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(54) Vending machine

(57) The present invention is related to a compact vending machine for combined distribution of two kinds of products, in particular snacks and drinks, said machine comprising a number of substantially horizontal trays (7) and a number of serpentine units (30), from which products are pushed into a vertical shaft (11) so that they become accessible through a distributing device (6), characterised in that the storage compartment of said machine is modular, meaning that said trays (7) and said serpentine units (30) can be installed on any one of a given number of locations within said storage compartment. Cooling is provided to the storage compartment. Said cooling can be provided to the totality or to part of the said storage compartment. A thermally insulating panel can be placed to obtain a modularity in the cooled and non/cooled areas.

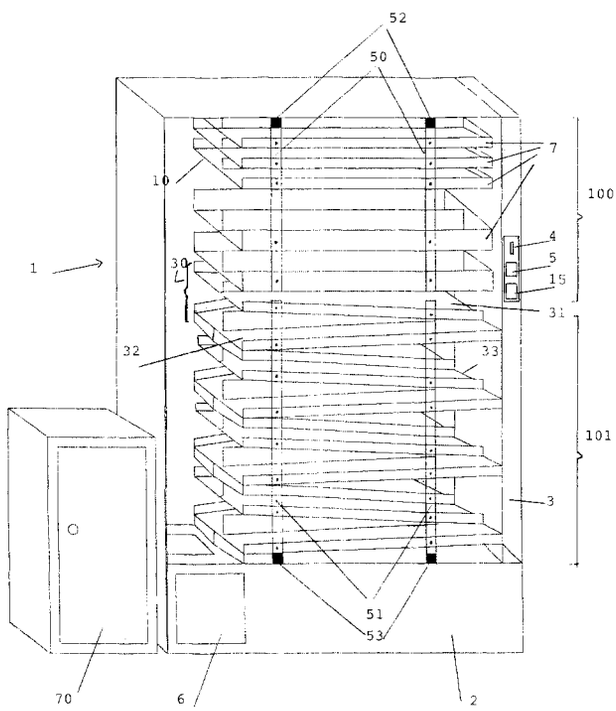

FIG. 1

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Description

Field of the invention

[0001] The present invention is related to a vending machine, in particular a vending machine for combined distribution of two types of products, such as snacks and drinks.

State of the art

[0002] Many types of vending machines have been described. For example, document US-A-5553736 is related to a snack distributing machine, whereby the products to be dispensed from the machine travel horizontally in a direction parallel to the front surface of the machine to a position from which the articles drop through a vertical shaft at the side of the machine, to a delivery area. Motor driven helical coils are used to move the products along their horizontal paths.

[0003] Another document, US-A-5176288, describes a drinks distributing machine, comprising a plurality of serpentine feed magazine units to store cylinder-like products, such as cans or bottles, in a number of stacks. A dispensing apparatus including at least one motor-driven auger controls the dispensing of cylindrical products from the bottom of the stack. The slopes of the feed magazine units are directed from the back of the machine to the front or vice versa, which makes it difficult to decrease the depth of a machine of this type. A typical depth of a standard drinks distributing machine is 760 mm.

[0004] Combined snack/drink distributors are commercially available. These machines equally use the helical coils and serpentine feed magazines for distributing drinks and snacks respectively. In many cases, the helical coils of these combined machines are perpendicular to the front of the machine, increasing the depth of the machine in question.

[0005] A general problem of the state of the art is the lack of modularity in distributing machines. In existing combined machines, two compartments are dedicated to the distribution of snacks and drinks respectively. No machines exist, which are compact in depth and whereby part of the snack distributing compartment can be interchanged for additional drink distributing devices or vice versa, should a higher demand for one of these products require this.

Aims of the invention

[0006] The present invention aims to present a vending machine for distribution of two types of products such as snacks and drinks which is new and inventive with respect to the prior art.

[0007] A further aim of the invention is to propose a modular vending machine for distributing two types of products, which is compact in depth.

Summary of the invention

[0008] The present invention is related to a vending machine, in particular for combined distribution of two types of products such as snacks and drinks, comprising a number of substantially horizontal trays and a number of serpentine units, from which products are pushed into a vertical shaft so that they become accessible through a distributing device, characterised in that the storage compartment of said machine is modular, meaning that said trays and said serpentine units can be installed on any one of a given number of locations within said storage compartment.

[0009] According to a preferred embodiment of the present invention, said vending machine is rectangular-shaped, and said trays and said serpentine units are substantially parallel to the front and back plane of said vending machine.

[0010] According to the preferred embodiment of the present invention, said trays are attached to a set of vertical strips, which are connected by way of rails to the roof of the storage compartment, and said serpentine units are attached to a second set of vertical strips, which are connected by way of rails to the floor of the storage compartment.

[0011] In another embodiment of the present invention, a set of trays and/or serpentine units are attached to one set of vertical strips, said strips being connected by way of a first set of rails to the roof of said storage compartment and by way of a second set of rails to the floor of said storage compartment.

[0012] According to one embodiment of the invention, said strips contains slots, into which extensions on the sides of said trays and serpentine units fit.

[0013] According to another embodiment of the invention, said strips have U-formed extensions, into which said trays or the slopes of said serpentine units fit.

[0014] According to a the present invention, said trays and said serpentine units comprise releasing devices for pushing products into said vertical shaft, and furthermore said machine comprises connection sockets on every location, so that said releasing devices of both the horizontal trays and the serpentine units may be powered and controlled on any of said given number of locations.

[0015] According to the preferred embodiment of the invention, said trays have a variable number of vertical sides extending from them, and, perpendicular to said sides, one upstanding member, to which at least one said releasing device is attached, said device consisting of a helical coil and motor, so that said motor is driving said helical coil and products attached to said coil, along the path between two of said vertical sides in the direction of the edge of said trays.

[0016] Still according to the preferred embodiment of the invention, said serpentine units each comprise two sloped panels, one being placed above the other, each having at least two vertical sides, said sloped panels

having substantially opposite slope angles with respect to the horizontal plane, the lower of said sloped panels comprising at its lowest point said releasing device, for freeing products, stored on said lowest point.

[0017] In a preferred embodiment of a vending machine according to the present invention, said machine has a depth of at least 313 mm.

[0018] A vending machine according to the invention may further comprise a cooling device for cooling all or part of the products stored in said machine.

[0019] Said cooling may be such that no separation exists between cooled and non-cooled area's within the storage compartment.

