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KASUGA

(54) **TRANSPORT TRAY, AND TRANSPORTING PACKAGE AND METHOD USING THE SAME**

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USPC **206/454**

(57) **ABSTRACT**

A transport tray can be commonly used for transporting two articles whose shapes and thickness are different between factories, and an exterior box also can be commonly used. A first placement section is formed on a surface side, a second placement section is formed on a back side to overlap with the first placement section. The first placement section includes a depressed part having an enough depth for receiving a LC cell, and the cell is held at a predetermined position by a bottom face and a side face that constitute the depressed part. The second placement section is formed by the supporting walls that protrudes to the back side and that has an enough depth for receiving a LC module. The module placed in the region surrounded by the supporting walls is held at a predetermined position by a bottom face and a side face that constitute the region.

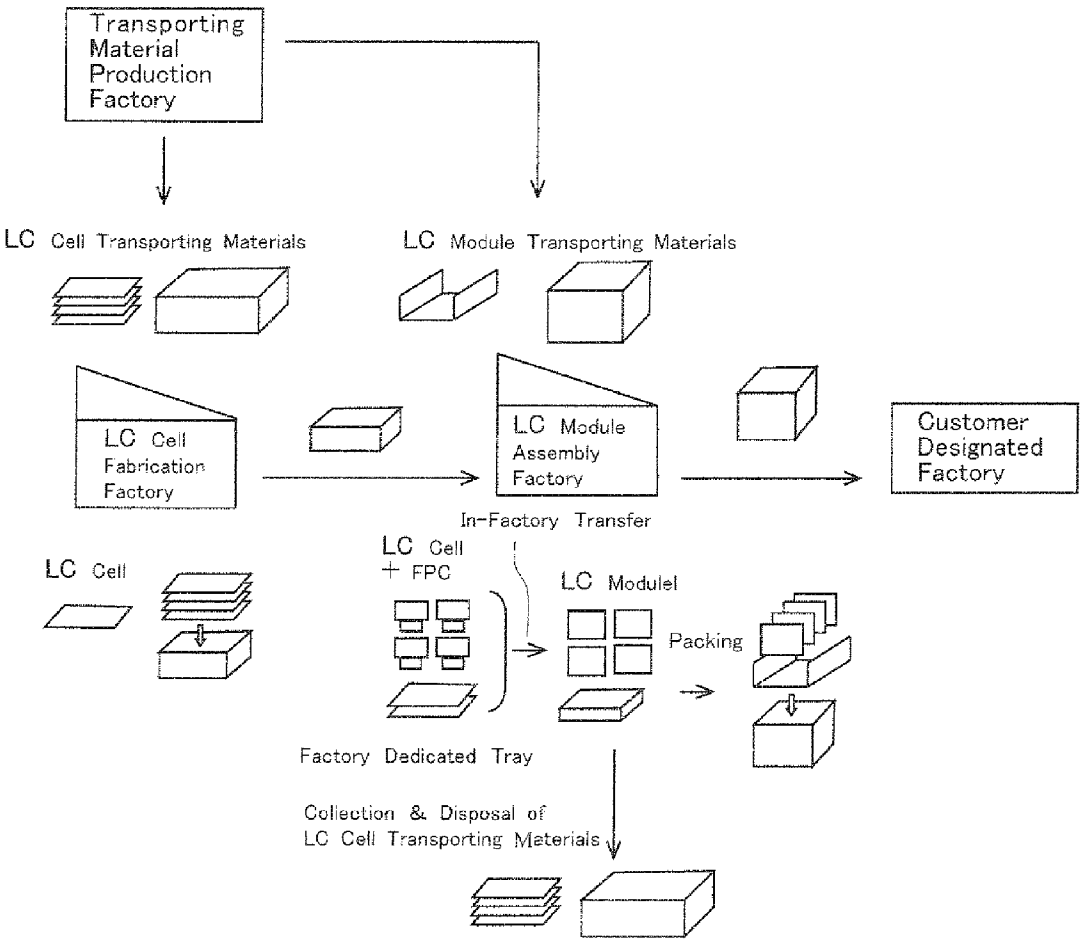


FIG. 1

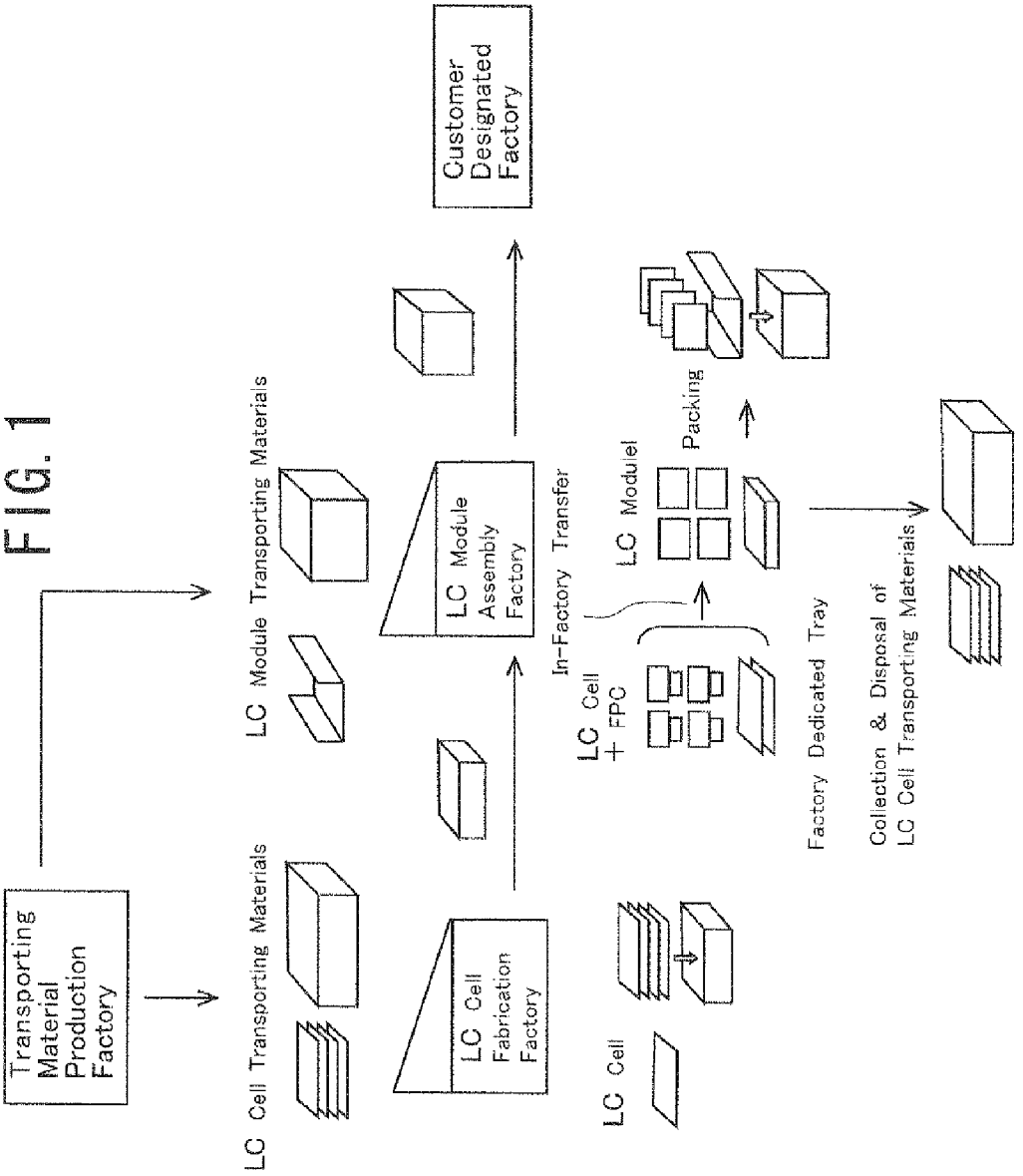

Transporting Material Production Factory
LC Cell Transporting Materials
LC Module Transporting Materials
LC Cell Fabrication Factory
LC Module Assembly Factory
Customer Designated Factory
In-Factory Transfer
LC Cell
LC Cell + FPC
LC Module
Packing
Factory Dedicated Tray
Collection & Disposal of LC Cell Transporting Materials

