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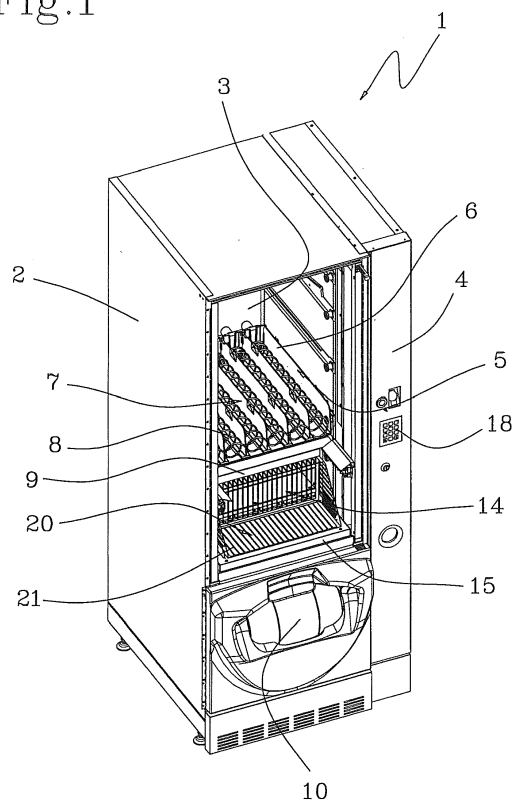
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(54) **Vending machine for heatable food products**

(57) A vending machine for food products, even heatable ones, comprises a storage area (5) to house products to be dispensed, a retrieval drawer (10) to pick up a product, a passage channel (9) arranged between the storage area (5) and the retrieval drawer (10), an oven (11) having an opening (12) and arranged upstream of the retrieval drawer (10) and downstream of the storage area (5). The vending machine (1) also comprises a charging and discharging member (14) of the oven (11) that is mobile between an intercepting position in which it interferes with and engages the passage channel (9), a charging position of the oven (11) in which it closes the opening (12) of the oven (11) and neither engages nor interferes with the passage channel (9) and a release position in which it partially engages and interferes with the passage channel (9).

Fig.1



Description

[0001] The object of the present invention is a vending machine for food products, even heatable ones.

[0002] Vending machine for food products, even heatable ones, are able to heat (or cook) the selected product, before it is delivered to the consumer, so as to allow the consumer to get the best out of the product itself.

[0003] Indeed, as known, inside vending machines the products are kept at a conservation temperature that is usually lower than the optimal consumption temperature of the product.

[0004] In vending machines for food products, even heatable ones, of the prior art, there is usually a microwave oven having a cooking chamber, a magnetron suitable for generating a flow of microwaves and a waveguide coupled with the magnetron and with the cooking chamber to guide the flow of microwaves generated by it and insert it into the cooking chamber. The cooking chamber, made from microwave-reflecting material, is equipped with an opening for charging/discharging the product and it is mounted so as to rotate from a receiving position to a cooking position and from here to a discharging position.

[0005] In the receiving position, the cooking chamber has its opening facing upwards, in other words towards the portion of distributor suitable for housing the products to be dispensed.

[0006] When a product is selected, it falls into the cooking chamber through the opening and the cooking chamber rotates into the cooking position in which the opening is positioned laterally and is closed by an element made from microwave-reflecting material so as to define a closed cooking cavity. In this configuration, the magnetron is activated and the product is heated/cooked. At the end of cooking, the cooking chamber rotates further until the opening is positioned below and the product is discharged into the retrieval area of the vending machine.

[0007] An example of a vending machine of the type summarily described is given by document WO 2008/141746.

[0008] Although the vending machine for food products, even heatable ones, described above allow heated or cooked products to actually be dispensed at an optimal temperature for ready consumption and although such dispensing takes place quickly or in any case in acceptable time periods, such vending machines do have some drawbacks.

[0009] Indeed, the heating and cooking carried out by them are not always satisfactory.

[0010] Such a drawback occurs since a portion of the product is placed in direct contact with at least one wall of the cooking chamber, preventing the microwaves from intercepting such a portion of product and thus heating or cooking it.

[0011] Moreover, in known vending machines, if it is not necessary to heat or cook the selected product (since for example it is already at the optimal temperature for

consumption) it is still necessary to wait the time needed for the product to transit from the cooking chamber before dispensing the product.

