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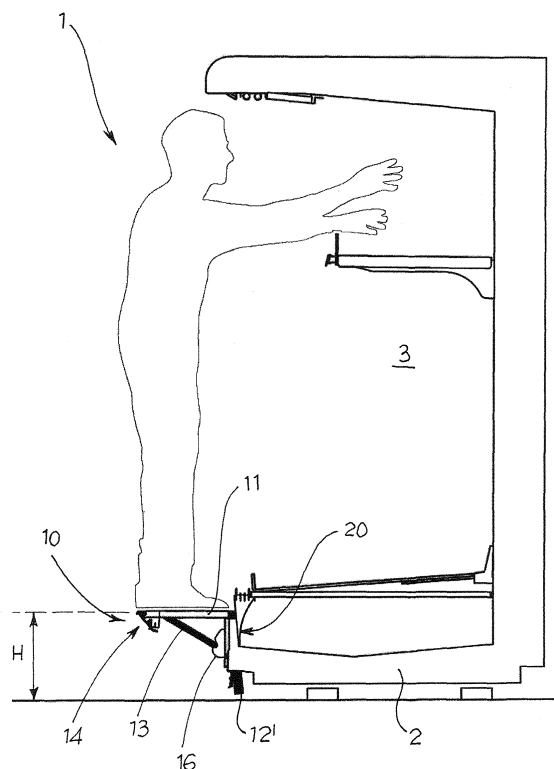
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(54) **Display cabinet with foldable step**

(57) The present invention relates to a display cabinet with facilitated access to the container compartment, in particular a refrigerator display cabinet of the vertical type, provided with a support base on the ground 2 above which a container compartment 3 is defined. The cabinet 1 comprises at least one retractable step 10 associated to the support base 2 near the access area to the container compartment 3. The step 10 is able to move from an extended position, in which it protrudes from the support base 2 defining a substantially horizontal support plane raised from the ground at a predefined height H, and a retracted position, in which the step 10 is positioned so as to reduce its encumbrance in relation to the support base 2. The cabinet 1 is characterised by the fact that on the support base 2, a housing seat 4 is provided for the step 10 when placed in the retracted position, the housing seat 4 extending substantially parallel to the front wall 20.



**Fig.3**

## Description

### Field of the invention

**[0001]** The present invention relates to a display cabinet with facilitated access to the container compartment.

**[0002]** Advantageously, such display cabinet may be a display cabinet with shelves or a refrigerated display cabinet, of either the vertical or horizontal type.

### Background of the invention

**[0003]** As is known, in mass retail and in general, in all sorts of supermarkets the shelves of display cabinets, such as vertical refrigerated cabinets or shelving are filled with products on a daily basis. The same problem arises as regards filling the compartments of horizontal refrigerated cabinets.

**[0004]** Filling is usually done during closure of the stores or, when necessary, during opening hours but in a non-regulated and non-uniform manners, variable depending on the size of the retail outlet or the instructions or standard procedures imposed by the person in charge of such operations.

**[0005]** Filling operations are influenced by the fact that the products must be positioned inside the refrigerated cabinets or on the shelving at varying heights and/or depths. In addition to this there is variability of the packaging and of the types of product to be positioned on the shelves or in the container compartments.

**[0006]** From an anthropometric point of view, employees filling the shelves fall within all types and schemes of ergonomic analysis, therefore from the shortest to the tallest. It follows therefore that during shelf-filling operations adverse situations frequently arise wherever there are container compartments or shelves further than 160 - 170 cm from the plane the operator is standing in.

**[0007]** Despite adopting all the safety measures required by current legislation on the use of refrigerated compartments, there are therefore a number of issues connected with the daily operations of filling display cabinets with products and the movement of the same from the warehouses to the cabinets themselves.

**[0008]** As things stand, these issues (not dealt with in a standard, unique manner by the systems currently available) negatively influence the speed and practicability of filling operations, forcing operators to make unsuitable and in some cases, dangerous, movements and to adopt erroneous postures and raise weights in a manner which is ergonomically incorrect.

**[0009]** In particular, to fill the higher shelves of vertical refrigerated cabinets, operators often climb onto the upper edge of the tank, exposing themselves to the risk of slipping. In the long run this behaviour also damages the cabinet itself. The upper edge of vertical display cabinets is not in fact particularly strong in that it is generally made from lightweight hollow sections (often in plastic material) which define the intakes of cool air circulating in the cab-

inet.

**[0010]** A similar situation may arise when filling the higher shelves of shelving. If stepladders or other similar mobile equipments are not available, operators tend to stand on the lower shelves, with the risk of slipping and damaging the shelving itself.

**[0011]** The case of horizontal refrigerator cabinets, in which the operator is forced to lean over the edge of the compartment, removing his/her weight from the ground so as to lean deep into the container compartment and reach the areas furthest away, is similar.

**[0012]** U.S. Patent US5341897 and international application WO89/05390 describe structures provided with retractable steps, housed in specially provided horizontal drawers made inside the support base of said structure. This step solution on the one hand resolves the aforementioned difficulties connected with filling said cabinets with goods, but on the other takes from useful space inside said cabinets. This problem is particularly relevant in refrigerated display cabinets where the support base is composed of a compartment which also acts as a utility space for housing the refrigeration systems.

**[0013]** The retractable step solution described in US5341897 and WO89/05390 is therefore difficult to apply to refrigerated display cabinets, given that it requires the sacrifice of useful space in the support base.

### Description of the invention

**[0014]** Consequently, the purpose of the present invention is to overcome the drawbacks of the prior art described above, by making available a display cabinet with facilitated access to the container compartment which enables simpler and easier positioning of products in the more inaccessible areas without using external equipment and without reducing the utilisable inner space of the cabinet itself.

**[0015]** A further purpose of the present invention is to make available a display cabinet with facilitated access to the container compartment which makes it possible to speed up the operations of placing the products to be displayed for sale.

**[0016]** A further purpose of the present invention is to make available a display cabinet with facilitated access to the container compartment which prevents employees from having to adopt ergonomically erroneous or dangerous postures during filling operations.

**[0017]** A further purpose of the present invention is to make available a display cabinet with facilitated access to the container compartment which is simple and economical to manufacture.

### Brief description of the drawings

**[0018]** The technical characteristics of the invention according to the aforementioned purposes are clear to see from the contents of the claims below and the advantages of the same will be clearer from the detailed

description below made by way of a non-limiting example with reference to the attached drawings referring to one or more embodiments wherein:

**[0019]** - Figures 1, 2 and 3 show three separate phases of use of a display cabinet with facilitated access to the container compartment made according to a preferred embodiment of the invention;

**[0020]** - Figures 4, 5 and 6 show three details respectively of Figures 1, 2 and 3 relative to a retractable step;

**[0021]** - Figures 7 and 8 show two different perspective views of the display cabinet illustrated in Figure 3; and

**[0022]** - Figure 9 shows an exploded view of the retractable step illustrated in detail in Figures 4, 5 and 6.

**[0023]** Detailed description

**[0024]** The present invention relates to a display cabinet with facilitated access to the container compartment.

**[0025]** The display cabinet made according to the invention will be globally denoted in the attached figures by reference numeral 1.

