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(54) Vending machine for cooked foods

(57) The vending machine for cooked foods comprises a cabinet, including a selection and cashing panel, inside which are positioned at least:

- a storing section, for storing single packets of (normally pre-cooked) foods, preferably at a temperature suitable for the conservation of frozen products;
- a mechanical hand, equipped with grippers, that lifts a packet of the food selected by a consumer through the selection and cashing panel from the storing section to an oven belonging to a cooking section and deposits the packet inside an oven;
- the cooking section, providing for at least one oven for completing the cooking of at least one packet of food selected by at least one consumer.

If the cooking section provides for two or more ovens, the cooking of two or more packets of food(s) is (or can be) completed at the same time.

Preferably, the vending machine further comprises a logic unit which manages at least the mechanical hand and the oven(s) belonging to the cooking section.

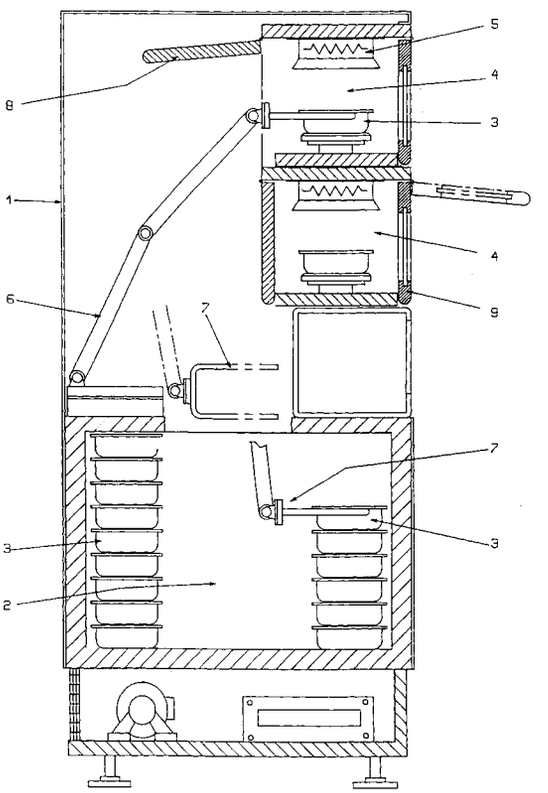

Fig. 2

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Description

Field of the invention

[0001] The present invention refers to a vending machine for cooked foods wherein a packet of (normally pre-cooked) food, selected by the consumer among those stored in a storing section (preferably at a temperature suitable for the conservation of frozen products), is lifted by a mechanical hand from the storing section to an oven belonging to a cooking section and put inside said oven for completing its cooking.

State of the Art

[0002] Vending machines for cooked foods are suitable to be installed in company canteens, schools, public locations and transit locations such as railways, airports, supermarkets, conference halls and similar sites, where there is the need for foods that offer a more substantial alternative to a sandwich but where there is not sufficient time for consuming a full meal.

[0003] Vending machines offering food and drink products, such as snacks, sandwiches, pastries, small pizzas, fruit juice, ice-cream, cold drinks in cans or hot drinks such as coffee, tea, milk and other items are well-known.

[0004] Less familiar and widely diffused however are hot food vending machines, such as vending machines with trays containing, for example, pasta, meat and other items which go towards forming a so-called meal.

[0005] At now, catering within company canteens and in public locations in general, where a proper internal kitchen service is not available, is assigned to specialist companies which at lunch time provide consumers with trays of cooked food.

[0006] This system involves a number of inconveniences such as high costs for a single meal, the need to provide suitable locations for the canteen service, the impossibility for the consumer of modifying the type of food chosen as the choice must be communicated to the supplier company the day before for the following day and, finally, the possibility of potential and unforeseeable problems resulting in delayed delivery of the food which may then be cold and consequently with less taste and aroma.

[0007] Other reasons for the limited diffusion of cooked food vending machines is their complex manufacture and the notable purchasing and maintenance costs due to the few vending machines at now manufactured and installed.

[0008] The present invention refers to a vending machine for cooked food which overcomes the above mentioned drawbacks as it is simple to manufacture and to maintain and easy to use by a consumer which can choose at any moment, through a selection and cashing panel, the most suitable type of food and retrieve and consume it (quite) immediately.

