US 20060226094A1

(19) **United States**

(12) **Patent Application Publication**

(10) **Pub. No.: US 2006/0226094 A1**

(43) **Pub. Date: Oct. 12, 2006**

Cho et al.

(54) **GLASS CASSETTE FOR LOADING GLASS SUBSTRATES OF DISPLAY PANELS**

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(21) Appl. No.: **11/263,312**

(22) Filed: **Oct. 31, 2005**

(30) **Foreign Application Priority Data**

May 3, 2005 (KR) 10-2005-0037084
Apr. 8, 2005 (KR) 20-2005-0009634

Publication Classification

(51) **Int. Cl.**
A47G 19/08 (2006.01)

(52) **U.S. Cl.** **211/41.18**

(57) **ABSTRACT**

A glass cassette for loading glass substrates for display panels includes an upper plate, a lower plate, side plates, a stopper and stepped support members. The lower plate is disposed substantially parallel to the upper plate. The side plates are disposed spaced apart from each other in a first direction and substantially parallel to each other. The side plates are connected to the upper plate and the lower plate. The stopper is disposed at an end portion of the glass cassette to limit a movement of the glass substrates in a second direction that is substantially perpendicular to the first direction to stop the movement of the glass substrates upon insertion. The stopper is connected between the upper plate and the lower plate. The stepped support members are disposed at each of the side plates while facing each other in the first direction in order to flatly support the glass substrates.

