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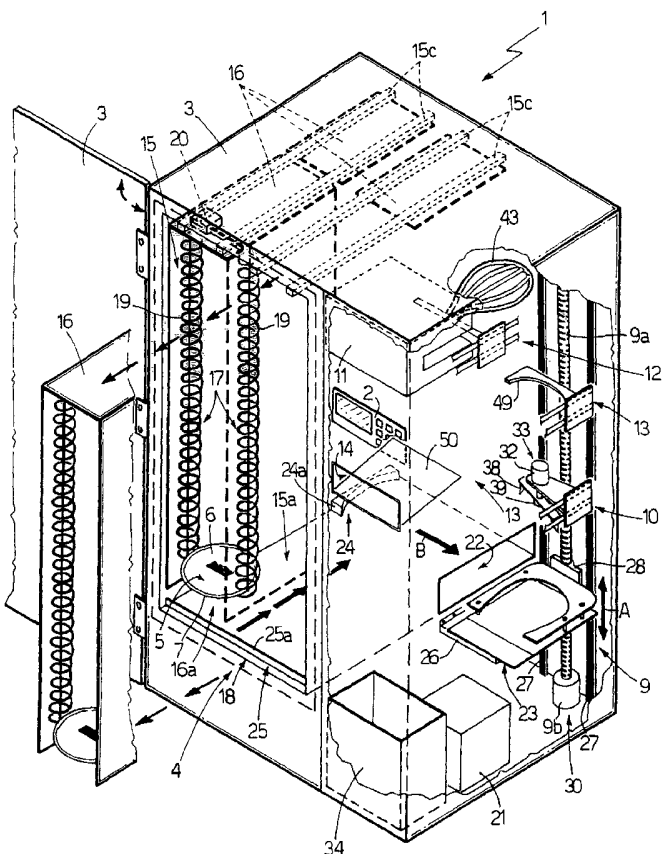
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(54) Title: AN AUTOMATIC DISPENSER OF HOT PIZZAS AND THE LIKE, AND CORRESPONDING METHOD OF OPERATION



(57) Abstract: A method for preparing hot pizzas in an automatic dispenser (1) of hot pizzas, in which a plate (7) containing a pizza (5) and sealed by a film (8) is picked up from a refrigerating unit (4) and transferred along a displacement path (A) to a baking oven (11), the film (8) being removed from the plate (7) along said displacement path (A); at the oven (11) the pizza (5) is picked up from the plate (7), the plate (7) itself being kept outside the oven (11), and is subsequently inserted inside the oven (11); following upon baking, the pizza is re-deposited in the plate (7) from which it has previously been taken, and transferred into a delivery station (14), where the plate (7) containing the hot pizza (5) is picked up by the user.

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"AN AUTOMATIC DISPENSER OF HOT PIZZAS AND THE LIKE, AND CORRESPONDING METHOD OF OPERATION"

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TECHNICAL FIELD

The present invention relates to an automatic dispenser of hot pizzas and the like, and to the corresponding method of operation.

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In particular, the present invention relates to an automatic dispenser of hot pizzas obtained starting from pizzas packaged inside containers made of plastic material suitable for packaging foodstuffs.

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BACKGROUND ART

As is known, automatic dispensers of hot pizzas are able to offer to the user the possibility of selecting, via a purposely designed control panel, a given pizza from a list of pizzas, and of obtaining, after prior payment and in an extremely rapid way, the desired hot pizza.

Automatic dispensers of hot pizzas currently known comprise: a refrigerating unit designed for storing the containers of the pizzas; an oven for baking the pizza; a displacing assembly, capable of taking the containers out of the refrigerating unit; a cutting assembly, designed to open the container that contains the pizza; a transfer assembly, designed for transferring the pizza from the cutting assembly to the oven; a magazine for storing delivery trays; and a delivery assembly.

In particular, the refrigerating unit is designed to keep the pizzas at a pre-set temperature of refrigeration and is provided with a plurality of shelves on which are set the pizza containers, whilst the displacing assembly is designed

to pick up each container from the shelves of the refrigerating unit to transfer it to the cutting assembly, which co-operates with the displacing assembly itself for opening the container and performing complete removal of the
5 pizza from the container.

In the case in point, the displacing assembly, following upon the removal of the pizza, puts the open container out of which the pizza was taken back in the shelves of the refrigerating
10 unit, or else, alternatively, deposits the container itself in a magazine, which is purposely provided for recovery of the packaging, set inside the automatic dispenser of hot pizzas.

Following upon removal of the pizza from the container, the
15 transfer assembly transfers the pizza into the internal chamber of the oven, in which baking is carried out, and subsequently takes the pizza out of the oven to transfer it into the tray magazine, in which the hot pizza is deposited on a delivery tray.

20

The delivery assembly effects, following upon loading of the hot pizza on the delivery tray, transfer of the latter to an output station, from which a user picks up the tray containing the hot pizza.

25

The automatic dispensers of pizzas mentioned above present the serious drawback of being extremely complex to produce and of having particularly large overall dimensions, which prevents their installation in public premises or in environments of
30 limited dimensions. Said impediment represents a serious commercial limitation for the sector of automatic distribution of hot pizzas, in so far as it renders impossible an extension of the market to all those public premises which, albeit of limited dimensions, are frequented every day by a large number
35 of potential consumers of pizza.

The automatic dispensers of hot pizzas mentioned above present, moreover, the drawback of using, for distribution of each pizza, a considerable amount of packaging material. In particular, for each pizza the use of the purposely provided pizza container is necessary, which, following upon removal of the pizza, is thrown away, and of a disposable tray for the delivery of the hot pizza to the user. It is evident that the use of a large amount of packaging material, in addition to having a major effect on the costs of distribution of hot pizzas, determines an evident waste of material and a further expense for the disposal of the containers and of the trays.

DISCLOSURE OF INVENTION

The purpose of the present invention is therefore to provide an automatic dispenser of hot pizzas that is constructionally simple, is of reduced dimensions, and at the same time, will enable a reduction in the amount of packaging material used.

According to the present invention, there is provided a method for preparing hot pizzas in an automatic dispenser of hot pizzas, as described in Claim 1.

According to the present invention, there is moreover provided an automatic dispenser of hot pizzas, as described in Claim 9.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described with reference to the annexed drawings, which illustrate a non-limiting example of embodiment thereof, in which:

- Figure 1 illustrates, in perspective view and with parts removed for reasons of clarity, an automatic dispenser of hot pizzas built according to the teachings of the present invention;
- Figure 2 is a perspective view of a pizza container used in the automatic dispenser of hot pizzas illustrated in Figure 1;
- Figure 3 is a perspective view of a loading platform

included in the automatic dispenser of hot pizzas illustrated in Figure 1;

- Figure 4 is a perspective view of a film-removal assembly included in the automatic dispenser of hot pizzas illustrated
5 in Figure 1;

- Figure 5 is a perspective view of a pizza-removal assembly included in the automatic dispenser of hot pizzas illustrated in Figure 1;

- Figure 6 is a perspective view of a delivery assembly
10 included in the automatic dispenser of hot pizzas illustrated in Figure 1; and

- Figure 7 is a perspective view of the pizza-removal assembly during a step of picking up a pizza from a plate, performed by means of the automatic dispenser of hot pizzas illustrated in
15 Figure 1.

BEST MODE FOR CARRYING OUT THE INVENTION

With reference to Figure 1, the reference number 1 designates as a whole an automatic dispenser of hot pizzas capable of
20 enabling any user to select, through a purposely designed control panel 2, a given pizza from a list of available pizzas, and to obtain, after prior payment and in an extremely rapid way, the desired hot pizza.