Summary of the invention

[0009] The present invention refers to a vending machine for cooked foods comprising a cabinet, including a selection and cashing panel, which houses at least:

- a storing section, for storing single packets of (normally pre-cooked) foods, preferably at a temperature suitable for the conservation of frozen products;
- a mechanical hand, equipped with grippers, that lifts a packet of the food selected by the consumer through the selection and cashing panel from the storing section to an oven belonging to a cooking section and deposits the selected packet of food inside the oven;
- the cooking section, providing for at least one oven for completing the cooking of at least one packet of food selected by at least one consumer.

[0010] Preferably, the vending machine further comprises a logic unit which manages at least the mechanical hand and the oven(s) belonging to the cooking section. If the cooking section provides for two or more ovens, the cooking of two or more packets of food(s) is (or can be) completed at the same time.

List of the drawings

[0011] A vending machine according to the invention will be disclosed with reference to an illustrative and non-restrictive embodiment shown by the enclosed figures, where:

- figure 1 shows a front view of a vending machine according to the invention;
- figure 2 shows an elevation sectional view of a vending machine according to the invention;
- figures 3 and 4 show simplified flow-charts showing sequences of functional steps carried out by a logic unit managing the vending machine.

Detailed description of the invention

[0012] Figure 1 shows a front view of a vending machine according to the invention, comprising a cabinet 1 provided with a selection and cashing panel 11, not disclosed therein as it is known to any person skilled in the art and in any case outside the scope of the present invention.

[0013] On the upper portion of the cabinet 1 is positioned a cooking section 10 including four ovens 4 while inside the cabinet are positioned a storing section 2 (placed on the lower portion of the cabinet 1) and a mechanical hand 6, which will be disclosed with reference to figure 2.

[0014] Figure 2 shows an elevation sectional view of a vending machine according to the invention, where the

cabinet 1 (providing for a selection and cashing panel 11; figure 1) houses at least the storing section 2, positioned in the lower part of the cabinet 1, wherein single packets of foods 3 are stored; the cooking section 10, positioned in the upper part of the cabinet 1 and providing for at least one oven 4 (four in the embodiment shown by figure 1) for completing the cooking of at least one packet of food 3 selected by the consumer; and a mechanical hand 6, equipped with collecting grippers 7, for lifting a packet 3 of the food selected by the consumer through the selection and cashing panel 11 from the storing section 2 to an oven 4 belonging to the cooking section 10 and for putting the packet of food 3 inside the oven 4.

[0015] On the preferred embodiment disclosed therein the food(s) stored inside the storing section 2 are pre-cooked to speed up the cooking action of the oven(s) 4 (the consumer can therefore enjoy the hot food only a few minutes after having selected it) and the mechanical hand 6 equipped with collecting grippers 7 is of the type providing for a human-like movement but, without departing from the scope of the present invention, the food (s) can be not pre-cooked food(s) and/or a different type of mechanical hand 6 (not disclosed herein as it is known to a skilled person) can be used.

[0016] Each oven 4 is supplied by already known heat sources 5 (as, for example, electrical or microwave heat sources) and is suitable to receive the packet of food 3 lifted from the storing section 2 by the mechanical hand 6, equipped with lifting grippers 7.

[0017] Each oven 4 is equipped with two opposing doors moved by opening means (not disclosed therein as they are known to any person skilled in the art and in any case they are outside the scope of the present invention), where the inner door 8 faces towards the inside of the cabinet 1 and is opened by the opening means to allow the packet of food 3 to be put by the lifting grippers 7 of the mechanical hand 6 inside the oven 4, while the outer door 9 faces towards the outside of the cabinet 1 and is opened by the consumer (through the relevant opening means) at the end of the cooking time for retrieving the cooked food.

[0018] If, as shown by the enclosed figures, the cooking section 10 provides for two or more ovens 4 (four according to the embodiment shown by figure 1), the vending machine is suitable to complete the cooking of at least two packets of pre-cooked food 3 at the same time.

[0019] On the preferred embodiment here disclosed, the storing section 2 is suitable for storing single packets of food 3 in the form of pre-cooked products at a temperature suitable for the conservation of frozen products.