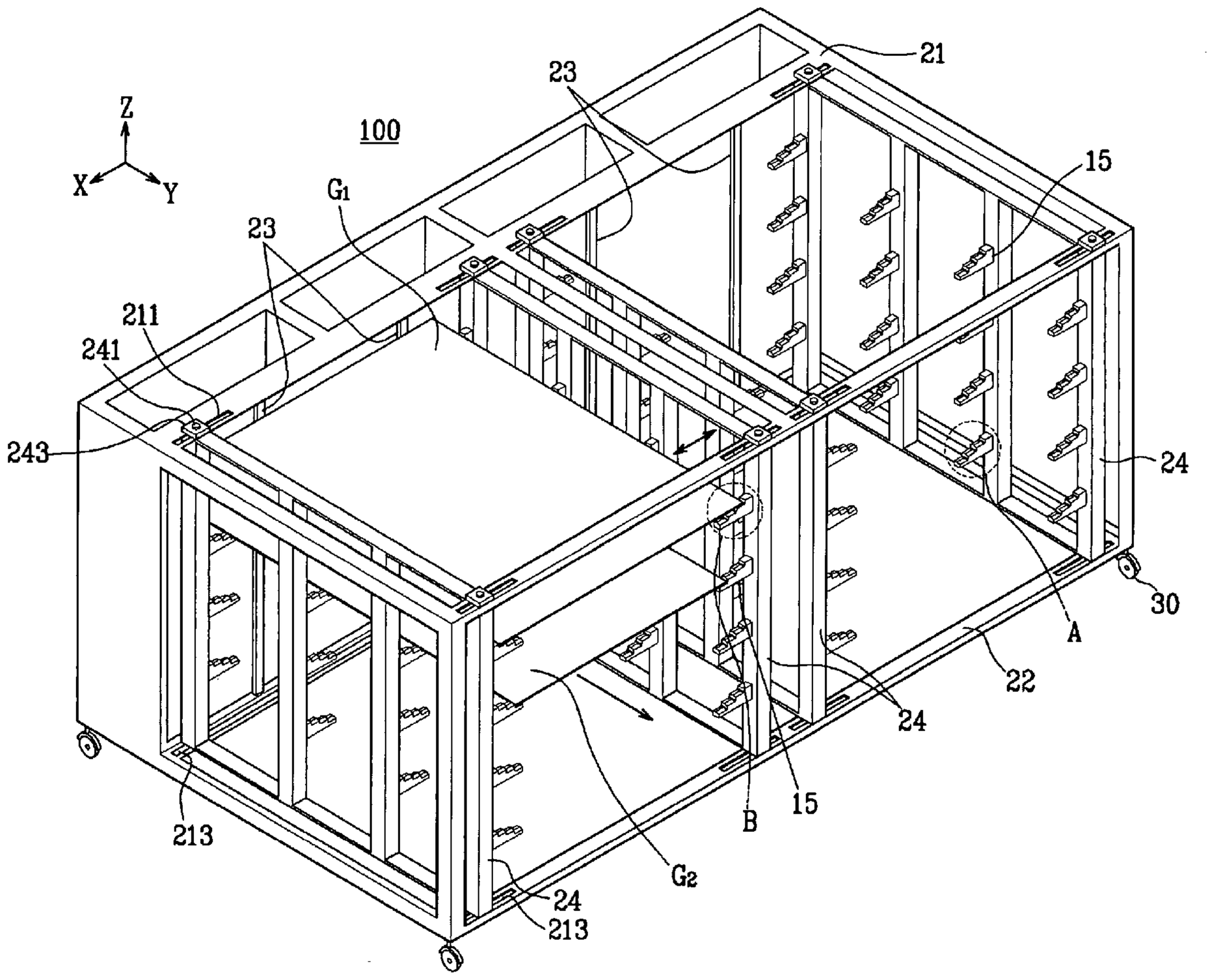


FIG. 1

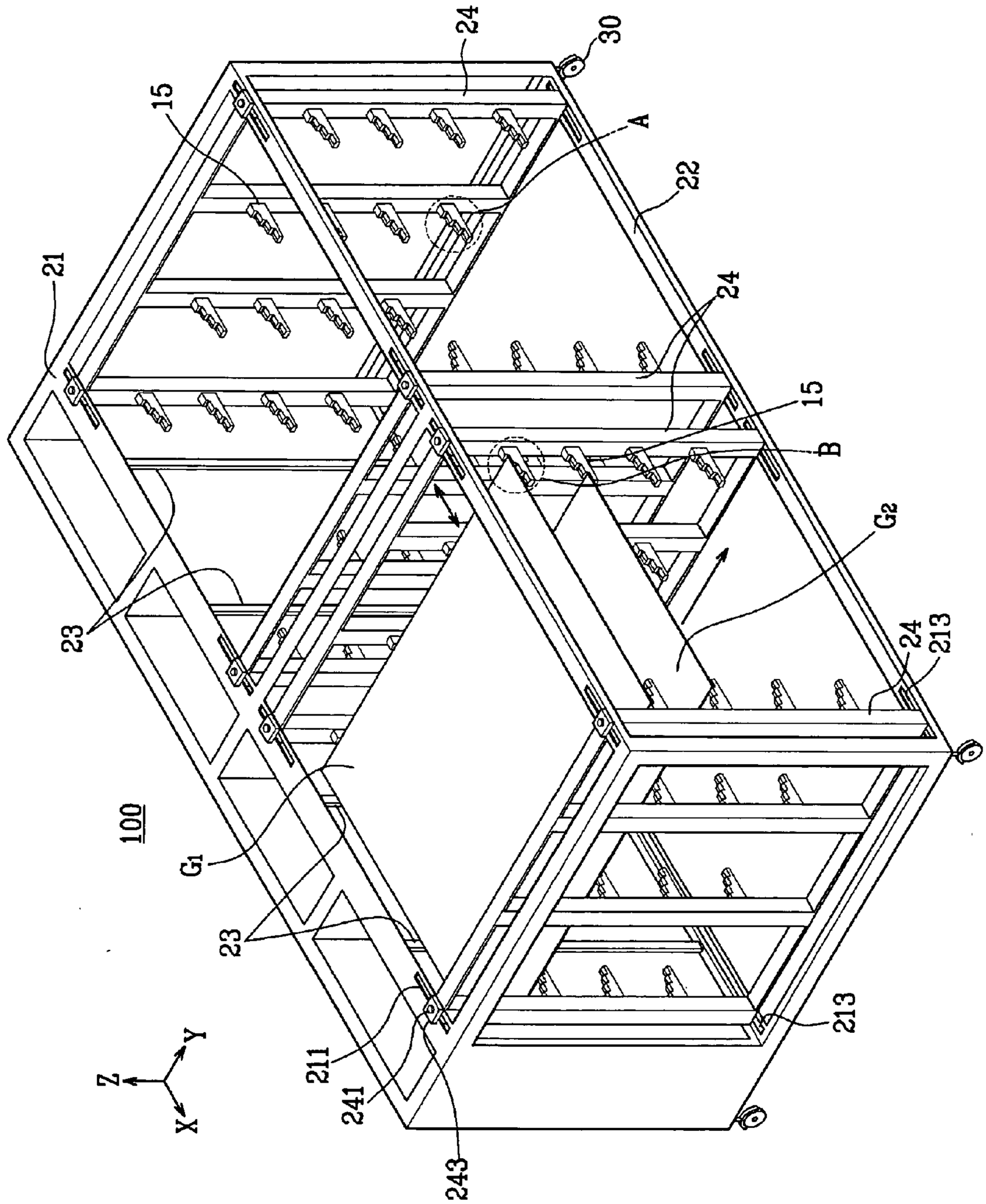
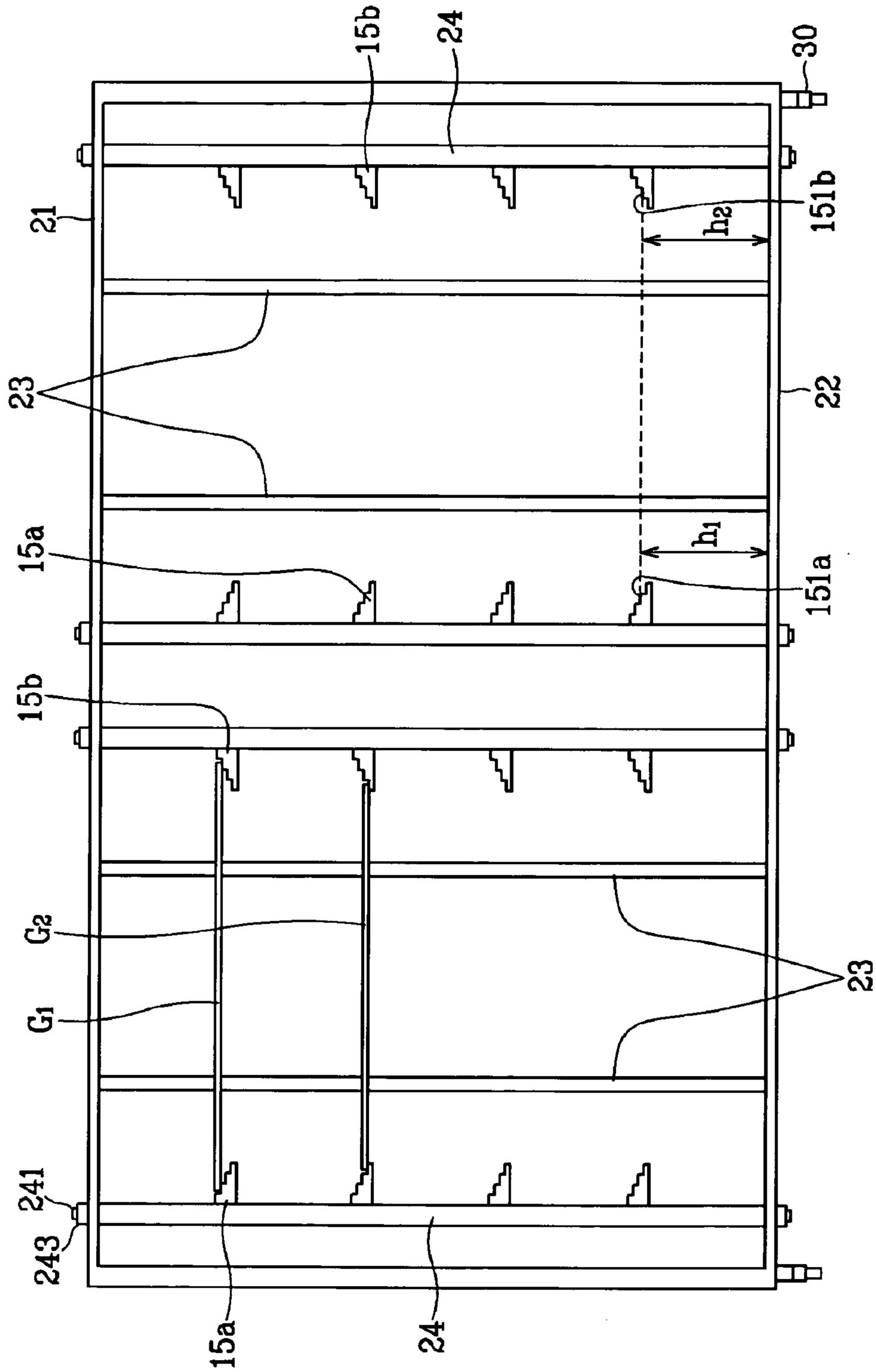