[0012] Furthermore, in the case quoted above it is necessary to inhibit the operation of the oven during the transit of the product (to avoid heating it), with consequent complication of the management software of the vending machine.

[0013] Finally, it is necessary to ensure the seal of the microwave oven to avoid dangerous emissions of microwaves from the oven, with consequent design complications and production costs of the vending machine.

[0014] In this context, the technical task forming the basis of the present invention is to propose a vending machine for food products, even heatable ones, that overcomes the drawbacks of the prior art quoted above.

[0015] In particular, the purpose of the present invention is to provide a vending machine for food products, even heatable ones, that is able to heat and cook the products evenly.

[0016] A further purpose of the present invention is to propose a vending machine for food products, even heatable ones, which allows the selected product to be dispensed quickly in the case in which the latter does not need heating or cooking.

[0017] A further purpose of the present invention is to provide a vending machine for food products, even heatable ones, having low production costs.

[0018] The specified technical task and the specified purposes are substantially accomplished by a vending machine for food products, even heatable ones, comprising the technical characteristics outlined in one or more of the attached claims.

[0019] Further characteristics and advantages of the present invention will become clearer from the indicative, and therefore not limiting, description of a preferred but not exclusive embodiment of a vending machine for food products, even heatable ones, as illustrated in the attached drawings, in which:

- figure 1 is a perspective view of a vending machine for food products, even heatable ones, according to the present invention, with some parts removed to better highlight others;
- figure 2 is a perspective view of a detail of the vending machine of figure 1 in a first operating condition;
- figure 3 is a perspective view of the detail of figure 2 in a second operating condition;
- figure 4 is a perspective view of the detail of figure 2 in a third operating condition; and
- figure 5 is a schematic representation of a further detail of the vending machine of figure 1.

[0020] With reference to the attached figures, a vending machine for food products, even heatable ones, according to the present invention has been wholly indicated with reference numeral 1.

[0021] The vending machine 1 comprises a frame 2

preferably equipped with a transparent panel 3, for example made from glass or polymeric material, to allow a user to see the products that can be dispensed by the vending machine. The transparent panel 3 can be mounted in a front rim 4 hinged to the frame 2.

[0022] Inside the frame 2 there is a storage area 5 for orderly housing a plurality of products to be dispensed.

[0023] In the preferred embodiment of the invention, the storage area 5 comprises a plurality of trays 6 (only one of which is shown in figure 1) preferably housed in the high part of the frame 2. Such trays 6 are arranged one on top of the other and can be seen through the transparent panel 3.

[0024] An extraction member 7 takes care of extracting a selected product from the storage area 5.

[0025] In particular, each tray 6 has an associated extraction member 7 of the products. Such extraction members comprise a plurality of spirals 8 set in rotation by one or more motors (not illustrated). The products to be dispensed are housed between the coils of the spirals 8, so that the rotation of the coils causes the products to move forwards until they are no longer supported by the tray 6 and fall towards the bottom of the frame 2.

[0026] In particular, the selected product is released by the extraction member 7 into a passage channel 9 that is defined by the space existing between the trays 6 and the transparent panel 3.

[0027] Downstream of the passage channel 9, in other words in the lower part of the frame 2, there is a retrieval drawer 10 to allow the user to pick up the selected product.

[0028] The vending machine 1 also comprises an oven 11 arranged operatively upstream of the retrieval drawer 10 and downstream of the storage area 5 to heat or cook a heatable products dispensed by the storage area 5.

[0029] The oven 11 comprises an opening 12 for the entry of the product to be heated and the exit of the heated product (figures 2 and 4).

[0030] Advantageously, the oven 11 is an infrared oven, in other words an oven equipped with an infrared radiation source 11a (for example one or more infrared lamps).

[0031] The oven 11 comprises a heating chamber 13 facing the passage channel 9 through the opening 12. The infrared radiation source 11a is preferably arranged inside the heating chamber 13 on the opposite side with respect to the opening 12.

[0032] The walls of the heating chamber 13 are made from or coated with material that reflects infrared radiation, for example such walls are made from or coated with aluminium. The element intended to close the opening 12 of the oven 11 (described later on) is also made from or coated with material that reflects infrared radiation.

