



(11) **EP 1 533 250 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention  
of the grant of the patent:  
**21.11.2007 Bulletin 2007/47**

(51) Int Cl.:  
**B65D 85/48 (2006.01)**

(21) Application number: **03029688.3**

(22) Date of filing: **23.12.2003**

(54) **Packaging container and packaging method for flat display glass**

Verpackungsbehälter und Verpackungsverfahren für Flachbildschirmscheiben

Emballage et méthode d'emballage de vitres d'écran plat

(84) Designated Contracting States:  
**DE FR GB**

(30) Priority: **24.11.2003 KR 2003083780**

(43) Date of publication of application:  
**25.05.2005 Bulletin 2005/21**

(73) Proprietor: **Samsung Corning Precision Glass Co.  
Ltd.  
Gumi-si,  
Kyungsangbuk-do (KR)**

(72) Inventors:  
• **Kim, Young Taek**  
**Gumi-si, Gyeongsangbuk-do 730-771 (KR)**  
• **Kim, Sung Cheal**  
**Gumi-si**  
**Gyeongsangbuk-do 730-110 (KR)**  
• **Yim, Sang Jae**  
**Cheonan-si**  
**Chungcheongnam-do 330-090 (KR)**  
• **Kim, Jung Han**  
**Cheonan-si**  
**Chungcheongnam-do 330-762 (KR)**  
• **Lee, Bum Ro**  
**Gwanak-gu**  
**Seoul 151-831 (KR)**

- **Lee, Chung Kil**  
**Asan-si**  
**Chungcheongnam-do 336-779 (KR)**
- **Park, Won Kyu**  
**Cheonan-si**  
**Chungcheongnam-do 330-762 (KR)**
- **Lee, Young Ho**  
**Gunpo-si**  
**Gyeonggi-do 435-731 (KR)**
- **Kim, Joon Hahn**  
**Asan-si**  
**Chungcheongnam-do 336-814 (KR)**

(74) Representative: **Bungartz, Klaus Peter**  
**Bungartz Patentanwaltskanzlei**  
**Eupener Strasse 161a**  
**50933 Köln (DE)**

(56) References cited:  
**DE-U1- 8 107 930 US-A- 5 678 693**  
**US-A1- 2003 164 318**

- **PATENT ABSTRACTS OF JAPAN vol. 2000, no.**  
**10, 17 November 2000 (2000-11-17) -& JP 2000**  
**203679 A (NIPPON ELECTRIC GLASS CO LTD),**  
**25 July 2000 (2000-07-25)**

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

**EP 1 533 250 B1**

## Description

**[0001]** The present invention generally relates to a packing container and a packing method for flat display glass, and more specifically, to a packing container and a packing method for flat display glass for increasing working efficiency by loading a lot of flat display glass into an 'L'-shaped frame in large quantities and comprising a packing material in combination with the frame.

**[0002]** As display apparatuses are made in large quantities, flat glasses used as substrate materials for flat display panels such as liquid crystal monitor panels or plasma display panels also tends to be in large size. Accordingly, when an existing horizontal loading method is used to load and transfer flat display glass, not only it can remarkably decrease working efficiency, but the flat glasses can be polluted or damaged by reciprocal contact between the flat glasses or external pollutants.

**[0003]** To solve the above problem, technologies for increasing loading efficiency as preventing the flat glasses from being polluted have been suggested. The DE 81 07 930 U1 discloses a packaging container as mentioned above. A further packaging container is already disclosed in the JP 2000-203679 A (method for receiving glasses plates, hereinafter, called 'JP Laid-open Patent'), which is described in Fig. 1 as state of the art.

**[0004]** However, in the case of the above JP Laid-open patent, it is necessary to individually manage an external packing material such as the packing bag or the box when packing the loaded flat glasses, and obtain a space where the released external packing material should be loaded after transferring. Furthermore, because the flat glasses are made in large quantities, it requires more manpower for work. Accordingly, it deteriorates working efficiency, producing a risk of a worker getting wounded and the loaded flat glasses being damaged by mistake when a final packing process is carried out with manual work. Like shown in prior art, when using estranging materials for estranging rim portions only of the loaded flat glasses, a sagging phenomenon of middle portions of the loaded glasses occurs even though the glasses are loaded by being vertically lifted up because the flat glasses get larger. Therefore, new estranging materials are highly required.

**[0005]** It is therefore an object of the present invention to provide a packing container for flat display glass with an improved efficiency and an improved safety in performing the packing process of loaded flat display glass.

**[0006]** In addition, it is another object of the present invention to provide a packing method for flat display glass capable of safely and efficiently performing loading and packing processes of the flat display glass.

**[0007]** That is, the present invention provides a packing container according to claim 1 or 4 and a packing method for flat display glass to improve working efficiency without individually managing a packing material by forming the packing material for packing loaded flat display glass in combined type, cutting down cost by remarkably

reducing the number of necessary workers without obtaining another space for loading the packing material according to claims 9 and 10.

**[0008]** In order to accomplish the above object, a packing container for flat display glass in accordance with the present invention is a packing container for flat display glass for vertically loading and packing a lot of flat display glass, comprising: a loading frame forming a basic bone structure of the packing container for the flat display glass, and consisting of a loading surface formed to support lower ends of each loaded flat display glass and a back plate surface formed vertical to the loading surface on a rear end portion of the loading surface and supporting back sides of each flat display glass; flat glasses fixing devices for fixing the loaded flat display glass; and packing means to open and/or shut an opened space of the loading frame where the loaded flat display glass are exposed, in combination with the loading frame as one to be fixed and opened/shut.

**[0009]** Desirably, buffer materials for protecting the flat display glass are further comprised on inner sides of lateral walls of the loading frame, formed by connecting an upper side of the loading surface, a front side of the back plate surface, and both side ends of the back plate surface and the loading surface. And, it is desirable to further comprise an estranging material disposed between the loaded flat display glass and contacted with entire surfaces of the loaded flat glasses or more than 90% of the entire surfaces, having a stiffener loaded in front of flat display glass loaded into a front line among the loaded flat display glass.

**[0010]** In addition, the flat glasses fixing devices consist of a clamp, or one pair of elastic belts on the left and the right and coupling units for reciprocal coupling on one unfixed end of each belt.

**[0011]** The packing means consist of a shutter roll installed on a back side of the loading frame, a shutter rail formed in side wall of the loading frame by connecting both side ends of the back plate surface and the loading surface, as a predetermined groove up to the loading surface from the back plate surface, and a shutter whose first end portion, which is one end, is fixed by being wound and the second end portion, which is the rest end, opens/shuts an opened upper side and a front side of the loading frame as vertically moving along the shutter rail. At this time, it is desirable to further comprise a hooking end protruded in predetermined size from the second end portion, and a hook tied to the hooking end in a front end portion of the loading surface, or further comprise a magnet in the second end portion of the reciprocally contacted shutter and/or in the front end portion of the loading surface.

**[0012]** Also, the packing means can be closely adhered to side wall of the loading frame formed by connecting both side ends of the back plate surface and the loading surface. Many cylinder-shaped rollers are installed on an upper end and a lower end of left and right side walls, respectively. A series of both chains rotate in

vertical direction as being wound around rollers, covering a front and a rear of the back plate surface by being wound between the rollers on inner sides of both lateral walls of many cylinder-shaped roller loading frames installed on an upper end and a lower end of both lateral walls, respectively. Many shutter plates are also comprised to cover at least the opened upper side and the front side of the loading frame, being closely adhered to each other while both side ends thereof are fixed into the both chains. It is possible to form opened part pierced vertically in order that the both chains and the shutter plates can pass through the front end portion of the loading surface.

**[0013]** Furthermore, in order to accomplish another object, a packing method for flat display glass in accordance with the present invention is a packing method for flat display glass for loading and packing a lot of flat display glass into a packing container for the flat display glass, which has: a loading frame consisting of a loading surface formed to support lower ends of each flat display glass and a back plate surface formed vertical to the loading surface and supporting back sides of each flat display glass, and sloped at a predetermined angle toward a back direction when a combination of the loading surface and the back plate surface configures an 'L' shape; flat glasses fixing devices for fixing the loaded flat display glass; and packing means to open and/or shut an opened space of the loading frame in combination with the loading frame as one to be opened/shut. The method, comprising the steps of: a first step of loading each flat display glass into a loading frame; a second step of loading a stiffener into a front side of flat display glass loaded into a front line among the loaded flat display glass; a third step of fixing the loaded flat display glass and the stiffener with flat glasses fixing devices; and a fourth step of packing the loaded flat display glass by cutting off the opened space of the loading frame after shutting the packing means.