FIG. 2


100
15b
24
30
21
151b
h2
22
23
15a
h1
151a
15b
G2
G1
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241
243
15a
24

FIG. 3

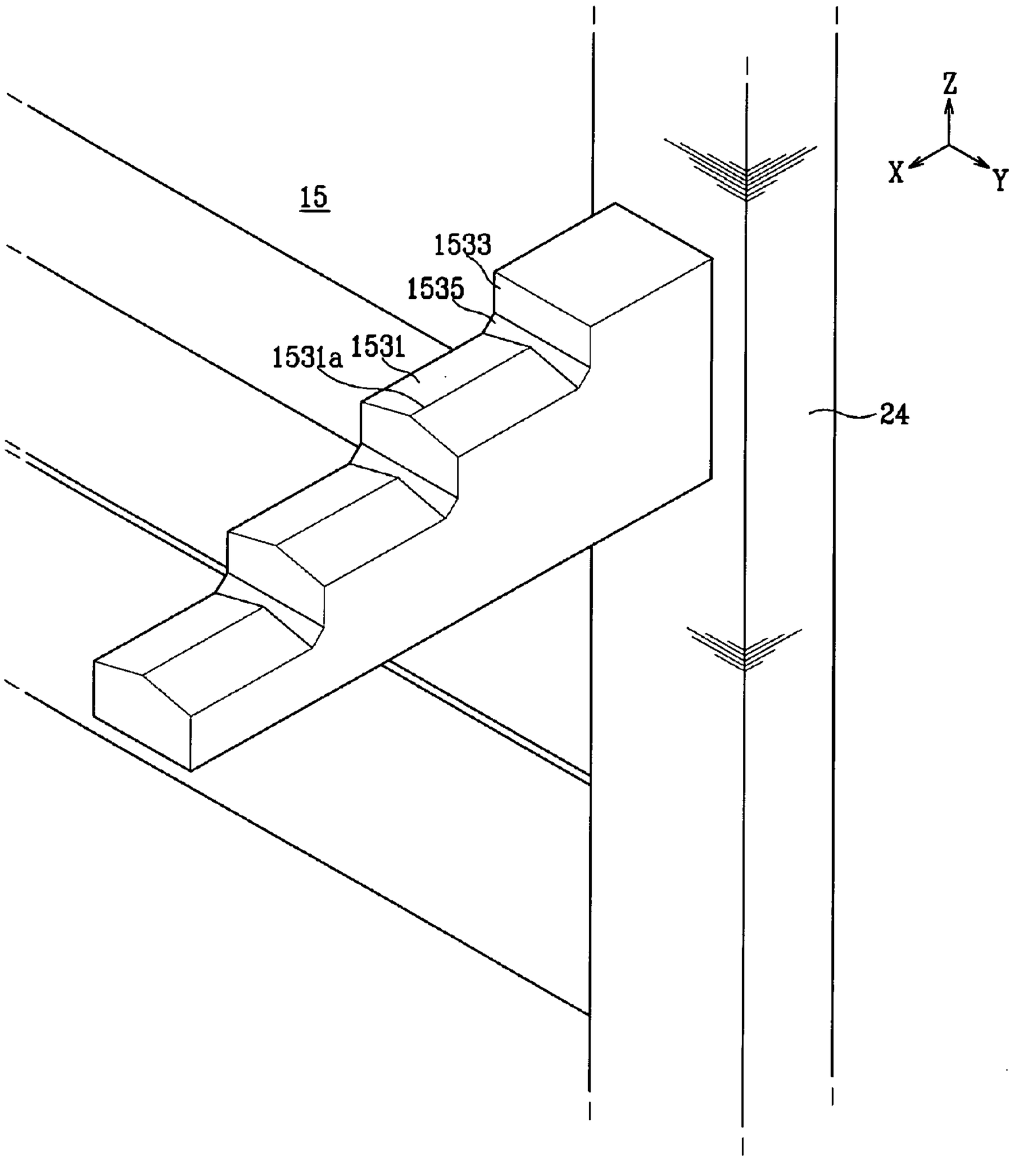


FIG. 4

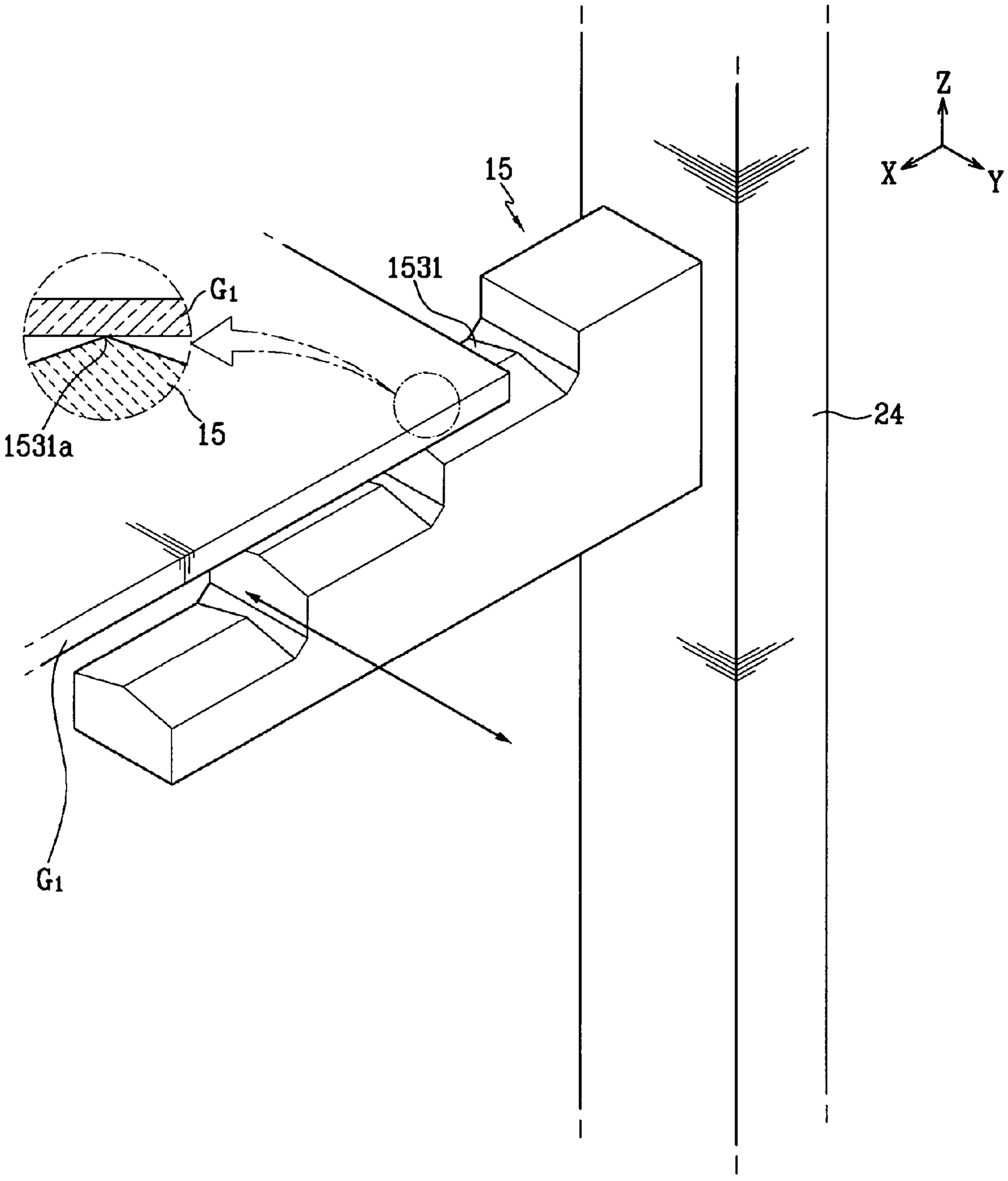
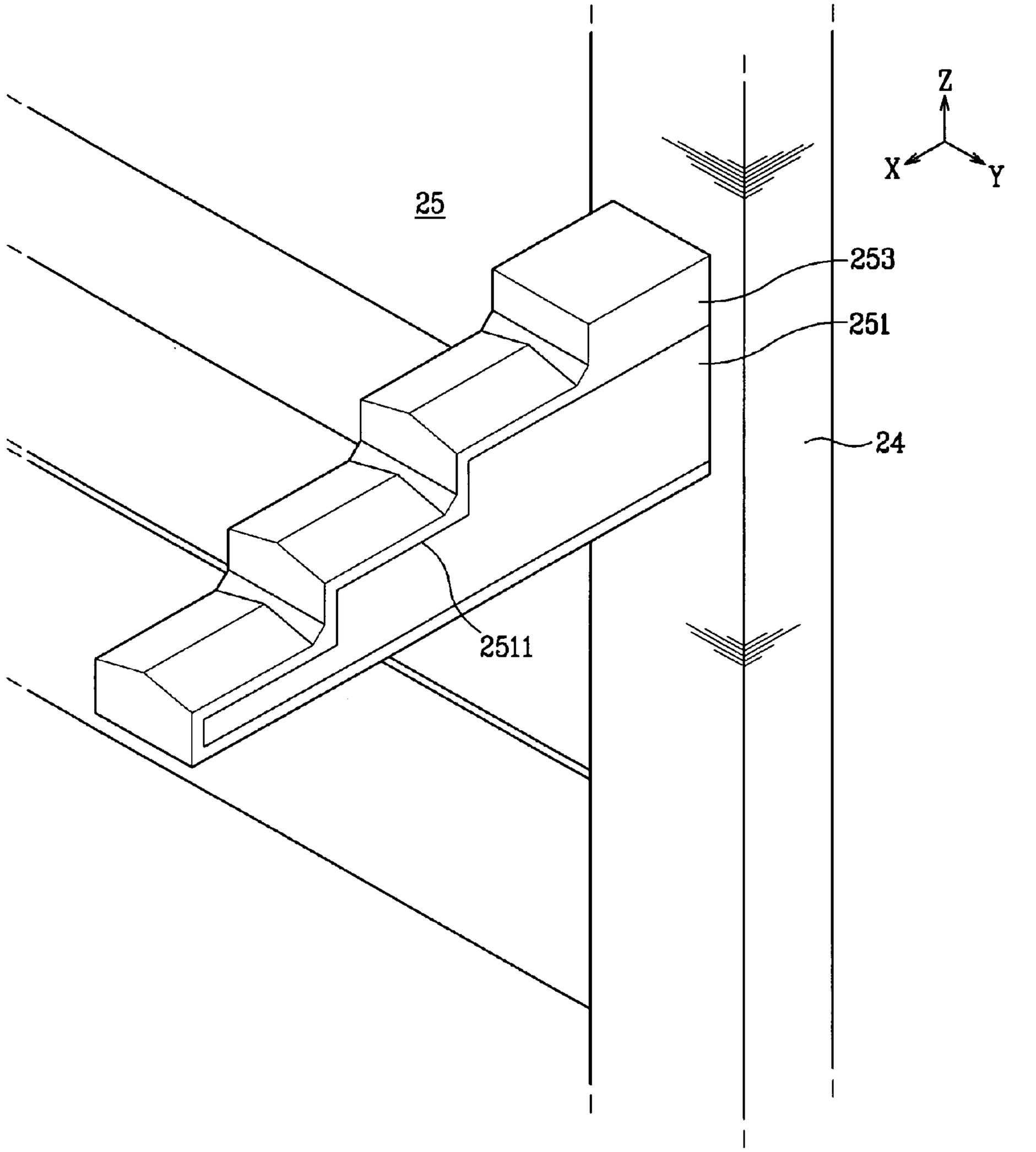


FIG. 5



GLASS CASSETTE FOR LOADING GLASS SUBSTRATES OF DISPLAY PANELS

[0001] This application claims priority to Korean Utility Model Application No. 2005-0009634 filed on Apr. 8, 2005 and Korean Patent Application No. 2005-0037084 filed on May 3, 2005, and all the benefits accruing therefrom under 35 U.S.C §119, and the contents of which in its entirety are herein incorporated by reference.