[0033] Advantageously, the vending machine 1 comprises a member 14 for charging and discharging the oven 11 that is mobile between an intercepting position in which it interferes with and engages the passage chan-

nel 9 (figure 2) to intercept a product transiting in the passage channel 9, a charging position of the oven 11 in which it closes the opening 12 of the oven 11 and neither engages nor interferes with the passage channel 9 (figure 3) and a release position in which it partially engages and interferes with the passage channel 9 (figure 4) to release the heated product towards the retrieval drawer 10.

[0034] It should be noted that by "neither interferes with nor engages" in the present description and in the subsequent claims we mean that the charging and discharging member 14 is arranged outside of the sliding channel 9. In other words, when the charging and discharging member 14 neither interferes with nor engages the sliding channel 9, the latter has continuity of passage for the products from the storage area 5 to the retrieval drawer 10.

[0035] In the preferred embodiment of the invention, the charging and discharging member 14 comprises a door 15 able to move between the intercepting, charging and release positions.

[0036] The door 15, in the intercepting position, substantially completely blocks the passage channel 9 (figure 2).

[0037] Moreover, the door 15, in the charging position, completely closes the opening 12 of the oven 11 (figure 3).

[0038] Preferably, the door 15 has dimensions substantially equal to the transversal dimension of the passage channel 9 measured at the oven 11 and substantially equal to the dimensions of the opening 12 of the oven 11.

[0039] In other words, the opening 12 of the oven 11 and the transversal dimension of the passage channel 9 measured at the oven 11 are substantially identical to each other and identical to the dimension of the door 15.

[0040] The vending machine 1 also comprises a moving device 16 for moving the charging and discharging member 14, and in particular for moving the door 15.

[0041] In the preferred embodiment of the invention, the moving device 16 comprises a motor 16a arranged beneath the oven 11. The motor 16a is connected to a linkage, in particular a lever mechanism 16b, which engages the door 15 on the opposite side with respect to the surface thereof intended to close the opening 12 of the oven 11 allowing the door to be moved between the quoted operating positions.

[0042] The movement of the charging and discharging member 14 is controlled and a monitoring and control unit 17 (figure 5).

[0043] According to a possible operating sequence, the vending machine comprises a selector 18 (schematised in figure 1 and 5) for selecting the product to be dispensed. The selector 18, upon selection of a product by the user, generates a selection signal SS representative of the selected product and sends it to the monitoring and control unit 17.

[0044] The monitoring and control unit 17, upon receiv-

ing the selection signal SS, generates an actuation signal SA and sends it to the moving device 16 and to the oven 11.

[0045] It should be noted that such an actuation signal SA is only generated in the case in which the selected product needs to be heated or cooked; otherwise, the monitoring and control unit 17 does not generate the actuation signal SA.

[0046] The actuation of the infrared oven 11 takes place upon receiving a further actuation signal SA2 generated and sent to the oven 11 by the monitoring and control unit 17.

[0047] Such a further actuation signal SA2 is generated upon receiving a passage signal SP generated by a sensor 19, for example a photocell, arranged along the passage channel 9 and upstream of the charging and discharging member 14.

[0048] The sensor 19 is sensitive to the passage of a product along the passage channel 9.

[0049] The further actuation signal SA2 is also sent to the moving device 16 to take the charging and discharging member 14 into the charging position.

[0050] It should be noted that the charging and discharging member 14, in rest condition of the vending machine, occupies the charging position. In other words, between one dispensing of a product and the next, the door 15 is in the charging position, closing the opening 12 of the oven 11 and leaving the passage channel 9 free.

[0051] When a product that needs to be heated or cooked is selected, the actuation signal SA activates the moving device taking the charging and discharging member 14 into intercepting position and prealerts the oven 11. Upon receiving the further actuation signal SA2, the charging and discharging member goes into the charging position closing the opening of the oven 11 and the oven goes into operation.

[0052] When heating or cooking is complete, the moving device takes the charging and discharging member 14 into discharging position.

[0053] In order to allow an optimal heating or cooking of the product, the vending machine 1 comprises a collection basket 20 for the product to be heated forming part of the charging and discharging member 14.

[0054] Advantageously, the collection basket 20 comprises reticular walls 21 suitable for supporting the product during heating.

[0055] In particular, the collection basket 20 comprises walls 21 consisting of preferably metallic elements shaped like a net or grating.

[0056] The mesh size of the grating is much greater, preferably at least 10 times greater, than the wavelength of the radiation emitted by the oven 11.

[0057] The collection basket 20 is constrained to the door 15 at the surface thereof intended to directly face into the heating chamber of the oven 11 when the charging and discharging member 14 is in the charging position.