**[0014]** Desirably, the first step includes a further step of loading an estranging material between the loaded flat display glass.

**[0015]** Moreover, the fourth step includes: a further step of cutting off an opened upper side and a front side of the loading frame by shutting, along a shutter rail, a shutter whose one end is fixed by being wound around the shutter roll installed on a back side of the loading frame and the rest end is tied to a shutter rail formed as a predetermined groove up to the loading surface from the back plate surface on an inner side of a lateral wall of the loading frame, formed by connecting both side ends of the back plate surface and the loading surface; and a further step of cutting off the opened upper side and the front side of the loading frame with many shutter plates by rotating a rolling shutter consisting of both chains rotating in vertical direction, being installed as covering the back plate surface on inner sides of lateral walls of the loading frame formed by connecting both side ends of the back plate surface and the loading surface, and many shutter plates covering at least the opened upper

side and the front side of the loading frame, being closely adhered to each other while fixed into the both chains.

**[0016]** As stated so far, a packing container and a packing method for flat display glass in accordance with the present invention can safely and efficiently perform loading and packing processes of the flat display glass by combining a loading frame for loading the flat display glass with a packing material for packing the loaded flat display glass.

**[0017]** Namely, the packing container and the packing method for the flat display glass in accordance with the present invention have the benefits as follows:

**[0018]** The invention has the following effects:

- First, it can improve working efficiency as reducing working cost without more manpower and spaces for a packing material, since the packing material is combined with a loading frame such as a shutter or a rolling shutter;
- Second, in prior art, a sagging phenomenon occurs in large-sized glasses (roughly, more than 1m in width and length size) because an estranging material is inserted to estrange rim portions only of flat glasses, being inserted between the flat glasses loaded in vertical direction. However, the present invention uses an estranging material contacted with entire surfaces or at least more than 90% of the entire surfaces between the flat glasses loaded in vertical direction and the flat glasses, thereby removing the sagging phenomenon;
- Third, when using the shutter with the packing means, it is possible to stably support a movement of the shutter through a shutter rail and smoothly open/shut the shutter through a shutter roll and a shutter driving roller, thereby minimizing an impact on the loaded flat glasses. Accordingly, it can stably maintain the loaded state of the flat display glass;
- Fourth, the present invention prevents the flat display glass from being damaged, by attaching buffer materials on a front side to which the loaded flat display glass are contacted, and changes a worn or a damaged buffer material by detaching the buffer material;
- Fifth, it prevents the flat display glass from being polluted by reciprocal contact to each other by inserting an estranging material between the flat display glass, and prevents the glasses from being damaged by an external impact or flat glasses fixing devices, by loading a stiffener on a front side of flat display glass loaded into a front line;
- Sixth, it is applicable to any types even though an loaded amount or thickness of the flat display glass is different, by making the flat glasses fixing devices with elastic rubber materials and comprising a length

controlling unit; and

**[0019]** Finally, it can change structure of a shape of the shutter or the rolling shutter, with a variety of applications.

**[0020]** The present invention will now be described in detail with reference to exemplary preferred embodiments as illustrated in the accompanying drawings. In the drawings shows

- Fig. 1 a side view of a flat glass receiving body (state of the art as described in the Japanese Laid-open Patent No. 2000-203679),
- Fig. 2 a perspective view of a packing container for flat display glass in accordance with the present invention,
- Fig. 3 a using state diagram of a packing container for flat display glass in accordance with the present invention and
- Fig. 4 a using state diagram of another embodiment of a packing container for flat display glass in accordance with the present invention.

**[0021]** Fig. 1 is a side view of a flat glasses receiving body suggested by the above JP Laid-open patent. Like shown in Fig. 1, on the receiving body suggested in the above JP Laid-open patent, a loading surface (14a) for loading flat glasses (G) in vertical direction and a back plate surface (14b) extended in vertical direction from a rear end portion of the loading surface are formed on an 'L'-shaped support. Since the loading surface is sloped at 2 to 20 degrees toward the back plate surface, a lot of flat glasses (G) is loaded, being lifted up as leaning against the back plate surface (14b). In addition, estranging members (15) put on rim portions only of the stacked flat glasses are inserted between the rim portions of each flag glass (G) and each flat glass. Reinforcing plates (16,17) are disposed on an external side of flat glasses located in a front line and between flat glasses located in a last line and the back plate surface (14b). Also, the estranging members (15) are put between the flat glasses (G) and the reinforcing plates, thereby preventing the flat glasses from being polluted and damaged. On the other hand, in the above JP Laid-open patent, rubber bands (18,19) are hooked over the back plate surface (14b) and the reinforcing plate (16) located in the front line so as to fix the loaded flat glasses, and an upper part thereof is covered with a packing bag (20). Then, the packing bag is sealed again by binding a rubber band (21).

**[0022]** Moreover, when transferring the flat glasses (G), it is transferred while being sealed with the packing bag (20) or being covered with another box thereon. Then, the loaded glasses are unloaded by releasing the rubber band after loosening the box and the packing bag. (Figure 1 shows an example already known from the state of the art).

**[0023]** Fig. 2 is a perspective view of a packing con-

tainer for flat display glass in accordance according to the present invention. Fig. 3 is a using state diagram of a packing container for flat display glass in accordance with the present invention, and Fig. 3 (a) is a diagram illustrating a state of loading flat display glass into a packing container for the flat display glass in accordance with the present invention. Fig. 3 (b) is a diagram illustrating a state of shutting a shutter of a packing container for flat display glass after loading the flat display glass. The packing container for the flat display glass in accordance with the present invention will be described as follows in reference to Fig. 2 and Fig. 3.

**[0024]** A packing container (100) for flat display glass in accordance with the present invention comprises: a loading frame (110) forming a basic bone structure of the container, and consisting of a loading surface (112) formed in horizontal direction and a back plate surface (114) formed vertical to the loading surface; a stiffener (124) disposed on a front side of flat display glass loaded into a front line to protect loaded flat display glass (120); flat glasses fixing devices (130a,130b) for fixing the loaded flat display glass (120); and a shutter (140) for protecting the loaded flat display glass from an external impact.

**[0025]** The loading frame (110) in accordance with the present invention forms the basic bone structure of the packing container (100) for the flat display glass, forming the loading surface (112) on a lower end in horizontal direction and the back plate surface (114) in vertical direction. The loading surface (112) is a part for supporting lower ends of the flat display glass when loading the flat display glass (120), buffering load of the flat display glass itself and external vibrations or impact by attaching buffer materials (113) to upper sides thereof. Also, the back plate surface (114) is a part for supporting back sides of the flat display glass when loading the flat display glass (120), buffering load of the flat display glass itself and external vibrations and impact by attaching a buffer material (115) on front sides thereof. In the meantime, it is desirable to attach a buffer material (111) to inner sides of both lateral walls (110a,110b) of the loading frame (110) protruded toward a front direction by connecting both side ends of the back plate surface (114) and the loading surface (112). On this case, the buffer materials (113,115) attached to the lateral walls (110a,110b), the loading surface (112), and the back plate surface (114) are detachable for replacement when necessary. So, a contact side of the lateral walls, the loading surface, and the back plate surface as well as one side of the buffer materials can be formed by Velcro fastener.

**[0026]** The loading surface (112) and the back plate surface (114) are formed in 'L' shape by being vertical to each other, and a combination of the loading surface and the back plate surface is mounted on the loading frame (110). Thus, it is possible to stably load the flat display glass (120) into the loading surface and the back plate surface.

**[0027]** The stiffener (124) in accordance with the

present invention protects the loaded flat display glass (120) from an external impact, being disposed on a front side of flat display glass loaded into a front line among the loaded flat display glass. And, the stiffener (124) ties and fastens the flat glasses fixing devices (130) from a front side of the stiffener when fixing the flat display glass (120), thereby preventing the flat display glass (120) from being impacted or damaged by the flat glasses fixing devices.

**[0028]** The flat glasses fixing devices (130) in accordance with the present invention fix the loaded flat display glass (120) into the loading frame (110), consisting of one pair of belts (130a,130b) on the left and the right fixed into grooves as one, which are formed on both sides of the back plate surface (114). At this time, it is desirable to make the both belts (130a,130b) of the flat glasses fixing devices with excellent elastic rubber materials, and to comprise a length controlling unit (not shown) in order to freely control length as a bag strap according to an amount of the loaded flat display glass (120). Also, comprise coupling units (132a,132b) to be tied to each other on one unfixed ends of the both belts (130a,130b). Desirably, form the coupling units in buckle or hook type. Therefore, the flat glasses fixing devices (130) fasten the loaded flat display glass (120) as covering it, and are reciprocally coupled on a front side of the stiffener (124) by the coupling units (132). Furthermore, vertically comprise at least more than two flat glasses fixing devices (130) so as to stably fix the loaded flat display glass (120). Fig. 2 and Fig. 3 illustrate that the flat glasses fixing devices consist of the one pair of the belts on the left and the right, but unlike this, it is possible to configure them with two belts vertically paired in one, including various types such as supporting bars or clamps except the belts.