[0020] In a preferred embodiment, the machine of the invention further comprises a thermally insulating panel, said panel being attachable to said vertical strips by the same mechanisms as the trays and serpentine units, said panel substantially occupying the complete cross-section of said vending machine, said panel being provided with a door placed in said vertical shaft , said door being provided with a spring-operated hinge for automatically closing said door after the passage of products through said door, said panel further comprising removable seals on both sides for sealing off the opening between said panel and the side walls of said storage compartment.

[0021] The present invention is equally related to a device comprising a first vending machine according to the invention and a second vending machine operated from the selection panel of said first vending machine.

Short description of the drawings

[0022] Figure 1 represents an overall view of a vending machine according to the invention.

[0023] Figure 2 represents a frontal view of the machine according to the invention and indicates the movement of the products.

[0024] Figure 3 illustrates the dimensions of a vending machine according to a preferred embodiment of the present invention.

[0025] Figure 4 illustrates the parts of the horizontal trays according to the invention.

[0026] Figure 5 illustrates the parts of the serpentine units according to the invention.

[0027] Figure 6 illustrates the fixation device for fixing the trays and the serpentine units according to the invention.

[0028] Figure 7 illustrates the rail system for getting access to the products according to a preferred embodiment of the invention.

[0029] Figure 8 represents a thermally isolating panel to be used in a machine according to the invention.

Detailed description of a preferred embodiment of the invention

[0030] The drawings of Figure 1 and 2 describe the different parts of the vending machine according to a preferred embodiment of the present invention. In this embodiment, the machine has the shape of a rectangular box 1, comprising a compartment 2 for a cooling group (not shown) and an electronics compartment 3, wherein a money collecting device 4, a money return device 5, and a selection device 15. The door (not shown) in front of the storage compartment may comprise a coin slot, an opening and a selection panel, through which the devices 4, 5 and 15 are operated. Further, a distributing device 6 is present, for example an automatically opening and closing door, through which products can be delivered to the customer. The door (not shown) in front of the storage compartment of the machine of the invention is transparent, so that the availability of products can be visually inspected. The vending machine of the invention may be installed on a pedestal or attached to a wall.

[0031] An additional machine 70, for example for distributing hot drinks may be installed next to the machine of the invention and operated from the selection device 15 of the machine of the invention. A socket is provided on the back panel of the machine of the invention, for connecting said additional machine 70 to the selection device 15.

[0032] Figure 3 shows the most important dimensions of a machine according to a preferred embodiment of the invention. It can be seen that the machine of the invention has a much lower depth than the standard drinks distributing machines.

[0033] The storage compartment of the vending machine according to the preferred embodiment shown in figures 1 and 2 is divided in two parts : first a top part 100 comprising horizontal trays 7, which are parallel to the front and back side of the rectangular box 1. These trays are preferably used to dispense products such as snacks, hygienic products, pharmaceuticals, cigarettes, etc.

[0034] As is shown in figure 2, at least one releasing device in the form of a combination of an electric motor 8 and helical coil 9 is used on each of said horizontal trays to drive a plurality of products from right to left (as seen by someone facing the front panel). When driven beyond the edge 10 of the horizontal trays, the products fall into a vertical shaft 11 after which they are collected by the customer through the distributing device 6.

[0035] The parts of said horizontal trays 7 are described in more detail in figure 4. Said trays comprise a panel 20, with slots 21 cut out. Vertical sides 22 have extensions 23 which fit into said slots. More than two of these sides can be attached to said panel 20, so as to form several horizontal paths for the products to move on. This way, the trays are adaptable to the size of said products. Extensions 80 are present on the sides of the panel 20, which are used to attach the trays to vertical strips 50. On the far end of the panel 20, meaning the opposite side of the edge 10, is an upstanding member 24, which contains three parallel openings 25. The cen-

tral opening is used for accommodating the axis of the motors 8 and attaching the coils 9 which are to drive the products to the edge 10. The two adjoining openings are used to fix the motors 8, driving the coils.

[0036] These motor/coil assemblies can be fixed anywhere along these openings 25, so that they can be easily shifted, added or removed, depending on the desired number and width of the horizontal paths. The upstanding member 24 further contains slots 26 into which extensions 27 of the vertical sides 22 fit.

[0037] As can be seen on figures 1 and 2, the height of said trays 7, determined by the height of said vertical sides 22, may be variable for the different trays, which is equally meant to accommodate products of different sizes.

[0038] The bottom part 101 of the storage compartment comprises several serpentine units 30, each comprising two sloped panels (later called 'slopes') 31 and 32, which are parallel to the front and back plane of the machine. In a preferred embodiment, said slopes 31, 32 have opposite slope angles with respect to the horizontal plane. These serpentine units are preferably used to dispense drinks in cans or bottles. Any cylinder-like object, which is able to roll down the slopes under the influence of gravity, can be distributed from these serpentine units.

[0039] As seen on figure 2, a product 60, stored on the highest point of slope 31, will, under the influence of gravity, travel along the slope 31, until the edge 33, where it falls onto slope 32, after which it will travel along slope 32. In normal circumstances, a row of products are stored on said slopes, so that the product placed on the lowest point of the lower slope 32 is the one that may be selected by the consumer. On each of the serpentine units 30, a releasing device 34 is present, attached to the lower slope 32. When activated after selection of said product, the releasing device allows to free said product so that it falls into the vertical shaft 11 and becomes accessible through the distributing device 6.

[0040] The slopes 31 and 32 are shown in more details in figure 5. They comprise slots 40, into which three vertical sides 41 can be inserted by way of extensions 42, so that two parallel paths may be formed on each slope for two rows of products to move on. The lower slope 32 has an opening 43 under which releasing devices 34 is attached, one for each parallel path. The holes 44 are used to attach said releasing devices to said slope. It is equally possible to install only two vertical sides 41, to accommodate one row of longer products (e.g. half litre bottles). In that case, only one releasing device 34 is installed on the bottom of slope 32. The slopes have extensions 81 allowing the attachment of said slopes to vertical strips 51.

[0041] Both the trays 7 and the slopes 31, 32 are installed parallel to the front and back plane of the machine, which allows a decreased depth for a vending machine according to the present invention, compared to other combined snack/drinks vending machines. In a preferred embodiment, the machine of the invention has a depth as low as 313 mm.

[0042] A very important characteristic of the vending machine of the invention is its modular concept. As was explained already, the trays 7 are adaptable in height and in number of horizontal paths. Also, the serpentine units can accommodate one or several parallel rows of cylinder-like products. Apart from this, however, the storage compartment in its totality is designed in a modular way.