[0020] A detailed description of a mechanical hand 6 equipped with lifting grippers 7 and suitable for lifting one at a time from the storing section 2 a packet 3 of the food selected by the consumer and for depositing it inside one of the ovens 4 belonging to the cooking section 10 will be omitted as it is (or could be) realised through mechanical means already known as "cartesian robot", i.e. through a computer based mechanical device normally used for moving a thing from a fist place to a second one, the first and second places being identified through their co-ordinates referred to a pre-set system of cartesian axes.

[0021] Cartesian robots are normally used as retrieval means for storage systems, for putting in working place a tool (as, of example, an electric welder) belonging to a computer-based manufacturing plant and so on.

[0022] As a not-limiting example, a "cartesian robot" suitable to be used in a vending machine according to the present invention is the model SMART S5 of the firm COMAU S.P.A. at GRUGLIASCO, Province of TORINO.

[0023] The vending machine is managed by a logic unit (or by a timing device like, for example, that which manages a washing machine or a dishwasher), not shown in figure 2 to simplify the graphical representation, which manages at least the mechanical hand 6 and the one or more ovens 4 belonging to the cooking section 10 by carrying out at least a sequence of functional steps.

[0024] Figures 3 and 4 show simplified flow-charts showing sequences of functional steps carried out by the logic unit managing the vending machine.

[0025] Figure 3 shows an example of a storage procedure, i.e. of a sequence of functional steps carried out by the logic unit when new packets of foods 3 are stored inside the storing section 2.

[0026] After an initialisation step (step 31), the logic unit:

- acquires the code (and/or other characterising features) of a new packet of food 3 to be stored inside the storing section 2 (step 32);
- acquires the co-ordinates (preferably the cartesian ones, referred to a pre-set system of cartesian axes) of the position (or of the cell) of the storing section 2 wherein the new packet of food 3 is stored (step 33);
- acquires the limit date of the stored food, i.e. the date after which (according to the national Law) the food is considered no more edible and cannot be sold therefore to a consumer (step 34);
- acquires the cooking time of the stored packet of food 3, i.e. how long the portion of food inside the packet must remain inside the oven 4 before being cooked (step 35);
- verifies (step 36) if there is at least one further packet of food 3 to be stored inside the storing section 2: if so, the logic unit acquires the code of the next packet of food 3 to be stored inside the storing section 2 (step 32), otherwise it goes to a stop step (step 37).

[0027] The acquired information are stored in at least one memory (not shown in figure 2) belonging or asso-

ciated to the logic unit: preferably they are stored in at least one "FIFO" (first input first output) memory so that the packet(s) of food(s) 3 first stored inside the storing section 2 is (are) the first cooked one(s).

[0028] If it is provided that the cooking time(s) of the oven(s) 4 is (are) pre-set regardless to the type of food put inside the oven(s) 4 by the mechanical hand 6, the logic unit does not acquire the cooking time(s) (step 35) of the packet(s) of food(s) 3 to be stored inside the storing section 2.

[0029] Without departing from the scope of the invention, the logic unit could omit the acquisition of the cooking time even if no pre-set cooking time(s) is (are) provided for the oven(s) 4, omit the acquisition of the limit date (step 34) and/or acquire the cooking time (step 35) before acquiring the limit date (step 34).

[0030] On a preferred embodiment, an operator entrusted of storing new packets of food(s) 3 inside the storing section 2 supplies (or can supply) through the keyboard belonging to the selection and cashing panel 11 the information to be acquired by the logic unit, which in turn inquires (or can inquire) the operator through display means belonging to the selection and cashing panel 11 if there is at least one further packet of food 3 to be stored; without departing from the scope of the invention, other interface means (not described therein as they are known to any skilled person and in any case they are outside the scope of the invention) could be used.

[0031] Figure 4 shows a sequences of functional steps carried out by the logic unit when managing the vending machine.