**[0029]** The shutter (140) in accordance with the present invention is packing means for protecting the loaded flat display glass (120) from an external physical impact, and a portion thereof is fixed by being wound around a shutter roll (142) disposed on a back side of the loading frame (110), then is opened/shut along a shutter rail (144). After the shutter (140) is shut, the shutter is fixed by another shutter locking device (not shown), preventing the shutter from being optionally opened.

**[0030]** The shutter roll (142) is disposed on the back side of the loading frame (110), that is, a space formed on a back side of the back plate surface (114), fixing one end portion of the wound shutter (140) and having a buffer device for stably winding and unwinding the shutter. In addition, the shutter rail (144) guides a movement of the shutter when opening and shutting the shutter (140), formed as predetermined groove type on inner sides of the both lateral walls (110a,110b) of the loading frame (110) protruded toward a front direction by connecting both side ends of the back plate surface (114) and the loading surface (112). Meanwhile, a shutter driving roller (not shown) is further comprised on an upper end of the back plate surface (114) so that the shutter can smoothly move, without being hooked, in a part where the shutter

is turned toward a front side from the back side of the loading frame (110) when opening/shutting the shutter (140) along the shutter rail (144). Accordingly, it is possible to smoothly open and shut the shutter (140) by the shutter driving roller, supporting load of the shutter and preventing the shutter from sagging.

**[0031]** The shutter locking device (not shown) prevents the shutter from being optionally opened after shutting the shutter (140), fixing the shutter in a front end portion of the loading surface (112). So, form a hooking end protruded in predetermined size from one end portion of the shutter (140) contacted with the loading surface (112), and comprise tying units for tying to the hooking end like a hook on a front end of the loading surface contacted with the shutter. Such shutter locking device can be modified in various types. For instance, the shutter can be fixed with magnetism by attaching a magnet to one end portion of the shutter (140) contacted to each other and/or a front end of the loading surface (112).

**[0032]** On the other hand, though Fig. 2 and Fig. 3 illustrate that the shutter (140) is vertically opened/shut by installing the shutter rail (144) in vertical direction, unlike this, it is possible to configure the shutter to be horizontally opened/shut by installing it in horizontal direction. In this case, the shutter can be horizontally opened/shut by vertically installing the shutter roll on the back side of the loading frame (110) and installing the shutter rail on the front end of the loading surface (112) and an upper side of the loading frame.

**[0033]** A method for loading and transferring flat display glass by using a packing container for the flat display glass in accordance with the present invention will be described as follows.

**[0034]** In order to transfer the flat display glass (120) checked in a clean room, load the flat display glass into the loading frame (110). More specifically, support lower ends of the flat display glass (120) by the loading surface (112) and support rear sides thereof by leaning against the back plate surface (114). Moreover, when loading the flat display glass (120), an estranging material (122) contacted with entire surfaces of the loaded flat glasses or at least more than 90% of the entire surfaces is inserted between each flat display glass, thereby preventing the flat display glass from being polluted or damaged by reciprocal contact to each other. It is possible to insert the estranging material (122) between the buffer material (115) mounted on the back plate surface (114) and flat display glass loaded into a last line. In the meantime, apart from the estranging material (122), it can prevent the flat display glass (120) from being polluted by coating front sides and rear sides of the glasses with films, respectively. Thus, various types of processes are available, including a process for coating the films between the flat display glass (120) and disposing the estranging material (122) or disposing the estranging material (122) only without coating the films.

**[0035]** After loading all the flat display glass (120), fix the flat display glass by pulling the both belts (130a,130b)

on the left and the right of the flat glasses fixing devices (130) to tie them together after loading the stiffener (124) into the front side of the flat display glass loaded into the front line. On this occasion, it is also available to insert the estranging material (122) between the flat display glass (120) and the stiffener (124).

**[0036]** When finishing up the loading and the fixing of the flat display glass (120), pull down the shutter (140) along the shutter rail (144) to close the shutter, and lock the shutter by uniting the shutter locking device. Then, transfer the shutter to a transferring place. At this moment, if the shutter locking device consists of a magnet, the shutter can be united by only shutting down the shutter perfectly.

**[0037]** Furthermore, when unloading the loaded flat display glass after transferring, release the united shutter locking device and push up the shutter (140) along the shutter rail (144). Then, take out the stiffener (124) after releasing united states of the flat glasses fixing devices (130), and unload the flat display glass (120) one by one.

**[0038]** Fig. 4 is a using state diagram of another embodiment of a packing container for flat display glass in accordance with the present invention, and Fig. 4 (a) is a diagram illustrating a state of loading flat display glass in another embodiment of a packing container for the flat display glass in accordance with the present invention. Fig. 4 (b) is a diagram illustrating a state of shutting a rolling shutter after loading flat display glass, and Fig. 4 (c) is a sectional view of A-A' direction in accordance another embodiment of the packing container for the flat display glass illustrated in Fig. 4 (b). Another embodiments of the packing container for the flat display glass illustrated in Fig. 4 (a) through Fig. 4 (c) have a rolling shutter (150) opening/shutting an opened region of a loading frame as rotating along the loading frame (110) instead of a vertically opened/shut shutter (140). Hereinafter, another embodiments of the packing container for the flat display glass illustrated in Fig. 4 (a) through Fig. 4 (c) will describe another embodiment of the container, but will omit descriptions on components already described through Fig. 2 and Fig. 3.

**[0039]** Like shown in Fig. 4 (a) and Fig. 4 (b), another embodiment of a packing container (100) for flat display glass in accordance with the present invention has the rolling shutter (150) to protect loaded flat display glass (120) from an external impact by opening/shutting an opened front side and an upper side of a loading frame (110). The rolling shutter (150) is installed as sequentially covering a back plate surface (114) toward inner sides of both lateral walls (110a, 110b) of the loading frame (110), forming a basic bone structure by comprising a serial of reciprocally connected chains (154) on the left and the right.

**[0040]** As shown in Fig. 4 (c), on one side of the rolling shutter (150), many shutter plates (152) are mounted on the chains (154) by using screws (152a) in order to cut off the front side and the upper side of the loading frame (110). On the other side thereof, the chains only are com-

prised without the shutter plates. Thus, as many as the shutter plates (152) should be mounted enough to cover at least the front side and the upper side of the loading frame (110). The chains (154) are installed and move across many rollers (156) comprised respectively on an upper end and a lower end of the loading frame (110). Also, install the both chains (154) to be closely adhered to the inner sides of the both lateral walls (110a, 110b) of the loading frame (110) as possible, and give enough margins between the chains and loading regions of the flat display glass so as to prevent the chains (154) from being contacted with or hooked over when loading or unloading the flat display glass (120).

**[0041]** Meanwhile, the rolling shutter (150) pierces through the loading surface since it should freely move in vertical direction while being connected with each other. Thus, form opened part (158) in a front end portion of the loading surface (112) so that the rolling shutter can pass through. At this time, in order that the rolling shutter (150) cannot be hooked over the opened part (158), form both widths of the opened part at least equally to those of the rolling shutter (150), and form front/rear widths thereof at least added thickness of the shutter plates (152) and the chains (154).

**[0042]** In Fig. 4 (a) and Fig. 4 (b), though the rolling shutter (150) vertically moves by being vertically installed in the loading frame (110), it is possible to horizontally move the rolling shutter by installing it in horizontal direction. In this case, form an upper side wall for cutting off the upper side of the loading frame (110) as installing the rolling shutter between the loading surface (112) and the upper side wall, and form the opened part through which the rolling shutter passes, on the both lateral walls (110a, 110b) thereof, respectively.

**[0043]** A method for loading and transferring flat display glass by using another embodiment of a packing container for the flat display glass in accordance with the present invention will be described as follows.

**[0044]** In order to transfer the flat display glass (120) checked in the clean room, load the glasses into the loading frame (110) and fix it with the flat glasses fixing devices (130). At this point, the rolling shutter (150) will be located on a side where the shutter plates (152) are not mounted. That is, the both chains (154) only will be located in the front side of the loading frame (110). On the other hand, the process of inserting the estranging material (122) and loading the stiffener (124) into front sides of the loaded flat display glass, so as to protect the flat display glass (120) when loading it, is the same as the above. If the loading of the flat display glass (120) is completed, a worker can transfer the glasses after cutting off the opened region of the loading frame by rotating the rolling shutter (150) to make the side, where the shutter plates (152) are mounted, toward the front side of the loading frame (110).