[0043] Said storage compartment which is defined as the total space taken up by the trays 7 and the serpentine units 30 may be filled up by any combination of these trays and serpentine units.

[0044] For this purpose, the trays 7 and the slopes 31, 32 of the serpentine units 30, are attached to vertical strips 50, 51. In the embodiment shown in figure 1, two sets of strips are present for both the trays 7 and for the slopes 31, 32 : two strips on the front side and two (not shown in figure 1) on the back side, so that the trays 7 are held together by 4 strips 50 and the serpentine units 30 are held together by 4 strips 51. The strips 50 and 51 are connected to the roof and floor of the machine's central compartment by way of rails 52, 53 respectively so that the complete set of trays or the complete set of slopes can be easily removed from the machine, for example in order to refill said trays or slopes or to replace the totality of trays 7 by a set of serpentine units 30 or vice versa.

[0045] In another embodiment, strips may be used whose length covers the entire height of the storage compartment. In this case, only four of these long strips are used, which are attached to the rails 52,53, so as to acquire one set of trays and/or serpentine units, which is taking up the totality of the storage compartment.

[0046] Two possible ways of connecting the trays 7 and the serpentine units 30 to the vertical strips 50, 51 are shown in figures 6a and 6b. In figure 6a, the strips have slots 90 cut out in which the extensions 80 or 81 fit. Advantageously, said extensions are mushroom-shaped on one side of the trays or slopes (as shown in figure 4 and 5), in order to fixate said trays or slopes.

[0047] An alternative fixation is shown in figure 6b, where the strips 50 and 51 have U-formed extensions 85 into which the trays or slopes can be easily inserted and from which they can be as easily withdrawn. In the latter case, no extensions 80 or 81 are necessary on the trays or slopes.

[0048] A preferred embodiment of the system of rails 53 on the bottom of the storage compartment is shown in figure 7. The rails 53 are fixed to a metal plate 91, onto which a second metal plate 92 is connected. Both plates substantially fill up the horizontal cross-section of the storage compartment. The connection 93 between said plates is a pivoting axis, permitting the top plate 92 to pivot over 90° with respect to the bottom plate 91, when both plates are withdrawn from the storage compartment. To the top plate 92 are connected the strips

51, to which the trays or slopes are attached in one of the previously described ways. This installation is preferably repeated on the top of the storage device, in such a way that a set of trays is suspended from a pivotable plate, connected to another plate which is attached to the rails 52.

[0049] All previously described mechanisms permit the easy removal of individual trays or slopes from the machine of the invention and provides easy access to the trays or serpentine units, for example for refilling. This allows a high degree of modularity. The strips 50 and 51 comprise a plurality of connection points as described in figures 6a and 6b, so that both trays 7 and serpentine units 30 can be installed anywhere along the length of these strips. This means that any combination of trays and serpentine units can easily be obtained in the machine of the invention. Also, thanks to the rails (52, 53), a complete set of trays and/or serpentine units, held together by the strips 50 or 51 can easily be replaced by another set, equally held together by strips.

[0050] The modularity is further accomplished by the fact that the releasing devices, motor/coil 8,9 or releasing device 34 are attached to the trays 7 and the lower slopes 32 of the serpentine units. This means that a tray 7 and accompanying motor/coil assemblies 8,9 can be removed as a whole from the machine by removing the tray from the strips 50 and by disconnecting the motor (s) from the electronics compartment 3. They are then easily placed in another location by reattaching the tray to the strips 50 or 51 and reconnecting said motor/coil assembly to the electronics compartment 3. The same removal of serpentine units 30 is possible. The easy connection and disconnection of the releasing devices is made possible by the presence of connection sockets (not shown on figures), present at all locations, so that said releasing devices may easily be connected to the selection device, on any of said locations.

[0051] If necessary, the complete storage compartment may be filled with either trays or serpentine units, or any combination of both.

[0052] This design makes it very easy to adapt the configuration of a vending machine according to the invention, to varying demand for a certain type of product. This modularity also allows a great deal of flexibility in the storage capacity of a vending machine according to the invention. In a machine with the dimensions shown on figure 3, and in a configuration according to figures 1 and 2, namely 5 trays and 4 serpentine units (8 slopes), up to 180 products may be distributed from the trays 7, while up to 160 cans (33 cl.) or up to 120 half litre plastic bottles may be distributed from the serpentine units. In other configurations, these numbers are variable to a large extent.

[0053] According to a preferred embodiment of the invention, the storage compartment (100, 101) is cooled. The cooling of the storage compartment, provided by the cooling group may be applied to the whole or to part of the machine of the invention. In case the bottom part of the storage compartment is filled with drinks, as shown in figure 1, this part may be refrigerated by way of a cooling element at the back of the storage compartment, occupying the space taken up by the serpentine units upon which the drinks are stored. In this set-up however, the space above the serpentine units will also be cooled to a certain extent. A standard cooling installation comprising a condenser and evaporator may be used for this purpose, allowing the regulation of cooling temperatures between certain degrees.

[0054] In another preferred embodiment of the invention, however, a clear separation is obtained between cooled and non-cooled compartments, as well as a modularity in terms of space occupied by said cooled and non-cooled compartments.

[0055] This is done by the thermally insulating panel 200, which can be placed anywhere in the storage compartment, attached to the strips 50 or 51, in the same way as the trays 7 or the serpentine units (see figure 6). That way, the panel 200 can easily be removed and reinstalled elsewhere.

[0056] The thermally insulating panel 200 is shown in figure 8. It substantially covers the complete cross-section of the rectangular box 1. It is provided on both sides with thermally insulating seals 201, sealing off the cooled from the non-cooled compartment. Said seals 201 are fixed to the panel 200 and the wall of the storage compartment so that they can be easily detached, for example by way of repositionable tape or other means. The cross-section of said seals 201 is equally shown in figure 8. Said cross-section is such that a good adhesion of the seals is provides to both the panel 200 and the wall of the storage compartment. Said panel 200 is further provided with a door 202 connected to the panel via a spring-operated hinge 203, said door being placed in the vertical shaft 11. Said hinge is designed so that the weight of the products falling through the vertical shaft 11 is able to open the door, permitting the products to fall into the distributing device 6, after which the door closes again.

[0057] Apart from the better separation between cooled and non-cooled compartments, a modularity of the cooling is obtained. By moving the panel 200 to different positions, the size of the refrigerated compartment can be easily adapted. The same panel could allow also to have a partition in the machine for frozen products, beside the non-cooled and/or cooled areas.