[0058] In the preferred embodiment of the invention,

the collection basket 20 comprises a first wall 21a constrained to the door 15, a second wall 21b that extends away from an edge of the first wall 21a, a shoulder wall 21c that extends substantially parallel to the first wall 21a from an edge of the second wall 21b opposite the joining edge with the first wall 21a.

[0059] Two further side walls 21d (only one of which is illustrated in the attached figures), preferably trapezoidal, join together the free edges of the walls 21a, 21b, 21c described above.

[0060] Advantageously, the walls 21 of the collection basket 20 are not in direct contact with the charging and discharging member 14, so as to prevent the product to be heated from staying rested on a continuous surface and thus not being hit by the infrared radiation.

[0061] Regarding this, the collection basket 20 is constrained to the charging member 14 through spacer elements 22 (partially illustrated in figure 2).

[0062] In particular, the collection basket 20 is constrained through the first wall 21a to the door 15 by means of the aforementioned spacer 22 that, in the illustrated embodiment, consists of a pair of profiled elements having a C-shaped section.

[0063] It should be noted that the collection basket 20, when inserted in the heating chamber of the oven 11, in other words when the charging and discharging member is in the charging position, does not make contact with the walls of the heating chamber, to allow a correct and uniform cooking or heating of the food product.

[0064] From what has been described above it can be seen how the vending machine for food products, even heatable ones, of the present invention overcomes the drawbacks of the prior art.

[0065] Indeed, the collection basket makes it possible the heat and cook the products evenly, since it avoids the product to be heated or cooked coming into contact with any continuous surface of the oven.

[0066] Moreover, the charging and discharging member allows direct and immediate dispensing of a product that does not need heat treatment, since it does not intercept such a product.

[0067] Furthermore, the charging and discharging member allows the production costs to be cut given there is little need for sealing elements or shielding elements capable of controlling the propagation of radiation inside or outside the vending machine.

Claims

1. Vending machine for food products, even heatable ones, comprising:

a storage area (5) for tidily housing a plurality of products to be dispensed;
a withdrawal drawer (10) arranged below said storage area (5) to withdraw a selected product;
an extracting member (7) for extracting a select-

- ed product from said storage area (5) and conveying it towards said withdrawal drawer (10); a passage channel (9), in which said extracting member (7) releases a selected product, arranged between said storage area (5) and said withdrawal drawer (10);
 an oven (11) operatively arranged upstream of said withdrawal drawer (10) and downstream of said storage area (5) to heat or cook a heatable product, said oven (11) comprising an opening (12) for the inlet and outlet of said product to be heated;
characterised in that it comprises a charge and discharge member (14) for charging and discharging the oven (11) movable between an intercepting position in which it interferes with and engages said passage channel (9) for intercepting a product passing through said passage channel (9), a position of charging the oven (11) in which it closes the opening (12) of the oven (11) and it does not engage and interfere with the passage channel (9) and a releasing position in which it partially engages and interferes with said passage channel (9) for releasing the heated product towards said withdrawal drawer (10).
2. Vending machine according to claim 1, wherein said charge and discharge member (14) comprises a door (15) movable between said intercepting, charging and releasing positions; said door (15), in said intercepting position substantially completely blocking said passage channel (9).
 3. Vending machine according to claim 2, wherein said oven (11) comprises a heating chamber (13) facing, through said opening (12), said passage channel (9); said door (15) in said charging position completely closing said opening (12).
 4. Vending machine according to any one of the previous claims, wherein said charge and discharge member (14), in an inoperative condition of the vending machine, is in said charging position.
 5. Vending machine according to any one of the previous claims, comprising a moving device (16) for moving said charge and discharge member (14); said moving device (16) receiving an actuation signal (SA) depending on the selected product.
 6. Vending machine according to any one of the previous claims comprising a selector (18) for selecting the product to be dispensed; said selector (18) generating a selection signal (SS) representative of the selected product and sending it to a monitoring and control unit (17).
 7. Vending machine according to claims 5 and 6,
- wherein said monitoring and control unit (17) generates said actuation signal (SA) and sends it to said moving device (16) upon receiving said selection signal (SS) in case where the selected product needs to be heated; said monitoring and control unit (17) not generating said actuation signal (SA) in case where the selected product does not need to be heated.
8. Vending machine according to any one of the previous claims, wherein said charge and discharge member (14) comprises a collecting basket (20) for the product to be heated; said collecting basket (20) comprising reticular walls adapted to support the product during heating.
 9. Vending machine according to claims 2 and 8, wherein said collecting basket (20) is constrained to said door (15) to be moved between said intercepting, charging and releasing positions.
 10. Vending machine according to any one of the previous claims, wherein said oven (11) is an infrared oven.