**[0045]** When unloading the loaded flat display glass after transferring, open the loading frame by making the side, where the shutter plates (152) are not mounted,

that is, the side where the both chains (154) only are installed, toward the front side of the loading frame (110) by rotating the rolling shutter (150). And, unload the flat display glass (120) after releasing the united state of the flat glasses fixing devices (130).

[0046] While this invention has been described in terms of several preferred embodiments, there are alterations, permutations, and equivalents which fall within the scope of this invention as set forth by the appended claims.

## Claims

1. Packing container (100) for a lot of flat display glass (120) to be vertically loaded and packed, said container (100) comprises:

- a loading frame (110), forming a basic bone structure of the packing container (100) for the flat display glass (120), and consisting of a loading surface (112) being formed to support lower ends of each loaded flat display glass (120) and a back plate surface (114) being formed vertically to the loading surface (112) on a rear end portion of the loading surface (112) and supporting a back side of each flat display glass (120)
- flat glasses fixing devices (130) for fixing the loaded flat display glass (120) and
- packing means to open and/or shut an opened space of the loading frame (110) where the loaded flat display glass (120) are exposed, and the packing means are fixed to the loading frame (110) and capable of being opened and/or shut, **characterised in that**

said packing means comprise

- a shutter roll (142) installed on a back side of the loading frame (110)
- a shutter rail (144) being formed as a predetermined groove up to the loading surface (112) from the back plate surface (114) on an inner side of a lateral wall of the loading frame (110), said lateral wall of the loading frame being formed by connecting both side ends of the back plate surface (114) and the loading surface (112); and
- a shutter (140) opening/shutting an opened upper side and a front side of the loading frame (112), wherein one end portion of said shutter (140) being fixed by being wound at the shutter roll (142) and an rest end portion vertically moving along the shutter rail (144).

2. Packing container (100) according to claim 1, wherein the container (100) further comprises

- a hooking end being protruded in predetermined size from the second end portion and
- a hook being tied to the hooking end at a front end portion of the loading surface (112).

3. Packing container (100) according to claim 1, wherein the container (100) further comprises a magnet in the second end portion of the reciprocally contacted shutter (140) and/or in the front end portion of the loading surface (112).

4. Packing container (100) for a lot of flat display glass (120) to be vertically loaded and packed, said container (100) comprises

- a loading frame (110), forming a basic bone structure of the packing container (100) for the flat display glass (120), and consisting of a loading surface (112) being formed to support lower ends of each loaded flat display glass (120) and a back plate surface (114) being formed vertically to the loading surface (112) on a rear end portion of the loading surface (112) and supporting a back side of each flat display glass (120)
- flat glasses fixing devices (130) for fixing the loaded flat display glass (120) and
- packing means to open and/or shut an opened space of the loading frame (110) where the loaded flat display glass (120) are exposed, and the packing means are fixed to the loading frame (110) and capable of being opened and/or shut, **characterised in that**

the packing means, comprise

- a plurality of cylinder-shaped rollers (156) being closely adhered to inner sides of left and right lateral walls of the loading frame (110), and being installed on an upper end and a lower end of the both lateral walls, respectively;

wherein said left and right lateral walls being formed by connecting both side ends of the back plate surface (114) and the loading surface (112),

- a series of both chains (154) covering front and rear sides of the back plate surface (114) by being wound between the rollers (156) on the inner sides of the both lateral walls of the loading frame (112), respectively, and rotating in vertical direction while being wound around the rollers (156); and
- a plurality of shutter plates (152), whose both side ends being closely adhered to each other while being fixed into the both chains (154), and covering at least the opened upper side and the front side of the loading frame (110);

wherein a part along a front end portion of the loading surface (112) being vertically formed open so that the both chains (154) and the shutter plates (152) can pass through.

5. Packing container (100) according to claim 4, wherein said container (100) further comprises buffer (111,113,115) materials protecting the flat display glass (120), on the inner sides of the lateral walls of the loading frame (110) formed by connecting a front side of the back plate surface (114) with both side ends of the back plate surface (114) and the loading surface (112). 5
6. Packing container (100) according to claim 4, wherein said container (100) further comprises an estranging material (122), being disposed between the loaded flat display glass (120), and contacted with at least more than 90% of entire surfaces of the loaded flat display glass (120) and wherein said container (100) comprises a stiffener (124), being loaded in front of flat display glass (120) loaded into a front line among the loaded flat display glass (120). 10
7. Packing container (100) according to claim 4, wherein the flat glasses fixing devices (130) consisting of a clamp. 15
8. Packing container (100) according to claim 4, wherein the flat glasses fixing devices (130) consisting of one pair of elastic belts on the left and the right, and coupling units for reciprocal coupling on one unfixed end of each belt. 20
9. Packing method for flat display glass (120) to load and pack a plurality of flat display glass (120) into a packing container (100) for the flat display glass (120), wherein said container (100) comprises, a loading frame (110), consisting of a loading surface (112) formed to support lower ends of each flat display glass (120); and a back plate surface (114) formed vertically to the loading surface (112), and supporting back sides of each flat display glass (120), wherein a combination of the loading surface (112) and the back plate surface (114) configuring an 'L' shape, flat glasses fixing devices (130) for fixing the loaded flat display glass (120), and packing means to open and/or shut an opened space of the loading frame (110), said method comprises a first step of loading each flat display glass (120) into a loading frame (110), a second step of loading a stiffener (124) into a front side of flat display glass (120) loaded into a front line among the loaded flat display glass (120), a third step of fixing the loaded flat display glass (120) and the stiffener (124) with flat glasses fixing devices (130) and a fourth step of packing the loaded flat display glass (120) by cutting off the opened space of the loading (110) frame after shut- 25  
30  
35  
40  
45  
50  
55

ting the packing means, the method being **characterised by**

- . the fourth step including a further step of cutting off an opened upper side and a front side of the loading frame (110) by shutting, along a shutter rail (144), a shutter (140),
- . one end of said shutter (140) being fixed by being wound around the shutter roll (142) installed on a back side of the loading frame (110), and
- . the rest end of said shutter (140) being tied to a shutter rail (144), said shutter rail (144) being formed in side wall of the loading frame (110), as a groove with predetermined depth up to the loading surface (112) from the back plate surface (114),

wherein said side wall of the loading frame (110) being formed by connecting both side ends of the back plate surface (114) and the loading surface (112).

10. A packing method for flat display glass (120) to load and pack a plurality of flat display glass (120) into a packing container (100) for the flat display glass (120), wherein said container (100) comprises, a loading frame (110), consisting of a loading surface (112) formed to support lower ends of each flat display glass (120); and a back plate surface (114) formed vertically to the loading surface (112), and supporting back sides of each flat display glass (120), wherein a combination of the loading surface (112) and the back plate surface (112) configuring an 'L' shape, flat glasses fixing devices (130) for fixing the loaded flat display glass (120), and packing means to open and/or shut an opened space of the loading frame (110), said method comprising a first step of loading each flat display glass (120) into a loading frame (110), a second step of loading a stiffener (124) into a front side of flat display glass (120) loaded into a front line among the loaded flat display glass (120), a third step of fixing the loaded flat display glass (120) and the stiffener (124) with flat glasses fixing devices (130) and a fourth step of packing the loaded flat display glass (120) by cutting off the opened space of the loading frame (110) after shutting the packing means, the method being **characterised by**

- . the fourth step including a further step of cutting off the opened upper side and the front side of the loading frame (110) with a plurality of shutter plates (152) by rotating a rolling shutter (150),
- . said rolling shutter (150) comprises, left and right chains (154) rotating in vertical direction, being installed as covering the back plate surface (114) on inner sides of left and right lateral



walls of the loading frame (110), said left and right lateral walls being formed by connecting both side ends of the back plate surface (114) and the loading surface (112), and a plurality of shutter plates (152) covering at least the opened upper side and the front side of the loading frame (110), said shutter plates (152) being closely adhered to each other while fixed into the left and right chains (154).