[0032] When a packet of food 3 is selected by a consumer through the selection and cashing panel 11, the logic unit:

- acquires the selection made by the consumer and compares it with the code(s) (acquired during the storage procedure; figure 3, step 32) of the packet (s) of food(s) still stored inside the storing section (step 41);
- assigns to the consumer's selection an oven 4 belonging to the cooking section 10 (step 42); the co-ordinates of the assigned oven 4 are therefore automatically acquired by the logic unit;
- manages the mechanical hand 6 (directly or though the logic unit belonging to the computer based "cartesian robot") for lifting a packet of the selected food (identified through its code) from the storing section 2 to the assigned oven 4 (step 43); the co-ordinates of the position of the storing section 2 from which the packet of food 3 selected by the consumer must be lifted have been acquired by the logic unit during the storage procedure (figure 3, step 33);
- opens the inner door 8 of the assigned oven 4 for putting the selected packet of food 3 inside the assigned oven 4 (step 44);
- supplies the heat source 5 of the assigned over 4 for completing the cooking of the portion of food put inside the assigned oven 4 (step 45); as mentioned above, the cooking time could be pre-set or it could be acquired by the logic unit during the storage procedure (figure 3, step 35);
- at the end of cooking time, allows the consumer to open the outside door 9 of the assigned oven 4 for retrieving the cooked food (step 46);
- verifies (step 4) if there is at least one further selection by at least one consumer: if so, the logic unit acquires the next selection (step 41), otherwise it goes to a stop step (step 48).

[0033] All modifications of and improvements in the above disclosed vending machine for cooked foods suggested by the experience and by the natural evolution of the technique may be effected by a person skilled in the art without departing from the scope of the invention.

Claims

1. Vending machine for cooked foods, comprising a cabinet (1) including a selection and cashing panel (11), characterised in that the cabinet (1) houses at least:

   - a storing section (2), for storing single packets of food(s) (3);
   - a mechanical hand (6), equipped with grippers (7), for lifting a packet (3) of the food selected by the consumer through the selection and cashing panel (11) from the storing section (2) to an oven (4) belonging to a cooking section (10) and for putting the selected packet of food (3) inside the oven (4);
   - the cooking section (10), providing for at least one oven (4) for completing the cooking of at least one packet of food(s) (3) selected by at least one consumer.

2. Vending machine according to claim 1, characterised in that the food(s) stored inside the storing section (2) are pre-cooked food(s).

3. Vending machine according to claim 1, characterised in that the packets of food(s) (3) are stored inside the storing section (2) at a temperature suitable for the conservation of frozen products.

4. Vending machine according to claim 1, characterised by further comprising a logic unit managing the vending machine.

5. Vending machine according to claim 4, characterised in that the logic unit manages at least the mechanical hand (6) and the at least one oven (4) belonging to the cooking section (10).

6. Vending machine according to claim 1 whose cooking section (10) provides for at least two ovens (4), characterised by being suitable to complete the cooking of at least two packets of food(s) (3) at the same time.

7. Vending machine according to claim 1, characterised by the fact that the mechanical hand (6) equipped with collecting gripper (7) provides for a human-like movement.

8. Vending machine according to claim 1, characterised in that each oven (4) is heated by a microwave heat source (5).

9. Vending machine according to claim 1, characterised in that each oven (4) is heated by an electric heat source (5).

10. Vending machine according to claim 1, characterised in that each oven (4) is equipped with two opposite doors, the inner door (8) facing towards the inside of the cabinet (1) and being opened to allow the mechanical hand (6) to put inside the oven (4) the selected packet of food (3), the outer door (9) facing towards the outside of the cabinet (1) and being opened by the consumer at the end of the cooking time for retrieving the cooked food.

11. Vending machine according to claim 4 characterised in that the logic unit carries out a storage procedure by carrying out, after an initialisation step, at least the following functional steps:

- to acquire features characterising a new packet of food (3) to be stored inside the storing section (2);
- to acquire the co-ordinates of the position of the storing section (2) wherein the new packet of food (3) is stored;
- to verify if there is at least one further packet of food (3) to be stored inside the storing section (2): if so, to acquire the code of the next packet of food (3) to be stored inside the storing section (2), otherwise to go to a stop step.

12. Vending machine according to claim 11 characterised in that the logic unit acquires the cartesian co-ordinates of the position of the storing section (2) wherein the new packet of food (3) is stored.

13. Vending machine according to claim 11 characterised in that, before verifying if there is at least one further packet of food (3) to be stored inside the storing section (2), the logic unit carries out the further step of acquiring the limit date of the stored food.

