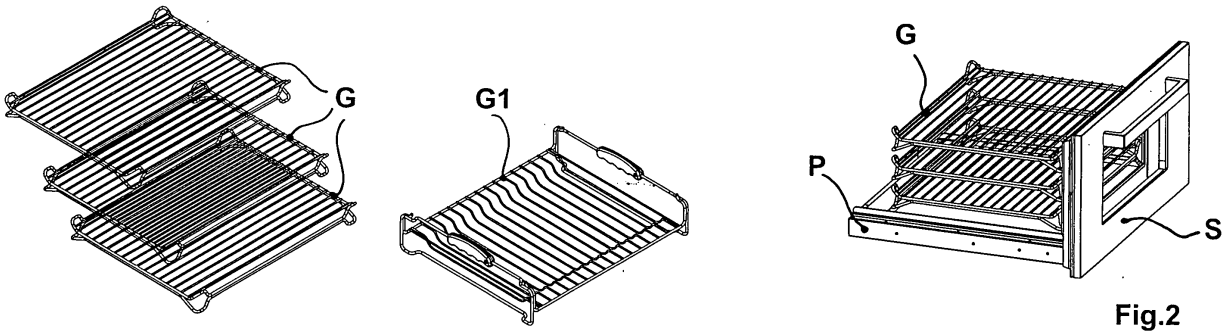

Fig.2

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Description

[0001] The present invention concerns kitchen ovens and in particular it concerns a new kitchen oven with pull out carriage door with sliding heating elements and grids.

[0002] It is very common, in particular for domestic applications, to use ovens for baking foods, said ovens being provided with a chamber, or muffle, usually in the shape of a parallelepiped, with a front opening that can be closed with a door.

[0003] Said muffle is covered with a suitable heat insulating material, while said door is usually made with one or preferably at least two glass plates, with an interspace between them, in order to ensure suitable heat insulation.

[0004] The inside of the muffle is the environment that is heated and where the food to be cooked is positioned, avoiding direct contact with the heat source.

[0005] The known ovens are suitably insulated to reduce heat dispersion towards the outside and to avoid overheating the external and front surfaces of the oven, which may damage the adjacent pieces of furniture and, even worse, cause burns.

[0006] The known kitchen ovens may also comprise ventilation systems to improve the cooking performance of the oven and cooling systems for the door, the handle and the panel where the controls and adjusting knobs are positioned.

[0007] Gas ovens are known, in which heating takes place by combustion, while electric ovens are safer and more practical to use.

[0008] Static or ventilated electric ovens are known. In static electric ovens the heat is generated by one or more electric resistances, usually positioned in the upper and lower part of the muffle.

[0009] Ventilated ovens also comprise at least one fan that sets the air heated by the resistances circulating, offering the advantage that the foods are cooked more rapidly and uniformly.

[0010] The known kitchen ovens also comprise a front closing frame that has the function to minimise heat dispersion.

[0011] The doors of the known kitchen ovens are of the pull down type, that is, their lower horizontal edge is hinged to the lower part of the muffle.

[0012] Doors with side opening, that is, hinged with their vertical side edge, are less common. This type of opening is recommended only when the door is small, since otherwise the weight of the door itself would be excessive and would cause rapid wear and breakage of the hinges.

[0013] Carriage doors are also known, that is, doors that slide horizontally on guides that are integral with the muffle walls.

[0014] The known doors, however, have several drawbacks.

[0015] First of all, in order to be able to extract the food, for example even only to check if it is cooked, it is necessary to open the door completely and introduce the hands into the muffle, with a high risk of bums, even serious, in case of accidental contact with the muffle walls or with the resistances.

[0016] Alternatively, it is possible to extract the plate or the grid on which the food has been placed. In order to carry out this operation, however, the user must wear suitable gloves and use pot holders in order to avoid burns.

[0017] Furthermore, the extraction of the grid, made with open door, causes a considerable outflow of heat, consequently causing a considerable waste of energy and a temperature drop inside the oven.