**[0026]** According to one general embodiment of the invention, the display cabinet 1 with facilitated access to the container compartment is provided with a support base on the ground 2, above which the container compartment 3 of the cabinet is defined. The support base 2 is delimited at the front in a vertical direction by at least one front wall 20.

**[0027]** Preferably, the display cabinet according to the invention is a vertical type refrigerator cabinet. Alternatively, the display cabinet 1 may also be a display cabinet with shelving or a refrigerator display cabinet of the horizontal type.

**[0028]** "Container compartment" is taken to mean the space inside the structure of the display cabinet destined for the display and storage of the goods for sale.

**[0029]** In the case of vertical refrigerator cabinets or mere shelving the container compartment extends mainly vertically. The compartment being divided into a number of sections by horizontal shelves hooked onto a back wall, in turn firmly constrained to a support base. In vertical refrigerator cabinets (as shown for example in Figures 1 or 7) the support base is composed of a closed compartment of a greater depth (in a horizontal direction) than that of the shelves and inside which is the utility space housing the refrigeration system (not shown). At the front (i.e. in the area giving access to the container compartment 3) the compartment is delimited vertically by the aforesaid outer front wall 20. In shelving the support base is composed of a plinth extending in depth as far as the shelves and extending in height to a varying extent according to the model.

**[0030]** Operatively, in the display cabinets extending mainly in a vertical direction the areas of the container compartment most difficult to access for shelf-filling staff are those delimited by the shelves positioned at a height of over 160 - 170 cm from the ground.

**[0031]** In the case of refrigerator cabinets extending horizontally the container compartment has a mainly horizontal extension. The compartment can be sub-divided

into a number of sections by vertical divisory elements. In this type of cabinet the support base is composed of a rigid box-like body (which delimits the utility space for the refrigeration system) to which a tank open at the top is anchored, delimited by perimeter walls of varying height, generally not less than 100 - 120 cm. The above-mentioned, front wall of the support base is built into the aforesaid rigid box-like body.

**[0032]** Operatively, in this type of display cabinet the areas of the container compartment most difficult to access are the central areas, near the bottom of the tank. Bearing in mind the average size of this type of cabinet, these areas are at distances of even more than 160 - 170 cm from the operator standing at the perimeter walls.

**[0033]** The display cabinet 1 comprises at least one retractable step 10 associated to the aforesaid support base 2 near the access area to the container compartment 3. The step 10 being able to move from an extended position, in which it protrudes from the support base 2 defining a substantially horizontal support plane raised from the ground at a predefined height H, to a retracted position, in which the step is positioned so as to reduce its encumbrance in relation to the support base 2.

**[0034]** Operatively, as shown in Figure 1, when the step is in the aforementioned extended position, it defines a stable support plane raised from the ground which shelf-filling employees can climb onto to considerably reduce the distance from the areas of the container compartment furthest away.

**[0035]** Thanks to the fact that the step 10 is attached to the cabinet 1, the employee is able to work from a stable support plane and therefore in total safety.

**[0036]** In addition, by raising the operating position the employees' posture is improved, thereby preventing the same from being tempted to climb onto (in the case of vertical cabinets) or to lean over (in the case of horizontal cabinets) the cabinets in an unsuitable manner on the upper edge of the support base of the cabinet.

**[0037]** Such advantage is particularly relevant for vertical refrigerator cabinets. Traditionally, as already said, shelf-filling staff tend to climb onto the upper edge of the compartment (where the air intakes of the refrigerator cabinet are situated), at the risk of slipping and damaging the cabinet itself.

**[0038]** A housing seat 4 is provided for the step 10 when the latter is placed in the aforementioned retracted position on the support base 2 of the cabinet 1.

**[0039]** Thereby, once the employee has completed filling the cabinet 1, the step 10 can be retracted inside the housing seat 4 preventing it from being an obstacle to anyone wishing to approach the display cabinet 1. In addition, once placed inside the housing seat, the step is no longer visible from the outside and therefore by the customers. Overall, therefore, when the step is in the retracted position the display cabinet 1 according to the invention has a substantially equivalent encumbrance and appearance to a display cabinet of the traditional type.

**[0040]** The housing seat 4 extends substantially parallel to the aforementioned front wall 20 of the support base 2.

**[0041]** In this manner, when the step 10 is placed in the retracted position, it does not occupy space inside the support base, but rather is positioned parallel to the aforementioned inner front wall 20.

**[0042]** A "substantially parallel" position of the housing seat 4 to the front wall 20, shall be understood to include embodiments in which the housing seat is not perfectly parallel, but is, rather, slightly inclined in relation to the front wall.

**[0043]** To reduce to the minimum the invasion of space inside the support base, it is preferable that at the aforementioned front wall 20 the support base 2 of the cabinet 1 extends in height sufficiently to define the aforementioned housing seat 4 in which to house the step 10.

**[0044]** More in detail, depending on the size and structure of the support base, the housing seat 4 may be made in different ways and assume different spatial directions in relation to the floor.

**[0045]** In the case shown in the attached drawings of a refrigerated vertical cabinet provided with a support base (i.e. the lower tank) extending considerably in height, the housing seat extends parallel to the outer front wall 20 of the support base 2. A similar situation arises with horizontal refrigerator cabinets where, depending on the configurations, the housing seat may extend not only to the aforementioned front wall of the support base, but also at least partially to the perimeter walls which vertically delimit the container compartment.

**[0046]** To enable sufficient raising of the operator, it is preferable that in the extended position the step is raised from the ground by a height of at least 25 cm.

**[0047]** To such purpose it is preferable that the support base of the cabinet 1 is at least 25 cm high, so that once the step has been extracted it is ready for use. In this case, as for example shown in the attached drawings referring to a vertical refrigerator cabinet, the support plane defined by the step finds itself substantially at the same level as the lowest shelf of the cabinet. Moreover, the housing seat may be made directly close to the outer front wall 20 of the cabinet, as will be described further, below.

**[0048]** Otherwise, in the case of cabinets with support bases lower than 25 cm, a mechanism able to raise the step (once extracted from the housing seat) to a higher level than the upper part of the support base may be necessary (depending on the overall height of the cabinet and therefore how high an operator needs to be raised).

**[0049]** According to a preferred embodiment shown in the attached drawings, the retractable step 10 comprises a plate-shaped body 11 able to define on its upper side 11a the support plane of the step 10, and two lateral guides 12', 12" positioned in said housing seat 4 to which said plate-shaped body 11 is slidably associated in order to move from said extended position to said retracted position.

**[0050]** As shown in particular in Figure 9, the plate-shaped body 11 (made for example in metallic sheet) is reinforced by a perimetral frame positioned on the inner side 11b of the body.

**[0051]** The plate-shaped body 11 is slidably associated to the two guides 12' and 12" by means of two lateral pins 19 which extend orthogonally to the transversal sides of the plate-shaped body 11.