## Patentansprüche

1. Verpackungsbehälter (100) für eine Mehrzahl von Glasscheiben (120) für Flachbildschirme, der in vertikaler Richtung geladen und beschickt wird, wobei der Behälter (100) aufweist:

- einen Laderahmen (110), der eine Grundtragstruktur des Verpackungsbehälters (100) für die Glasscheiben (120) der Flachbildschirme bildet und aus einer Ladefläche (112), die derart ausgebildet ist, dass sie die unteren Ende jeder eingelegten Glasscheibe (120) der Flachbildschirme abstützt, und einer Rückseitenoberfläche (114) besteht, die in vertikaler Richtung zur Ladefläche (112) an einem hinteren Endbereich der Ladefläche (112) ausgebildet ist und eine Rückseite jeder der Glasscheiben (120) der Flachbildschirme abstützt,
- Befestigungsmittel (130) für flache Glasscheiben zur Befestigung der aufgenommenen Glasscheiben (120) der Flachbildschirme und
- Verpackungsmittel zum Öffnen und/oder Schließen eines Öffnungsbereiches des Laderahmens (110) über den die eingelegten Glasscheiben (120) der Flachbildschirme zugänglich sind, wobei die Verpackungsmittel an dem Laderahmen (110) befestigt sind und geöffnet und/oder geschlossen werden können,

**dadurch gekennzeichnet, dass**  
die Verpackungsmittel aufweisen:

- einen Rollladen (142), der auf einer Rückseite des Laderahmens (110) angebracht ist,
- eine Rollladenschiene (144), die als festgelegte Rinne von der Rückseitenoberfläche (114) an einer inneren Seite einer Seitenwand des Laderahmens (110) bis zur Ladefläche (112) verläuft, wobei die Seitenwand des Ladengehäuses dadurch gebildet ist, dass die seitlichen Enden der Rückseitenoberfläche (114) und die Ladefläche (112) miteinander verbunden sind; und
- einen Rollladen (140) der eine geöffnete obere Seite und eine vordere Seite des Laderahmens (112) öffnet/schließt, wobei ein Endbereich dieses Rollladens (140) dadurch befestigt ist, dass

er um die Rollladenrolle (142) herumgelegt ist, und ein verbleibender Endbereich vertikal längs der Rollladenschiene (144) bewegt ist.

2. Verpackungsbehälter (100) nach Anspruch 1, wobei der Behälter (100) weiterhin aufweist:

- einen Einhakbereich, der mit vorbestimmter Größe von dem zweiten Endbereich hervorspringt und
- einen Haken, der an den Hakbereich an einem vorderen Endbereich der Ladefläche festgelegt ist.

3. Verpackungsbehälter (100) nach Anspruch 1, wobei der Container (100) weiter einen Magnet in dem zweiten Endbereich des wechselseitig anliegenden Rollladen (140) und/oder in dem vorderen Endbereich der Ladefläche (112) aufweist.

4. Verpackungsbehälter (100) für eine Mehrzahl von Glasscheiben (120) für Flachbildschirme, der in vertikaler Richtung geladen und beschickt wird, wobei der Behälter (100) aufweist:

- einen Laderahmen (110), der eine Grundtragstruktur des Verpackungsbehälters (100) für die Glasscheiben (120) der Flachbildschirme bildet und aus einer Ladefläche (112), die derart ausgebildet ist, dass sie die unteren Ende jeder eingelegten Glasscheibe (120) der Flachbildschirme abstützt, und einer Rückseitenoberfläche (114) besteht, die in vertikaler Richtung zur Ladefläche (112) an einem hinteren Endbereich der Ladefläche (112) ausgebildet ist und eine Rückseite jeder der Glasscheiben (120) der Flachbildschirme abstützt,
- Befestigungsmittel (130) für flache Glasscheiben zur Befestigung der aufgenommenen Glasscheiben (120) der Flachbildschirme und
- Verpackungsmittel zum Öffnen und/oder Schließen eines Öffnungsbereiches des Laderahmens (110) über den die eingelegten Glasscheiben (120) der Flachbildschirme zugänglich sind, wobei die Verpackungsmittel an dem Laderahmen (110) befestigt sind und geöffnet und/oder geschlossen werden können,

**dadurch gekennzeichnet, dass**  
die Verpackungsmittel aufweisen:

- eine Mehrzahl von zylindrischen Rollen (156) nahe der inneren Seite der linken und rechten Seitenwände des Laderahmens (110), die an einem oberen Ende und einem unteren Ende der beiden Seitenwände jeweils befestigt sind; wobei die linken und die rechten Seitenwände dadurch gebildet sind, dass die beiden seitlichen

Enden der Rückseitenoberfläche (114) und der Ladefläche (112) miteinander verbunden sind,

- Ketten (154), die beide entlang der vorderen und der hinteren Seiten der Rückseitenoberfläche (114) verlaufen, indem sie an den Rollen (156) an den inneren Seiten der beiden Seitenwände des Laderahmens (112) jeweils umgelenkt sind und sich in vertikaler Richtung während des Laufens um die Rollen (156) umdrehen, und

- eine Mehrzahl von Verschlussplatten (152), deren beiden Seitenenden dicht zueinander angeordnet sind und die an den beiden Ketten (154) befestigt sind, und die zumindest die geöffnete Oberseite und die Frontseite des Laderahmens (110) abdecken,

wobei ein Teil eines Vorderseitenbereiches der Ladefläche (112) in vertikaler Richtung mit einer Öffnung versehen ist, so dass die beiden Ketten (154) und die Verschlussplatten (152) durchgeführt werden können.

5. Verpackungsbehälter (100) nach Anspruch 4, wobei der Behälter (100) weiterhin die Glasscheiben (120) der Flachbildschirme schützende Pufferelemente (111, 113, 115) aufweist, die an den inneren Seiten der Seitenwände des Laderahmens (110) dadurch ausgebildet sind, dass eine Vorderseite der Rückseitenoberfläche (114) mit den beiden Seitenenden der Rückseitenoberfläche (114) und der Ladefläche (112) verbunden sind.

6. Verpackungsbehälter (100) nach Anspruch 4, wobei der Behälter (100) weiter ein Abstandsmaterial (122) aufweist, dass zwischen den eingeladenen Glasscheiben (120) der Flachbildschirme angeordnet ist und zumindest mit wenigstens mehr als 90% der gesamten Oberflächen der eingeladenen Glasscheiben (120) der Flachbildschirme in Kontakt ist, und wobei der Behälter (100) eine Verstärkungsstrebe (124) aufweist, die vor den Glasscheiben (120) der Flachbildschirme innerhalb einer Front zwischen den eingeladenen Glasscheiben (120) der Flachbildschirme eingebracht ist.

7. Verpackungsbehälter (100) nach Anspruch 4, wobei die Befestigungsmittel (130) für flache Glasscheiben von einer Klammer gebildet sind.

8. Verpackungsbehälter (100) nach Anspruch 4, wobei die Befestigungsmittel (130) für flache Glasscheiben aus einem Paar von elastischen Bändern an der linken und der rechten Seite und Kupplungseinheiten für die wechselseitige Kupplung an einem der freien Enden eines jeden Bandes gebildet sind.

9. Verfahren zum Verpacken von Glasscheiben (120)

für Flachbildschirme zum Bestücken und Verpacken einer Mehrzahl von Glasscheiben (120) für Flachbildschirme in einen Verpackungsbehälter (100) für Glasscheiben (120) von Flachbildschirmen, wobei der Verpackungsbehälter (100) aufweist, einen Laderahmen (110), der aus einer Ladefläche (112) besteht, die zum Abstützen der unteren Enden eines jeden Glases (120) für Flachbildschirme gebildet ist, und einer Rückseitenoberfläche (115), die vertikal zur Ladefläche (112) ausgebildet ist und Rückseiten eines jeden Glases (120) eines Flachbildschirmes abstützt, wobei eine Kombination des Laderahmens (112) und der Rückseitenplatte "L"-förmig ausgebildet ist, Befestigungsmittel (130) für flache Glasscheiben zur Befestigung der aufgenommenen Glasscheiben (120) und Verpackungsmittel zum Öffnen und/oder Schließen eines geöffneten Raumes des Laderahmens (110), wobei das Verfahren umfasst, einen ersten Schritt des Ladens jedes Glases (120) der Flachbildschirme in den Laderahmen (110), einen zweiten Schritt des Ladens einer Verstärkungsstrebe (124) auf eine Vorderseite des Glases (120) des Flachbildschirmes, die auf den Frontbereich des aufgenommenen Glases (120) des Flachbildschirmes aufgebracht ist, einen dritten Schritt, der Befestigung eingebrachten Glases (129) der Flachbildschirme der Verstärkungsstreben (124) mit Befestigungsmittel (130) für flache Glasscheiben und einen vierten Schritt des Verpackens der eingeladenen Glasscheiben (120) der Flachbildschirme durch Beseitigen des geöffneten Raumes des Laderahmens (110) nach Schließen der Verpackungsmittel, wobei das Verfahren

**dadurch gekennzeichnet ist, dass**

- der vierte Schritt ferner einschließt, einen Schritt des Verschließens einer geöffneten Unterseite und einer Frontseite des Laderahmens (110) durch Schließen eines Rollladens (140) entlang einer Rollladenschiene (144),
- wobei ein Ende des Rollladens (140) dadurch befestigt ist, dass er um eine Rollladenrolle (142) herumgelegt ist, die an der Rückseite des Laderahmens (110) angeordnet ist und
- Das freie Ende des Rollladens (140) durch eine Rollladenschiene (144) festgelegt ist, wobei diese Rollladenschiene (144) in den Seitenwänden des Laderahmens (110) eingeformt ist als Nut mit einer vorbestimmten Tiefe und bis zur Ladefläche (112) von der Rückseitenoberfläche (114) reicht,

wobei diese Seitenwände des Laderahmens (110) dadurch gebildet sind, dass die beiden Seitenenden der Rückseitenoberfläche (114) und die Ladefläche (112) miteinander verbunden sind.

