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(54) Refrigerated display counter

(57) Display counter for the display and sale of food products, comprising a compartment (13) to contain the products associated with an openable front glass (12) and with a rear service door (17) which can also be opened, the counter including a lower supporting structure (15) which is connected at the upper part with lateral uprights (38), wherein the display counter comprises first actuator means (18, 19, 21) suitable to move the front glass (12) from a first closed position to a second, upwardly open position, distant from said first position by at least 180°, the first actuators (18, 19, 21, 23) being housed retracted, part inside the lower supporting structure (15) and part inside the lateral uprights (38), the first actuator means (18, 19, 21, 23) cooperating with an outer supporting rod (20) suitable to move and support the front glass (12) in its second, upwardly open position, and being governed by a command unit (28) accessible to the responsible staff.

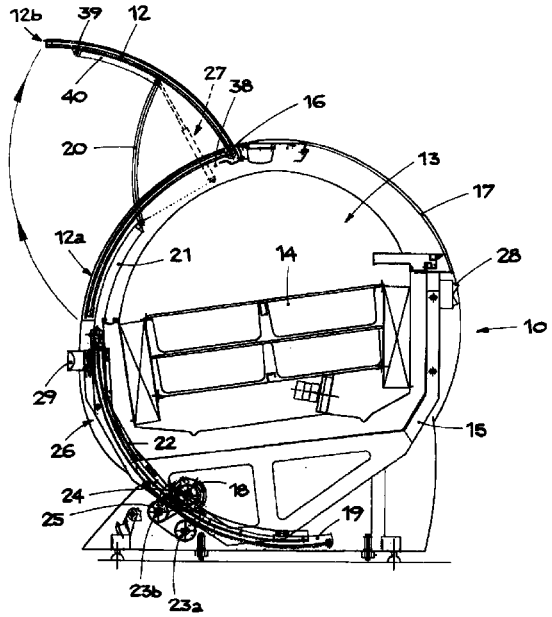

fig. 2a

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Description

FIELD OF THE INVENTION

[0001] This invention concerns a refrigerated display counter, of the type suitable to be employed in commercial enterprises to display and sell food products, comprising at least a compartment to contain and display the goods, associated with at least an openable transparent front piece and with a rear service door, which can also be opened, and which allows the assistant to access the containing compartment.

BACKGROUND OF THE INVENTION

[0002] The state of the art includes display counters, employed in commercial enterprises, comprising at least a compartment inside which the goods for sale are displayed and preserved. The compartment is associated at the rear with a service door which can be opened and which allows access to the sales assistants, and at the front a transparent front piece through which the customer can inspect and select the goods on sale.

[0003] The front glass can generally be opened so as to facilitate loading and cleaning the containing compartment, and also for maintenance on the internal parts.

[0004] The transparent front piece is opened-closed manually in various ways, for example by sliding, tipping or rotating it.

[0005] In this type of display counter, therefore, the customer too can freely access the goods on display, which can be inconvenient because it encourages theft and, in the case of goods consisting of foodstuffs, entails considerable hygiene problems.

[0006] In some cases the transparent front piece is equipped with closing means, for example locks or similar, which are not very practical, are aesthetically displeasing and do not ensure that the front glass can be locked in the open position.

[0007] Opening the front glass manually also entails providing gripping handles or knobs which often compromise the aesthetics of the display counter and obscure the customer's view.

[0008] Moreover, in the case of very large and heavy glasses, it is difficult and not very practical to move them manually.

[0009] Various solutions have been proposed which provide to automatically move a glass in a display counter.

[0010] For example, EP-A-580.493 provides to associate an actuator with a front glass which can be opened; the actuator is arranged below and outside the display surface of the counter.

[0011] The glass is curved in shape and is moved towards the outside from the working position to a retracted position below the counter, by means of a downwards rotation imparted to a support onto which the lower end of the glass itself is attached.

[0012] The hinge point around which said support rotates is also located below the counter.

[0013] This solution cannot be applied to display counters of the type with a compartment containing food products which are accessible to customers and sales assistants, since the supporting plane has to be very long in order to contain the glass, the support and the drive mechanism, underneath and in a retracted position.

[0014] It therefore cannot be applied to a refrigerated display counter where the assistant and the customer are on opposite sides of the counter and the assistant can serve the customer directly with a product chosen from among those displayed.

[0015] It should be noted that, given the position (Fig. 3) which the glass assumes when it is rotated below the supporting plane, it must necessarily retract inside the lateral bulk of said plane so as not to constitute an element of risk and danger for the legs of the customers.

[0016] Moreover, in its retracted position below the display plane of the counter, the glass and its support are in a completely overturned position, and weigh heavily on the hinge point, which is thus highly stressed by high loads and is greatly cantilevered.

[0017] Furthermore, the display plane of the counter must be appropriately shaped on the lower part, in order to contain the supporting bracket which, when the glass has finished rotating, enters into the bulk of said plane.

[0018] As it rotates, the glass passes very close to the structure of the counter and this may be the cause of danger and damage to the structure itself.

[0019] The state of the art also includes US-A-5.755.496, which provides the automatic drive of a front glass towards the outside, but this system cannot be applied to show cases or counters which have transparent surfaces also at the sides, since the position of the drive members obstructs visibility and occupies display space.