[0018] Moreover, to carry out the necessary periodical cleaning operations inside the oven, the user must open the door completely and introduce his/her arms into the muffle, thus assuming extremely uncomfortable positions.

[0019] To overcome all the drawbacks mentioned above, a new type of kitchen oven with pull out carriage has been designed and implemented, said door being provided with sliding heating elements, lower cooking plate and grids.

[0020] The main aim of the present invention is to facilitate the positioning and extraction of foods, without risk of bums and reducing the use of accessories, like gloves or pot holders, to protect the hands.

[0021] Another aim of the present invention is to allow the user to clean the oven easily, comfortably and rapidly.

[0022] A further aim of the present invention is to increase the cooling speed of the oven's heating elements after use.

[0023] Another aim of the present invention is provide an oven that is easy to use.

[0024] These and other direct and complementary aims have been achieved through the implementation of a new kitchen oven with pull out carriage door, with sliding heating elements, lower cooking plate and grids.

[0025] The present invention comprises - as to its main components - a muffle with front pull out carriage door, one or more guides suited to control the horizontal translation of said door, and wherein said door is integral with at least one heating element, protected by a surface preferably made of pyroceram, serving as a support and cooking plate.

[0026] Said muffle has metal walls covered with heat insulating material, like the known kitchen ovens, in order to reduce heat dispersion and to avoid overheating the external surfaces of the oven.

[0027] Said oven may also comprise fans, lighting devices and the other devices and accessories with which kitchen ovens are usually provided.

[0028] The door is constituted by one or more glass plates with interspaces between them, to increase heat insulation and minimise the overheating of the door itself, thus eliminating the risk of burns.

[0029] The door can be opened and closed by sliding it horizontally, that is, the door translates horizontally slid-

ing on lateral guides that are integral with said muffle.

[0030] A horizontal bottom element is integral with said door, said bottom element comprising a lower support box containing one or more layers of insulating material, for example pyroceram, and at least one heating element, in this specific case an electric resistance, above which there is at least one plate, preferably made of pyroceram, that serves as a support and cooking plate.

[0031] In particular, said layers of insulating material are interposed between said lower support box and said heating element.

[0032] When the door is completely closed, the bottom of the oven comprises therefore at least two distinct layers of insulating material, at least one of which is incorporated in the lower fixed wall of the muffle, while the second is integral with said sliding horizontal bottom element.

[0033] The insulation of the oven is therefore further maximised near the heat source, constituted by said heating element, and in this way energy waste and the overheating of the external surfaces of the oven are reduced.

[0034] One or more grids, plates and/or food containers, on which the food to be cooked is placed, are integral, preferably in a removable way, with said horizontal bottom element, for example with apposite support brackets integral with said sliding support and cooking plate.

[0035] According to the invention, said horizontal bottom element may also comprise one or more revolving plates or grids, in order to ensure maximum uniformity in the cooking of the food.

[0036] In practice, the opening of the door, which is obtained by sliding the door itself in horizontal direction, causes at the same time the translation of said horizontal bottom element with heating element and of said food-holding accessories, which are therefore completely extracted from the inside of the muffle, thus allowing the user to move with the maximum freedom and comfort.

[0037] The opening of the door and the simultaneous translation of said horizontal bottom element with heating element constrained to it causes the interruption of the power supply to the resistance, that is, determines the opening of the power supply circuit of the heating element.

[0038] In this way, when the door is opened, the operation of said heating element is interrupted, in order to reduce energy waste.

[0039] After use, the sliding oven door can be opened completely, so that the cooling of the oven takes place more rapidly than in the known ovens, since the heating element is completely exposed to the environment outside the oven.

[0040] Furthermore, according to the invention, the new sliding horizontal bottom element comprises at least one induction heating device, entirely or partly integral with said horizontal bottom element.

[0041] In greater detail, according to this solution, said horizontal bottom element comprises, in addition to said lower support box with overlaid integral layers of heat insulating material, also one or more electromagnetic coils, together with or in replacement of said electric resistance, above which there is a pyroceram plate that serves as a support plate.