25 The automatic dispenser 1 of hot pizzas is provided with a casing 3 defined by a frame and by a series of vertical panels appropriately fixed to the frame itself, and comprises, inside the latter, a refrigerating unit 4, which is designed for storing inside it a plurality of pizzas 5, and an electric
30 oven 11 of a known type, such as for example an electric oven provided with a series of infrared lamps, which is designed to carry out baking of the pizza 5.

With reference to Figure 2 in particular, each pizza 5 is pre-
35 packaged, i.e., is set inside a respective container 6, made of plastic material of a known type (suitable for alimentary

use), which consists of a tray or plate 7 for containing the pizza 5 and of a film 8 having the function of sealing the plate 7 at its top opening.

5 In the case in point, each plate 7 is substantially circular and is provided with an outer annular rim 7a, on which is fixed the film 8, so as to obtain the closing of the container 6. It should be pointed out that the containers 6 can be stored in a protective atmosphere and that the pizzas 5 can be
10 deep-frozen.

As regards the film 8, this is made of a plastic material and is provided with a label 8a made of ferromagnetic material or the like, set centrally on the film 8 itself.

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With reference to Figure 1, the automatic dispenser 1 moreover comprises an elevator assembly 9, which is able to transport the container 6 of the pizza 5, starting from the refrigerating unit 4, along a displacement path A that is
20 substantially vertical, and a separation assembly 10, which is set along the displacement path A, and is designed to carry out removal of the film 8 from the plate 7 of the container 6, keeping the pizza 5 inside the plate 7 itself.

25 The automatic dispenser 1 moreover comprises a pizza-removal assembly 12, which is set above the separation assembly 10, along the displacement path A of the elevator assembly 9, and is designed to co-operate with the latter for picking up the pizza 5 from the plate 7 and inserting it in the oven 11. The
30 pizza-removal assembly 12 is moreover able to take the pizza 5 out of the oven 11, following upon baking, for depositing it again inside the same plate 7 out of which it has been taken.

The automatic dispenser 1 moreover comprises a delivery
35 assembly 13, set along the displacement path A of the elevator assembly 9 and having the function of transferring the plate 7

containing the hot pizza 5, to an outlet opening 14 made on the casing 3 and designed to enable the user to pick up the plate 7 containing the desired hot pizza 5.

5 With reference to Figure 1, the refrigerating unit 4 comprises a refrigerator 15 designed for storing inside it a series of containers 6 of the pizza 5 and having a window 22 made on its side wall facing the elevator assembly 9, and a loading station 18 set on the bottom 15a of the refrigerator 15 and
10 designed for transferring towards the elevator assembly 9, through the side window 22, each container 6 present inside the refrigerator 15.

Inside the refrigerator 15 are present four magazines 16,
15 which are set in a raised position with respect to the loading station 18 and are set alongside one another at the four vertices of a rectangle and present openings 16a, at their bottom ends, which face the bottom 15a of the refrigerator 15. In particular, the magazines 16 are able to receive inside
20 them a given number of containers 6 of the pizza 5 stacked on top of one another, so as to form a vertical pile, and are mounted so that they are free to slide on respective horizontal guides 15c fixed on the top wall of the refrigerator 15 to enable advantageously removal (as
25 illustrated in Figure 1) of each magazine 16 from the refrigerator 15 and thus to enable loading of the containers 6 of the pizza 5 inside the magazines 16.

With reference to Figure 1, each magazine 16 is provided with
30 a conveying device 17, which is able to convey the pile of containers 6 towards the opening 16a of the magazine 16, so as to enable transfer by gravity of each container 6 onto the bottom 15a of the refrigerator 15 to the loading station 18.

35 In particular, each conveying device 17 comprises: at least one pair of helical springs 19, which are arranged with their

respective longitudinal axes perpendicular to the bottom 15a and are designed to support the pile of containers 6 of pizzas 5; and a rotation device 20 consisting, for example, of an electric motor reducer 20, which is able to set simultaneously in rotation the pair of helical springs 19 about the respective longitudinal axes, so as to convey the pile of containers 6 towards the opening 16a of the magazine 16.

Each helical spring 19 extends starting from the top of the refrigerator 15 to the top opening 16a, and is provided with a pre-set number of coils, which are sized so as to support an outer portion of the container 6. In the case in point, each container 6, when inserted in the magazine 16, has a first outer annular portion and a second outer annular portion inserted between two consecutive coils of a corresponding helical spring 19, which co-operates with the other helical spring 19 to keep the containers 6 on horizontal planes and set vertically at a distance apart from one another, the said distance corresponding substantially to the thickness of the container 6.

As regards the loading station 18, this is set underneath the magazines 16 and comprises a first pusher assembly 24 designed to displace the container 6 deposited on the bottom 15a of the refrigerator 15, towards the side window 22, along a rectilinear path B so as to enable transfer of the container 6 from inside the refrigerator 15 towards a platform 23 of the elevator assembly 9, on which loading of the container 6 is performed.

The loading station 18 moreover comprises a second pusher assembly 25, which is designed to displace the container 6, starting from any position on the bottom 15a, towards the rectilinear path B.

The first pusher assembly 24 comprises: a horizontal contrast

element 24a, which is preferably, but not necessarily, C-shaped, is set facing the side window 22, and extends resting on the bottom 15a; and a displacing device (not illustrated) of a known type, designed to displace the contrast element 24a away from and towards the side window 22 along the path B, between a position of rest, in which the contrast element 24a is set in a position corresponding to a side wall of the refrigerator 15 opposite to the side window 22, and a loading position, in which the contrast element 24a is set at the side window 22.

As regards the second pusher assembly 25, this comprises a vertical shovel 25a that extends over the entire width of the bottom 15a, parallel to the path B, and a displacing device (not illustrated), which is designed to displace the shovel 25a orthogonally to the rectilinear path B, between a position of rest, in which the shovel 25a is set at the front wall of the refrigerator 15, and an advanced position, in which the shovel 25a is set at a distance from the rear wall, such as to enable displacement of the contrast element 24a, between the shovel 25a and the rear wall itself.

With reference to Figure 1, the refrigerating unit 4 finally comprises a door 26, which is hinged on the side wall of the refrigerator 15, so as to be able to rotate outside the refrigerator 15 itself about a horizontal axis, between a position of closing, in which the door 26 is set resting on the side wall of the refrigerator 15 so as to close the side window 22, and a top opening position, in which the door 26 is set on a substantially horizontal plane.

As regards the elevator assembly 9, this is set alongside the refrigerating unit 4, at the side window 22, and comprises, in addition to the platform 23: a pair of vertical guides 27, which extend parallel to one another and to the displacement path A; a carriage 28 that is mobile on the vertical guides 27

and is designed to support the platform 23; and a displacing mechanism 30, designed to displace the carriage 28 along the displacement path A so as to translate the platform 23 between a loading position (illustrated in Figure 1), in which the platform 23 is set at the side window 22, and a delivery position, in which the platform 23 is set at the outlet opening 14.

In particular, the displacing mechanism 30 comprises: a worm screw 9a, which extends parallel to the vertical guides 27 and on which is mounted the carriage 28; and a rotation device 9b, which is designed to set in rotation the worm screw 9a about the respective longitudinal axis in a first direction of rotation or in a second direction of rotation, so as to determine lowering or, respectively, raising of the carriage 28 and of the platform 23 along the displacement path A.

With reference to Figures 1 and 3, the platform 23 comprises: a top plate 23a, which extends in cantilever fashion from the carriage 28 and is set horizontally; and a bottom plate 23b set underneath the top plate 23a, and engaged to the latter through vertical pins 29 designed for enabling the bottom plate 23b to displace vertically between a first position, in which the bottom plate 23b is set bearing upon the undersurface of the top plate 23a, and a second position, in which the bottom plate 23b is set parallel to and at a distance from the top plate 23a.