**[0052]** More specifically, each lateral guide 12' and 12" is composed of a U-shaped section closed at the ends so as to act as an end stop for the aforesaid two pins 19. The two guides 12' and 12" are firmly anchored to the support base 2 of the cabinet 1. The position in height of their upper ends defines the elevation of the step 10, that is the aforementioned height H.

**[0053]** In the retracted position, i.e. when the plate-shaped body 11 is retracted inside the housing seat 4, the two pins 19 are situated at the lower end of the respective guide 12' and 12" in contact with a first end stop element which prevents the plate-shaped body from coming off the guides.

**[0054]** In the extended position, i.e. when the plate-shaped body 11 is fully extracted from the housing seat 4, the two pins 19 are at the upper end of the respective guide 12' and 12" in contact with a second end stop element which prevents the plate-shaped body from coming off the guides.

**[0055]** Operatively, once they have reached the second end stop, the two pins 19 allow the plate-shaped body to perform a rotation of about 90° around a longitudinal axis X to bring the upper side 11b from a substantially vertical lying plane to a substantially horizontal lying plane.

**[0056]** Preferably, the retractable step 10 is provided with a mobile support element 13 associated to the plate-shaped body 11. Operatively, in the extended position, as shown in Figures 3, 7 and 8, such mobile support element 13 abuts on the cabinet 1 so as to mechanically support the plate-shaped body 11 discharging the stresses imparted to the step (in particular the weight of the operator) to the cabinet.

**[0057]** More specifically, the aforesaid support element 13 is composed preferably of a closed frame of a substantially rectangular shape equivalent to that of the plate-shaped body, which is hinged along a first side 13' to the lower side 11b of the plate-shaped body 11 at the free end of the latter. The frame is hinged so as to have a pivoting movement in relation to the plate-shaped body.

**[0058]** Operatively, when the step moves from the extended position to the retracted position substantially positioning itself on a substantially vertical lying plane, the support element 13 follows the plate-shaped body 11 inside the housing seat 4, moving against the lower surface 11b under the effect of its weight. Vice versa, when the step moves from the retracted position to the extended position positioning itself on a substantially horizontal lying plane, in the rotation movement of 90° downwards, the support element separates from the lower surface

11b of the plate-shaped body 11, free to be positioned against the cabinet (as shown for example in Figure 3).

**[0059]** According to one embodiment not shown, the aforesaid support element can rest directly on the ground. In this case such support element may be made with a pair of arms, hinged to the plate-shaped body and telescopically adjustable in length.

**[0060]** Advantageously, as envisaged in the preferred embodiment shown in the attached drawings, the plate-shaped body 11 is provided along its outer, longitudinal edge 11c with a ticket holder device 14. In relation to the plate-shaped body 11, such device 14 is positioned so as to perform its function when the step 10 is retracted inside the housing seat 4.

**[0061]** More specifically, as shown in Figures 4 and 9, the ticket holder device 14 comprises a profiled element 21, having at least one flat surface or with a curved transversal section. Along the longitudinal edges of said profiled element 21, there are two longitudinal parallel tabs 22 on the aforementioned surface, distanced from each other, making it possible to hold onto such surface paper, plasticised or metallic strips where information on the displayed products can be inserted. The profiled element 21 is preferably connected to the plate-shaped body 11 by a metallic sheet 23 and two or more shaped supports 24 able to position the profiled element 21 at the desired angle in relation to the plate-shaped body 11 defining the support plane of the step 10.

**[0062]** Advantageously, the housing seat 4 may extend parallel to the front wall 20 keeping itself outside the support base 2 or inside it, for example inside the front wall itself or to the rear of it.

**[0063]** Advantageously, as envisaged according to the preferred embodiment shown in the attached drawings, the housing seat 4 is delimited laterally by the two lateral guides 12', 12", which are connected externally to the support base 2, and externally by one or more screens 15 (preferably in metallic sheet) attached directly to the support base (for example at the front wall 20) and/or to the two guides 12', 12" (see Figures 4 and 9).

**[0064]** Preferably, a protective buffer 16 for the support base 2 may be attached to the aforesaid one or more screens 15.

**[0065]** Advantageously, as shown in Figure 6 or 8, on the protective buffer 16 a longitudinal recess 17 may be made which acts as insertion seat for the support element 13, when the step 10 is placed in the aforementioned extended position.

**[0066]** Preferably, the retractable step 10 is made from modular elements. It is thus possible to install it all along the length of the cabinets, adapting it to the specific length of each single model.

**[0067]** Advantageously, the retractable step 10 may be fitted directly on newly manufactured display cabinets, or may be applied to existing cabinets by means of retrofitting.

**[0068]** To such purpose a retrofit kit maybe provided comprising the aforesaid plate-shaped body 11, the two

guides 12' and 12", the support element 13 and, if necessary, the aforesaid one or more metallic screens 15.

**[0069]** The present invention offers a number of advantages, some of which already presented.

**[0070]** A first advantage lies in the fact that employees assigned to shelf-filling can work more easily, reaching the areas furthest from the ground without using external equipment.

**[0071]** The improved working conditions, in terms of stability and access to the container compartment of the cabinets, also make filling operations decidedly faster.

**[0072]** Thanks to the retractable step built-in to the display cabinet itself, the shelf-filler can work from a higher position, thereby preventing the operator from adopting ergonomically incorrect or dangerous postures.

**[0073]** In addition, the invention makes the use of ladders or other mobile equipments unnecessary or at least no longer essential. Such equipments, as well as occupying considerable space and having to be moved from one display cabinet to another, cannot normally be firmly anchored to the cabinets and is therefore not always safe.

**[0074]** The display cabinet 1 has an encumbrance and appearance substantially equivalent to those of a similar display cabinet of the traditional type given that the step is retractable and when placed in the retracted (non operative) position disappears from view and does not take up space.

**[0075]** The display cabinet 1 does not suffer substantial reductions of useful space in the support base, if compared to similar traditional cabinets without the retractable step 10 according to the invention.

**[0076]** Lastly, the display cabinet 1 with facilitated access to the container compartment may be made simply and economically, involving solely the installation of an extremely simple device in terms of mechanics and construction.