[0042] The electromagnetic coil, crossed by electric current, generates a magnetic induction field, which causes the rapid heating of any metallic element positioned near it, like a pan or metal food container placed on said pyroceram support plate.

[0043] In this way said lower bottom element, and in particular said support plate, is never hot, since the induction plates heat only the magnetic metal mass, that is, in this specific case, only the bottom of the food container.

[0044] Alternatively, according to the invention, at least one metallic mass, which is heated by induction when hit by the magnetic field, is placed near said pyroceram support plate or even included in it.

[0045] According to the invention, furthermore, said oven with induction plate may comprise also further electric resistances, positioned for example in the upper part of the muffle, suited to facilitate the heating of the inside of the muffle, and therefore the cooking of the food.

[0046] The characteristics of the invention will be highlighted in greater detail in the following description, with reference to the drawings attached as non-limiting examples.

[0047] Figure 1 is an exploded view of the new pull out door with sliding heating element, support and cooking plate and food grids.

[0048] Figure 2 shows the new door completely assembled, while Figure 3 shows a three-dimensional view of the new door partially inserted in the oven muffle.

[0049] Figure 4 shows a three-dimensional view of the muffle, while Figure 5 shows an exploded view of the guides integral with the muffle that allow the door to slide horizontally.

[0050] The present invention comprises a muffle (M) with front pull out carriage door (S) that slides on one or more guides (D) integral with said muffle (M) and suited to control the horizontal translation of said door (S) itself.

[0051] Said door (S) comprises one or more glass plates (V) fixed to metal counter doors (C), with interspaces between them to increase heat insulation and minimise the overheating of the door itself, thus eliminating the risk of burns.

[0052] Said door (S) also comprises a front plate (F), entirely or partially made of glass, provided with an apposite handle (F1) to be used to open/close it.

[0053] A horizontal bottom element (P) is integral with said door (S), said bottom element comprising a lower support box (T) containing one or more layers of insulating material (I), for example pyroceram, and at least one heating element (R), in this specific case an electric resistance, above which there is at least one support and cooking plate (A), preferably made of pyroceram.

[0054] In particular, said layers of insulating material

(I) are interposed between said lower support box (T) and said heating element (R).

[0055] The new oven also comprises one or more grids (G), plates and/or food containers, on which the food to be cooked is placed.

[0056] Said grids (G, G1), plates and/or food containers are integral, preferably in a removable way, with suitable support brackets (B) properly constrained to said sliding support and cooking plate (A).

[0057] Said door (S) and said horizontal bottom element (P) thus slides horizontally inside said muffle (M). In particular, the side edges of said lower support box (T) slide in said guides (D) and counter guides (D1) integral with the internal side walls of said muffle (M).

[0058] Said guides (D) and counter guides (D1) also comprise special retainers or devices suited to prevent said horizontal bottom element (P) and said door (S) from being withdrawn.

[0059] These are the schematic characteristics that are sufficient to carry out the invention for a person skilled in the art, consequently upon implementation changes may be made that do not affect the substance of the innovative concept disclosed herein.

[0060] Therefore, with reference to the above description and the attached drawings, the following claims are expressed.

Claims

1. Electric kitchen oven comprising a muffle (M), heating elements and internal ventilation devices, if necessary, a front door (S) sliding on guides (D) that are integral with said muffle (M), for sliding said door (S) in horizontal direction, **characterized in that** a horizontal bottom element (P) is integral with said door (S), said horizontal bottom element sliding integrally with said door (S) and comprising at least one heating element (R) with a support and cooking surface (A) positioned over it.

2. Oven according to claim 1, **characterized in that** said horizontal bottom element (P), sliding integrally with said door (S), also comprises a lower support box (T) containing one or more layers of heat insulating material (I) interposed between said heating element (R) and said lower support box (T).