14. Vending machine according to claim 11 characterised in that, before verifying if there is at least one further packet of food (3) to be stored inside the storing section (2), the logic unit carries out the further step of acquiring the cooking time of the stored packet.

15. Vending machine according to at least one of claim 11-14, characterised in that the information acquired by the logic unit are stored in at least one "FIFO" memory.

16. Vending machine according to at least one of claim 11-14, characterised in that the logic unit acquires the above information from an operator entrusted of storing at least one packet of food (3) inside the storing section (2), respectively inquires the operator through interface means belonging to the selection and cashing panel (11).

17. Vending machine according to claim 11 characterised in that, when a packet of food (3) is selected by a consumer through the selection and cashing panel (11), the logic unit manages the vending machine by carrying out at least the following functional steps:

- to acquire the selection made by the consumer and to compare it with the features characterising of the packet(s) of food(s) still stored inside the storing section (2);
- to assign to the consumer's selection an oven (4) belonging to the cooking section (10);
- to manage the mechanical hand (6) for lifting a packet of the selected food from the storing section (2) to the assigned oven (4);
- to open the inner door (8) of the assigned oven (4) for putting the selected packet of food (3) inside the assigned oven (4);
- to supply the heat source (5) of the assigned over (4) for completing the cooking of the portion of food (3) put inside the assigned oven (4);
- at the end of the cooking time, to allow the consumer to open the outside door (9) of the assigned oven (4) for retrieving the cooked food;
- to verify if there is at least one further selection by at least one consumer: if so, to acquire the next selection, otherwise to go to a stop step.

18. Vending machine according to claim 17, characterised in that the logic unit manages the mechanical hand (6) though a logic unit belonging to the mechanical hand (6).

19. Vending machine according to claim 17, characterised in that the logic unit acquires during the storage procedure the co-ordinates of the position of the storing section (2) from which the packet of food (3) selected by the consumer must be lifted.