10. Verfahren zum Verpacken von Glasscheiben (120)

für Flachbildschirme zum Bestücken und Verpacken einer Mehrzahl von Glasscheiben (120) für Flachbildschirme in einen Verpackungsbehälter (100) für Glasscheiben (120) von Flachbildschirmen, wobei der Verpackungsbehälter (100) aufweist, einen Laderahmen (110), der aus einer Ladefläche (112) besteht, die zum Abstützen der unteren Enden eines jeden Glases (120) für Flachbildschirme gebildet ist, und einer Rückseitenoberfläche (115), die vertikal zur Ladefläche (112) ausgebildet ist und Rückseiten eines jeden Glases (120) eines Flachbildschirmes abstützt, wobei eine Kombination des Laderahmens (112) und der Rückseitenplatte "L"-förmig ausgebildet ist, Befestigungsmittel (130) für flache Glasscheiben zur Befestigung der aufgenommenen Glasscheiben (120) und Verpackungsmittel zum Öffnen und/oder Schließen eines geöffneten Raumes des Laderahmens (110), wobei das Verfahren umfasst, einen ersten Schritt des Ladens jedes Glases (120) der Flachbildschirme in den Laderahmen (110), einen zweiten Schritt des Ladens einer Versteifungsstrebe (124) auf eine Vorderseite des Glases (120) des Flachbildschirmes, die auf den Frontbereich des aufgenommenen Glases (120) des Flachbildschirmes aufgebracht ist, einen dritten Schritt, der Befestigung eingebrachten Glases (129 der Flachbildschirme der Versteifungsstreben (124) mit Befestigungsmittel (130) für flache Glasscheiben und einen vierten Schritt des Verpackens der eingeladenen Glasscheiben (120) der Flachbildschirme durch Beseitigen des geöffneten Raumes des Laderahmens (110) nach Schließen der Verpackungsmittel, wobei das Verfahren

**dadurch gekennzeichnet ist, dass**

- der vierte Schritt ferner den Schritt beinhaltet, dass die geöffnete Oberseite und die Vorderseite des Laderahmens (110) mit einer Vielzahl von Verschlussplatten (152) durch Drehen eines Rollladen (150) geschlossen werden,
- der Rollladen (115) aufweist, linke und rechte Ketten (154), die in vertikale Richtung umgelegt sind und so angebracht sind, dass sie auf der Rückseitenoberfläche (114) der inneren Seiten der linken und rechten Seitenwände des Laderahmens (110) aufliegen, wobei die linken und rechten Seitenwände **dadurch** gebildet sind, dass die seitlichen Enden der Rückseitenoberfläche (114) und der Ladefläche (112) miteinander verbunden sind, und eine Vielzahl von Rollladenplatten (142) zumindest die geöffnete Oberseite und die Unterseite des Laderahmens (110) abdecken, wobei die Rollladenplatten (142) nahe zu einander angeordnet und an den linken und rechten Ketten (154) befestigt sind.

## Revendications

1. Emballage (100) pour un lot de dalles d'écran plat (120) devant être chargées verticalement et emballées, ledit emballage (100) comprenant :

- un cadre de chargement (110) prenant la forme d'une structure osseuse de base de l'emballage (100) pour les dalles d'écran plat (120) et consistant en une surface de chargement (112) formée pour supporter les extrémités inférieures de chaque dalle d'écran plat (120) chargée et une surface de plaque arrière (114) formée verticalement par rapport à la surface de chargement (112) sur une partie d'extrémité arrière de la surface de chargement (112) et supportant un côté arrière de chaque dalle d'écran plat (120) ;
- des dispositifs de fixation de dalles plates (130) pour fixer les dalles d'écran plat (120) chargées ; et
- des moyens d'emballage pour ouvrir et/ou fermer un espace ouvert du cadre de chargement (110), les dalles d'écran plat (120) chargées étant exposées et les moyens d'emballage étant fixés au cadre de chargement (110) et pouvant être ouverts et/ou fermés,

**caractérisé en ce que** lesdits moyens d'emballage comprennent :

- un rouleau de volet (142) monté sur un côté arrière du cadre de chargement (110) ;
- un rail de volet (144) prenant la forme d'une rainure prédéterminée allant jusqu'à la surface de chargement (112) depuis la surface de plaque arrière (114) sur un côté intérieur d'une paroi latérale du cadre de chargement (110), ladite paroi latérale du cadre de chargement étant formée en reliant les deux extrémités latérales de la surface de plaque arrière (114) et de la surface de chargement (112) ; et
- un volet (140) ouvrant/fermant un côté supérieur ouvert et un côté avant du cadre de chargement (112), une partie d'extrémité dudit volet (140) étant fixée par enroulement au rouleau de volet (142) et une partie d'extrémité d'appui se déplaçant verticalement le long du rail de volet (144).

2. Emballage (100) selon la revendication 1, dans lequel l'emballage (100) comprend en outre :

- une extrémité de crochitage faisant saillie dans une mesure prédéterminée hors de la seconde partie d'extrémité ; et
- un crochet étant attaché à l'extrémité de crochitage au niveau d'une partie d'extrémité

avant de la surface de chargement (112).

3. Emballage (100) selon la revendication 1, dans lequel l'emballage (100) comprend en outre un aimant dans la seconde partie d'extrémité du volet (140) contacté en va-et-vient et/ou dans la partie d'extrémité avant de la surface de chargement (112).

4. Emballage (100) pour un lot de dalles d'écran plat (120) devant être chargées verticalement et emballées, ledit emballage (100) comprenant :

- un cadre de chargement (110) prenant la forme d'une structure osseuse de base de l'emballage (100) pour les dalles d'écran plat (120) et consistant en une surface de chargement (112) formée pour supporter les extrémités inférieures de chaque dalle d'écran plat (120) chargée et une surface de plaque arrière (114) formée verticalement par rapport à la surface de chargement (112) sur une partie d'extrémité arrière de la surface de chargement (112) et supportant un côté arrière de chaque dalle d'écran plat (120) ;
- des dispositifs de fixation de dalles plates (130) pour fixer les dalles d'écran plat (120) chargées ; et
- des moyens d'emballage pour ouvrir et/ou fermer un espace ouvert du cadre de chargement (110), les dalles d'écran plat (120) chargées étant exposées et les moyens d'emballage étant fixés au cadre de chargement (110) et pouvant être ouverts et/ou fermés,

**caractérisé en ce que** les moyens d'emballage, comprennent :

- une pluralité de rouleaux (156) de forme cylindrique étroitement collés aux côtés intérieurs des parois latérales gauche et droite du cadre de chargement (110) montés sur une extrémité supérieure et une extrémité inférieure des deux parois latérales, respectivement ; lesdites parois latérales gauche et droite étant formées en reliant les deux extrémités latérales de la surface de plaque arrière (114) et de la surface de chargement (112) ;
- une série de deux chaînes (154) couvrant les côtés avant et arrière de la surface de plaque arrière (114) lors de l'enroulement entre les rouleaux (156) sur les côtés intérieurs des deux parois latérales du cadre de chargement (112), respectivement, et tournant dans la direction verticale lors de l'enroulement autour des rouleaux (156) ; et
- une pluralité de plaques de volet (152) dont les deux extrémités latérales sont étroitement collées entre elles tout en étant fixées dans les deux

chaînes (154) et couvrant au moins le côté supérieur ouvert et le côté avant du cadre de chargement (110) ;

une partie le long de la partie d'extrémité avant de la surface de chargement (112) formée verticalement s'ouvrant de façon à ce que les deux chaînes (154) et les plaques de volet (152) puissent la traverser.