**[0077]** The invention hereto described thus achieves the objectives specified.

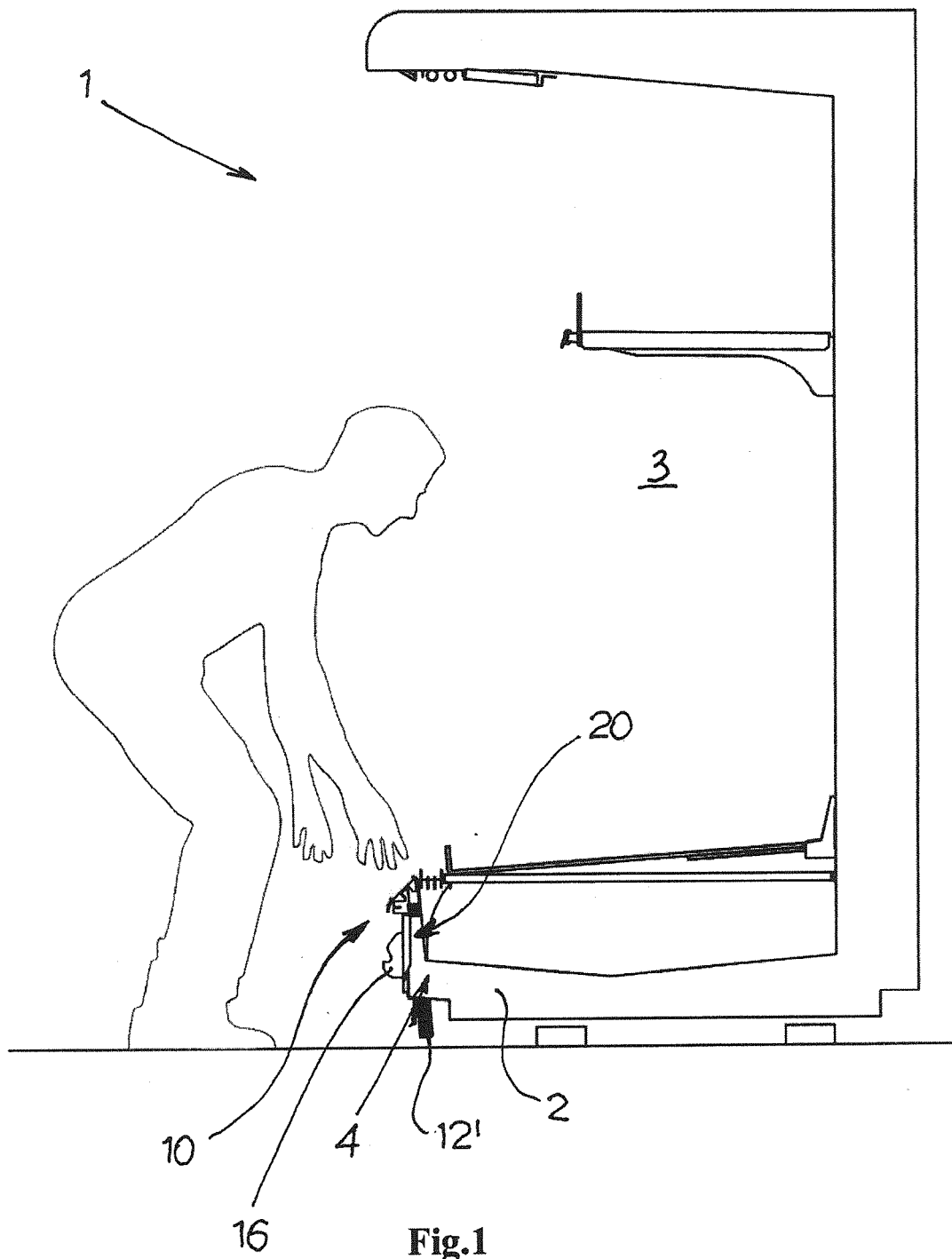
**[0078]** Obviously, it may, in its practical embodiment, be of a shape and/or configuration other than those shown above while remaining within the scope of protection.

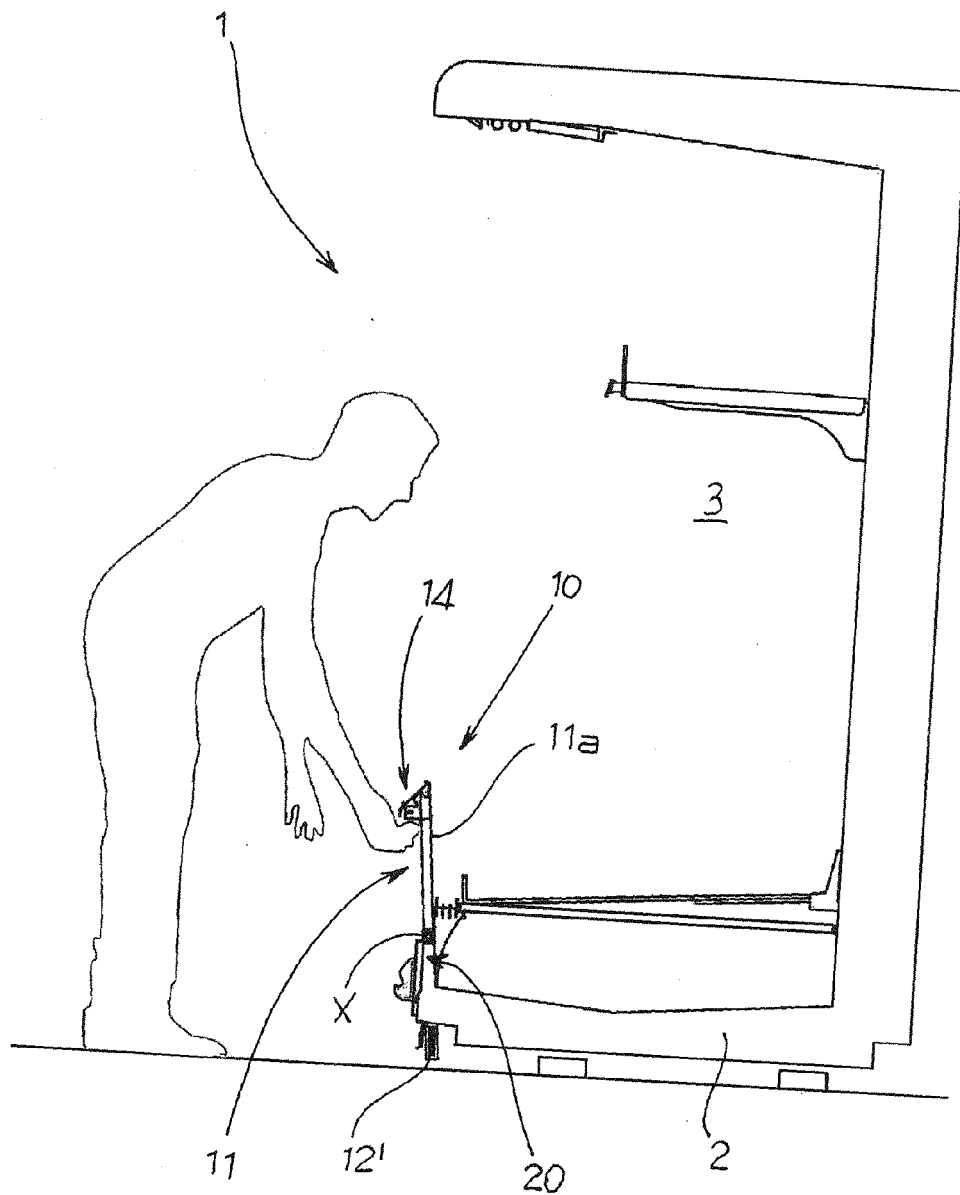
**[0079]** Moreover all the parts may be replaced by technically equivalent parts and the dimensions, shapes and materials used may be varied as needed.