3. Oven according to claims 1, 2, **characterized in that** said support and cooking plate (A) is a pyroceram plate.

4. Oven according to claims 1, 2, 3, **characterized in that** said heating element (R) is an electric resistance.

5. Oven according to claims 1, 2, 3, **characterized in that** said horizontal bottom element (F) that slides integrally with said door (S) comprises, in addition to said lower support box (T), also one or more electromagnetic coils interposed between said lower support box (T) and said upper support and cooking plate (A) in pyroceram, and wherein said electromagnetic coil generates a magnetic field suited to heat by induction one or more metallic containers positioned on said support and cooking plate (A).

6. Oven according to claim 5, **characterized in that** said horizontal bottom element (F), sliding integrally with said door (S), also comprises a metallic mass positioned near or included in said support and cooking plate (A) made of pyroceram, said metallic mass being suited to be heated by induction by the magnetic field generated by said coils.

7. Oven according to claims 5, 6, **characterized in that** it comprises also one or more electric resistances interposed between said lower support box (T) and said support and cooking plate (A).

8. Oven according to one or more of the previous claims, **characterized in that** one or more grids (G) and/or plates and/or food containers are integral with said door (S) and/or with said support and cooking plate (A)

9. Oven according to one or more of the previous claims, **characterized in that** each one of said grids and/or plates and/or food containers are removably constrained to one or more support brackets (B) integral with said support and cooking plate (A)

10. Oven according to one or more of the previous claims, **characterized in that** said support and cooking plate (A) also comprises one or more revolving support plates or food grids.

11. Oven according to one or more of the previous claims, **characterized in that** the opening of said door (S) and the simultaneous horizontal translation towards the outside of said horizontal element (P) and of said heating element (R) causes the opening of the electric circuit that feeds the heating element (R) itself.

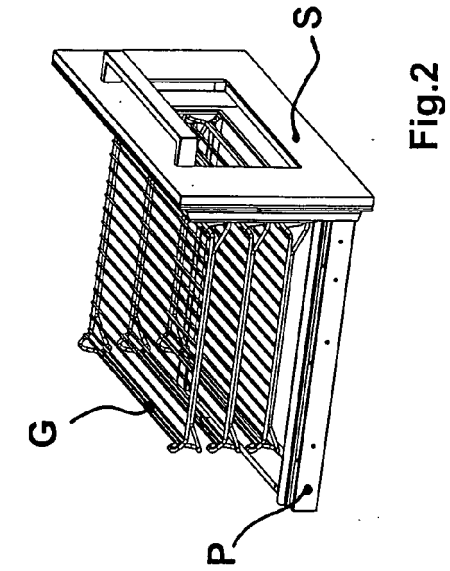
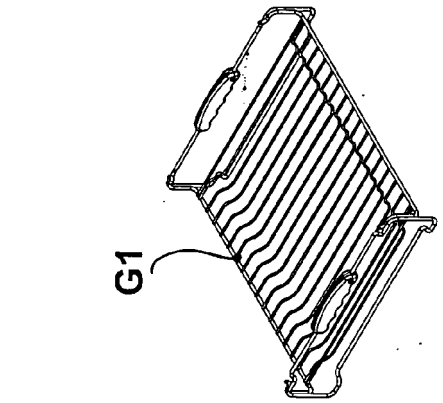
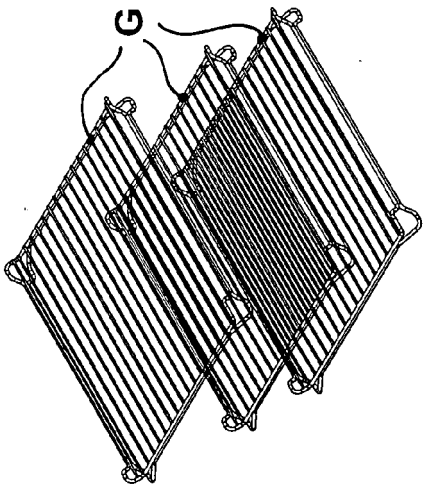