[0020] Generally speaking, other solutions included in the state of the art either are not suitable to be applied on at least partly curved glass surfaces (for example SE-C-505.622), or, once the glass has been taken to its retracted position, do not allow complete access to the compartment containing and displaying the products (for example SE'522 and JP-A-08 308694), or they include drive members which are partly visible and therefore damage the overall aesthetics of the display counter.

[0021] Moreover, in some solutions moving the glass surfaces may possibly take dust and condensation which has accumulated on said surface inside the compartment, which entails problems of hygiene and contamination of the food products contained in the display compartment.

[0022] This is what happens in the above-mentioned JP'694 and in US-A-2.994.572.

[0023] The solutions known in the state of the art, moreover, do not provide auxiliary movement means in the event of a malfunction in the automated system.

[0024] With regard to the rear door, or service door, it is normally kept closed, both to limit the entrance of dust or dirt inside the compartment, and also to keep the environmental conditions inside unchanged, particularly in the case of refrigerated show cases, such as counters for ice cream or similar.

[0025] The service door is opened-closed manually in various ways, for example by sliding, tipping or rotating the door.

[0026] This means that it is always necessary to have at least one hand free to carry out these operations, and therefore if the sales assistant who has to access the compartment has both his/her hands busy, he/she must put down what he/she has in his/her hand(s) in order to open the door.

[0027] The same happens when the door has to be closed, when the sales assistant removes goods with both his/her hands from the compartment, which entails loss of time and difficulties for the sales assistants themselves.

[0028] In some circumstances it may happen that the sales assistant leaves the service door open, in order to avoid the repeated and complex opening and closing thereof, or may even remove the service door completely, during working hours, and then replace it at closing time.

[0029] In this case, apart from the contamination of the goods displayed by dust and dirt, there is a risk of a variation in the environmental conditions inside the glass compartment.

[0030] This is a serious disadvantage when, for example in the case of refrigerated display counters for ice cream, meat, vegetables and so on, the goods on display require rigorously controlled environmental conditions so as to be correctly preserved.

[0031] The present Applicant has designed and embodied this invention to overcome these shortcomings and obtain further advantages.

SUMMARY OF THE INVENTION

[0032] The invention is set forth and characterized in the main claim, while the dependent claims describe other characteristics of the invention.

[0033] The purpose of the invention is to provide a display counter of the type suitable for the direct display and sale of products, equipped with means for the automatic opening/ closing of the front glass, arranged on the customer side, ensuring a complete, practical and precise movement and that the front glass is locked securely and stably both in the open and closed position.

[0034] Another purpose of the invention is to achieve a display counter wherein the operations to open-close the service door, arranged on the assistant's side, can be made automatically, and wherein it is guaranteed that the service door is closed during periods of non-use, so as to maintain the hygro-thermal conditions inside the glass compartment as far as possible unchanged.

[0035] A further purpose is to obtain these movements of the front glass and the service door by means of drive organs arranged completely retracted in the bulk of the structure of the counter, so that they in no way alter either the visibility or the accessibility of the refrigerated compartment, or the operating ability of the assistants and the customers, nor entail risks of hygiene due to the fall of dust or condensation onto the food products contained and displayed in the compartment.

[0036] The display counter according to the invention comprises first actuator means associated with the front glass and suitable to determine its selective movement upwards from a closed position to a completely open position and vice versa.

[0037] The display counter also comprises second actuator means suitable to cause the service door to move with a sliding movement, preferentially downwards, from an outer position to an inner, retracted position inside the closed structure of the counter.

[0038] As for the front glass, it may move upward even through an angle of much more than 180°, so as to take the glass to a position of maximum opening which, apart from not creating any danger for the customer who is near the counter, allows total and facilitated access to the refrigerated compartment, for example to carry out operations to load/ unload the products.

[0039] The front glass may be flat or, preferentially, curved.

[0040] According to the invention, the commands for these first actuator means are arranged on the side of the counter in correspondence with which the sales assistants operate, so that the opening-closing operations are exclusively reserved to the said staff.

[0041] According to a variant, the commands are associated with a security system which allows them to be temporarily locked so as to prevent accidental activation or non-authorised people from using them.

[0042] In a preferential embodiment, there are accident prevention means provided which are suitable to prevent the opening-closing of the front glass when sensors detect the presence of people in the space wherein the glass moves, or to interrupt the opening-closing of the glass in the event that this should accidentally come into contact with people or things.

[0043] The first actuator means which actuate the opening-closing of the front glass are accommodated completely retracted inside the structure of the display counter.

[0044] To be more exact, in the preferential embodiment of the invention, part of said first actuator means are accommodated in the supporting and abutment

uprights of the glass arranged on the sides of the display counter, and part inside the underlying compartment where the technical equipment of the display counter is housed.

[0045] The first actuator means, which preferentially comprise rack means arranged inside said uprights associated with motorized toothed drive wheels arranged in said underlying compartment, neither obstruct nor reduce the visibility of the products on display, nor do they occupy any space required for display.

[0046] According to a variant, the first actuator means consist of flexible elements, such as belts or chains, associated with rotary elements of a driven type, with a pulley or toothed wheel.