5. Emballage (100) selon la revendication 4, dans lequel ledit emballage (100) comprend en outre des matériaux amortissants (111, 113, 115) protégeant les dalles d'écran plat (120), sur les côtés intérieurs des parois latérales du cadre de chargement (110) formés en reliant un côté avant de la surface de plaque arrière (114) aux deux extrémités latérales de la surface de plaque arrière (114) et de la surface de chargement (112).

6. Emballage (100) selon la revendication 4, dans lequel ledit emballage (100) comprend en outre un matériau de séparation (122) disposé entre les dalles d'écran plat (120) chargées et en contact avec 90 % au moins de la totalité des surfaces des dalles d'écran plat (120) chargées et ledit emballage (100) comprenant un raidisseur (124) chargé à l'avant des dalles d'écran plat (120) chargées, dans une ligne avant parmi les dalles d'écran plat (120) chargées.

7. Emballage (100) selon la revendication 4, dans lequel les dispositifs de fixation de dalles plates (130) consistent en un crampon.

8. Emballage (100) selon la revendication 4, dans lequel les dispositifs de fixation de dalles plates (130) consistent en une paire de courroies élastiques sur la gauche et la droite et en des unités de couplage pour le couplage réciproque sur une extrémité non fixée de chaque courroie.

9. Procédé d'emballage pour des dalles d'écran plat (120) pour charger et emballer une pluralité de dalles d'écran plat (120) dans un emballage (100) pour les dalles d'écran plat (120), dans lequel ledit emballage (100) comprend un cadre de chargement (110) consistant en une surface de chargement (112) formée pour supporter les extrémités inférieures de chaque dalle d'écran plat (120) ; et une surface de plaque arrière (114) formée verticalement par rapport à la surface de chargement (112) et supportant les côtés arrière de chaque dalle d'écran plat (120), une combinaison de la surface de chargement (112) et de la surface de plaque arrière (114) configurant une forme en « L », des dispositifs de fixation de dalles plates (130) pour fixer les dalles d'écran plat (120) chargées et des moyens d'emballage pour ouvrir et/ou fermer un espace ouvert du cadre de chargement

(110), ledit procédé comprenant une première étape de chargement de chaque dalle d'écran plat (120) dans un cadre de chargement (110), une seconde étape de chargement d'un raidisseur (124) dans un côté avant des dalles d'écran plat (120) chargées dans une ligne avant parmi les dalles d'écran plat (120) chargées, une troisième étape de fixation des dalles d'écran plat (120) chargées et du raidisseur (124) avec les dispositifs de fixation de dalles plates (130) et une quatrième étape d'emballage des dalles d'écran plat (120) chargées en coupant l'espace ouvert du cadre de chargement (110) après fermeture des moyens d'emballage, le procédé étant **caractérisé en ce que** :

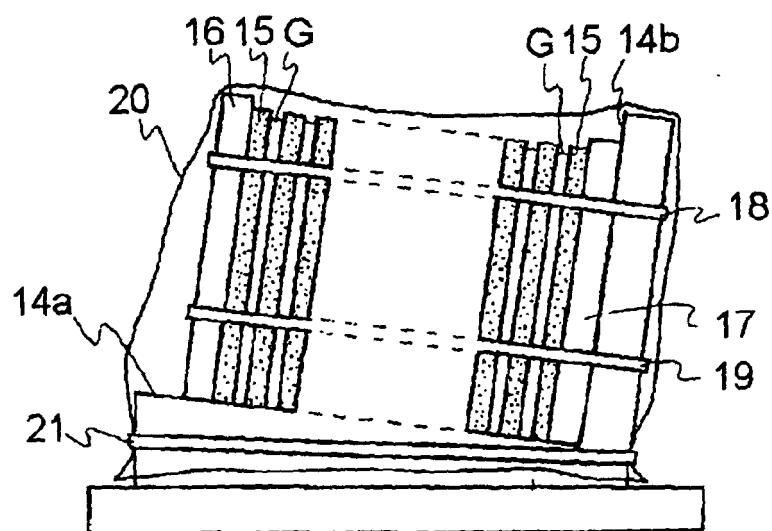
- la quatrième étape comprend une étape supplémentaire de découpe d'un côté supérieur ouvert et d'un côté avant du cadre de chargement (110) en fermant, le long d'un rail de volet (144), un volet (140) ;
- une extrémité dudit volet (140) étant fixée par enroulement autour du rouleau de volet (142) monté sur un côté arrière du cadre de chargement (110) ; et
- l'extrémité restante dudit volet (140) étant reliée à un rail de volet (144), ledit rail de volet (144) formé dans la paroi latérale du cadre de chargement (110) comme une rainure de profondeur prédéterminée jusqu'à la surface de chargement (112) depuis la surface de plaque arrière (114) ;

ladite paroi latérale du cadre de chargement (110) étant formée en reliant les deux extrémités latérales de la surface de plaque arrière (114) et de la surface de chargement (112).

- 10.** Procédé d'emballage pour des dalles d'écran plat (120) pour charger et emballer une pluralité de dalles d'écran plat (120) dans un emballage (100) pour les dalles d'écran plat (120), dans lequel ledit emballage (100) comprend un cadre de chargement (110) consistant en une surface de chargement (112) formée pour supporter les extrémités inférieures de chaque dalle d'écran plat (120) ; et une surface de plaque arrière (114) formée verticalement par rapport à la surface de chargement (112) et supportant les côtés arrière de chaque dalle d'écran plat (120), une combinaison de la surface de chargement (112) et de la surface de plaque arrière (112) configurant une forme en « L », des dispositifs de fixation de dalles plates (130) pour fixer les dalles d'écran plat (120) chargées et des moyens d'emballage pour ouvrir et/ou fermer un espace ouvert du cadre de chargement (110), ledit procédé comprenant une première étape de chargement de chaque dalle d'écran plat (120) dans un cadre de chargement (110), une seconde étape de chargement d'un raidisseur (124) dans un

côté avant des dalles d'écran plat (120) chargées dans une ligne avant parmi les dalles d'écran plat (120) chargées, une troisième étape de fixation des dalles d'écran plat (120) chargées et du raidisseur (124) avec les dispositifs de fixation de dalles plates (130) et une quatrième étape d'emballage des dalles d'écran plat (120) chargées en coupant l'espace ouvert du cadre de chargement (110) après fermeture des moyens d'emballage, le procédé étant **caractérisé en ce que** :

- la quatrième étape comprend une étape supplémentaire de découpe du côté supérieur ouvert et du côté avant du cadre de chargement (110) avec une pluralité de plaques de volet (152) en faisant tourner un volet roulant (150) ;
- ledit volet roulant (150) comprenant des chaînes (154) gauche et droite tournant dans la direction verticale est fixé comme couvrant la surface de plaque arrière (114) sur les côtés intérieurs des parois latérales gauche et droite du cadre de chargement (110), lesdites parois latérales gauche et droite formées en reliant les deux extrémités latérales de la surface de plaque arrière (114) et de la surface de chargement (112) et une pluralité de plaques de volet (152) couvrant au moins le côté supérieur ouvert et le côté avant du cadre de chargement (110), lesdites plaques de volet (152) étant étroitement collées entre elles lorsqu'elles sont fixées dans les chaînes (154) gauche et droite.