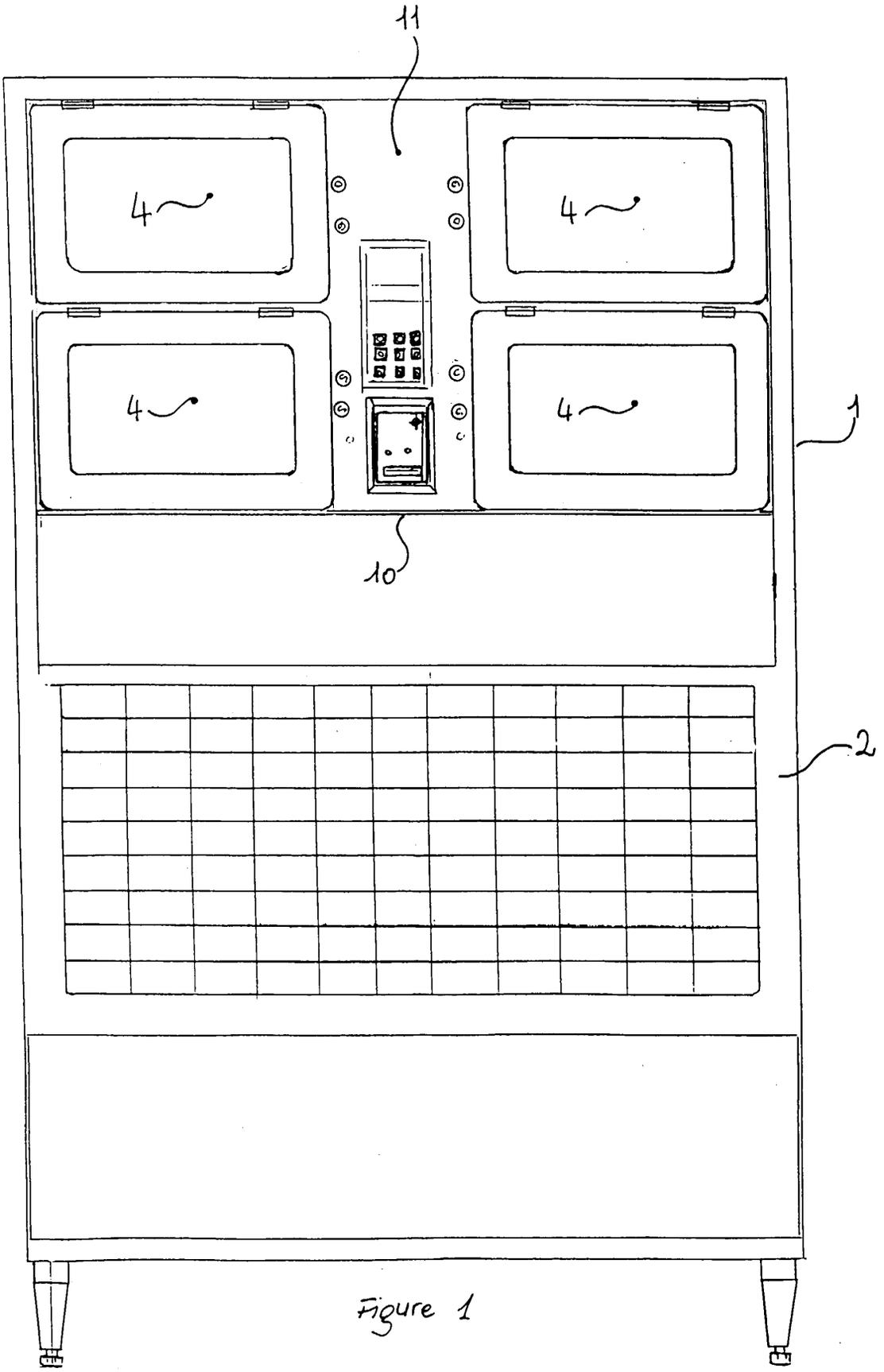

Figure 1

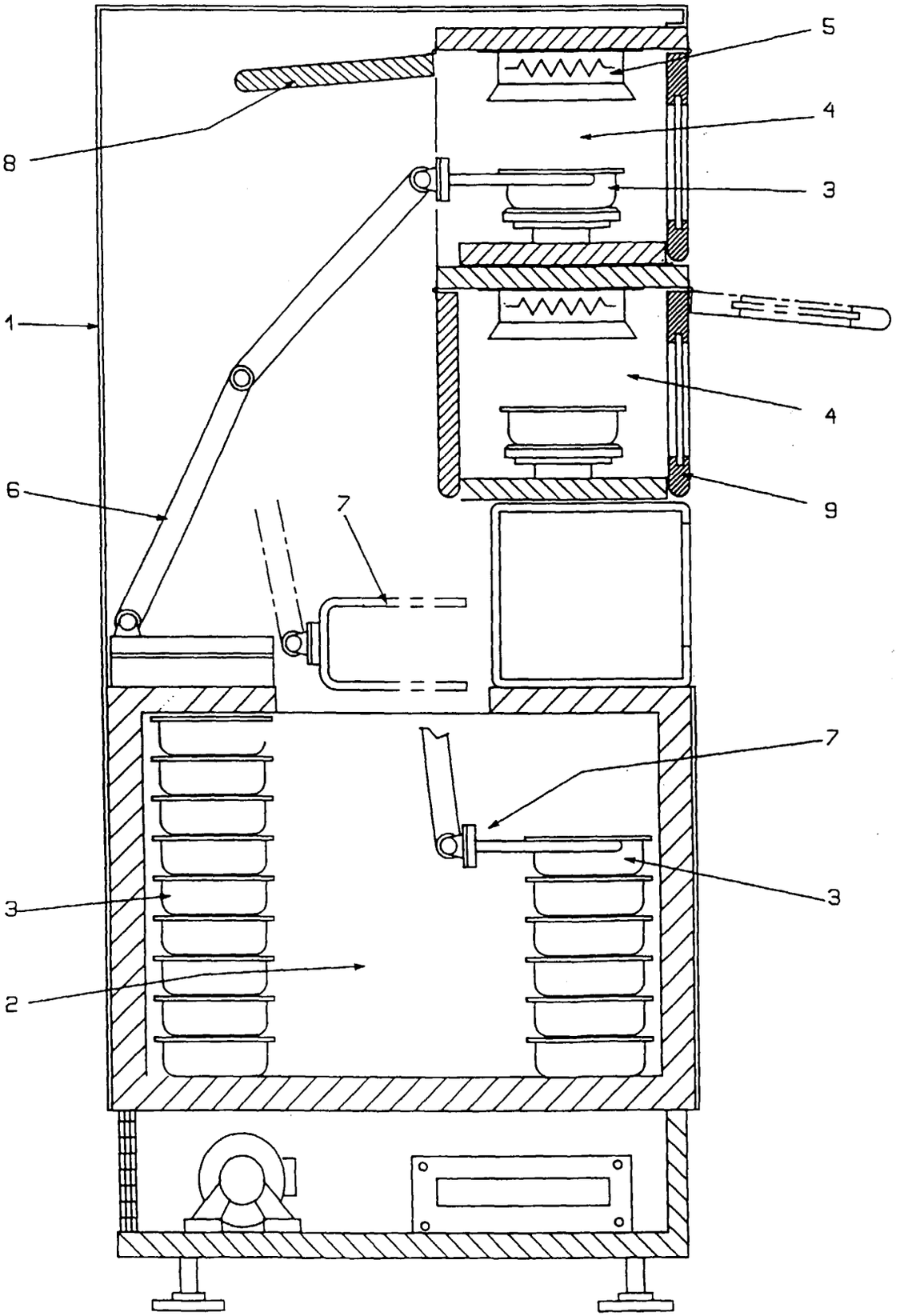

Fig. 2

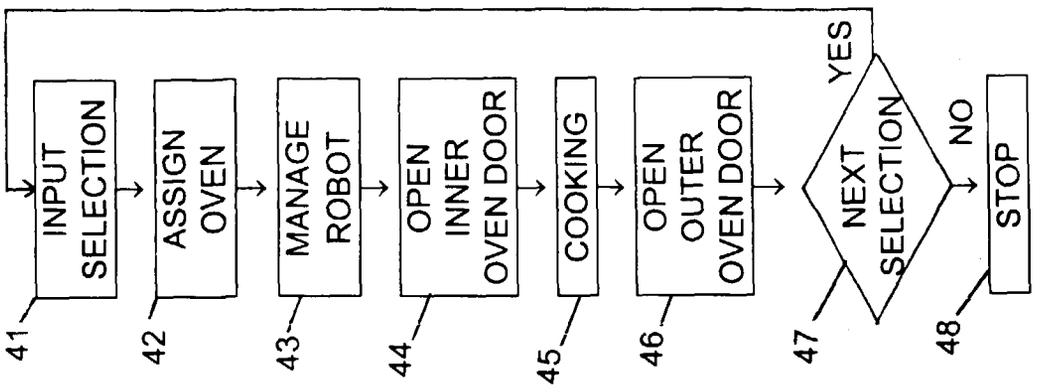

Figure 4

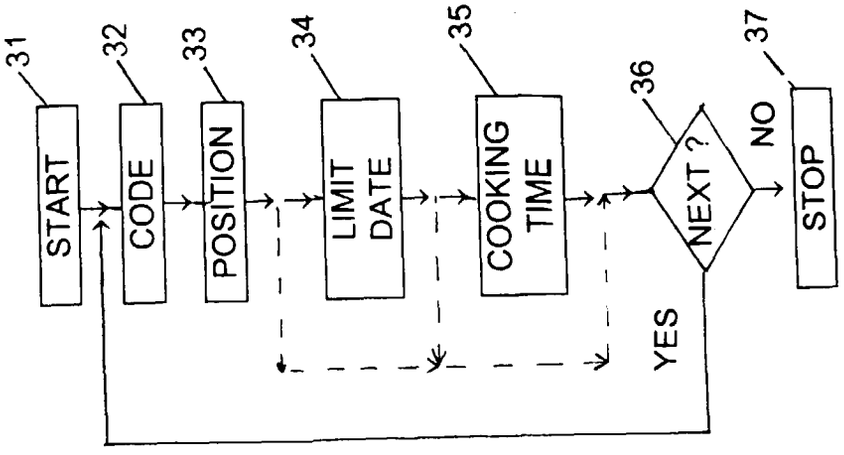

Figure 3

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Application Number
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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
THE HAGUE	13 December 1999	Wauters, J

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EUROPEAN SEARCH REPORT

Application Number
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