[0047] The drive motors can be of the electric or hydraulic type.

[0048] According to another variant, the first actuator means comprise elements with hydraulic or pneumatic jacks acting on the service door with a push-and-pull action.

[0049] In a further preferential embodiment, there are means to drive the front glass manually, which can be used in the event of a malfunction in the motorized drive means.

[0050] In a preferential embodiment, the second actuator means which command the automatic drive of the service door are governed by sensor means to detect the presence of a sales assistant near the display counter.

[0051] The sensor means are suitable to detect the absence/ presence of the sales assistant within a defined field near the display counter, and to signal this absence/presence to a command unit.

[0052] When the sensor means detect a presence near the counter, they transmit an input signal to the command unit which activates the second actuator means to automatically open the service door.

[0053] On the contrary, when the sales assistant goes out of the field of detection of the sensor means, this condition is signalled to the command unit, which provides to automatically close the service door.

[0054] The sales assistant is thus able to access the compartment even with both hands occupied, and also to go away from the display counter without having to worry about re-closing the service door.

[0055] In one embodiment of the invention, when there is no-one within the field of detection of the sensor means, the closing of the service door is retarded for a desired time, in order to prevent repeatedly opening and closing the service door when the sales assistant goes out of the field of detection of the sensor means for a brief period only.

[0056] In a preferential embodiment, said second actuator means comprise rack means arranged retracted inside the uprights which constitute the structure of the display counter and are associated with motorized toothed drive wheels arranged inside the technical compartment below.

[0057] According to a variant, said second actuator means consist of flexible elements, such as belts or chains, associated with rotary elements of a driven type, with a pulley or toothed wheel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0058] These and other characteristics of the invention will become clear from the following description of a preferred form of embodiment, given as a non-restrictive example, with reference to the attached drawings wherein:

- Fig. 1 is a side view of a display counter according to the invention with the front glass in the open position;
- Fig. 2a is a transverse cross section of the display counter shown in Fig. 1;
- Fig. 2b shows a variant of Fig. 2a wherein the manual movement means of the front glass have been activated;
- Fig. 3 is a schematic view of the display counter shown in Fig. 1 which illustrates how the service door is able to move;
- Fig. 4 is a transverse cross section of the display counter shown in Fig. 3.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

[0059] With reference to the attached Figures, the number 10 denotes generally a display counter equipped with first means to open-close the front glass 12 and second means to open-close the rear or service door 17.

[0060] In this case, the display counter 10 consists of a refrigerated show case of the type used to display and sell ice cream, and is characterized by ample glass surfaces which allow the complete visibility, both at the front and at the side, of the entire inner space defined by the counter 10.

[0061] The display counter 10 comprises a refrigerated compartment 13 inside which the tubs 14 containing the ice cream are located, and a lower supporting structure 15 which connects at the top with curved supporting lateral uprights 38.

[0062] The sales assistant has access to the tubs 14 by means of a service door, or rear glass, 17 of the type which can be opened, while the front glass 12 is moved to facilitate loading, cleaning and maintenance of the compartment 13. Normally, in fact, the front glass 12 remains closed and allows customers to see and choose the products contained in the tubs 14.

[0063] In this case, the front glass 12 is of the type with a curved profile and has the upper end coupled with the display counter 10 by means of a hinge 16.

[0064] By rotating around the hinge 16, the front

glass 12 can selectively assume a closed position 12a, substantially close up against the uprights 38, or an open position 12b.

[0065] The movement means of the front glass 12 are arranged retracted, part inside the supporting structure 15 and part inside the curved upper supporting uprights 38.

[0066] The movement means comprise a first command unit 28 functionally connected to an actuator unit 26 consisting of at least a reversible electric motor 18, at least a rack 19 and a first outer rod 20.

[0067] The end of the first outer rod 20 is hinged to a second rod 40, which in turn is attached at the end to a point of anchorage 39 to the front glass 12.

[0068] The rack 19 has an arched conformation, with a bending radius substantially equal to that of the uprights 38 of the display counter 10, and is coupled at the top with an extension element 21 with is also arched and of the same radius.

[0069] The rack 19 and the extension element 21 are suitable to slide inside a mating guide 22 arranged retracted inside the uprights 38, so that all the elements 19, 21 and 22 are completely invisible from outside and do not occupy either any display space or any space outside the counter 10.

[0070] Moreover, the movement organs in no way obstruct the visibility of the products inside the counter 10.

[0071] The inner end of the first rod 20 is pinned to the upper end of the extension element 21 and the outer end is hinged, as we have already said, on the second rod 40.

[0072] By means of the first command unit 28, in this case assembled on the rear side of the display counter 10, the sales assistant activates the reversible motor 18, on the shaft of which a driver toothed wheel 24 is keyed; the toothed wheel 24 is suitable to command a pair of toothed wheels, respectively 23a and 23b, which drive the rack 19.

[0073] A transmission shaft 25 is also keyed onto the toothed wheel 23b and travels the whole length of the counter 10; it is suitable to transmit rotary motion to an identical group of wheels, 23a, 23b and 24, which cannot be seen in the drawings, suitable to drive a mating rack 19 housed in the opposite upright of the counter 10.