BACKGROUND OF THE INVENTION

[0002] (a) Field of the Invention

[0003] The present invention relates to a glass cassette for loading glass substrates of display panels, and more particularly, to a glass cassette for loading glass substrates having various sizes.

[0004] (b) Description of the Related Art

[0005] Recent developments in semiconductor technology have led to a demand for display devices having smaller size, decreased weight and enhanced performance. Liquid crystal display (LCD) devices, plasma display panel (PDP) devices, flat emission display (FED) devices, vacuum fluorescent display (VFD) devices, and organic light emitting display (OLED) devices are examples of such display devices.

[0006] Although display devices are manufactured by various methods, most of the display devices include a pair of glass substrates with a vacuum between the pair of glass substrates. Glass substrates are typically produced by cutting an original piece of glass into a plurality of cell glass substrates, which are used in manufacturing display devices.

[0007] The original piece of glass or the cell glass substrates are loaded into a glass cassette in order for transportation during a manufacturing process. For example, during manufacture of an LCD device, multilayered thin film patterns are disposed on transparent insulation glass panels or cell glass substrates made of, for example, SiO_2 using a deposition process and an etching process. Next, the cell glass substrates are loaded into the glass cassette and transported in order to undertake a next process. Since the cell glass substrate is suctioned and attached to an arm of a robot, it is possible to remove the cell glass substrate from the glass cassette freely. Additionally, since the cell glass substrate is transported in the glass cassette, exposed surfaces of the cell glass substrate may be protected from damage, and thereby the cell glass substrate is both preserved and easily transported.

[0008] Recently, large display devices have been manufactured using a large cell glass substrate. The large cell glass substrate is manufactured by cutting large pieces of original glass using a multi-cutting process. When the large cell glass substrate is manufactured, it is necessary for the large cell glass substrate to be loaded into the glass cassette without deflection. When the large cell glass substrate is deflected, patterns disposed on a surface of the large cell glass substrate may be damaged or the large cell glass substrate may be broken. In addition, when the large cell glass substrate is deflected while being loaded in the glass cassette, it is difficult to stably fix the large cell glass substrate in the glass cassette.

[0009] Additionally, a problem currently exists in that cell glass substrates of various sizes cannot be loaded together into a glass cassette of the prior art. Since each glass cassette currently loads cell glass substrates of only one size, many glass cassettes are required to transport each of various different sizes of glass substrates. Therefore, a cost of manufacturing display devices is increased.

SUMMARY OF THE INVENTION

[0010] The present invention is contrived to solve the above-mentioned problems by providing a glass cassette for loading glass substrates of various sizes together.

[0011] A glass cassette for loading glass substrates of display panels includes an upper plate, a lower plate, side plates, a stopper and stepped support members. The lower plate is disposed substantially parallel to the upper plate. The side plates are disposed spaced apart from each other in a first direction and substantially parallel to each other. The side plates are connected to the upper plate and the lower plate. The stopper is disposed at an end portion of the glass cassette to limit a movement of the glass substrates in a second direction that is substantially perpendicular to the first direction to stop the movement of the glass substrates upon insertion. The stopper is connected between the upper plate and the lower plate. The stepped support members are disposed at each of the side plates while facing each other in the first direction in order to flatly support the glass substrates.

[0012] In another exemplary embodiment of the present invention, a glass cassette for loading glass substrates of display panels includes an upper plate, a lower plate, side plates, and stepped support members including a resin. The lower plate is disposed substantially parallel to the upper plate. The side plates are disposed spaced apart from each other in a first direction and substantially parallel to each other. The side plates are connected to the upper plate and the lower plate. The stepped support members including a resin are disposed at each of the side plates while facing each other in the first direction in order to flatly support the glass substrates. Each of the support members includes multiple glass supporting surfaces corresponding to glass substrates of various sizes.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The above and other features and advantages of the present invention will become more apparent by describing in detail exemplary embodiments thereof with reference to the attached drawings, in which:

[0014] **FIG. 1** is a perspective view of a glass cassette according to an exemplary embodiment of the present invention;

[0015] **FIG. 2** is a front view of the glass cassette of **FIG. 1**;

[0016] **FIG. 3** is an enlarged view of area A of **FIG. 1**;

[0017] **FIG. 4** is an enlarged view of area B of **FIG. 1**; and

[0018] **FIG. 5** is an enlarged view of a stepped supporting member of a glass cassette according to an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0019] Hereinafter, exemplary embodiments of the present invention will be described in detail with reference to FIGS.

1 to **5**. The embodiments herein explained are intended only to exemplify the present invention, and thus the present invention is not limited thereto.

[**0020**] **FIG. 1** shows a glass cassette **100** for loading glass substrates of various sizes. For example, as shown in **FIG. 1**, a size of a relatively large glass substrate G_1 is larger than a size of a relatively small glass substrate G_2. A structure of the glass cassette **100** shown in **FIG. 1** is merely to illustrate an exemplary embodiment of the present invention and the present invention is not limited thereto. Accordingly, the structure of the glass cassette **100** may be modified into other forms.

[**0021**] A shape of the glass cassette **100** shown in **FIG. 1** is similar to a hexahedron. The glass cassette **100** includes side plates **24** that are installed to face each other. The side plates **24** are extended in a Y-axis direction and arranged in an X-axis direction, which is substantially perpendicular to the Y-axis direction, such that each of the side plates **24** is substantially parallel to each other and faces each other. The side plates **24** are spaced apart from each other along the X-axis direction by a selected distance. The side plates **24** are extended in a Z-axis direction, which is substantially perpendicular to an X-Y plane. In order to load as many glass substrates into the glass cassette **100** as possible, it is desirable that the glass substrates are loaded in the Y-axis direction. In order for a glass handling robot to conveniently handle the glass substrates and in order to occupy an effective processing space in a production line, it is desirable that accommodation for size differences between the glass substrates should be made in the X-axis direction rather than in the Z-axis direction. Therefore, the side plates **24** are installed along the X-axis direction such that the glass cassette **100** may accommodate glass substrates having different sizes.