In detail, the top plate 23a has an internal hollow opposite to the carriage 28, shaped and sized so as to receive and support the body of the container 6 at an outer annular rim 7a of the plate 7, allowing a front portion 7c of the container 6 itself to project, whilst the bottom plate 23b has preferably, but not necessarily, a substantially rectangular shape and is sized so as to support the bottom of the plate 7 of the container 6.

With reference to Figure 3, the bottom plate 23b comprises a first horizontal portion 23c and a second flexible portion 23d, which is connected to one end of the first portion 23c and is mobile, against the action of a spring (not illustrated), between a position of rest (indicated with a solid line in Figure 3), in which it is co-planar with the first portion 23c, and an operative position (indicated with a dashed line in Figure 3), in which it is bent downwards.

10

With reference to Figures 1 and 4, the separation assembly 10 is set in an intermediate position along the displacement path A of the elevator assembly 9, and is designed to carry out removal of the film 8 from the plate 7 of the container 6, and to transfer the film 8 removed from the plate 7 to a film bin 34, included in the automatic dispenser 1 of pizzas and set inside the latter so as not to interfere with the displacement of the platform 23.

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The separation assembly 10 comprises a film-removal unit 33, and a displacing mechanism 36 capable of displacing horizontally the film-removal unit 33 between an operative position, (indicated with a solid line in Figure 4), in which the film-removal unit 33 is set above the platform 23 along the displacement path A, and a film-unloading position, (indicated with a dashed line in Figure 4), in which the film-removal unit 33 is set above the film bin 34, aligned with the opening of the latter.

20

In detail, in the example illustrated, the displacing mechanism 36 comprises: a pair of horizontal guides 36a, fixed to the frame of the casing 3; a slide 35, mounted so that it is free to slide on the guides 36a from which there extends, in cantilever fashion, a bracket 35a; and a displacement device of a known type (not illustrated), capable of displacing the slide 35 between the operative position and the

35

film-unloading position.

As regards the film-removal unit 33, this is fixed to the bracket 35a and comprises: a rotation device 32, for example
5 an electric motor set with its shaft facing downwards; a gripping device 39, fixed to the shaft of the electric motor 32; a pair of blade-holder arms 37, which extend radially starting from the gripping device 39 in a position diametrically
10 opposed to one another; and a pair of vertical blades 38, each of which is fixed on a free end of a respective blade-holder arm 37, from which it extends downwards, and each of which is designed to incise, during the movement of rotation of the
shaft of the motor 32, the film 8 along the inner perimetral rim 7d of the plate 7.

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The gripping device 39 has the function of separating the film 8 from the plate 7 following upon the operation of incision of the film 8, and in the example illustrated consists of an
20 electromagnet 39 or by a similar device, which is designed, upon command, to generate a magnetic field that is able to attract the label 8a fixed on the film 8 so as to separate the latter from the plate 7.

With reference to Figures 1 and 5, the pizza-removal assembly
25 12 is set in an intermediate position along the displacement path A and above the separation assembly 10, and is designed to pick up the pizza 5 from the plate 7 for inserting it into the baking chamber of the oven 11, leaving the plate 7 itself on the platform 23 outside the oven 11.

30

As is more clearly illustrated in Figure 5, the pizza-removal assembly 12 comprises: a mechanism of deformation 47 capable of temporarily bending downwards the portion 7c of the plate 7 when the platform 23 moves to the entrance of the oven 11; a
35 horizontal shovel 43; a displacing mechanism 46, which is capable of displacing the shovel 43 along a horizontal path

between a loading position, in which the shovel 43 is inserted at the bent portion 7c of the plate 7 (between the base of the pizza 5 and the bottom of the plate 7) and a position of baking, in which the shovel 43 is completely inside the baking chamber of the oven 11.

In detail, in the example illustrated, the deformation mechanism 47 comprises: a projecting appendage 44, which is fixed along the displacement path A at the entrance of the oven 11, from which it extends towards the elevator assembly 9, and is designed to engage the portion 7c of the plate 7, during the vertical displacement upwards of the platform 23, so as to determine a temporary bending downwards of the portion 7c of the plate 7 that is sufficient to enable insertion of the shovel 43 between the pizza 5 and the plate 7.

As regards the displacing mechanism 46, this comprises (in the example illustrated): a pair of horizontal guides 40, fixed to the frame of the casing 3; a slide 41, which is mounted so that it is free to slide on the guides 40, and from which there extends, in cantilever fashion, a horizontal arm 40a, on which there is fixed the shovel 43; and a displacement device of a known type (not illustrated), which is capable of displacing the slide 41 between the loading position of the shovel 43 and the baking position.

The pizza-removal assembly 12 finally comprises a contrast device 45, which is designed to co-operate with the shovel 43 for depositing the hot pizza in the plate 7. In detail, in the example illustrated, the contrast device 45 comprises a shovel 45, which is mobile vertically away from and towards the surface of the shovel 43 so as to set itself, when the shovel 43 is positioned above the platform 23 (for depositing the pizza 5 on the plate 7) between the rim of the pizza 5 and the entrance of the oven 11.

With reference to Figures 1 and 6, the delivery assembly 13 is set in a position corresponding to the delivery position of the elevator assembly 9 and is designed for transferring the plate 7 containing the hot pizza 5 from the platform 23 towards an inclined chute 50, which is fixed to the frame of the casing 3 at the outlet opening 14.

The delivery assembly 13 comprises a thrust head 49 and a mechanism of translation 51, capable of displacing the thrust head 49 horizontally between a resting position, in which the thrust head 49 sets itself resting on the platform 23 (between the outer annular rim 7a of the plate 7 and the carriage 28) and an unloading position, in which the thrust head 49 is set at the entrance of the chute 50.

In detail, the translation mechanism 51 comprises: a pair of horizontal guides 52, fixed to the frame of the casing 3; a slide 53, mounted so that it is free to slide on the guides 52 and designed to support the thrust head 49; and a displacement device of a known type (not illustrated) capable of displacing the slide 53 between the resting position and the unloading position.

The thrust head 49, in the example illustrated, consists of a horizontal shovel 49, which has a hollow that is shaped and sized so as to receive a portion of the outer annular rim 7a of the plate 7 and is fixed on the slide 53, from which it extends in a direction substantially transverse to the direction of displacement of the slide 53 itself.

From what is described above, it should be pointed out that the automatic dispenser 1 comprises an electronic control unit 21 (illustrated in Figure 1), which is capable of controlling the operations performed by the refrigerating unit 4, the elevator assembly 9, the separation assembly 10, the pizza-

removal assembly 12, and the delivery assembly 13.

Operation of the automatic dispenser 1 of hot pizzas is described in what follows.

5 The containers 6 of the pizzas 5 are stacked and divided inside the magazines 15, according to the type of pizza, into different sets of pizzas.

10 In particular, in the example presented, it is assumed that the automatic dispenser 1 of hot pizzas will be able to provide four different types of pizzas 5, each of which is associated to a respective magazine 16 present in the refrigerator 15. It is further assumed that initially the platform 23 is positioned at the delivery assembly 13.

15

The user is able to select the desired pizza by means of the control panel 2, after prior payment of a pre-set sum, which may be made, for example, by means of an electronic payment device of a known type (not illustrated), which is capable of communicating to the electronic control unit 21 confirmation of the payment. It is evident that the control panel 2 may be made up of a keyboard for selecting the desired pizza, and possibly a display device of a known type, such as, for example, a liquid-crystal display.