Fig.1

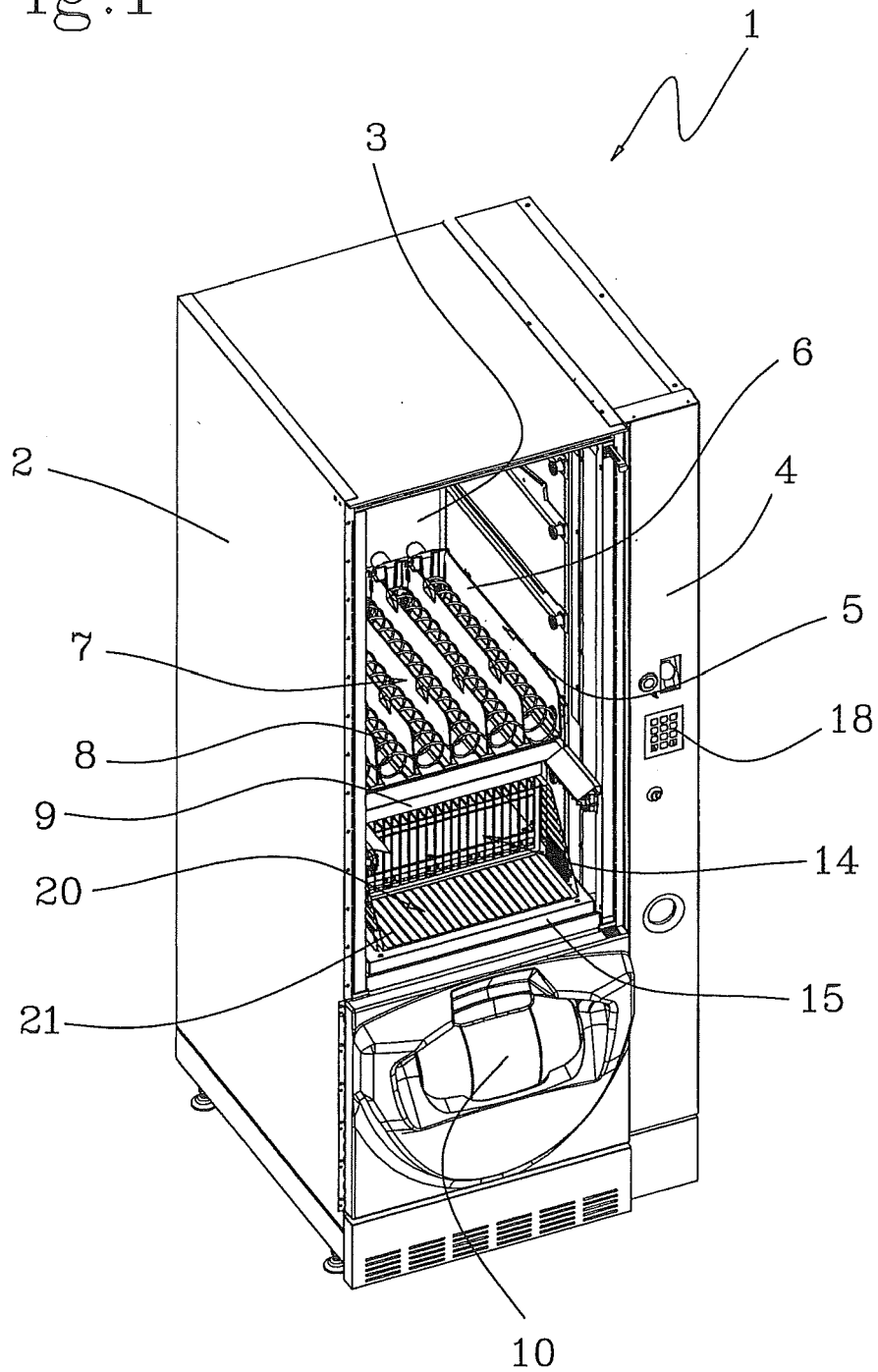


Fig.2

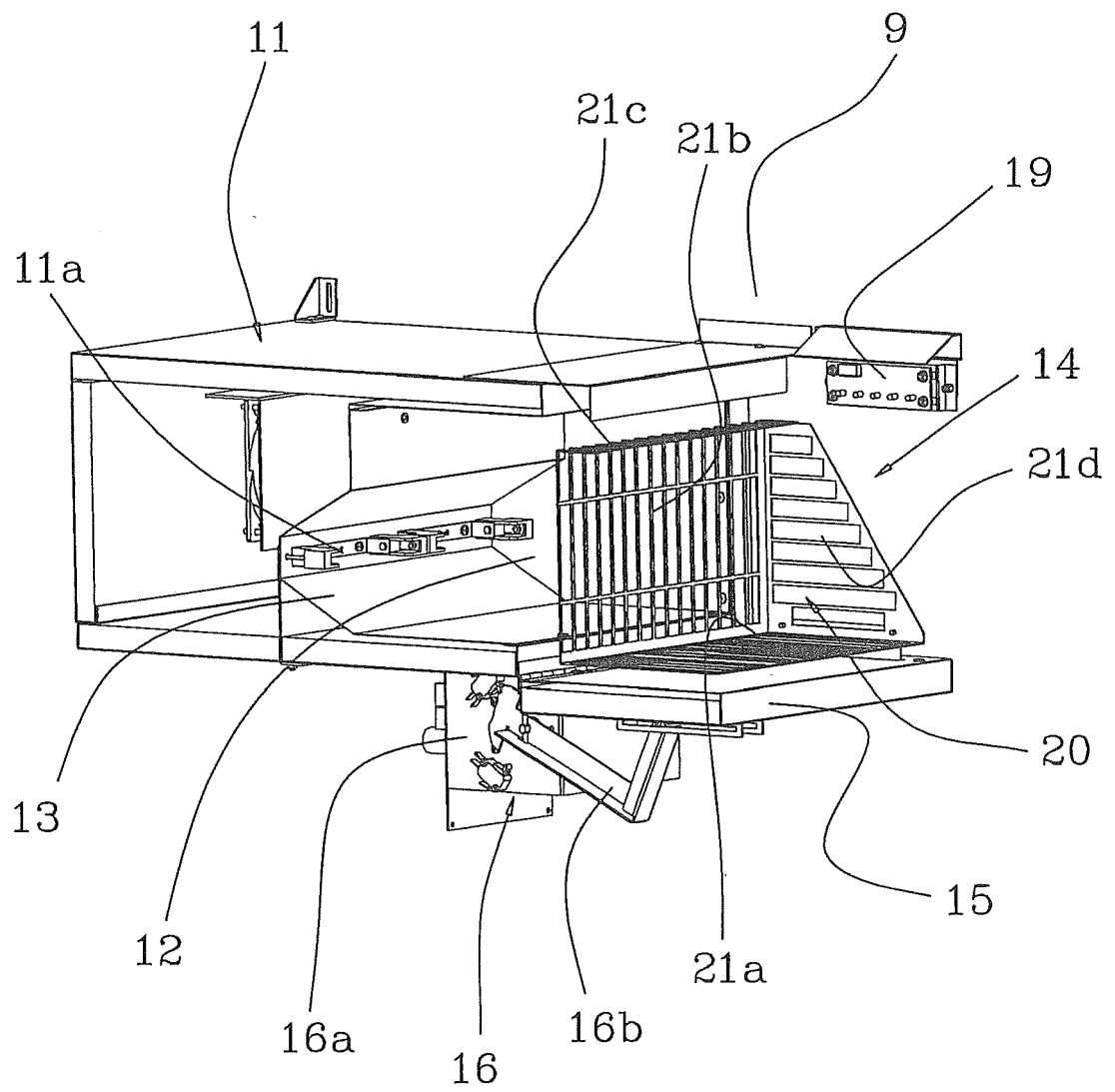


Fig.3

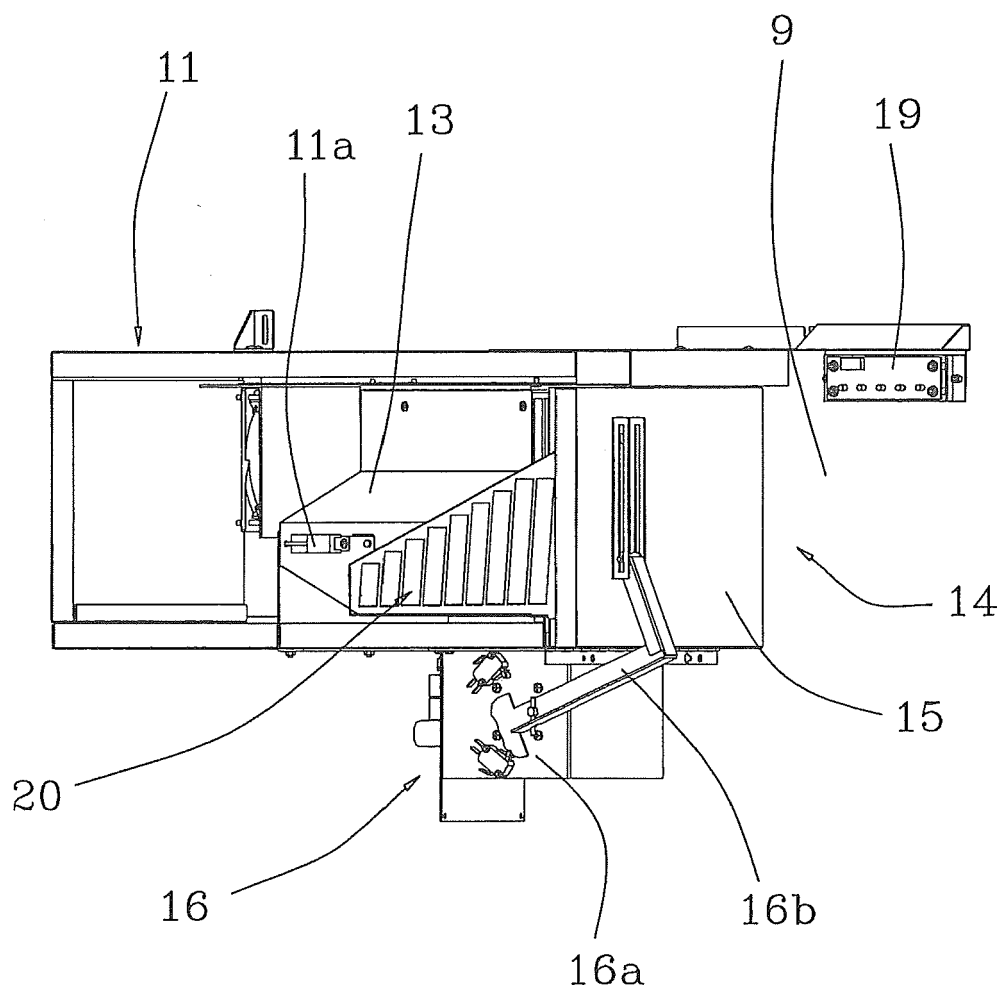


Fig.4

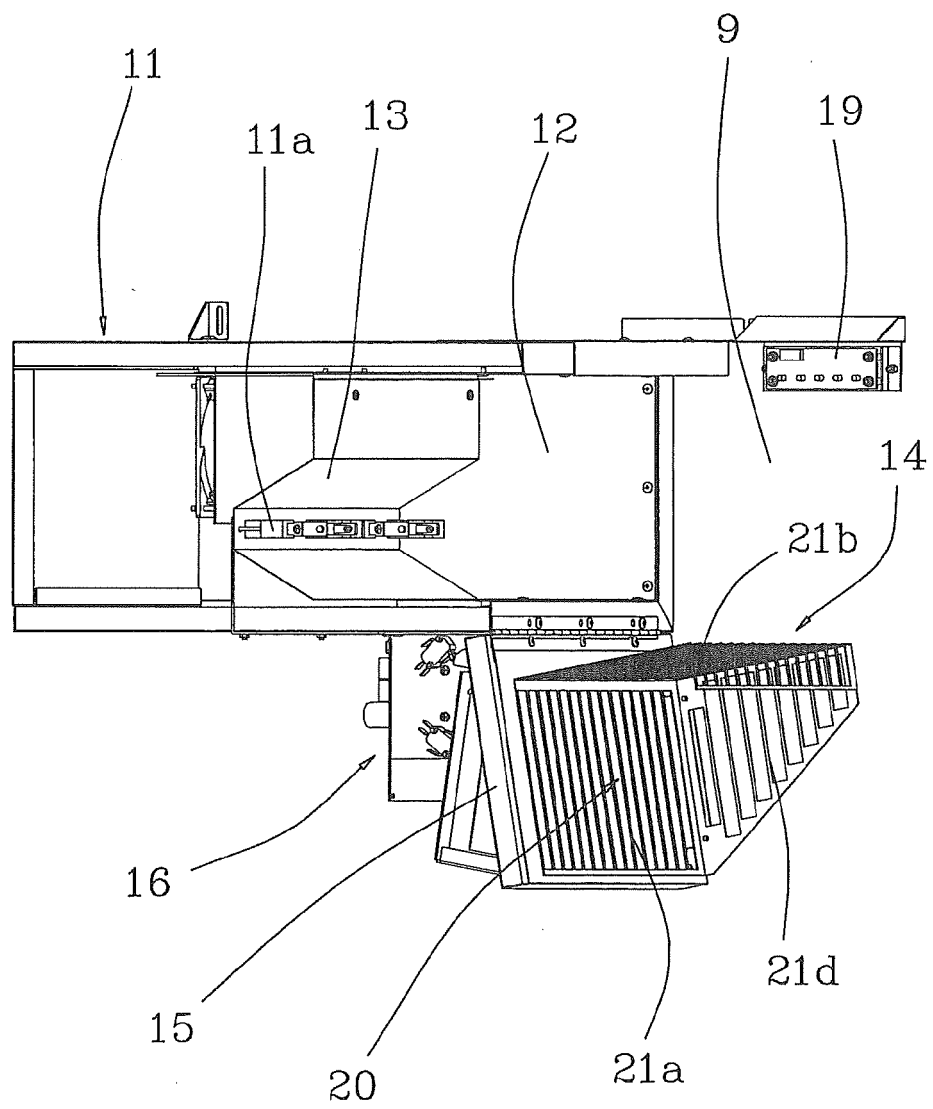