## Claims

1. Display cabinet with facilitated access to the container compartment, in particular a refrigerated display cabinet of the vertical type, provided with a support base for sitting on the ground (2) above which a container compartment (3) is defined and which is delimited at the front in a vertical direction by at least one front wall (20), said display cabinet comprising at least one retractable step (10) associated to said support base (2) near the access area to said con-

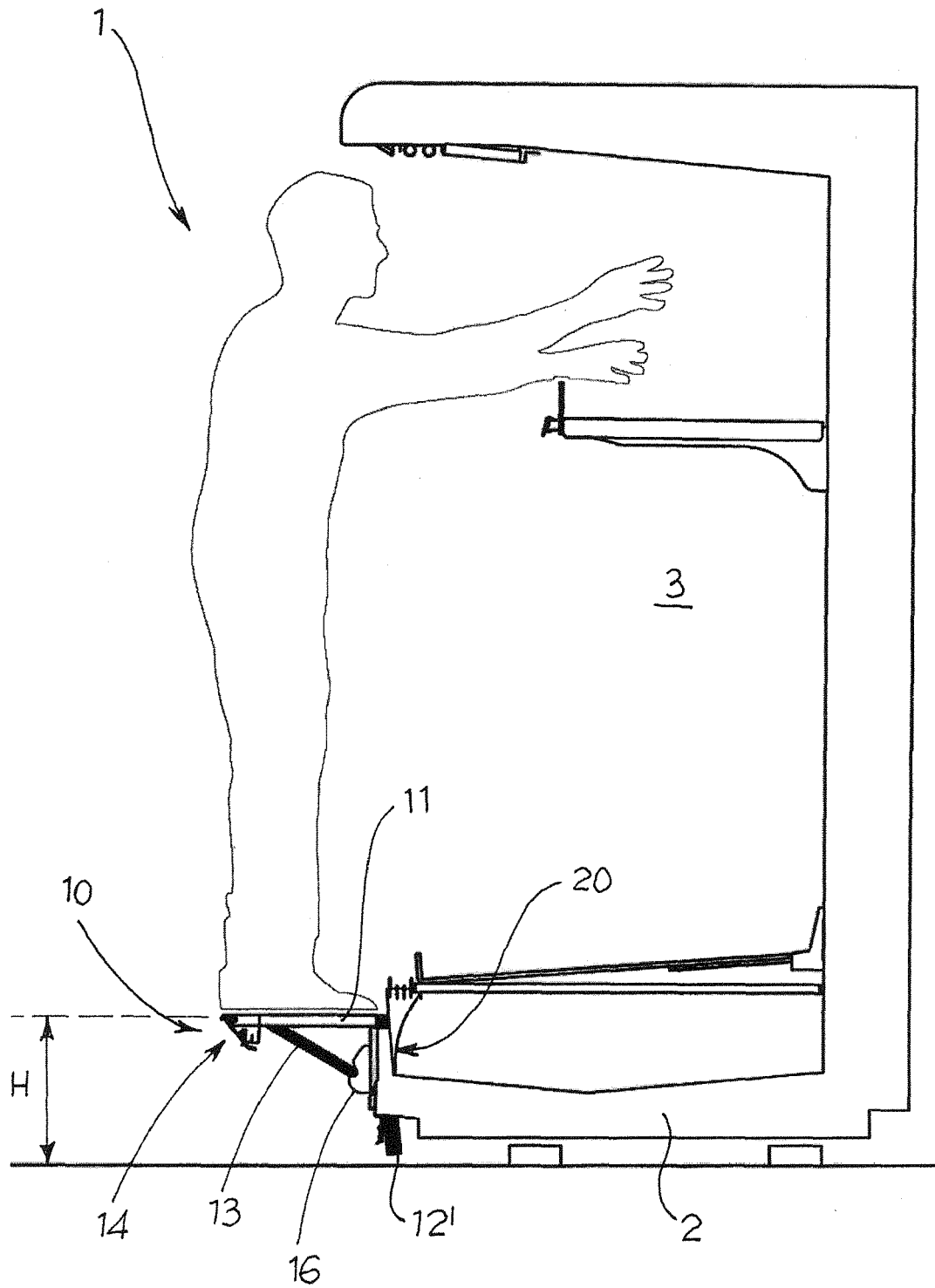
- tainer compartment (3), said step (10) being able to move from an extended position, in which it protrudes from said support base (2) defining a substantially horizontal support plane raised from the ground at a predefined height (H), to a retracted position, in which said step (10) is positioned so as to reduce its encumbrance in relation to said support base (2), **characterised by** the fact on said support base (2) a housing seat (4) is arranged for said at least one step (10) when placed in said retracted position, said housing seat (4) extending substantially parallel to said front wall (20).
2. Display cabinet according to claim 1, wherein said support base (2) extends in height in correspondence of said front wall (20) sufficiently to accommodate said step (10) inside said housing seat (4).
  3. Display cabinet according to claim 1 or 2, wherein each retractable step (10) comprises a plate-shaped body (11), able to define said support plane, and two lateral guides (12', 12'') positioned in said housing seat (4) and to which said plate-shaped body (11) is slidably associated in order to move from said extended position to said retracted position.
  4. Display cabinet according to claim 3, wherein said retractable step (10) comprises a support element (13) associated to said plate-shaped body (11), in said extended position said support element resting on the ground and/or on said cabinet (1) so as to mechanically support said plate-shaped body (11).
  5. Display cabinet according to claim 4, wherein said support element (13) comprises a frame hinged to said plate-shaped body (11) on the lower side (11b) of the latter, so as to have a swinging movement in relation to the same.
  6. Display cabinet according to claim 4 or 5, wherein said support element (13) follows said plate-shaped body (11) inside said housing seat (4) when the step moves from said extended position to said retracted position.
  7. Display cabinet according to any of the previous claims, wherein said plate-shaped body (11) is provided along its outer longitudinal edge (11c) with a ticket holder device (14), positioned in relation to said plate-shaped body (11) so as to perform its function when said step (10) is retracted inside the housing seat (4).
  8. Display cabinet according to one or more of the claims from 3 to 7, wherein said housing seat (4) is delimited laterally by said two lateral guides (12', 12''), connected externally to said support base (2), and is delimited externally by one or more screens (15) attached directly to said support base and/or to said two guides (12', 12'').
  9. Display cabinet according to claim 8, wherein externally to said one or more screens (15) a protective buffer (16) for said support base (2) is attached.
  10. Display cabinet according to claim 9, wherein said protective buffer (16) is provided with a longitudinal recess (17) which acts as the insertion seat for said support element (13).