Claims

1. A vending machine, in particular for combined distribution of two types of products such as snacks and drinks, comprising a number of substantially horizontal trays (7) and a number of serpentine units (30), from which products are pushed into a vertical shaft (11) so that they become accessible through a distributing device (6), **characterised in**

that the storage compartment (100,101) of said machine is modular, meaning that said trays (7) and said serpentine units (30) can be installed on any one of a given number of locations within said storage compartment.

2. The vending machine according to claim 1, wherein said vending machine is rectangular-shaped, and wherein said trays (7) and said serpentine units (30) are substantially parallel to the front and back plane of said vending machine.

3. The vending machine according to claim 1 or 2, wherein one set of trays (7) and/or serpentine units (30) are attached to a set of vertical strips (50), which are connected by way of rails (52) to the roof of said storage compartment, and wherein a second set of trays (7) and/or serpentine units (30) are attached to a second set of vertical strips (51), which are connected by way of rails (53) to the floor of said storage compartment.

4. The vending machine according to claim 1 or 2, wherein a set of trays (7) and/or serpentine units (30) are attached to one set of vertical strips, said strips being connected by way of a first set of rails (52) to the roof of said storage compartment and by way of a second set of rails (53) to the floor of said storage compartment.

5. The vending machine according to claim 3 or 4, wherein said strips contain slots 90, into which extensions (80, 81) on the sides of said trays (7) and serpentine units (30) fit.

6. The vending machine according to claim 3 or 4, wherein said strips have U-formed extensions (85), into which said trays (7) or the slopes (31,32) of said serpentine units fit.

7. The vending machine according to any one of the claims 1 to 6, wherein said trays (7) and said serpentine units (30) comprise releasing devices for pushing products into said vertical shaft (11), and wherein said machine comprises connection sockets on every location, so that said releasing devices of both the horizontal trays (7) and the serpentine units (30) may be powered and controlled on any of said given number of locations.

8. The vending machine according to claim 7, wherein said trays (7) have a variable number of vertical sides (22) extending from them, and, perpendicular to said sides (22), one upstanding member (24), to which at least one said releasing device is attached, said device consisting of a helical coil (9) and motor (8), so that said motor is driving said helical coil and products attached to said coil, along the path between two of said vertical sides (22) in the direction of the edge (10) of said trays.

9. The vending machine according to claim 7, wherein said serpentine units each comprise two sloped panels (31, 32), one being placed above the other, each having at least two vertical sides (41), said sloped panels (31,32) having substantially opposite slope angles with respect to the horizontal plane, the lower of said sloped panels comprising at its lowest point said releasing device, for freeing products, stored on said lowest point.

10. The vending machine according to any one of the claims 1 to 9, having a depth of at least 313 mm.

11. The vending machine according to any one of the claims 1 to 10, wherein a cooling device is cooling the totality of said storage compartment.

12. The vending machine according to any one of the claims 1 to 10, wherein a cooling device is cooling one part of said storage compartment, said part not being separated from the rest of said storage compartment.

13. The vending machine according to any one of the claims 1 to 10, wherein a cooling device is cooling one or more parts of said storage compartment, said parts being separated by thermally isolating separation from the rest of said storage compartment.

14. The vending machine according to claim 13, wherein said thermally isolating separation consists of a panel (200) which is attachable to said vertical strips by the same mechanisms as the trays (7) and serpentine units (30), said panel substantially occupying the complete cross-section of said vending machine, said panel (200) being provided with a door (202) placed in said vertical shaft (11), said door being provided with a spring-operated hinge (203) for automatically closing said door after the passage of products through said door, said panel (200) further comprising removable seals (201) on both sides for sealing off the opening between said panel (200) and the side walls of said storage compartment.

15. A device comprising a first vending machine according to any one of the claims 1 to 14 and a second vending machine operated from the selection panel (15) of said first vending machine.