[state of the art]

Fig. 1

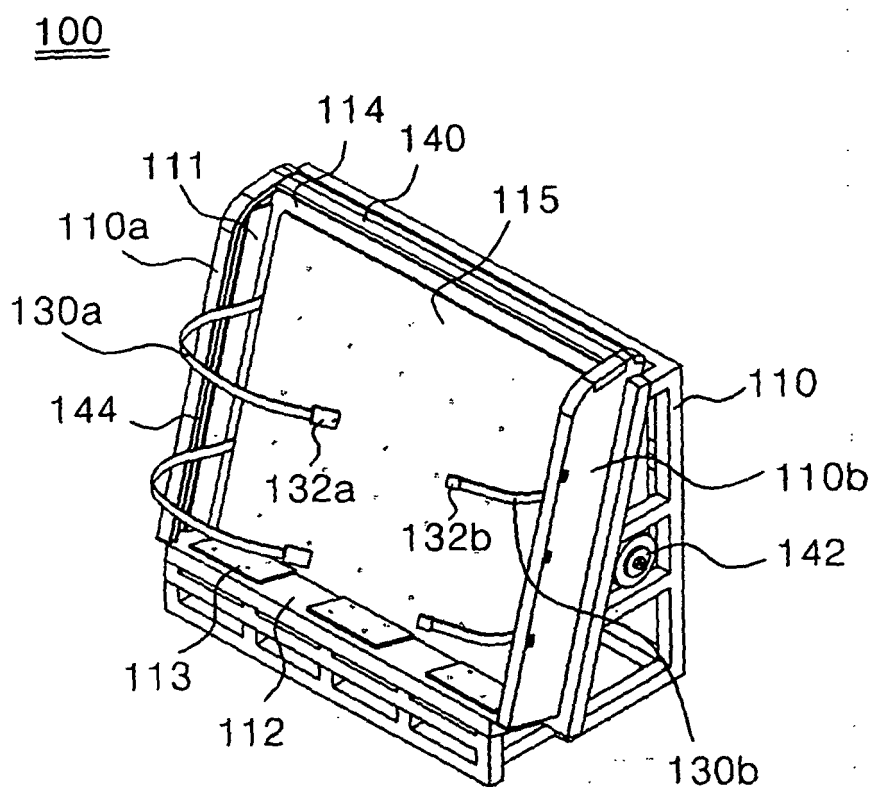
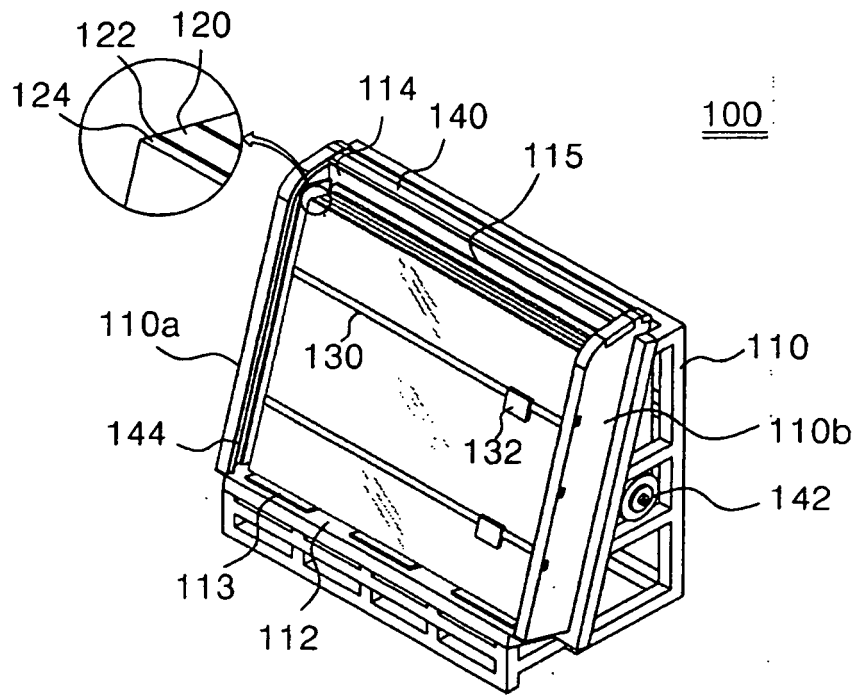
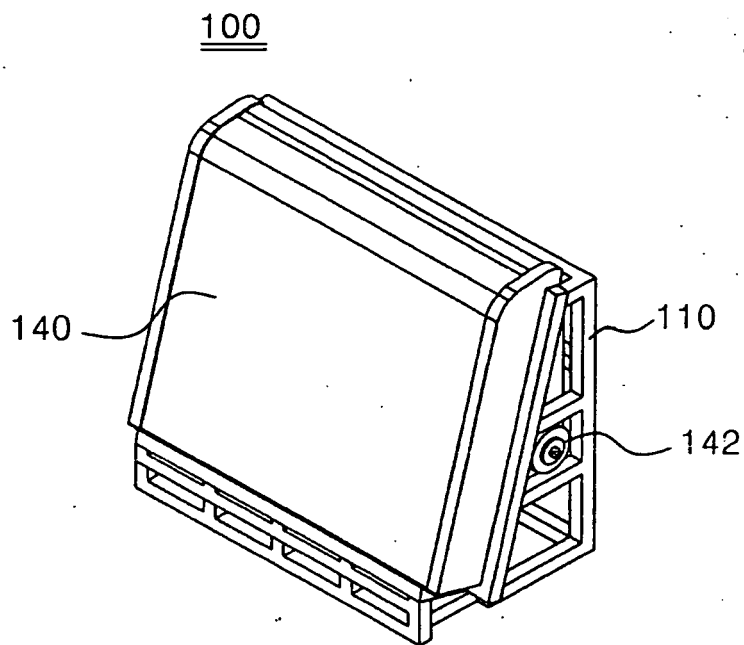


Fig. 2



(a)



(b)

Fig. 3

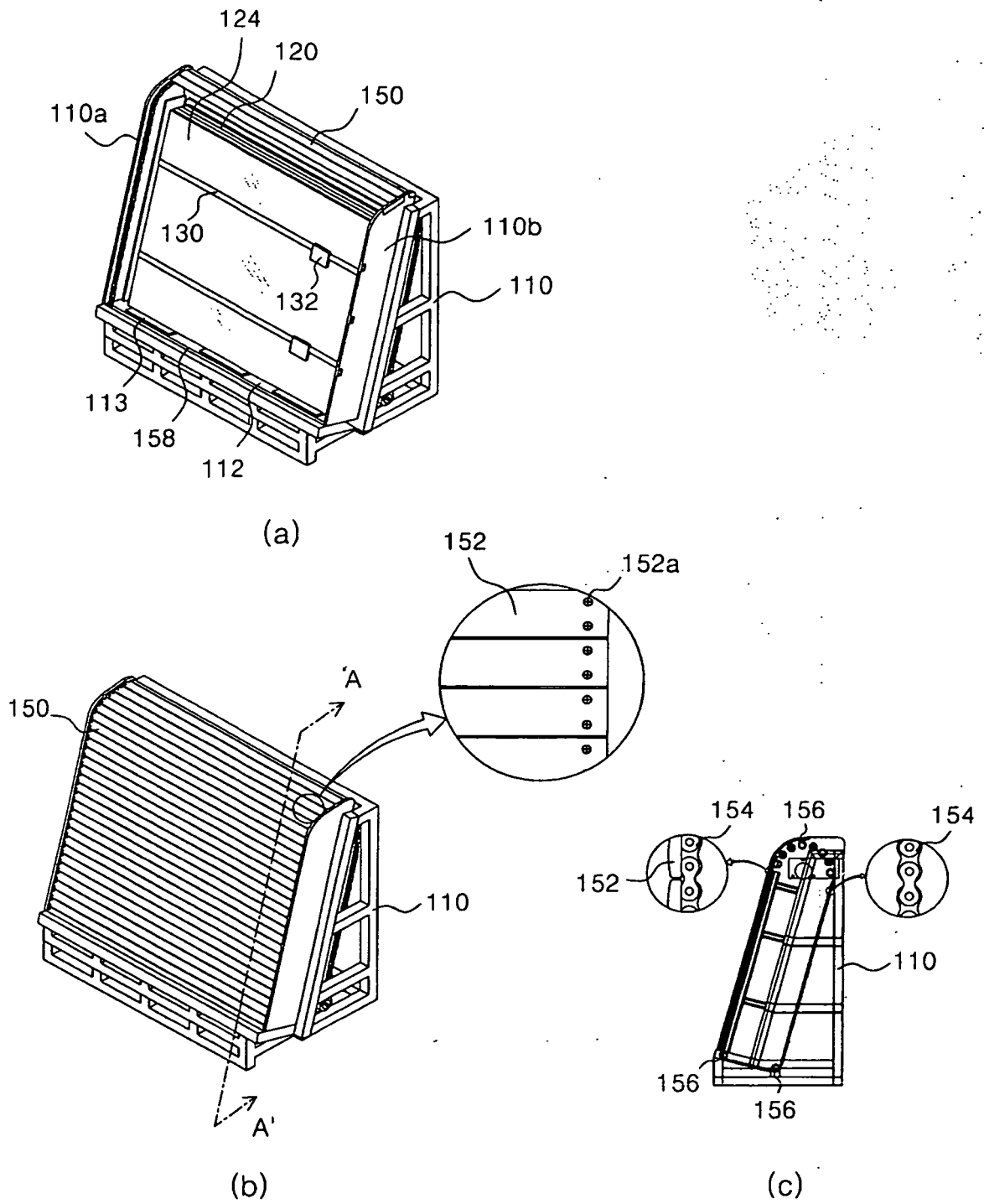


Fig. 4



**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- DE 8107930 U1 [0003]
- JP 2000203679 A [0003] [0020]