Fig.2





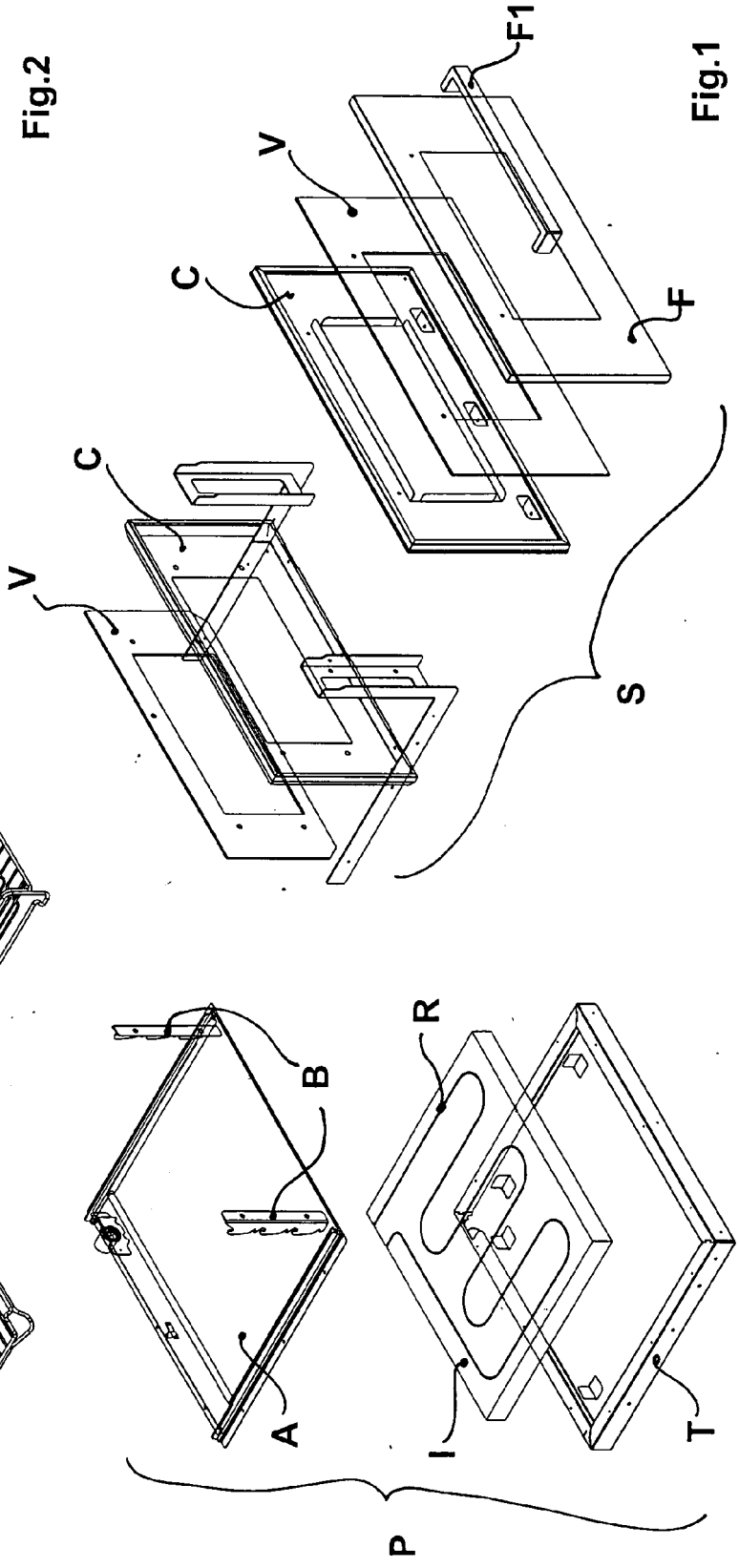


Fig.1

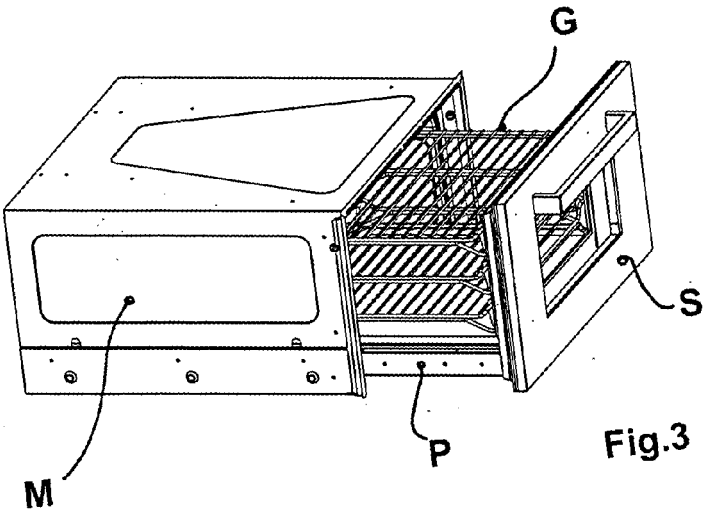


Fig.3

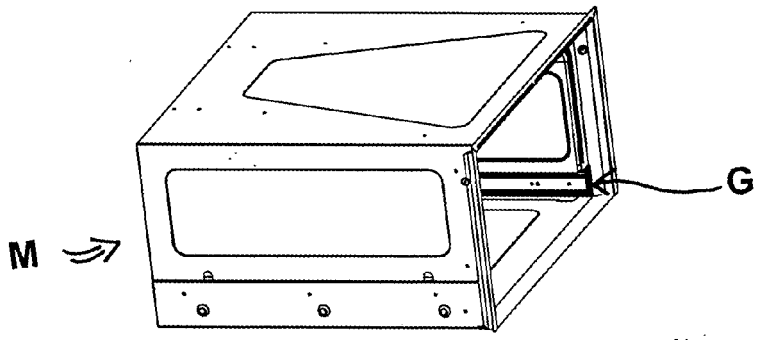


Fig.4

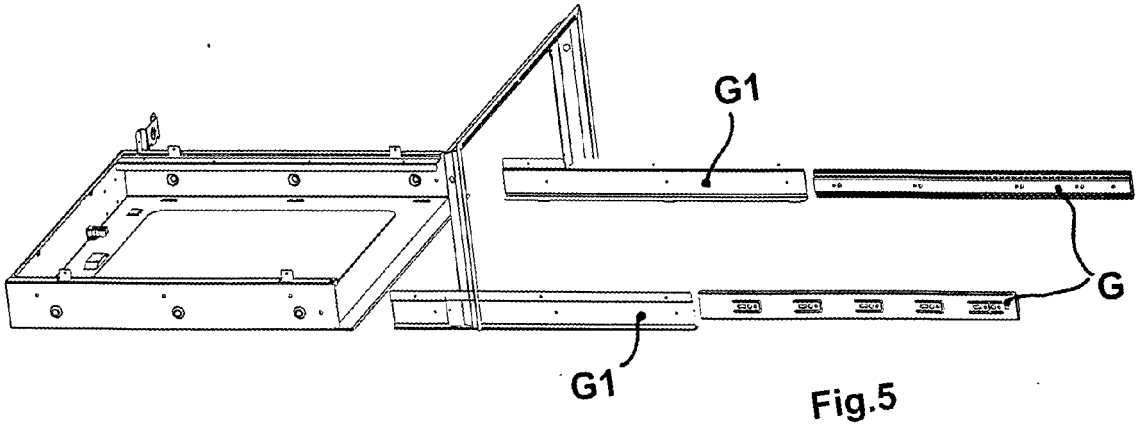


Fig.5

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EUROPEAN SEARCH REPORT

Application Number
EP 06 42 5072

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	26 June 2006	von Mittelstaedt, A

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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