25

Once the signal encoding the pizza selected is received by the control panel 2, the electronic control unit 21 activates the conveying device 17 associated to the magazine 16 containing the type of pizza selected, which effects the displacement of the pile of containers 6 towards the top opening 16a of the magazine 16, in this way bringing about expulsion and dropping of a container 6 onto the loading station 18.

35 In particular, the displacement of the pile is controlled by the electronic control unit 21, which activates the rotation device 20 associated to the magazine 16, bringing about

rotation of the helical springs 19, which, by rotating about the respective longitudinal axes, progressively displace the containers 6 towards the top opening 16a of the magazine 16, causing dropping of a container 6 onto the bottom 15a of the refrigerator 15.

Once expulsion of the container 6 is ascertained, the electronic control unit 21 activates the elevator assembly 9 and the first pusher assembly 24 and second pusher assembly 25 so as to carry out loading of the container 6 on the platform 23.

In particular, in the aforesaid loading step, the elevator assembly 9 displaces the platform 23 downwards along the displacement path A so as to place it in the loading position. It should be pointed out that the platform 23, during displacement towards the loading position, causes displacement of the door 26 from the position of closing to the position of opening. For this purpose, the platform 23 is provided with a fork-like element 55 (illustrated in Figure 3), which is capable of engaging, during displacement of the platform 23, a pin (not illustrated) fixed outside the door 26, in this way bringing about the opening of the latter.

Following upon positioning of the platform 23 in the loading position (illustrated in Figure 1), the electronic control unit 21 controls advance of the shovel 25a towards the rear wall of the refrigerator 15 so as to ensure positioning of the container 6 on the rectilinear path B.

Once the displacement of the shovel 25a is completed, the electronic control unit 21 controls advance of the contrast element 24a towards the side window 22, in this way causing loading of the container 6 on the platform 23.

At this point, the electronic control unit 21 activates the

elevator assembly 9 so as to displace the platform 23 along the displacement path A towards the separation assembly 10, and displaces the film-removal unit 33 in the respective operative position, in which cutting of the film 8 of the container 6 is performed.

In detail, the electronic control unit 21 controls displacement of the film-removal unit 33, positioning it above the platform 23, and at the same time activates the displacement upwards of the platform 23 so as to cause penetration of the blades 38 into the film 8.

At this point, the control unit 21 activates the rotation device 32, which, by setting in rotation the blade-holder arms 37 and hence the blades 38, causes cutting of the film 8 along the inner perimetral rim 7d of the plate 7.

Once cutting of the film 8 is completed, the control unit 21 activates the electromagnet 39, which by attracting the label 8a integrated in the film determines separation of the film 8 from the plate 7 and subsequently controls displacement of the film-removal unit 33 into the unloading position above the film bin 34, and when this position is reached, the electromagnetic device 39 is de-activated, bringing about the consequent release of the label 8a and hence depositing of the film 8 inside the film bin 34.

Once the operation of separation of the film 8 from the plate 7 is completed, the elevator assembly 9 displaces the platform 23 to the entrance of the oven 11 so as to place the bottom plate 23b in a position substantially co-planar with the shovel 43. It should be pointed out that, during approach of the platform 23 to the oven 11, the projecting appendage 44 engages the perimetral rim 7a of the projecting portion 7c of the plate 7, bringing about temporary bending downwards of the projecting portion 7c (illustrated in Figure 7).

It should moreover be pointed out that the temporary bending downwards of the projecting portion 7c is advantageously guaranteed, during engagement of the projecting appendage 44, by bending downwards of the flexible portion 23d of the bottom plate 23b.

At this point, the control unit 21 controls displacement of the shovel 43 into the loading position. It is evident that the bending downwards of the portion 7c of the plate 7 enables the shovel 43 to be inserted between the bottom of the pizza 5 and the top surface of the bottom of the plate 7, thus causing loading of the pizza 5 above the shovel 43. Once loading of the pizza on the shovel 43 is completed, the control unit 21 controls a limited displacement downwards of the platform 23, thus causing the complete removal of the pizza 5 from the plate 7, which remains empty on the platform 23, and end of the bending of the projecting portion 7c by the projecting appendage 44.

20

At this point, the shovel 43 is brought into the baking position inside the baking chamber of the oven 11 for a pre-set interval of time so as to guarantee baking of the pizza 5. At the end of baking of the pizza 5, the shovel 43 is brought back into the loading position towards the platform 23. In this step, the shovel 43 is positioned above and outside the plate 7, which has remained on the platform 23.

The control unit 21 controls lowering of the shovel 45 towards the shovel 43, and simultaneously activates the displacement of the latter towards the oven 11. It is evident that in this step the rim of the hot pizza 5 set on the shovel 43 is contrasted, during displacement of the shovel 43, by the shovel 45, which, by preventing displacement towards the oven 11 of the pizza 5, determines loading by gravity of the latter inside the underlying plate 7.

At this point, the platform 23 containing the plate 7 with the hot pizza 5 is displaced towards the delivery assembly 13, and the thrust head 49 is displaced into the position of resting, i.e., between the perimetral rim 7a of the plate 7 and the carriage 28.

It should be pointed out that in this step the platform 23, during displacement towards the delivery position, co-operates with a lever element 54 (illustrated in Figure 3), which is set on the elevator assembly 9 and designed to displace, when it reaches the delivery position, the bottom plate 23b upwards so as to set it bearing upon the top plate 23a. In the case in point, the displacement upwards of the bottom plate 23b determines partial removal of the plate 7 from the hollow of the top plate 23a and at the same time alignment of the plate 7 itself with the entrance of the chute 50.

Following upon raising of the bottom plate 23b, the electronic control unit 21 controls translation of the shovel 49 towards the unloading position, bringing about in this way displacement of the plate 7 containing the hot pizza 5 onto the chute 50, which conveys the plate 7 containing the hot pizza 5 towards the outlet opening 14, from which the user is able to pick up the hot pizza 5.

The automatic dispenser 1 of hot pizzas is advantageous in so far as it has extremely small overall dimensions as compared to the automatic dispensers of pizzas currently available on the market.

The automatic dispenser of hot pizzas has, moreover, the considerable advantage of using the plate 7 of the pizza 5 also for delivery of the hot pizza, thus eliminating the need to use disposable trays and the corresponding magazine inside the automatic dispenser. It is evident that the use of the

plate 7 for a dual function determines a considerable reduction in the packaging and a consequent reduction both in the costs of production of the pizza and in the costs of disposal of the packaging.

5

Finally, it should be pointed out that the automatic dispenser of hot pizzas described above is extremely simple and consequently economic to produce.

10 Finally, it is clear that modifications and variations can be made to the automatic dispenser of pizzas described and illustrated herein, without thereby departing from the scope of the present invention.

15 In particular, the automatic dispenser 1 is able to deliver, on request of the user, in addition to hot pizzas, also the deep-frozen pizza contained in the container 6. It is evident that in this case, following upon loading of the container 6 on the platform 23 by the loading station 18, the elevator
20 assembly 9 displaces the platform 23 itself directly to the delivery position, in which the delivery assembly 13 actuates the transfer of the container 6 towards the outlet window 14. It should be pointed out that in this case, the oven 11, the separation assembly 10, and the pizza-removal assembly 12
25 remain inactive.

Finally, it should be pointed out that the film-removal unit 33, the shovel 43, and the thrust head 49 can be advantageously displaced in the respective horizontal
30 direction by a single displacing mechanism of a known type, which comprises, for example, a pair of horizontal guides fixed to the frame of the casing 3, and a slide mounted so that it is free to slide on the guides, from which a first bracket, a second bracket, and a third bracket extend, which
35 are designed for supporting, respectively, the film-removal unit 33, the shovel 43, and the thrust head 49.