[0074] In fact, on the opposite side of the counter 10, there is a movement assembly 26 which is not shown here and which is identical, except for the reversible motor 18, to the one shown in Fig. 2, so that the opening-closing of the front glass 12 is perfectly balanced.

[0075] The sliding movement of the rack 19 and the associated extension element 21 pushes/pulls the first rod 20 which, by means of the second rod 40 which is pinned to the front glass 12, causes the latter to rotate around the hinge 16.

[0076] In a preferential embodiment, the reversible motor 18 is automatically slowed down before the front glass 12 assumes its open position and closed position, in order to prevent excessive stress on the hinge 16 or, more generally, on the structure of the display counter 10.

[0077] According to a variant, shown in Fig. 2a with a line of dashes, the front glass 12 is associated with the structure of the display counter 10 by means of a jack 27 of the passive type, suitable to keep the glass 12 in defined positions of balance, in this case the closed position 12a and the open position 12b.

[0078] According to another variant, the jack 27 is of the active type and is directly commanded by the first command unit 28 to open-close the front glass 12.

[0079] The jacks 27 can be of the hydraulic or pneumatic type.

[0080] In the embodiment shown in Fig. 2b, it can be seen how the second rod 40 allows the front glass 12 to move upwards into the open position even when the drive mechanism is broken.

[0081] In fact, the front glass 12 can be opened by rotating the second rod 40 with respect to the first rod 20 around the hinge point, although the first rod 20 remains stationary since it is clamped by the lack of movement of the rack 19.

[0082] A further variant of the invention provides that the first command unit 28 comprises a security system, for example of the type with a combination key or otherwise, which will allow the device to be locked so that it cannot be used by non-authorized personnel.

[0083] In the rear part of the counter 10, the service door 17 is suitable to assume a closed position 17a, wherein it prevents access to the compartment 13, and an open position 17b, wherein it slides to a retracted position, moving downwards, inside the structure 15 and allows access to the compartment 13.

[0084] The means to move the door 17 comprise sensor means 11 (visible only in Fig. 3) suitable to detect the presence of a person near the rear side of the display counter 10 where the sales assistant operates.

[0085] In this case, the sensor means 11 are of the barrier type and comprise photo cellular means 11a or similar, located in alignment on one side and the other of the counter 10 at a desired distance therefrom.

[0086] According to a variant, shown here with a line of dashes, there is a sensor 11b, mounted advantageously in a central position on the supporting structure 15, of the type with a conical aperture so as to define a field of detection which widens over the rear of the display counter 10.

[0087] The sensors 11 are connected to a second command unit 30 suitable to selectively activate an actuator unit comprising a reversible motor 31, preferably of the electric or hydraulic type.

[0088] The reversible motor 31 is suitable to make rotate a toothed wheel 32 which, by means of a belt 33, drives a pinion 34 engaged on a rack 35.

[0089] The motor 31, the wheel 32 and the pinion

34 are arranged substantially retracted inside the lower structure 15.

[0090] The toothed wheel 32 is also axially connected, in a manner which is not shown here, by means of a transverse bar which runs for the whole length of the counter 10, to an identical toothed wheel which drives an identical pinion engaged on a mating rack.

[0091] As already mentioned for the front glass 12, on the opposite side of the display counter 10 there is a drive unit identical to the one shown in Fig. 2, which is driven by the toothed wheel 32 through the transverse bar.

[0092] The rack 35 has a curvilinear development mating with the curve of the uprights 38 of the counter 10, it is located inside said uprights 38 and is anchored to the lower edge of the door 12 in correspondence with the point of attachment 36.

[0093] Under normal conditions and in the absence of the sales assistant, the service door 17 maintains its closed position 17a, in order to preserve inside the compartment 13 the environmental conditions necessary for a correct preservation of the ice cream.

[0094] When the sales assistant comes near the display counter 10 from the rear side, the sensor means 11 detect this presence and send an input signal to the second command unit 30, which provides to automatically activate the reversible motor 31 in an anti-clockwise direction.

[0095] This activation of the reversible motor 31, through the wheel 32 and the pinion 34, draws the rack 35 downwards and causes the service door 17 to slide into the open position 17b, thus allowing access to the compartment 13. The open position 17b is maintained for as long as the sensor means 11 detect the presence of the sales assistant.

[0096] When the sales assistant goes away from the display counter 10, and leaves the field of detection of the sensor means 11, the second command unit 30 causes the reversible motor 31 to be driven in a clockwise direction, thrusting the rack 35 upwards and thus causing the service door 17 to slide until it assumes the closed position 17a.

[0097] In a preferential embodiment, the closing of the service door 17 is delayed, for a defined time, after the sales assistant has gone away.

[0098] In this embodiment, the second command unit 30 comprises a timer device 37 which is automatically activated when the service door 17 is open, when the sales assistant goes away from the display counter 10; the timer 37 is suitable to measure the continuous time wherein the sensor means 11 do not detect any presence inside the field of detection.

[0099] A pre-memorized threshold value is compared with the time measured by the timer 37 and, until this value is reached, the service door 17 is kept open, thus avoiding repeated operations of opening and closing the service door 17 in the event that the sales assistant goes away for only a brief period.