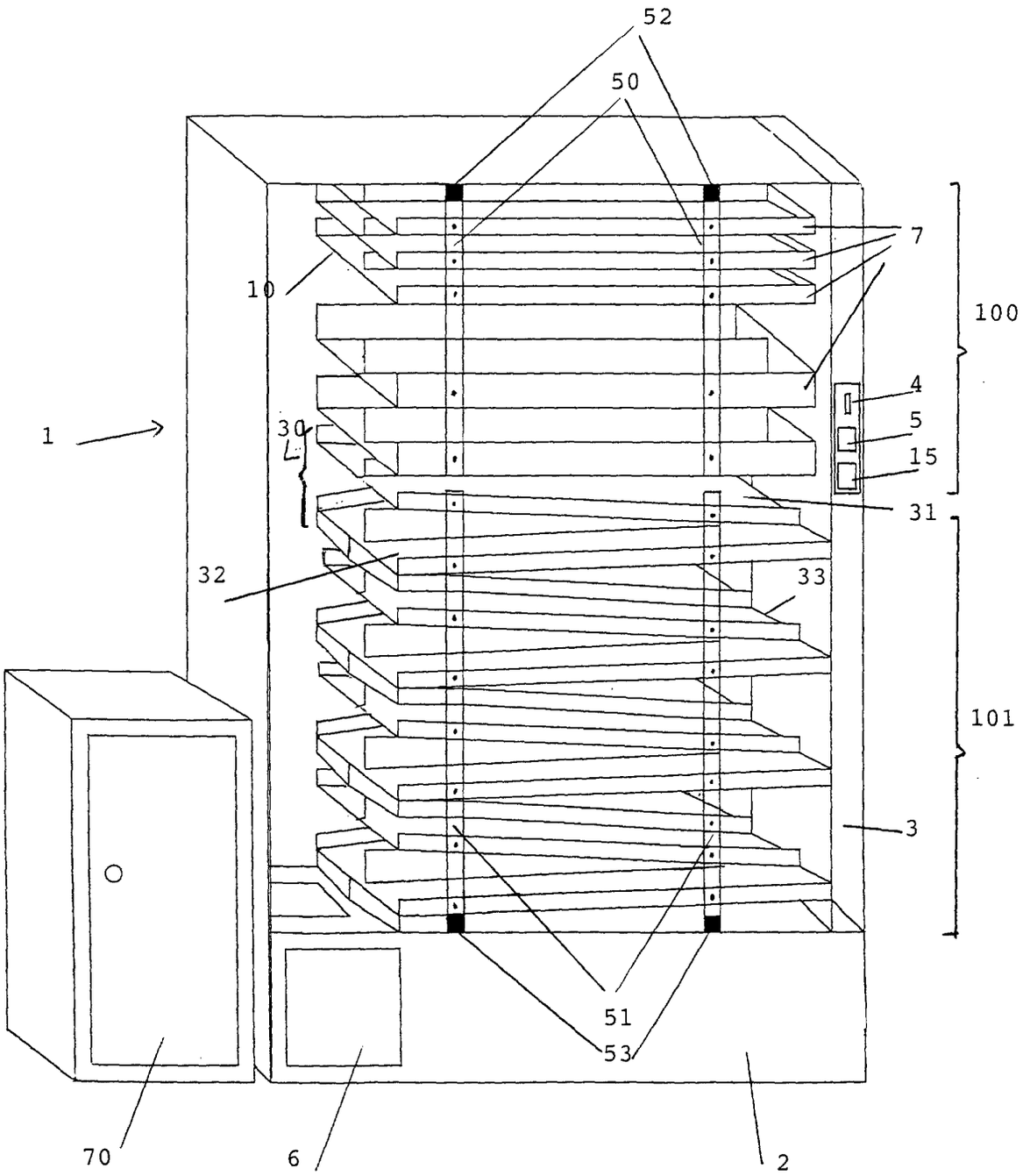

FIG. 1

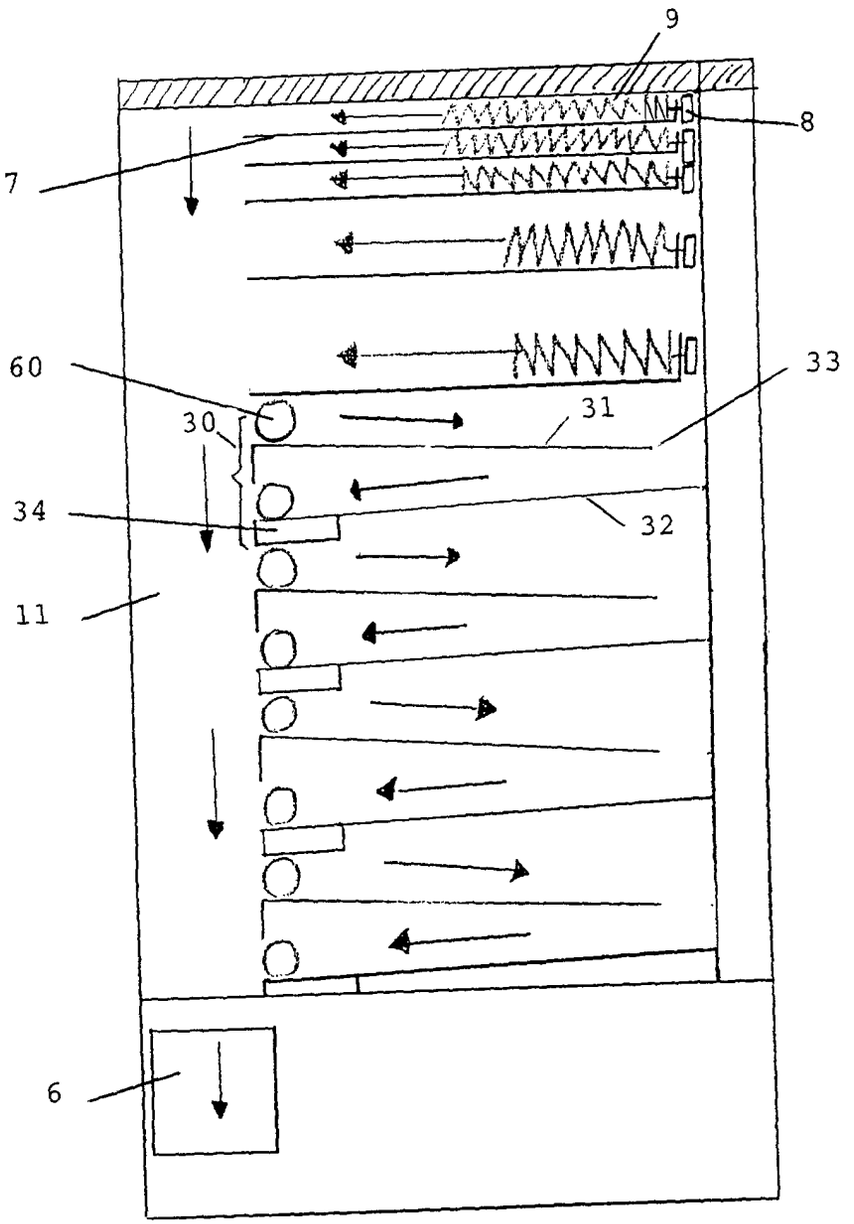

FIG. 2

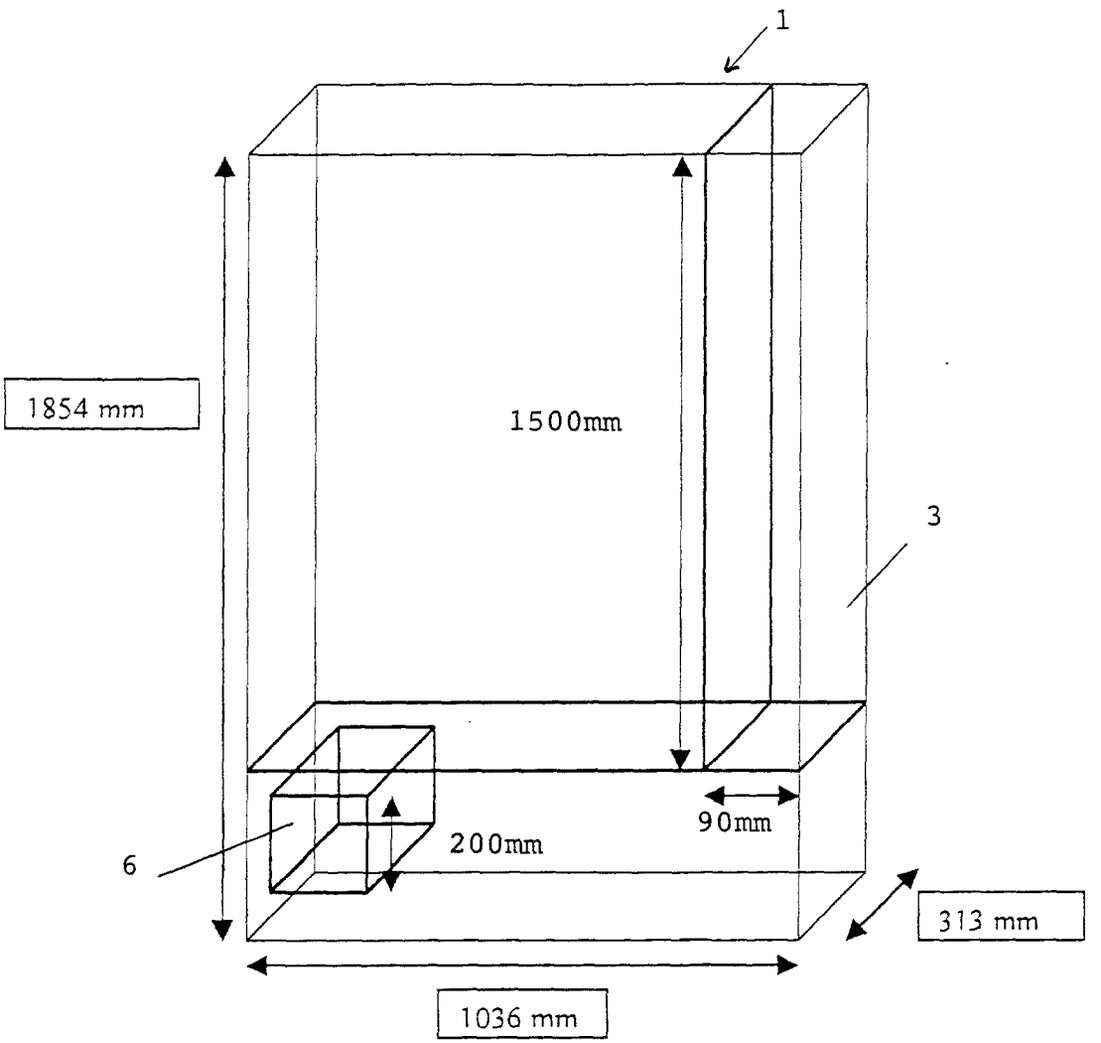

FIG. 3

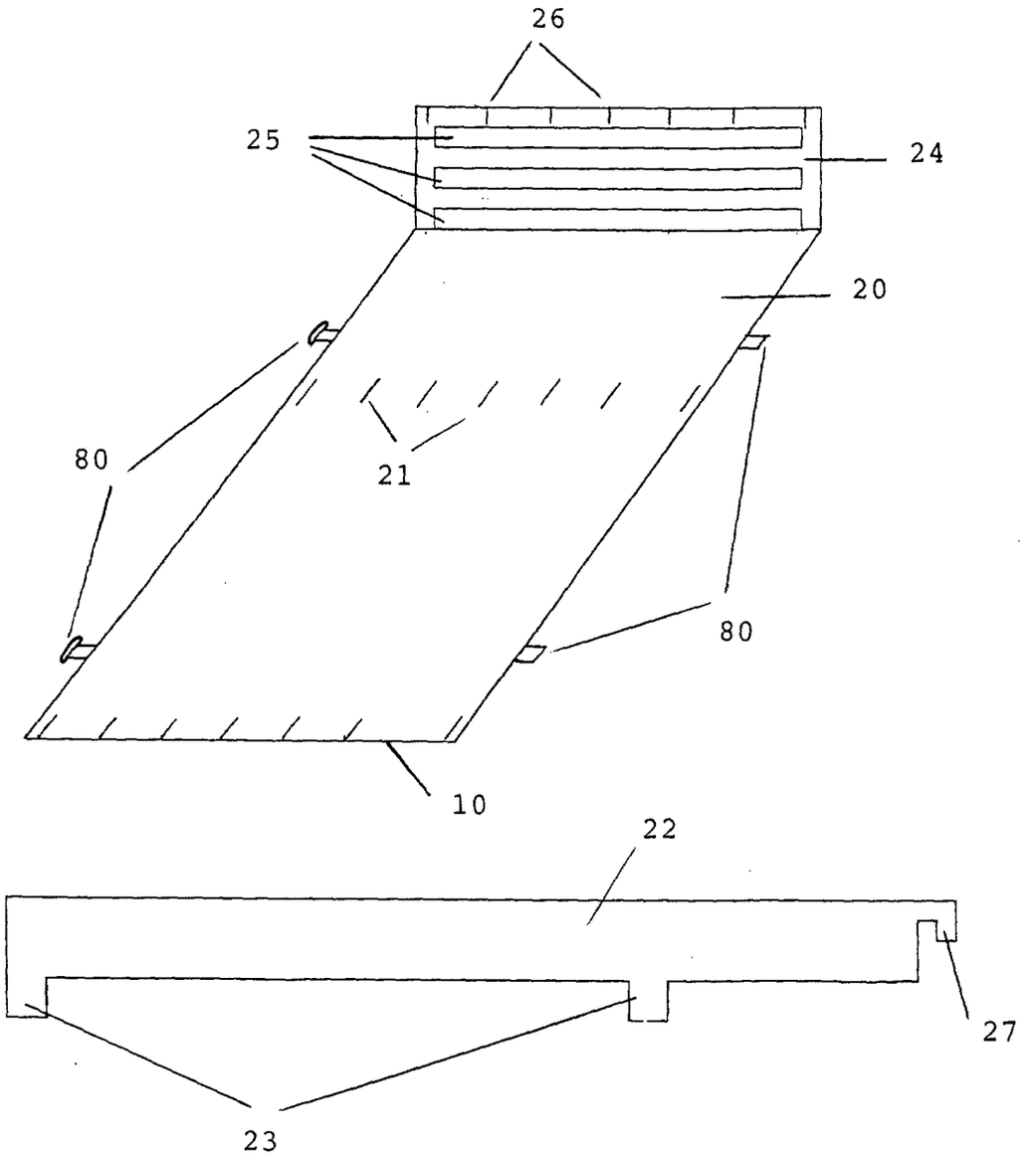

FIG. 4

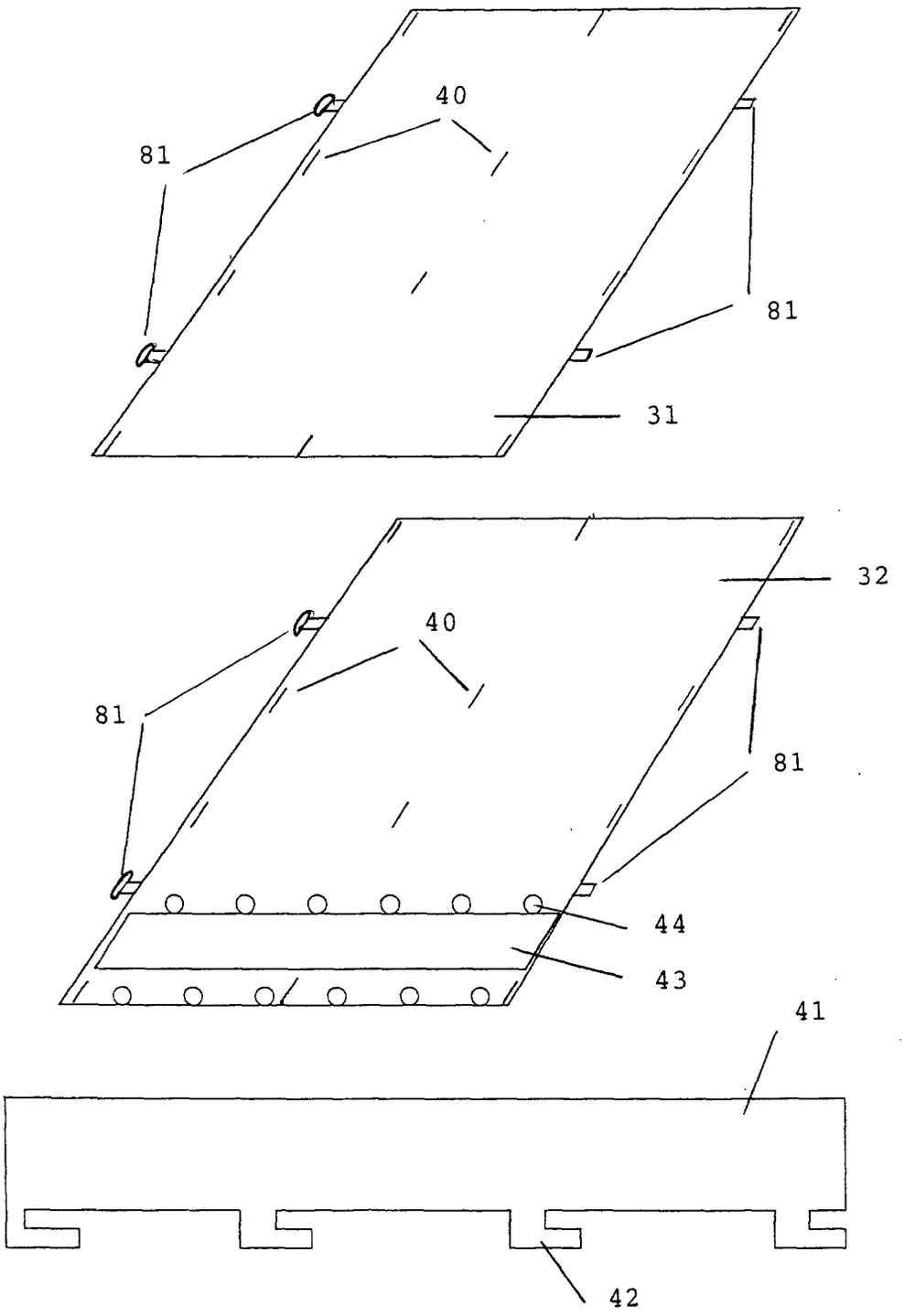

FIG. 5

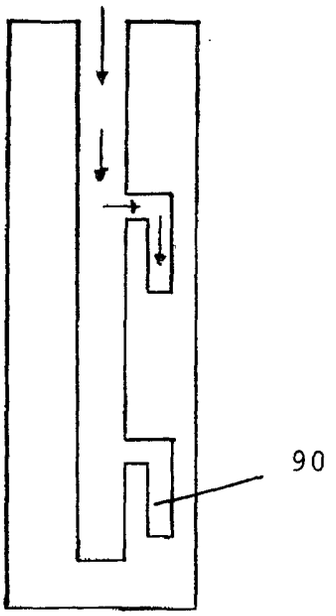

FIG. 6a

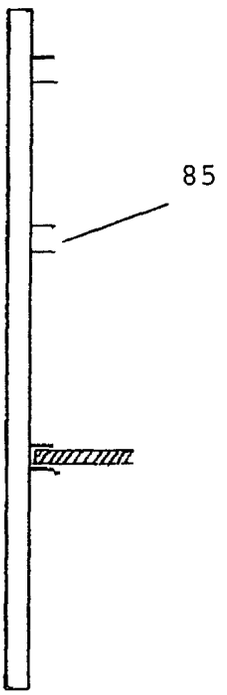

FIG. 6b

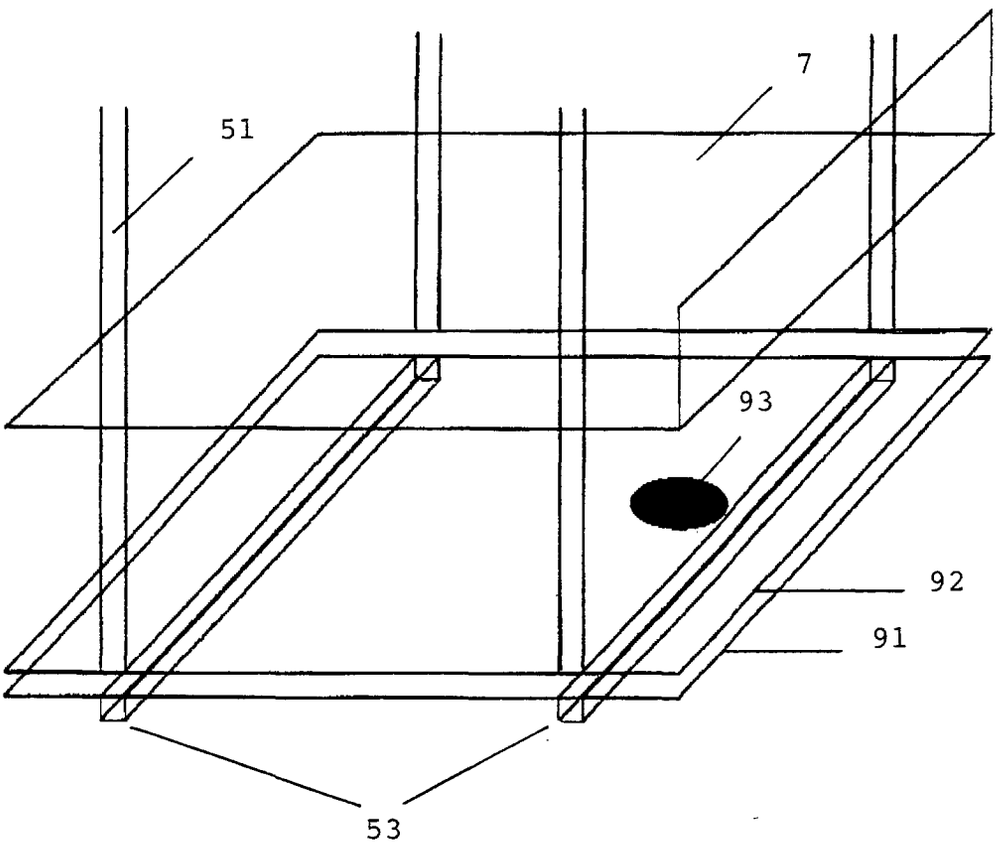

FIG. 7

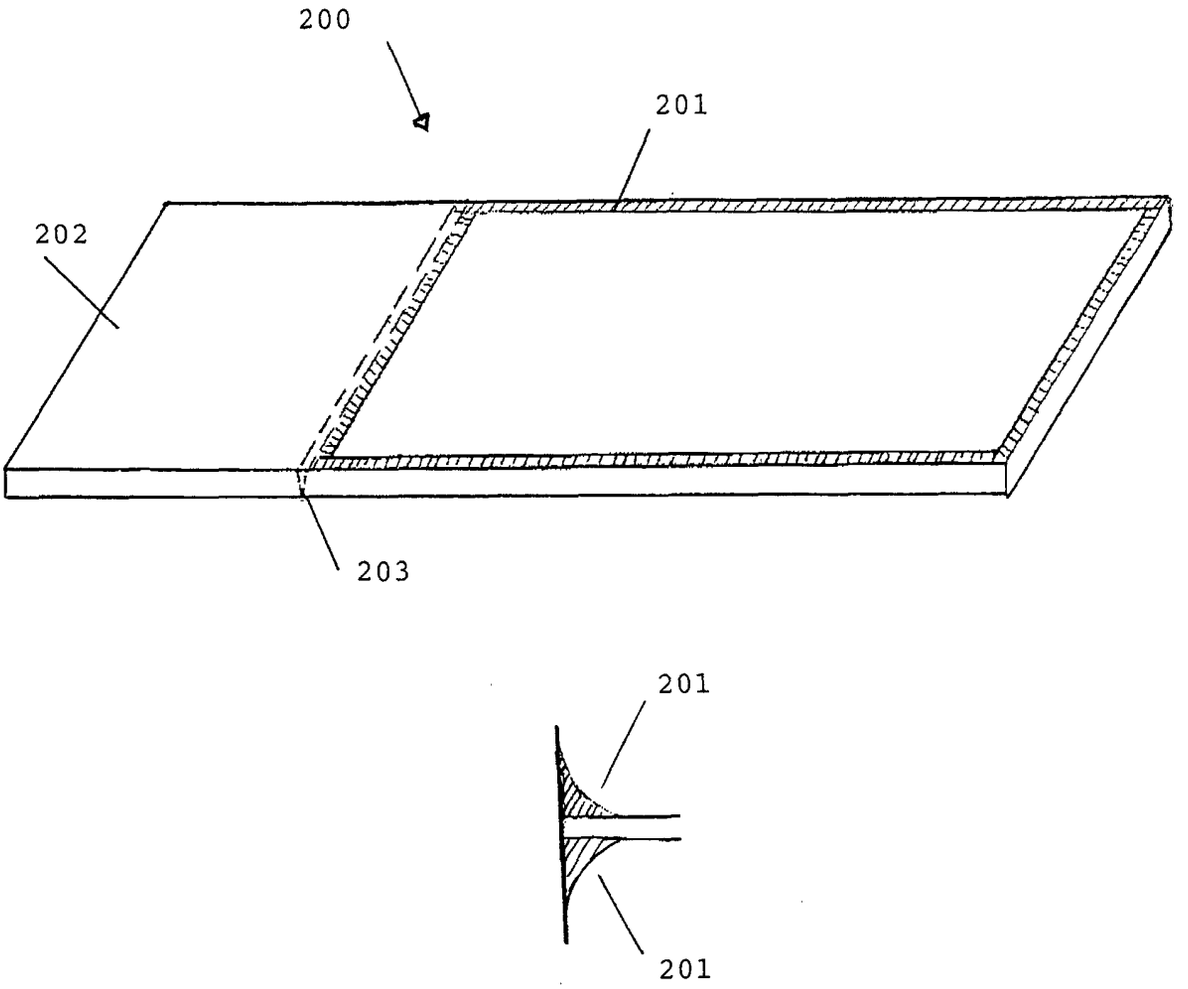