C L A I M S

1. A method for preparing hot pizzas in an automatic dispenser (1) of hot pizzas, said method being characterized in that it
5 comprises the following steps:
- picking up a pizza from a refrigerating unit (4), designed to keep said pizza (5) at a pre-set temperature, said pizza (5) being set inside a container (6) comprising a plate (7) and a film (8) for closing said plate (7);
 - 10 - transferring the container (6) from said refrigerating unit (4) to a baking oven (11), removing the film (8) from the plate (7) along a displacement path (A);
 - picking up the pizza (5) from said plate (7), keeping the plate (7) itself outside the oven (11);
 - 15 - inserting the pizza (5) inside the oven (11) to complete the baking of the pizza (5);
 - extracting the pizza (5) from said oven (11) for depositing it in the plate (7), from which has been previously taken; and
 - transferring the plate (7) containing the hot pizza (5) to a
20 delivery station (14), where the plate (7) is designed to be picked up by the user.
2. The method according to Claim 1, characterized in that said
25 step of picking up the pizza (5) from the plate (7) comprises the step of bending temporarily downwards a portion (7c) of the plate (7), so as to enable the insertion of shovel means (43) at the said bent portion (7c), between said pizza (5) and the plate (7).
- 30 3. The method according to Claim 2, characterized in that said step of bending temporarily downwards said portion (7c) of the plate (7) comprises the steps of:
- displacing vertically said plate (7) containing said pizza (5) along said displacement path (A), keeping the plate on a
35 substantially horizontal plane; and
 - engaging an outer annular portion (7a) of said plate (7) by

means of deformation elements (47) during vertical displacement of said plate (7).

4. The method according to Claim 3, characterized in that said
5 step of picking up the pizza (5) from said plate (7) comprises the step of displacing horizontally said shovel means (43) so as to insert the shovel means (43) at the bent portion (7c) of said plate (7), between the pizza (5) and the plate (7).

10 5. The method according to any one of the preceding claims, characterized in that said step of removing said film (8) from said plate (7) comprises the step of cutting said film (8) along an annular rim (7d) of said plate (7).

15 6. The method according to Claim 5, characterized in that said step of removing said film (8) from said plate (7) comprises the step of picking up the film (8) from the plate (7) and depositing it in a film bin (34).

20 7. The method according to Claim 6, in which the film (8) of said container (6) comprises at least one label (8a) made of ferromagnetic material, said method being characterized in that said step of picking up the film (8) comprises the step of generating a magnetic field by means of gripping means (39)
25 so as to attract said label (8a) towards said gripping means (39) themselves.

8. The method according to any one of the preceding claims in which said refrigerating unit (4) comprises a plurality of
30 vertical magazines (16), each of which comprises a plurality of containers (6) stacked on top of one another, the method being characterized in that said step of picking up the pizza (5) from the refrigerating unit (4) comprises the steps of:
- depositing by gravity a container (6) stacked inside said
35 magazine (16), on a surface (15a) that is substantially horizontal to and set underneath said magazines (16); and

- displacing said container (6) onto said surface (15a) to load it on a platform (23) that is substantially co-planar with said surface (15a) and mobile along said displacement path (A).

5

9. An automatic dispenser of hot pizzas and the like characterized in that it comprises:

- a refrigerating unit (4) designed to contain inside it a plurality of pizzas (5) in order to maintain them at a pre-set temperature, each of said pizzas (5) being set inside a container (6) comprising a plate (7) and a film (8) for closing said plate (7);
- an oven (11) designed for baking said pizza (5);
- an elevator assembly (9) designed for displacing a platform (23) along a substantially vertical displacement path (A);
- a loading assembly (18) designed for loading a container (6) present in said refrigerating unit (4) onto said platform (23) of said elevator assembly (9);
- a separation assembly (10), designed for removing, along said displacement path (A), said film (8) from said plate (7) of said container (6) set on said platform (23);
- a pizza-removal assembly (12), designed for picking up the pizza (5) from said plate (7), keeping said plate (7) outside said oven (11) on said platform (23) and inserting said pizza (5) inside said oven (11) for a pre-set interval of time so as to carry out baking of the pizza (11), said pizza-removal assembly (12) being designed for taking said pizza (5) out of said oven (11) to deposit it on the plate (7) from which it was previously removed;
- a delivery station (14); and
- a delivery assembly (13), designed for transferring the plate (7) containing the hot pizza (5) set on the platform (23) towards said delivery station (14).

10. The automatic dispenser of hot pizzas according to Claim 9, characterized in that said pizza-removal assembly (12)

35

comprises deformation means (47) designed for engaging an outer annular portion (7a) of said plate (7) during the displacement of the platform (23) along the displacement path (A) so as to bend a portion (7c) of the plate (7) downwards.

5

11. The automatic dispenser of hot pizzas according to Claim 10, characterized in that said deformation means (47) comprise a projecting appendage (44), set along the displacement path (A) at the oven (11), from which it extends towards the elevator assembly (9).

10

12. The automatic dispenser of hot pizzas according to Claim 11, characterized in that said pizza-removal assembly (12) comprises a shovel (43), which is mobile horizontally between the oven (11) and the elevator assembly (9) and is designed for picking up said pizza (5) from said plate (7) in order to transfer it away from and towards said oven (11).

15

13. The automatic dispenser of hot pizzas according to Claim 12, characterized in that it comprises a contrast device (45) designed to co-operate with said mobile shovel (43) for depositing said pizza (5) in said plate (7).

20

14. The automatic dispenser of hot pizzas according to any one of the preceding claims, characterized in that said separation assembly (10) comprises: a film-removal unit (33) designed for cutting and picking up the film (8) from the plate (7); and displacing means (30) designed for displacing horizontally the film-removal unit (33) between the platform (23) and a film bin (34).

30

15. The automatic dispenser of hot pizzas according to Claim 14, characterized in that the film-removal unit (33) comprises cutting means (33) designed for cutting said film (8) and gripping means (39) designed for picking up said film (8) cut away from said plate (7).

35

16. The automatic dispenser of hot pizzas according to Claim 15, characterized in that said cutting means (33) comprise: at least one horizontal blade-holder arm (37); at least one vertical blade (38) fixed to said blade-holder arm (37); and rotation means (32), designed for setting in rotation said at least one blade-holder arm (37) about a vertical axis.

17. The automatic dispenser of hot pizzas according to Claim 15 or Claim 16, characterized in that said film (8) of said container (6) comprises at least one label (8a) made of ferromagnetic material, and in that said gripping means (39) comprise an electromagnet (39) designed for generating, upon command, an electromagnetic-field capable of attracting said label (8a) with said film (8) towards said gripping means (39).

18. The automatic dispenser of hot pizzas according to any one of Claims 9 to 17, characterized in that said loading assembly (18) is set inside said refrigerating unit (4), said refrigerating unit (4) comprising an outlet door (26) designed to enable the loading assembly (18) to transfer said container (6) outside said refrigerating unit (4).

19. The automatic dispenser of hot pizzas according to Claim 18, characterized in that said refrigerating unit (4) comprises a plurality of vertical magazines (16), each of which is designed to receive inside it a plurality of containers (6) that can be stacked on top of one another.

20. The automatic dispenser of hot pizzas according to Claim 19, characterized in that each magazine (16) comprises conveyor means (17) designed for conveying at least one container (6) to said loading assembly (18).

21. The automatic dispenser of hot pizzas according to Claim

19, characterized in that said conveyor means (17) comprise at least one pair of helical springs (19) arranged vertically, and electric means of rotation (20) designed for setting in rotation said helical springs (19) about respective
5 longitudinal axes.

22. The automatic dispenser of hot pizzas according to any one of the preceding claims, characterized in that said delivery assembly (13) comprises a thrust head (49) and displacing
10 means (51) designed for displacing horizontally said thrust head (49) between the platform (23) and said delivery station (14).