[**0022**] It is possible to adjust a spacing between the side plates **24** along the X-axis direction by moving the side plates **24**, as described below. Therefore, the relatively small glass substrate G_1 can be loaded into a space between one set of side plates **24**, while the relatively large glass substrate G_2 can be loaded into a space between another set of side plates **24**. Alternatively, the relatively small and large glass substrates G_1 and G_2 may both be loaded between a same set of side plates **24** because the glass cassette **100** includes support members capable of accommodating glass substrates having various sizes. Advantageously, occupying efficiency of space within the glass cassette **100** may be improved.

[**0023**] Referring to **FIG. 1**, the glass cassette **100** includes an upper plate **21**, a lower plate **22**, the side plates **24**, and a stopper **23**. The glass cassette **100** may also include other elements, if necessary. The glass substrates may be inserted into the glass cassette **100** or removed from the glass cassette **100** in a direction indicated by an arrow (in the Y-axis direction). The stopper **23** is installed at an interior portion of the glass cassette **100** such that the stopper **23** limits motion of the glass substrates G_1 and G_2 in the Y-axis direction in order to stop them upon insertion. The stopper **23** extends in the Z-axis direction, for example, from the lower plate **22** to the upper plate **21**. Therefore, the stopper **23** prevents the glass substrates from falling out of the glass cassette **100**.

[**0024**] The stopper **23** in **FIG. 1** is shown substantially in a vertical orientation along the Z-axis, but alternatively, the stopper **23** may be placed diagonally from the lower plate to the upper plate **21**. In other alternative embodiments, a single stopper **23** or more than two may be installed on the interior portion of the glass cassette **100** such that that movement of the glass substrates G_1 and G_2 in the Y-axis may be limited.

[**0025**] The lower plate **22** is disposed substantially parallel to the upper plate **21** and faces the upper plate **21**. Rollers **30** may be installed under the lower plate **22** to permit movement of the glass cassette **100**. The side plates **24** connect the upper plate **21** and the lower plate **22** together and face each other. A plurality of stepped support members **15** may be installed on each of the side plates **24** to have a predetermined spacing between each of the stepped support members **15** in both the Y-axis and Z-axis directions. Each of the stepped support members **15** extends toward a corresponding one of the stepped support members **15** disposed at a corresponding one of the side plates **24**.

[**0026**] The stepped support members **15** may be individually installed on the side plates **24**. The side plates **24** may be configured to allow the support members **15** to be installed at any of a number of positions along the side plates **24**. In alternative embodiments, the stepped support members **15** may be pre-assembled onto a strip (not shown), the strip with the support members **15** then installed on the side plates.

[**0027**] Glass substrates of various sizes may be loaded into the glass cassette **100** together due to a structure of the stepped support members **15**. In other words, as shown in **FIG. 1**, it is possible to load the relatively large glass substrate G_1 and the relatively small glass substrate G_2 into the glass cassette **100** together.

[**0028**] Referring to **FIG. 1**, the upper plate **21** and the lower plate **22** may have top and bottom grooves **211** and **213**, respectively. The top and bottom grooves **211** and **213** face each other along the Z-axis direction and are formed along the X-axis direction. The side plates **24** are installed to enable movement of the side plates **24** along the grooves **211** and **213** in the X-axis direction. For example, the side plates **24** can be freely moved in the X-axis direction by releasing screws **241**. The screws **241** are screwed into a hole (not shown) which is continuously formed through screw fixing members **243** and the side plates **24**. When the side plates **24** are placed in a desirable position, is the side plates **24** are fixed there by tightening the screws **241**. Therefore, it is possible to adjust spacing between stepped support members **15** facing each other according to a size of the glass substrates.

[**0029**] The screw fixing members **243** can be detached from the side plates **24** by completely unscrewing the screws **241** if necessary. Therefore, the side plates **24** may be easily removed from the glass cassette **100**. Removal of the side plates **24** may be necessary when a spacing between the side plates **24** and stepped support members **15** must be adjusted in order to load a much larger glass substrate. Advantageously, the glass cassette **100** is easily maneuverable and configurable to enhance a transporting capability of glass substrates so that manufacturing time is reduced since the side plates **24** can be easily detached from the glass cassette **100** or repositioned.

[**0030**] As shown in **FIG. 2**, the glass substrates $G_{1 \text{ and } G2}$, which are inserted into the glass cassette **100**, are flatly

supported in the X-Y plane or horizontal direction. The stepped support members **15** are formed to face each other in the horizontal direction so as to flatly support the glass substrates. Advantageously, it is also possible to prevent deflection of the glass substrates such that patterns formed on the glass substrates are not damaged.

[**0031**] The stepped support members **15** include a first stepped support member **15***a* and a second stepped support member **15***b* facing the first stepped support member **15***a*. The glass substrate (G_1 for example) may be loaded onto corresponding steps of the first stepped support member **15***a* and the second stepped support member **15***b*. In an exemplary embodiment of the present invention, heights of the steps of the first and second stepped support members **15***a* and **15***b* facing each other may be substantially the same in order to flatly support the relatively large and small glass substrates $G_{1 \text{ and } G2}$.

[**0032**] For example, a vertical distance h_1 between a step **151***a* of the first stepped support member **15***a* and the lower plate **22** is substantially same as a vertical distance h_2 between a corresponding step **151***b* of the second stepped support member **15***b*, which faces to the step **151***a* of the first stepped support member **15***a*, and the lower plate **22**. Therefore, it is possible to load a glass substrate into the glass cassette **100** stably.

[**0033**] In alternative embodiments, the heights of the steps of the first and second stepped support members **15***a* and **15***b* may be different as to support the glass substrates G_1 and G_2 at an angle as retrieval or placement of the glass substrates G_1 and G_2 into the glass cassette **100** may require.

[**0034**] An enlarged view of area A of **FIG. 1** showing the stepped support member **15** is shown in **FIG. 3**. The stepped support member **15** has a structure capable of supporting various sizes of glass substrates without changing a position of the side plates **24**. The shape of the stepped support member **15** shown in **FIG. 3** is merely to illustrate an exemplary embodiment of the present invention, and the present invention is not limited thereto.