[0100] When the time measured reaches the reference threshold value, the reversible motor 31 is activated to close the service door 17.

[0101] In the embodiment shown in Fig. 2, moreover, sensors 29 are provided suitable to prevent the opening-closing of the front glass 12 when they detect the presence of people in the space wherein the front glass 12 moves, or to interrupt the opening-closing of the glass in the event that it should accidentally come into contact with people or things.

[0102] In this case, the sensors 29 are located in a central position on the supporting structure 15 and are of the type with a conical aperture so that they define a field of detection which widens over the front of the display counter 10.

[0103] According to a variant, there are sensors 29 provided of the type suitable to define a detection barrier in front of the counter 10.

[0104] According to a further variant, appropriate sensors are provided, for example of the conduction type, distributed on the closing perimeter of the glass 12 or the supporting structure 15, for example in cooperation with the packing.

Claims

1. Display counter for the display and sale of food products, comprising at least a compartment (13) to contain and display the products associated with at least an openable front glass (12) and with a rear service door (17) which can also be opened and which gives access to said containing compartment (13), said counter including a lower supporting structure (15) which is connected at the upper part with supporting lateral uprights (38), the display counter being characterized in that it comprises first actuator means (18, 19, 21, 23a, 23b) suitable to move said front glass (12) from a first closed position adjacent to said supporting lateral uprights (38) to a second, upwardly open position, and distant from said first position by at least 180°, said first actuator means (18, 19, 21, 23a, 23b) being housed retracted, part inside said lower supporting structure (15) and part inside said lateral uprights (38), said first actuator means (18, 19, 21, 23a, 23b) cooperating with at least an outer supporting rod (20) suitable to move and support the front glass (12) in its second, upwardly open position, and being governed by a command unit (28) accessible to the responsible staff.

2. Display counter as in Claim 1, characterized in that it comprises second actuator means (31, 32, 34, 35) suitable to move said service door (17) from a first closed position (17a) wherein it prevents access to said compartment (13) to a second open position (17b) wherein it retracts sliding inside the counter (10), said second actuator means (31, 32,

34, 35) being arranged retracted part inside said lower supporting structure (15) and part inside said supporting lateral uprights (38).

3. Display counter as in Claim 1, characterized in that said first actuator means (18, 19, 21, 23a, 23b) are governed by accident prevention means comprising at least a sensor (29) suitable to detect the presence of people or things in the space wherein said front glass (12) moves upwards.

4. Display counter as in Claim 1, characterized in that said command unit (28) comprises temporary locking means which can be selectively activated and de-activated by the authorised staff, suitable to prevent accidental activation of said first actuator means (18, 19, 21, 23a, 23b) and use thereof by unauthorised staff.

5. Display counter as in Claim 1, characterized in that said first actuator means comprise a reversible motor (18) and toothed wheels (23a, 23b) arranged retracted inside said lower supporting structure (15), said toothed wheels (23a, 23b) being suitable to drive at least a rack (19) arranged retracted inside said supporting lateral uprights (38), said rack (19) being suitable to act, by means of extension means (21) also arranged inside said uprights (38), on said rod (20) to thrust said front glass (12).

6. Display counter as in Claim 5, characterized in that said rod (20) is hinged at the end to a second rod (40) suitable to be driven to move said front glass (12) manually in the event of malfunction of said first actuator means (18, 19, 21, 23a, 23b).

7. Display counter as in Claim 2, characterized in that said second actuator means comprise at least a reversible motor (31) and at least a pinion (34) arranged retracted inside said lower supporting structure (15), and a rack (35) arranged retracted inside said supporting lateral uprights (38) and connected on one side to said service door (17) and on the other side to said at least one pinion (34).

8. Display counter as in Claim 1, characterized in that said front glass (12) is associated with said supporting lateral uprights (38) by means of a hinge (16) around which it can rotate to move from said closed position (12a) to said open position (12b) and vice versa.

9. Display counter as in Claim 5, characterized in that it comprises two units of toothed wheels (23a, 23b), rack (19) and rod (20) each arranged on a respective side of the display counter (10).

10. Display counter as in Claim 1, characterized in that said first actuator means comprise flexible elements, such as belts or chains, associated with rotary elements, with a pulley or toothed wheel, of a driven type.

11. Display counter as in Claim 7, characterized in that the drive of said motor means (31) is governed by sensor means (11) to detect the presence of persons or things, acting in correspondence with the rear side of the counter (10) where said service door (17) is located.

12. Display counter as in Claim 11, characterized in that said sensor means (11) are suitable to supply an input signal to automatically open the service door (17) and to keep it in the open position (17b) when the presence of the sales assistant has been detected near the display counter (10).

13. Display counter as in Claim 11 or 12, characterized in that said sensor means (11) are suitable to supply an input signal to automatically close the service door (17) and to keep it in the closed position (17a) when no presence has been detected near the display counter (10).

14. Display counter as in Claim 11, characterized in that it comprises timer means (37) suitable to determine the automatic closure of the service door (17) after a pre-set time from the moment when the sensor means (11) do not detect any presence near the display counter (10).

15. Display counter as in Claim 7, characterized in that it comprises two pinion-rack (34-35) units each of which is arranged on a respective side of the display counter (10).