**Fig.2**





**Fig.3**

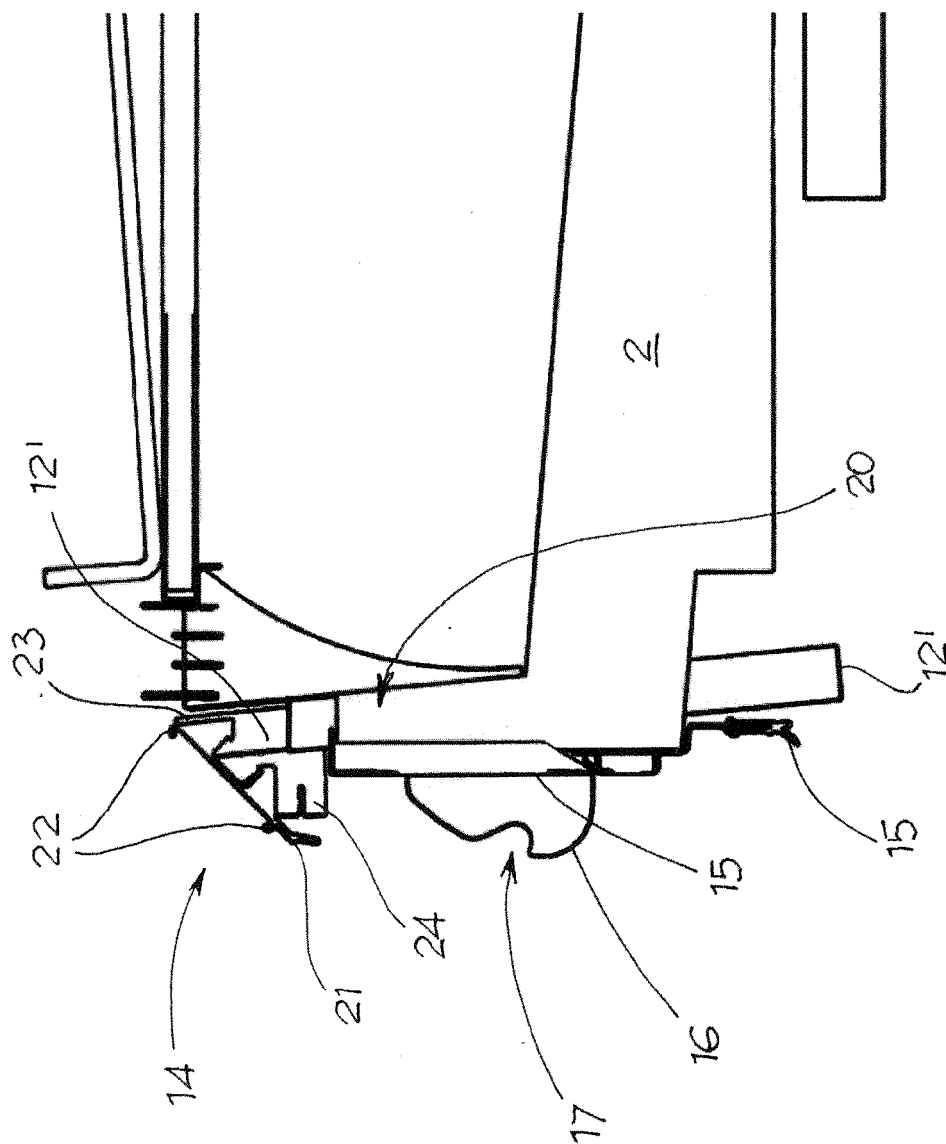


Fig.4

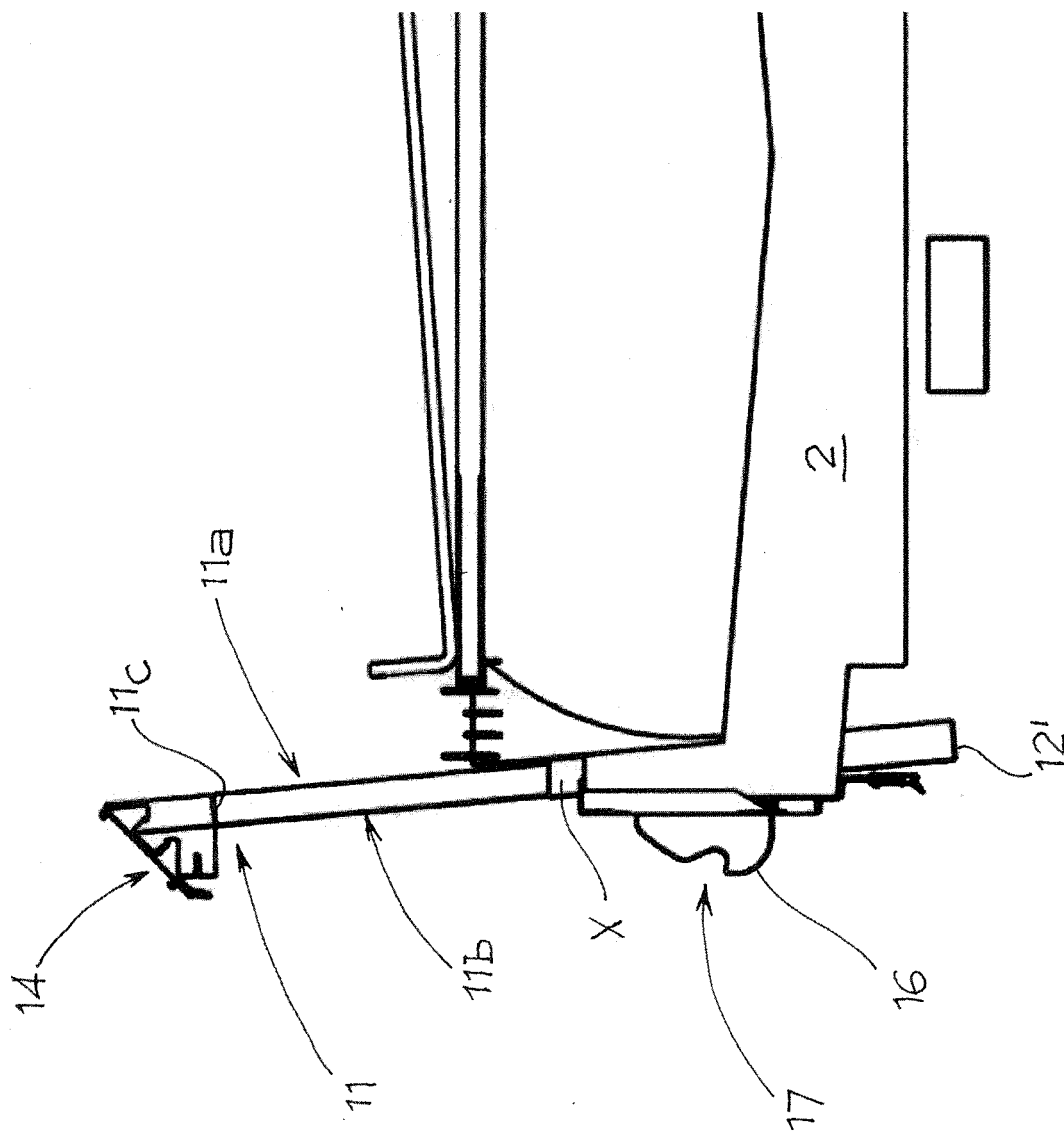
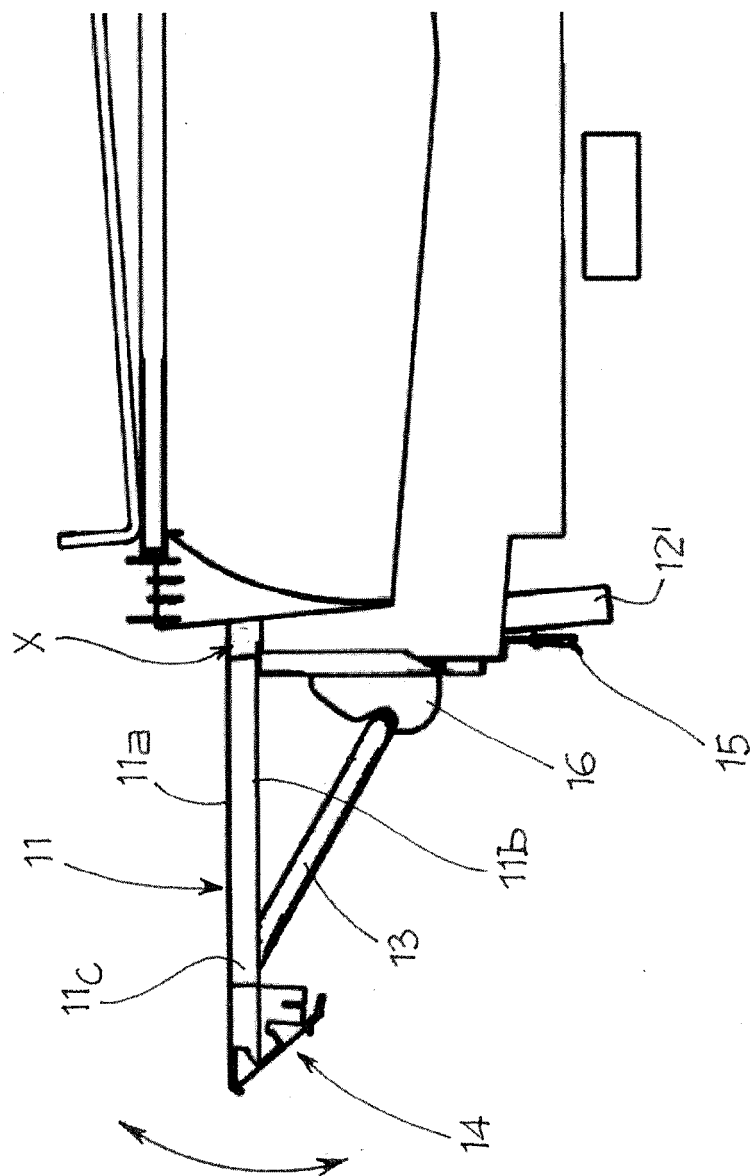