[**0035**] An external surface of the stepped support member **15** is shaped like steps which include alternating glass supporting surfaces **1531** and vertical surfaces **1533** which are continuously connected to each other. In other words, the external surface of the stepped support member **15** includes a series of alternating vertical surfaces **1533** and glass supporting surfaces **1531**, which form a series of steps. Although three such steps are shown in **FIG. 3**, a number of the steps may be more or less than three as desired. Therefore, a glass substrate may be loaded into or removed from the glass cassette **100** by a robot or an operator and the glass substrate is effectively supported while taking up minimal space in the glass cassette **100**. Advantageously, the glass substrate may be prevented from being cracked and a generation of particulates is prevented by reducing contact or interference with the vertical surface **1533** of the stepped support member **15**.

[**0036**] In an exemplary embodiment, the stepped support member **15** is made of a resin, which is substantially non-abrasive and provides stability for the glass substrate when the glass substrate is placed on the stepped support member **15** and comes in contact therewith. Advantageously, the glass substrate is prevented from being scratched.

[**0037**] Glass substrates undergo a thermal treating process while in the glass cassette **100**. Therefore, there is a possibility that the stepped support member **15** may be thermally deformed if a general resin is used to form the stepped support member **15**. Thus, polyether ether ketone (PEEK), which is resistant to thermal deformation, is used as the resin in the stepped support member **15**.

[**0038**] A peak **1531***a* may be formed on the external surface of the stepped support member **15**, which comes in contact with the glass substrate. A shape of the peak **1531***a* in **FIG. 3** is merely to illustrate an exemplary embodiment of the present invention and the present invention is not limited thereto. Therefore, the shape of the peak **1531***a* can be modified to other forms. Advantageously, the peak **1531***a* minimizes friction between the glass substrate and the stepped support member **15** to prevent scratches on a surface of the glass substrate by minimizing a contact area between the glass substrate and the stepped support member **15**. This will be explained in more detail with reference to **FIG. 4** below.

[**0039**] An inclined surface **1535** may be formed between the glass supporting surface **1531** and the vertical surface **1533** of the stepped support member **15**. The inclined surface **1535** advantageously reduces interference between the glass substrate and the vertical surface **1533** of the stepped support member **15**, and makes it easier to load the glass substrate into the glass cassette **100**.

[**0040**] **FIG. 4** is an enlarged view showing the stepped support member **15** of area B of **FIG. 1**. The relatively larger glass substrate G_1 is loaded onto the stepped support member **15**. The glass supporting surface **1531** is peaked along the X-axis direction substantially perpendicular to the glass-inserting direction (the direction indicated by an arrow in the y-direction). In other words, the peak **1531***a* of each glass supporting surface **1531** extends in the X-axis direction, which is substantially perpendicular to the glass-inserting direction.

[**0041**] An enlarged circle of **FIG. 4** shows a cross section of a portion of the relatively large glass substrate G_1 and the stepped support member **15**. As shown in **FIG. 4**, a contact area between the relatively large glass substrate G_1 and the glass supporting surface **1531** on which the relatively large glass substrate G_1 is loaded is minimized. In other words, the relatively large glass substrate G1 only comes in contact with the peak **1531***a* of the stepped support member **15**. In particular, the glass supporting surface **1531** is shaped with inclined surfaces that form the peak **1531***a*. Therefore, particulates do not remain on the glass supporting surface **1531** but rather fall off. Advantageously, since the particulates are removed in this manner, deterioration of quality of a glass substrate due to the particulates is reduced, or effectively prevented.

[**0042**] **FIG. 5** shows a stepped support member **25** provided in the glass cassette **100** according to another exemplary embodiment of the present invention. Since a structure of the stepped support member **25** is substantially same as the stepped support member **15** described with reference to **FIGS. 1-4**, a detailed explanation of the same elements will be omitted for convenience.

[**0043**] As shown in **FIG. 5**, a metal portion **251** is included in the stepped support member **25**. An external

surface of the metal portion **251** is covered with a resin **253**. Since a forming process of the resin **253** on the external surface of the metal portion **251** can be easily understood by those skilled in the art, a detailed explanation of the forming process is omitted.

[**0044**] It is possible to easily injection-mold the resin **253** on the external surface of the metal portion **251**. Strength of the metal portion **251** allows a length of the stepped support member **25** to be increased in order to stably support a large glass substrate. In such a case, if the stepped support member **25** is manufactured using the metal portion **251**, the resin **253** does not sink while being injection-molded.

[**0045**] Since the stepped support member **25** is extended in the X-axis direction, it is pressed downward (Z-axis direction) when the large glass substrate is loaded thereon. Accordingly, unless it is strong enough, the stepped support member **25** can be deflected downward and the large glass substrate may fall off. Advantageously, strength of the stepped support member **25** is improved by using the metal portion **251**, which reduces, or effectively prevents deflection of the stepped support member **25**.

[**0046**] In an exemplary embodiment, a light material with good strength such as Al is used as the metal portion **251**, although other light materials may also be used. The metal portion **251** may be integrally manufactured with the side plate **24** and then injection-molded with the resin **253**.

[**0047**] In addition, an upper surface **2511** of the metal portion **251** is stepped, thereby reinforcing the strength of the stepped support member **25**, while allowing multiple sized glass substrates to be transported by the glass cassette **100** without requiring a repositioning of the side plates **24**. Although the upper surface **2511** of the metal portion **251** is stepped in **FIG. 5**, this is merely to illustrate an exemplary embodiment of the present invention and the present invention is not limited thereto. Therefore, it is satisfactory if at least one external surface among the external surfaces of the metal portion **251** is stepped.

[**0048**] Direct contact between a glass substrate and the metal portion **251** may cause damage to the glass substrate. In order to prevent damage to the glass substrate, at least one external surface of the stepped support member **25** that comes in contact with the glass substrate may be made of or coated with the resin **253**.

[**0049**] In a glass cassette according to an exemplary embodiment of the present invention, stepped support members are installed in the horizontal direction while facing each other. Advantageously, damage to the glass substrate caused by deflection thereof can be reduced, or effectively prevented.

[**0050**] Since a vertical distance between a step of a first stepped support member and a lower plate of the glass cassette may be substantially the same as a vertical distance between a corresponding step of a second stepped support member and the lower plate, the glass substrate may be stably loaded in the glass cassette.