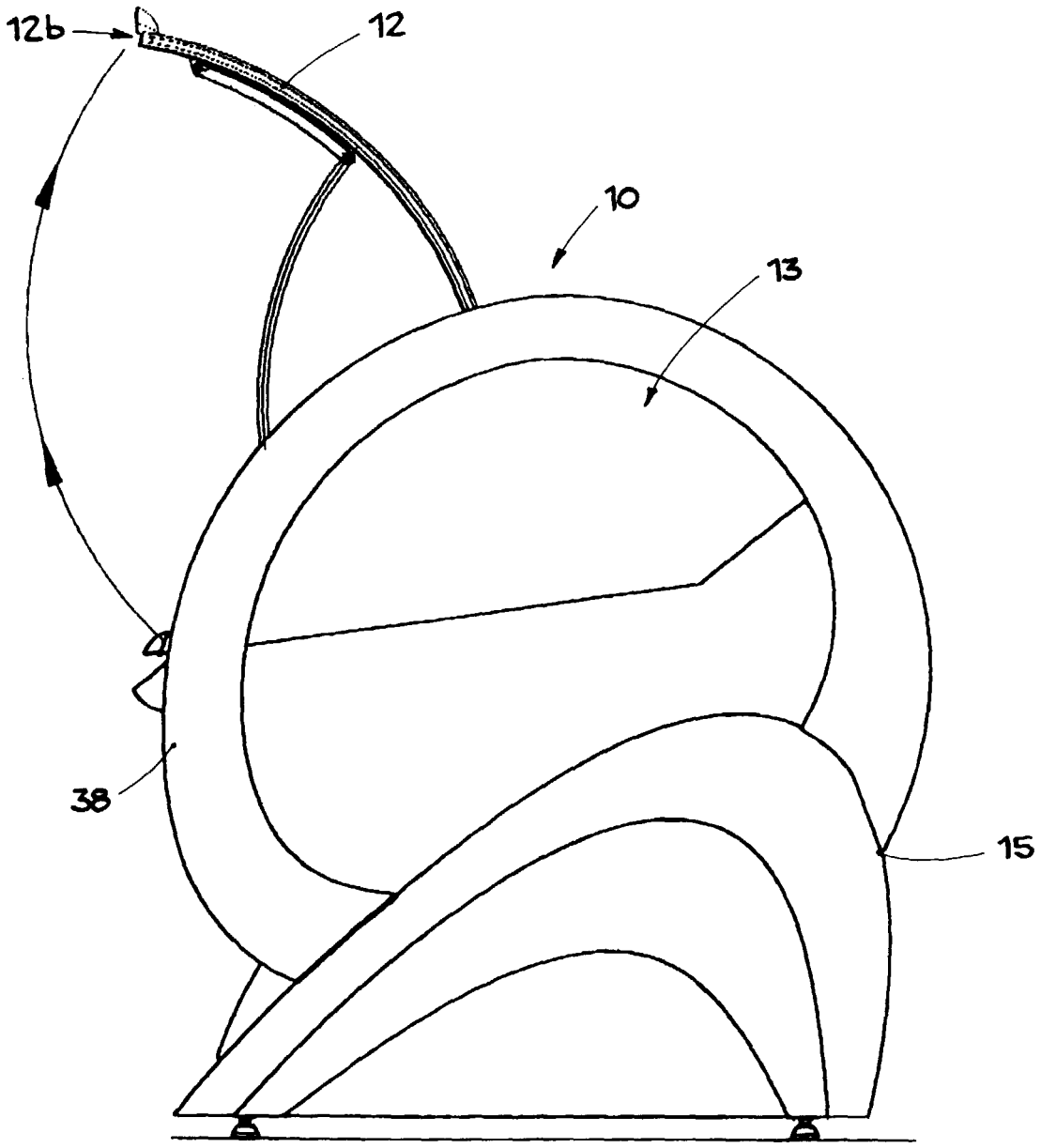

fig. 1

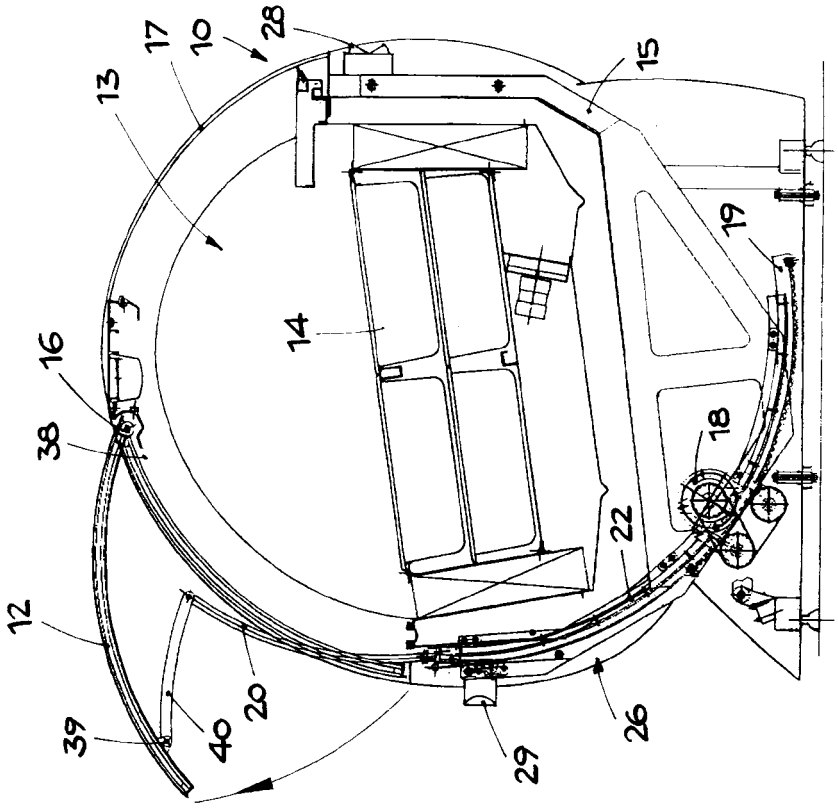
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fig. 2b