23. The automatic dispenser of hot pizzas according to any one
15 of Claims 14 to 22, characterized in that said displacing means (36; 51) comprise at least one horizontal guide (36a; 52), and a slide (41; 53) mounted so that they are free to slide on said guide (36a; 52).

20 24. The automatic dispenser of hot pizzas according to any one of the preceding claims, characterized in that it comprises an electronic control unit (21), designed to control said refrigerating unit (4), said oven (11), said loading assembly (18), said separation assembly (10), said pizza-removal
25 assembly (12), said delivery assembly (13), and said elevator assembly (9).

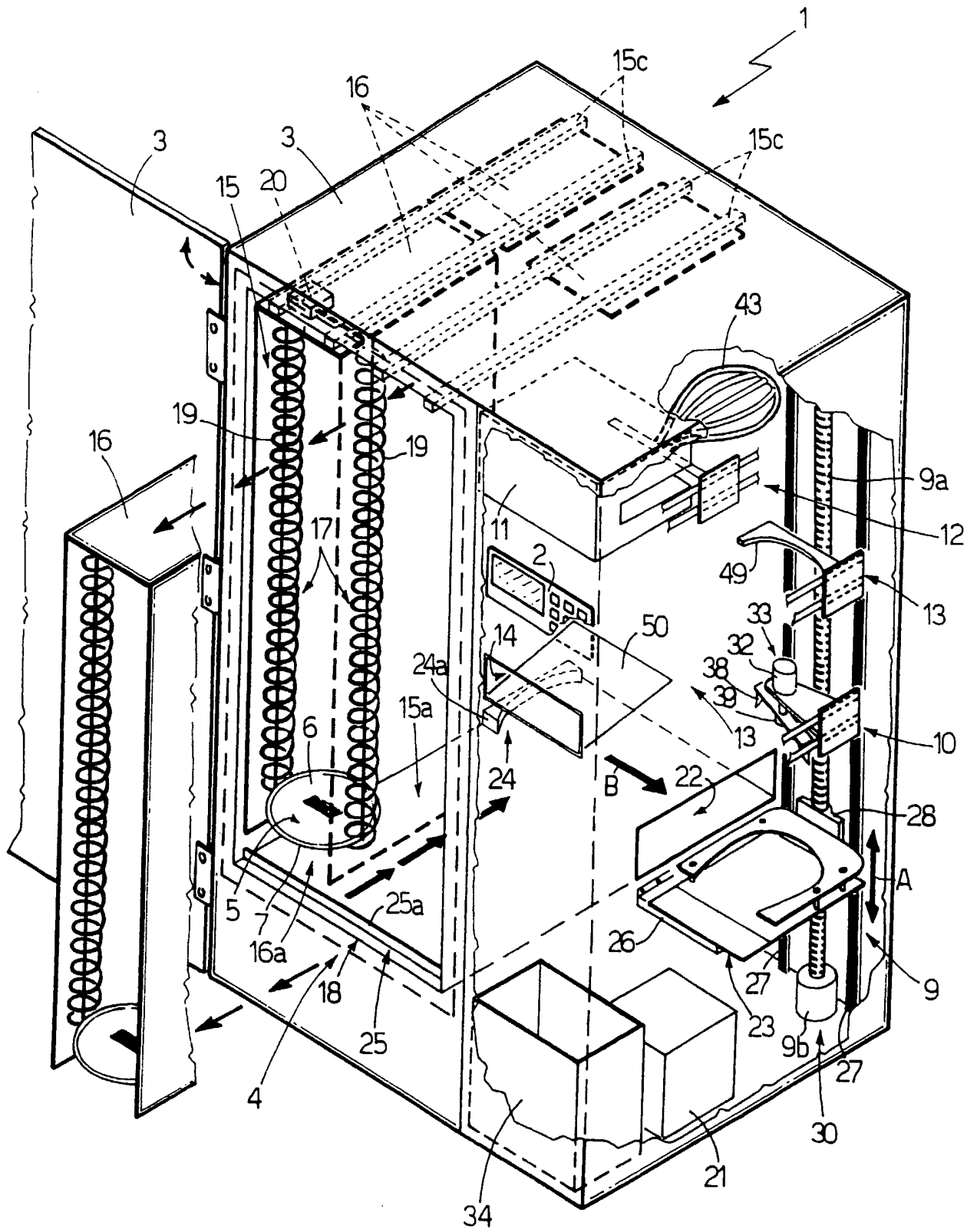


Fig.1

2 / 5