[**0051**] A peak may be formed on an external surface of the stepped support members and comes in contact with the glass substrate to minimize a contact area between the glass substrate and the stepped support member and reduce, or effectively prevent scratches or damage to a surface of the glass substrate.

[**0052**] Inclined surfaces are formed between the glass supporting surface and a vertical surface of the stepped support member, and thereby interference between the glass substrate and the vertical surface of the stepped support member can be minimized. Therefore, it is easy to load the glass substrate into the glass cassette.

[**0053**] Since grooves are formed in an upper plate and lower plate of the glass cassette, it is possible for spacing between side plates facing each other to be varied. Since the stepped support members are made of a resin, the glass substrate is prevented from being damaged. Since PEEK is used as the resin, thermal deformation of the stepped support members is prevented. A metal portion may be included in the stepped support member, thus strength of the stepped support member is reinforced.

[**0054**] Although exemplary embodiments of the present invention have been described, it can be obviously understood by those skilled in the art that the present invention may be modified in various forms without departing from the spirit and scope of the appended claims.

What is claimed is:

1. A glass cassette for loading glass substrates of display panels, wherein the glass cassette comprises:

an upper plate;

a lower plate disposed substantially parallel to the upper plate;

side plates disposed spaced apart from each other in a first direction and substantially parallel to each other, the side plates being connected to the upper plate and the lower plate;

a stopper disposed at an end portion of the glass cassette to limit a movement of the glass substrates in a second direction that is substantially perpendicular to the first direction to stop the movement of the glass substrates upon insertion, the stopper being connected between the upper plate and the lower plate; and

stepped support members disposed at each of the side plates while facing each other in the first direction in order to flatly support the glass substrates.

2. The glass cassette of claim 1, wherein the stepped support members comprise:

a first stepped support member disposed at a first side plate; and

a second stepped support member disposed at a second side plate corresponding to the first side plate such that the first and second stepped support members face each other,

wherein a vertical distance between a step of the first stepped support member and the lower plate is substantially same as the vertical distance between a step of the second stepped support member, which faces the step of the first stepped support member, and the lower plate.

3. The glass cassette of claim 1, wherein a glass supporting surface is disposed on an external surface of the stepped support members and comes in contact with the glass substrate.

4. The glass cassette of claim 3, wherein the glass supporting surface includes a peak that extends in a direction

perpendicular to a direction at which the glass substrates are inserted into the glass cassette.

5. The glass cassette of claim 1, wherein the stepped support member includes alternating glass supporting surfaces and vertical surfaces that are continuously connected to each other to form steps, and an inclined surface is disposed between each of the glass supporting surfaces and the vertical surfaces.

6. The glass cassette of claim 1, wherein the upper plate and the lower plate each have grooves extending along the first direction and facing each other, and a position of each of the side plates is adjustable along the grooves in order to adjust a spacing between the stepped support members responsive to a size of the glass substrates.

7. The glass cassette of claim 1, wherein the stepped support member comprises a metal portion.

8. A glass cassette for loading glass substrates of display panels, wherein the glass cassette comprises:

an upper plate;

a lower plate disposed substantially parallel to the upper plate;

side plates disposed spaced apart from each other in a first direction and substantially parallel to each other, the side plates being connected to the upper plate and the lower plate; and

support members disposed at each of the side plates while facing each other in the first direction in order to flatly support the glass substrates,

wherein each of the support members comprises multiple glass supporting surfaces corresponding to glass substrates of varying sizes.

9. The glass cassette of claim 8, further comprising a stopper disposed at an end portion of the glass cassette to limit a movement of the glass substrates in a second direction that is substantially perpendicular to the first direction to stop the movement of the glass substrates upon insertion, the stopper being connected between the upper plate and the lower plate.

10. The glass cassette of claim 8, wherein a distance between the side plates is adjustable along grooves disposed in the upper and lower plates.

11. A glass cassette for loading glass substrates of display panels, wherein the glass cassette comprises:

an upper plate;

a lower plate disposed substantially parallel to the upper plate;

side plates disposed spaced apart from each other in a first direction and substantially parallel to each other, the side plates being connected to the upper plate and the lower plate;

a stopper disposed at an end portion of the glass cassette to limit a movement of the glass substrates in a second direction that is substantially perpendicular to the first direction to stop the movement of the glass substrates upon insertion, the stopper being connected between the upper plate and the lower plate; and

stepped support members comprising a resin, the stepped support members disposed at each of the side plates while facing each other in the first direction in order to flatly support the glass substrates.

12. The glass cassette of claim 11, wherein the resin is a polyether ether ketone (PEEK).

13. The glass cassette of claim 11, wherein the stepped support member further comprises a metal portion.

14. The glass cassette of claim 11, wherein an external surface of the stepped support member that comes in contact with the glass substrates is made of the resin.

15. The glass cassette of claim 11, wherein the resin is a polyether ether ketone (PEEK).

16. The glass cassette of claim 13, wherein the metal portion is made of aluminum (Al).

17. The glass cassette of claim 13, wherein an external surface of the metal portion is stepped.

18. The glass cassette of claim 13, wherein the metal portion is integrally formed with one of the side plates.

19. A glass cassette for loading glass substrates of display panels, wherein the glass cassette comprises:

an upper plate;

a lower plate disposed substantially parallel to the upper plate;

side plates disposed spaced apart from each other in a first direction and substantially parallel to each other, the side plates being connected to the upper plate and the lower plate; and

support members comprising a resin disposed at each of the side plates while facing each other in the first direction in order to flatly support the glass substrates,

wherein each of the support members comprises multiple glass supporting surfaces corresponding to glass substrates of varying sizes.

20. The glass cassette of claim 19, further comprising a stopper disposed at an end portion of the glass cassette to limit a movement of the glass substrates in a second direction that is substantially perpendicular to the first direction to stop the movement of the glass substrates upon insertion, the stopper being connected between the upper plate and the lower plate.

21. The glass cassette of claim 19, wherein a distance between the side plates is adjustable along grooves disposed in the upper and lower plates.

22. The glass cassette of claim 19, wherein the support members further comprise a metal portion, and the resin is disposed at a surface of the support members that contact the glass substrates.

* * * * *