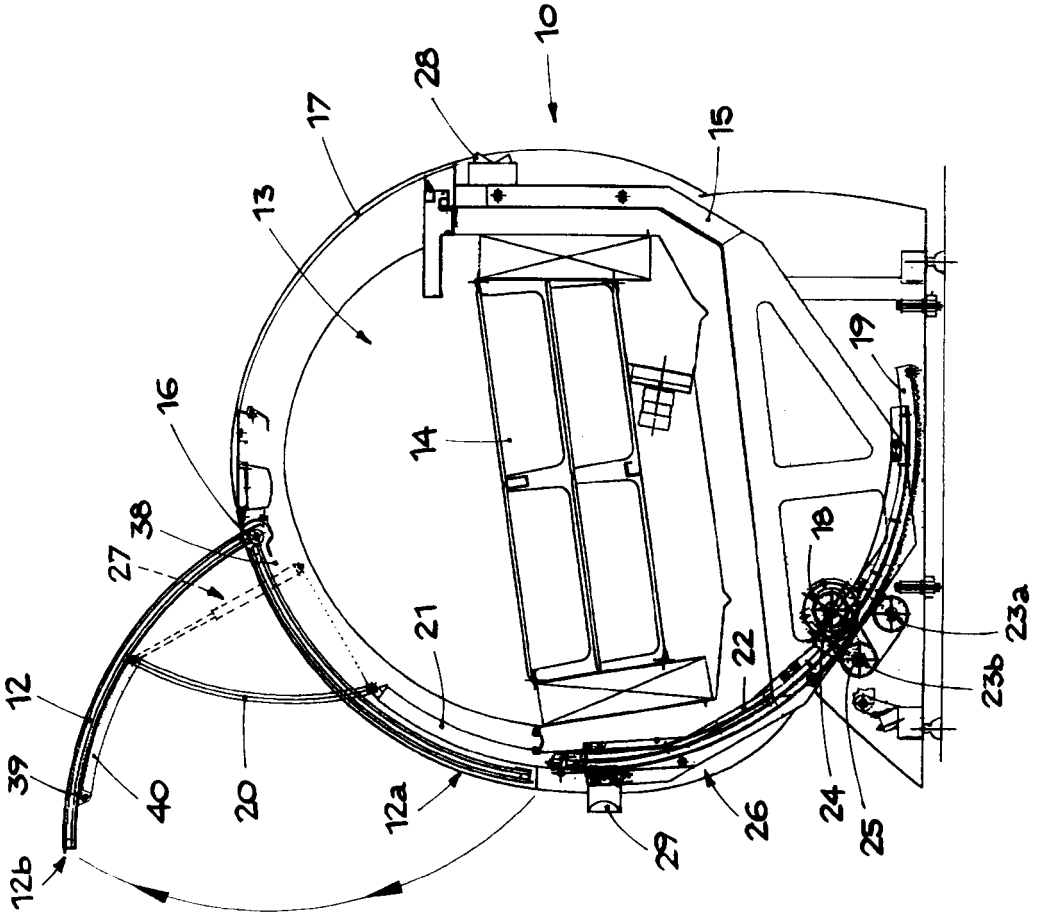
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fig. 2a