Fig.5



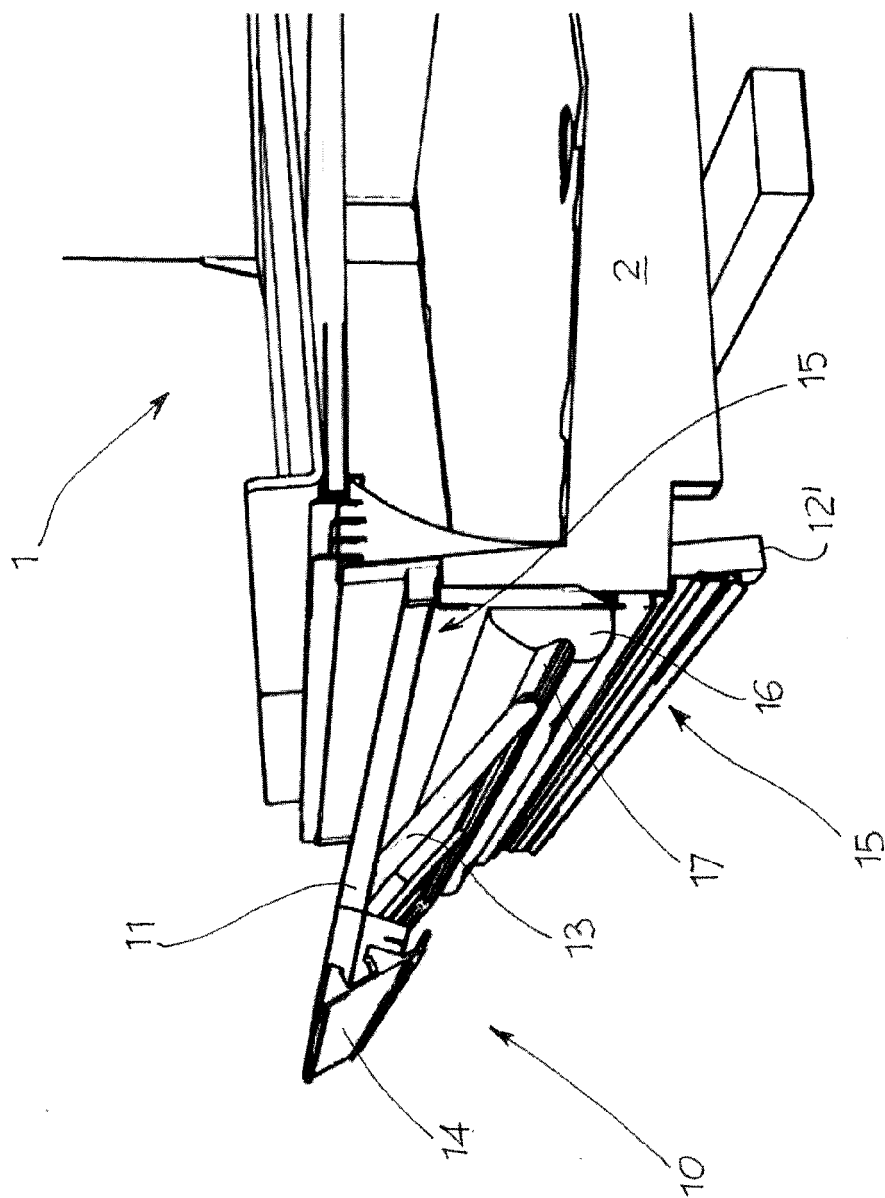


Fig. 7

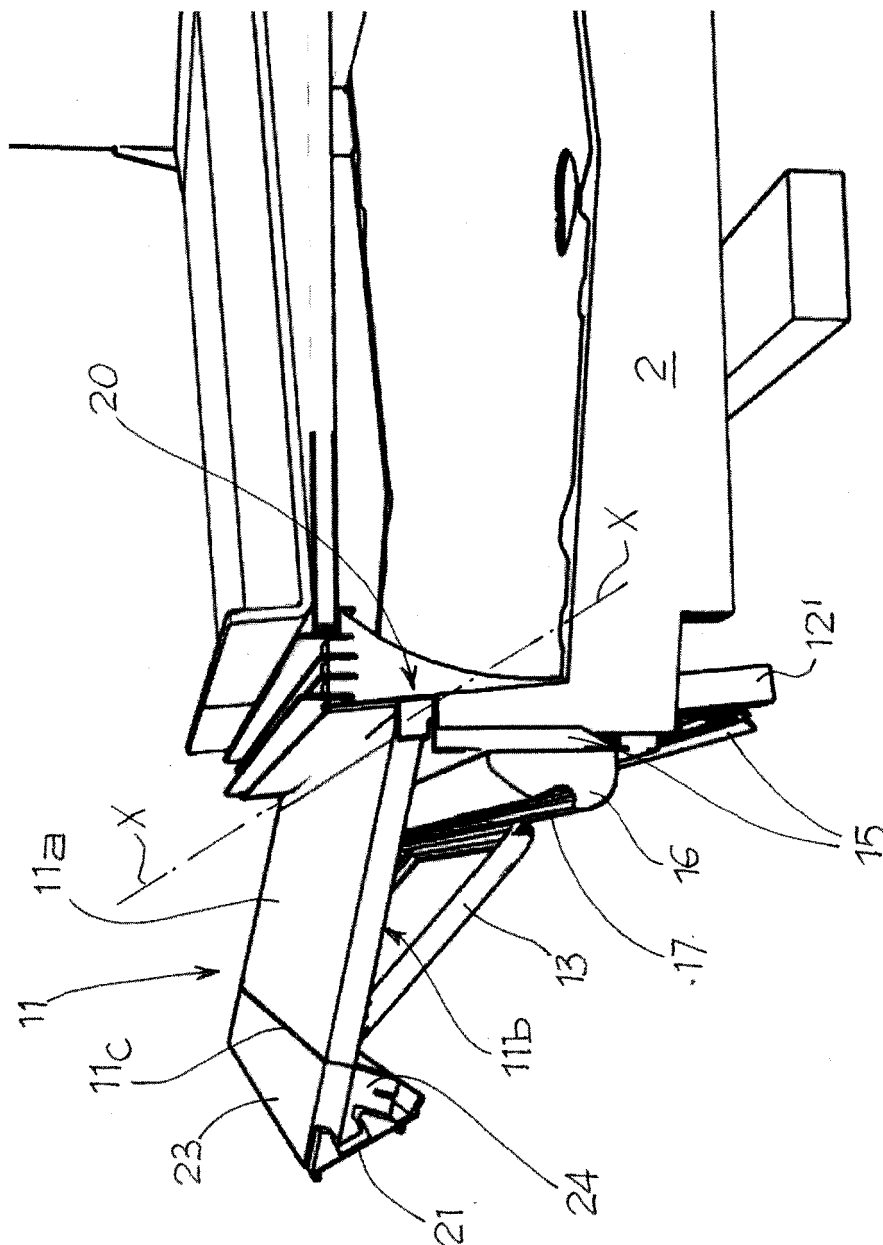


Fig.8

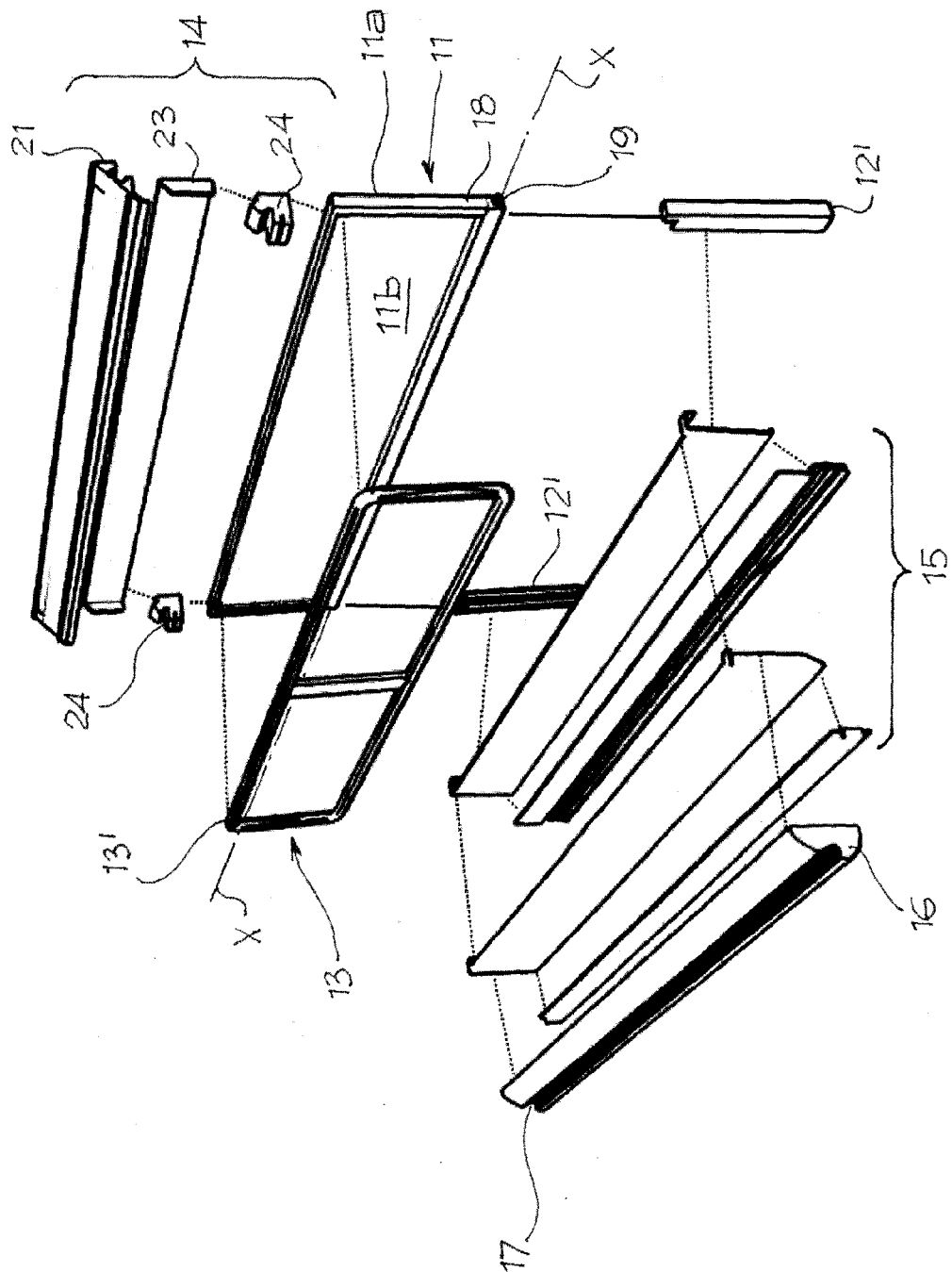


Fig. 9



## EUROPEAN SEARCH REPORT

Application Number  
EP 10 15 7304

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 1 July 2010	Examiner Cardan, Cosmin
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 15 7304

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
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01-07-2010

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**REFERENCES CITED IN THE DESCRIPTION**

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