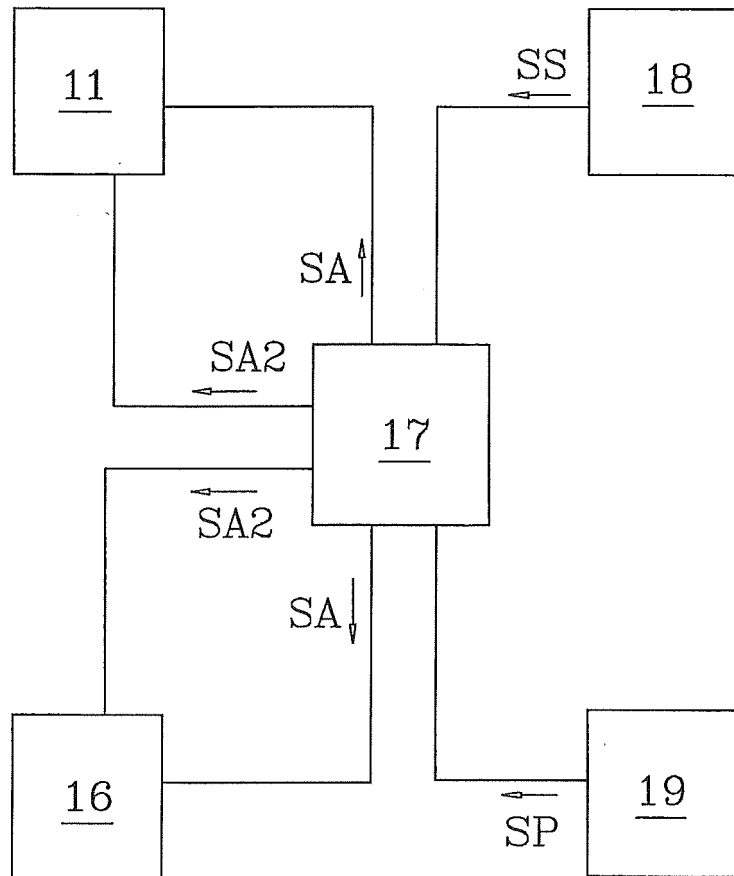


Fig.5





EUROPEAN SEARCH REPORT

Application Number
EP 13 15 2203

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Place of search		Date of completion of the search	Examiner
The Hague		3 April 2013	Van Dop, Erik
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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03-04-2013

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REFERENCES CITED IN THE DESCRIPTION

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