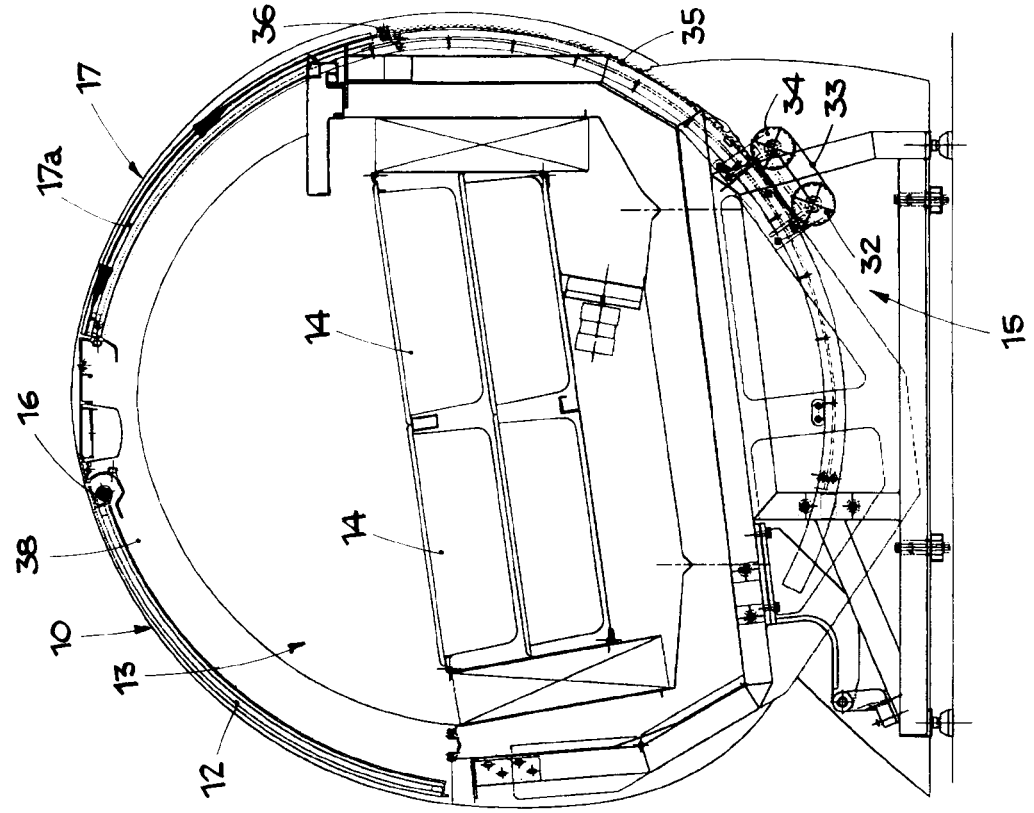
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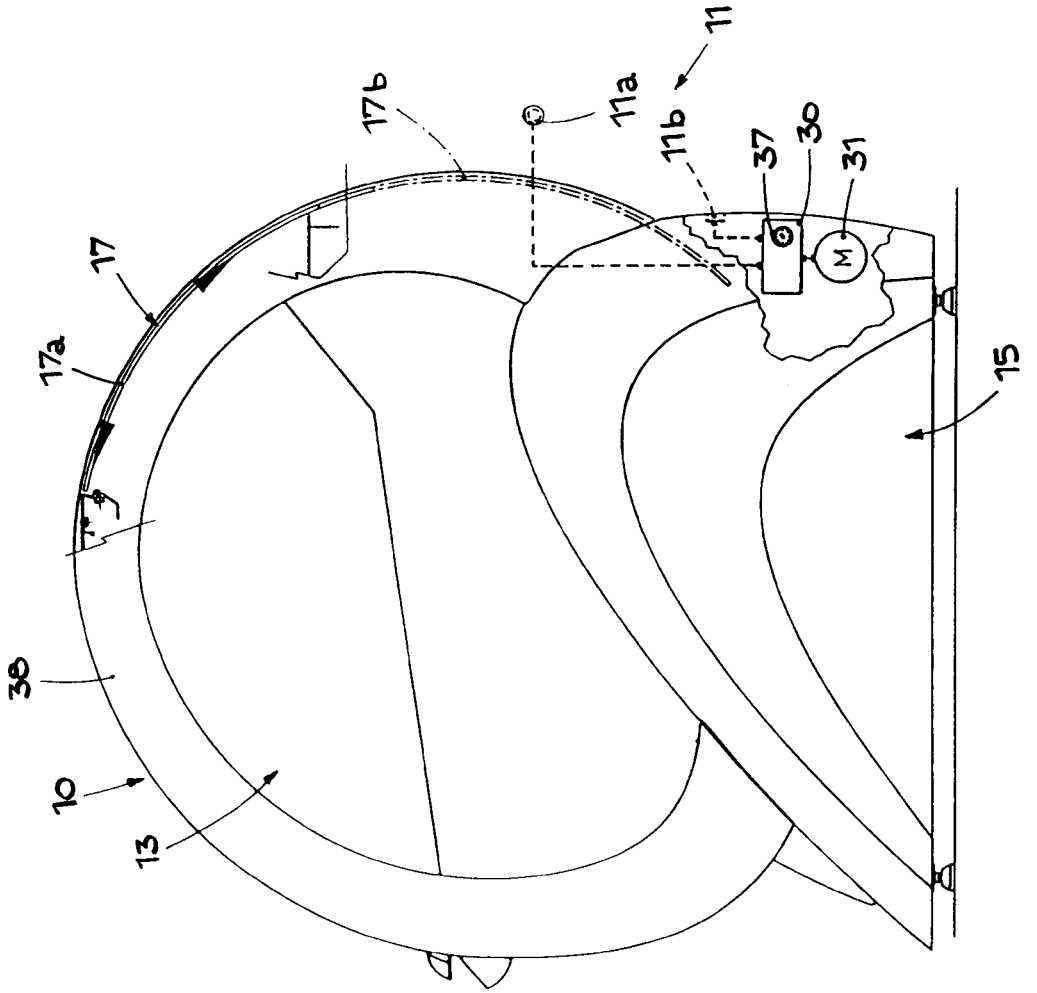
Fig. 4


11
17b
11a
11b
37
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31
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17a
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Fig. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 00 10 0722

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
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