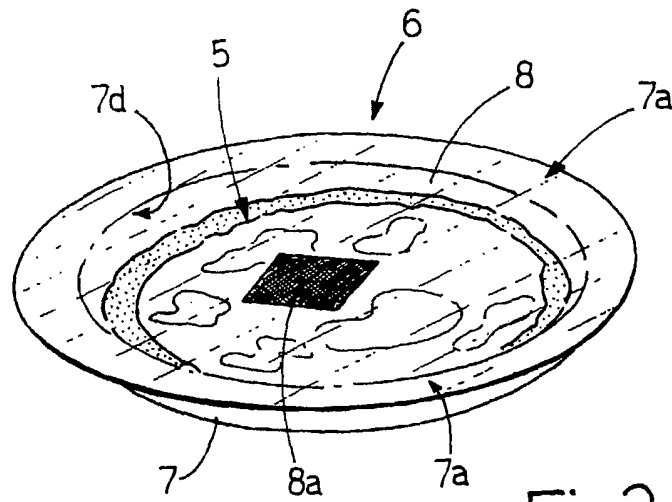


Fig.2

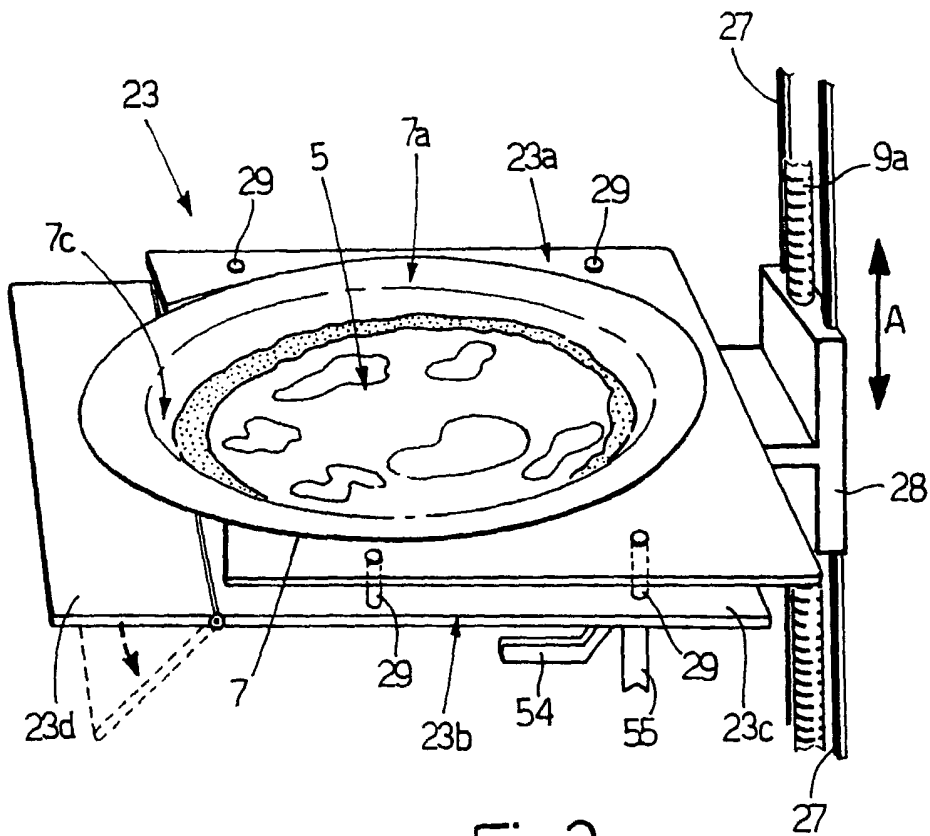


Fig.3

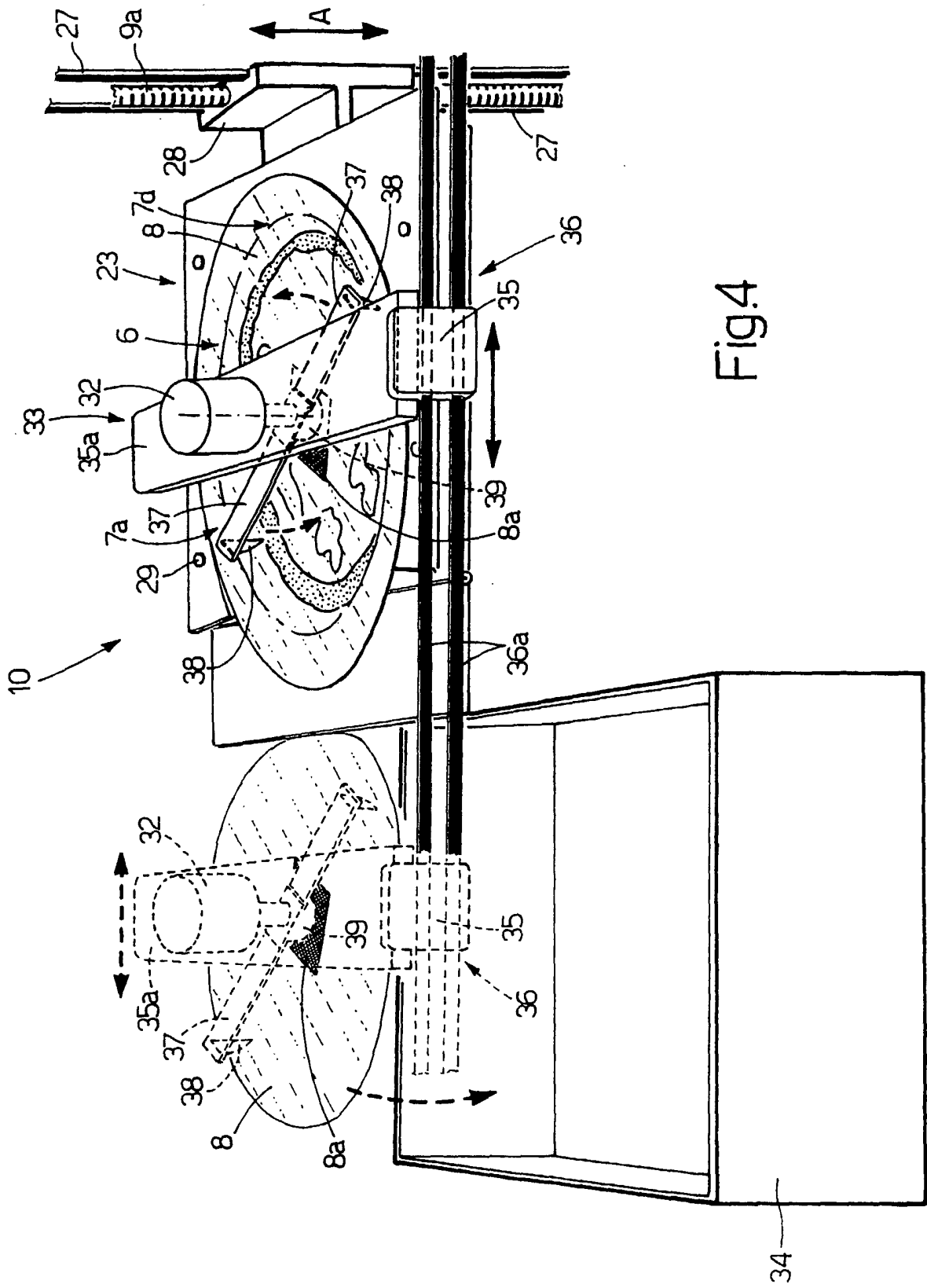


Fig.4

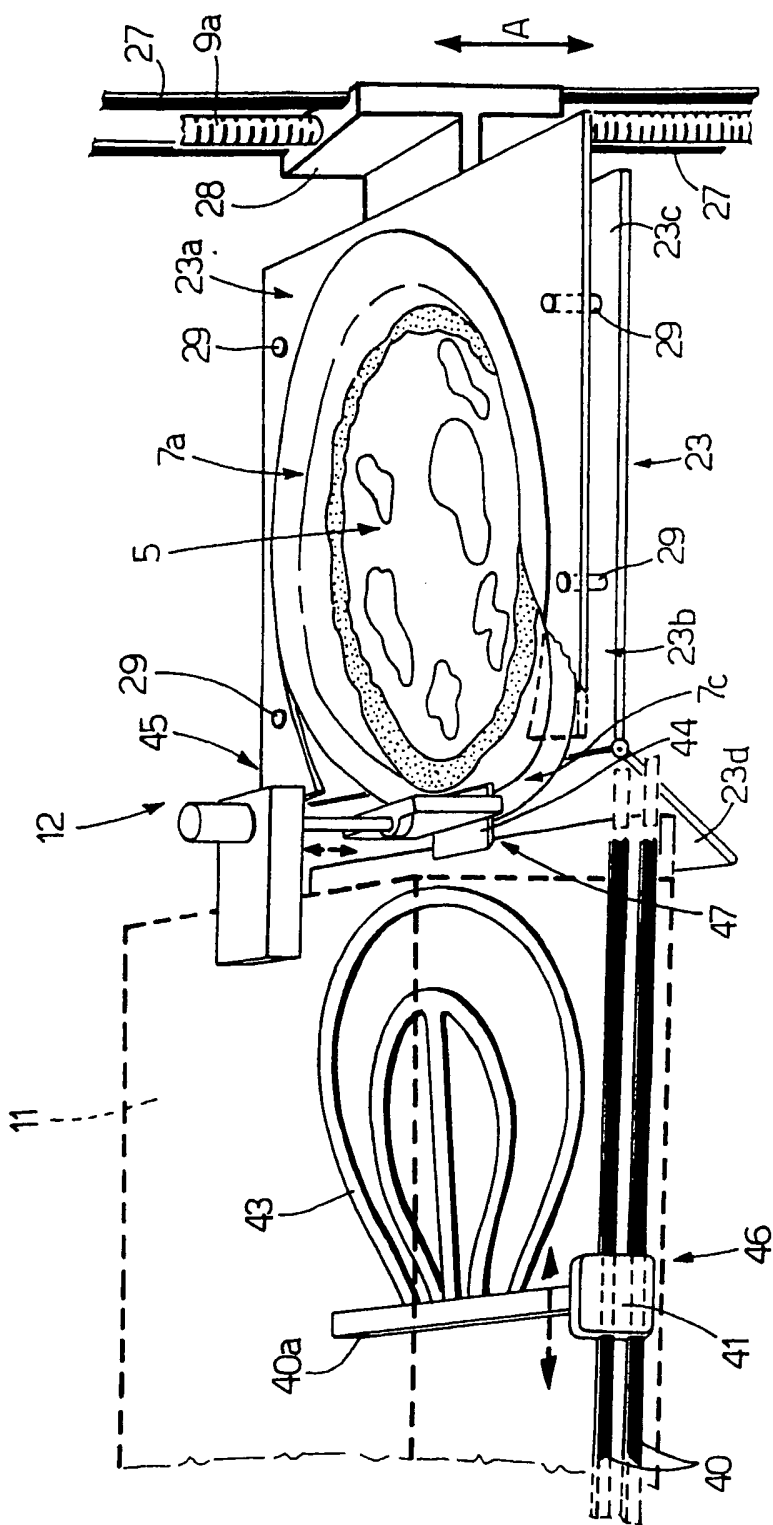


Fig.5

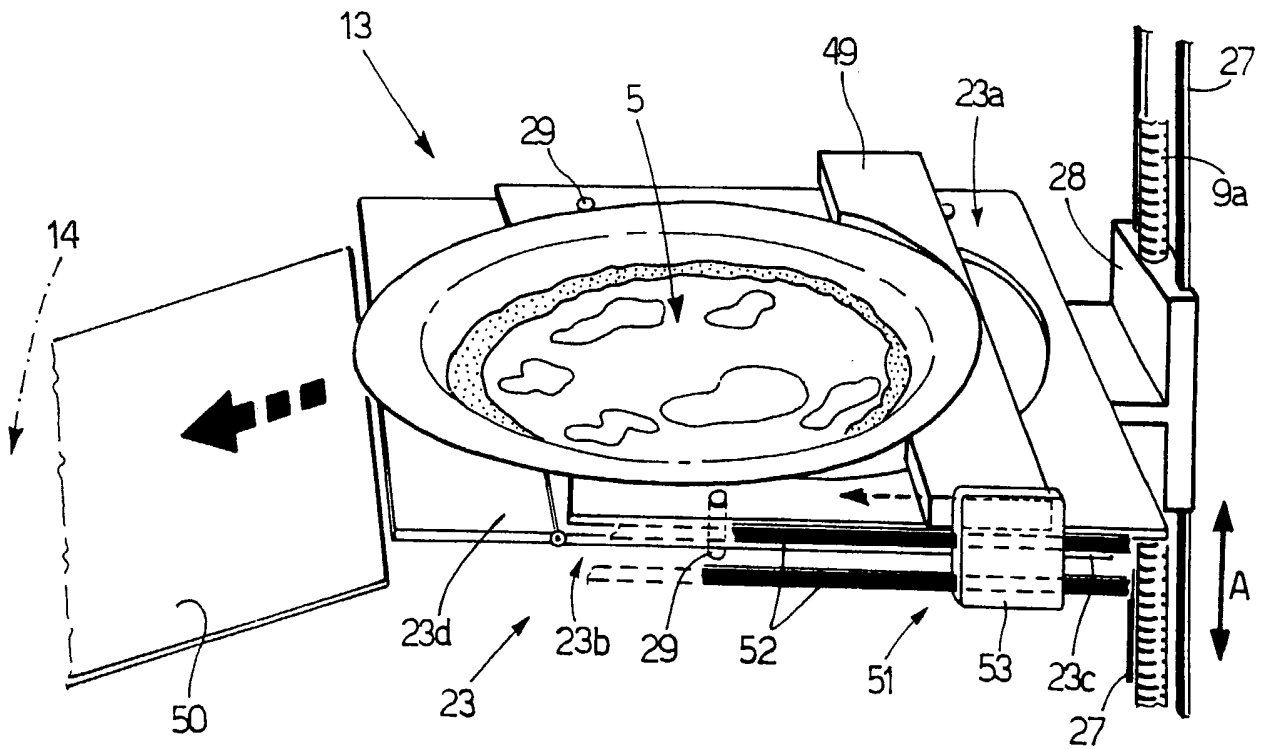


Fig.6

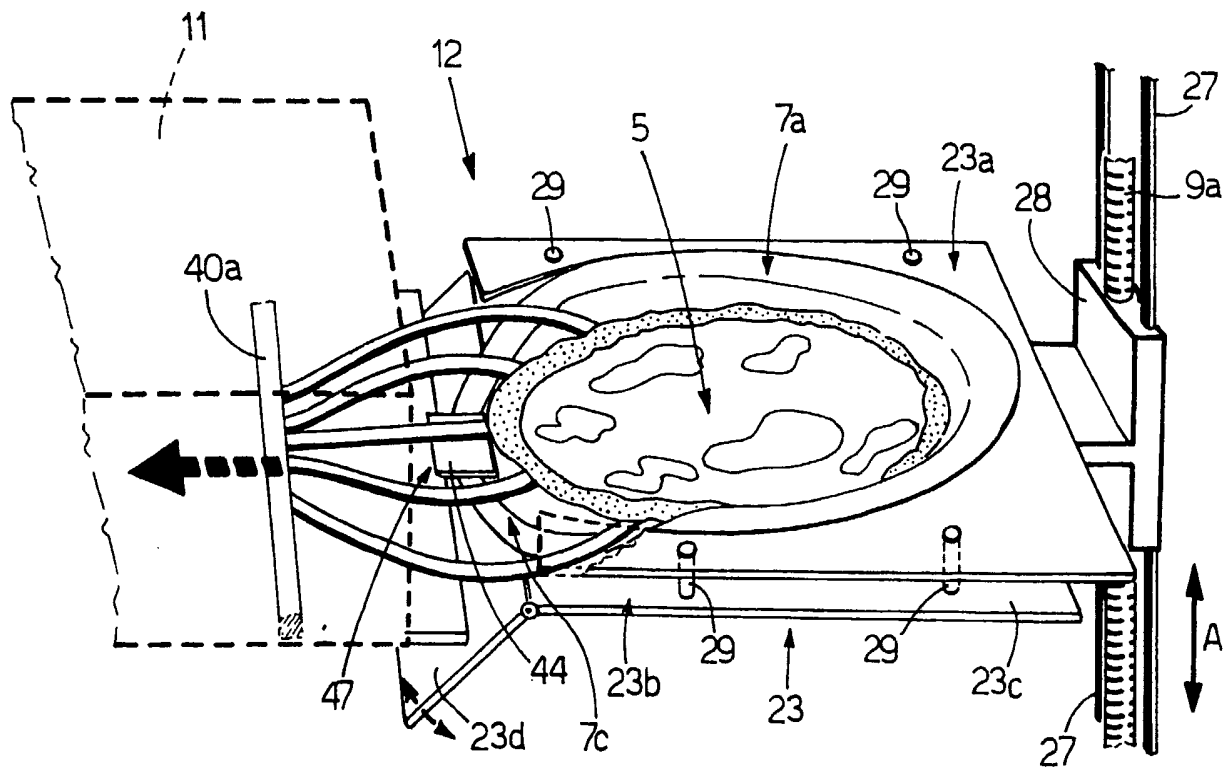


Fig.7

INTERNATIONAL SEARCH REPORT

International Application No
PCT/IT 03/00139

A. CLASSIFICATION OF SUBJECT MATTER IPC 7 G07F9/10		
According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED		
Minimum documentation searched (classification system followed by classification symbols) IPC 7 G07F		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 1 107 199 A (TOP VENDING SRL) 13 June 2001 (2001-06-13) abstract; claim 19; figures 1-9 paragraphs '0003!', '0004!'	1-24
Y	US 5 435 685 A (KAJIMURA TORU ET AL) 25 July 1995 (1995-07-25) abstract; claim 1; figures 1-3 column 1, line 45 -column 3, line 40 column 9, line 57-59	1-24
A	EP 0 437 344 A (ENERSYST DEV CENTER INC) 17 July 1991 (1991-07-17) abstract; claims 23,28	1-24
<input type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
° Special categories of cited documents :		
A document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family		
Date of the actual completion of the international search 18 July 2003		Date of mailing of the international search report 29/07/2003
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer Höhn, M

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