FIG. 8

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 00 87 0096

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	US 4 730 750 A (FICKEN LEONARD A) 15 March 1988 (1988-03-15)	1-3,5, 7-13,15	G07F11/34 G07F11/42
A	* column 2, line 35 - column 4, line 44 * * figure 3 *	4,6,14	
Y	US 5 176 288 A (CRAVEN HERMAN) 5 January 1993 (1993-01-05)	1-3,5,7, 9-13	
A	* column 3, line 49 - column 5, line 68 * * figure 2 *	4,6,14	
Y	US 4 757 915 A (ALBRIGHT HENRY J ET AL) 19 July 1988 (1988-07-19)	8	
A	* abstract * * figures 9,20 *	1,3-6	
Y	US 3 901 366 A (SCHULLER JAMES T ET AL) 26 August 1975 (1975-08-26) * abstract * * figure 1 *	15	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

G07F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	9 November 2000	Wolles, B

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 00 87 0096

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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09-11-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4730750 A	15-03-1988	CA 1310620 A	24-11-1992
		DE 3779810 D	23-07-1992
		DE 3779810 T	24-12-1992
		EP 0244990 A	11-11-1987
		US 4823984 A	25-04-1989
US 5176288 A	05-01-1993	NONE	
US 4757915 A	19-07-1988	EP 0258954 A	09-03-1988
		JP 63056795 A	11-03-1988
US 3901366 A	26-08-1975	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82