FIG. 2

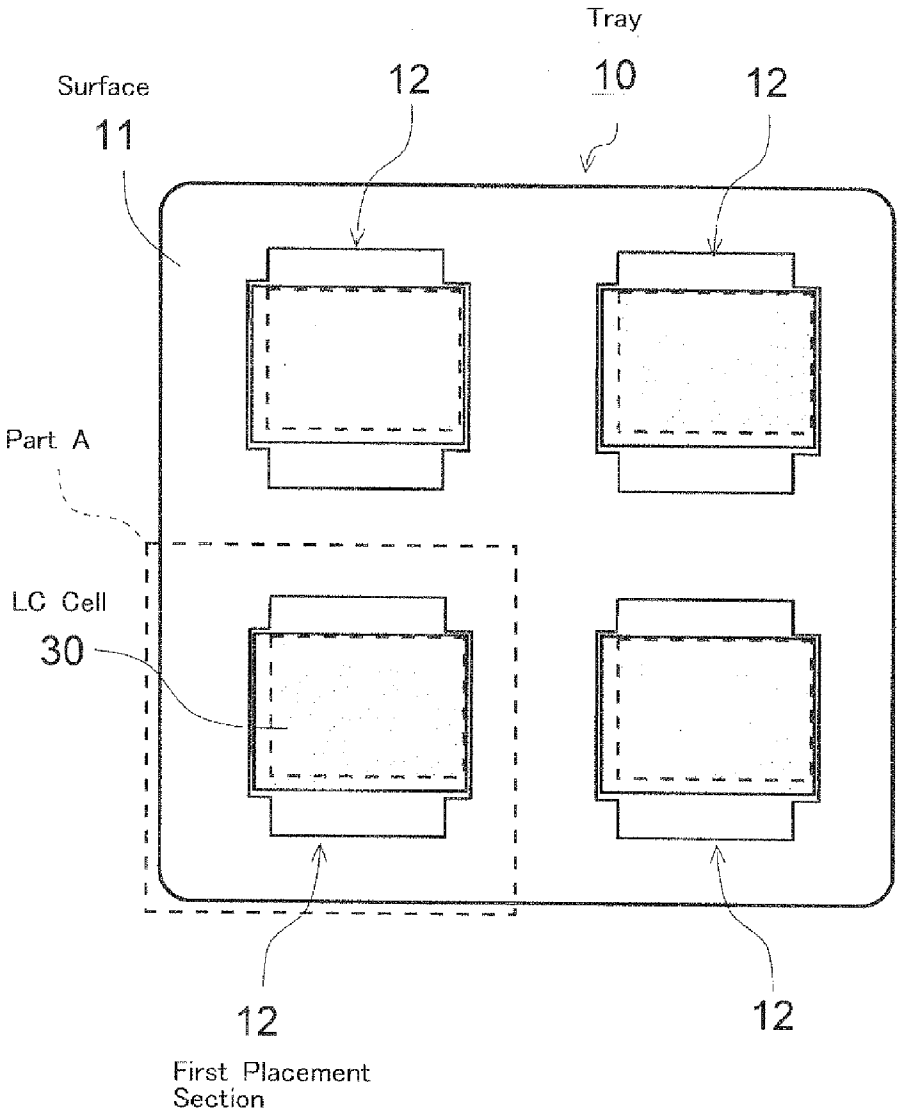

Tray
10
Surface
11
12
12
Part A
LC Cell
30
12
12
First Placement
Section

FIG. 3

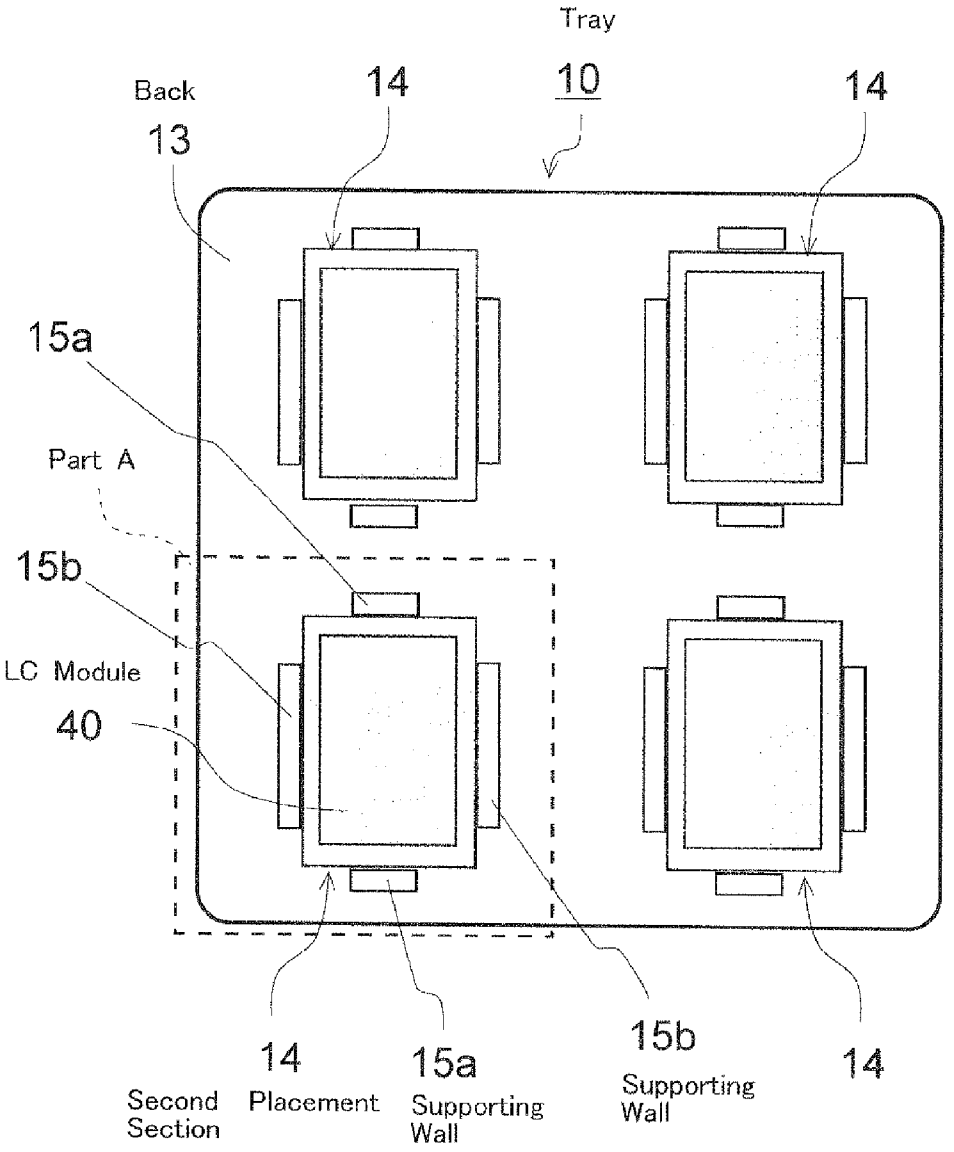

Tray
10
Back
13
14
14
15a
Part A
15b
LC Module
40
14
Second Section
14
Placement
15a
Supporting Wall
15b
Supporting Wall
14

FIG. 4A

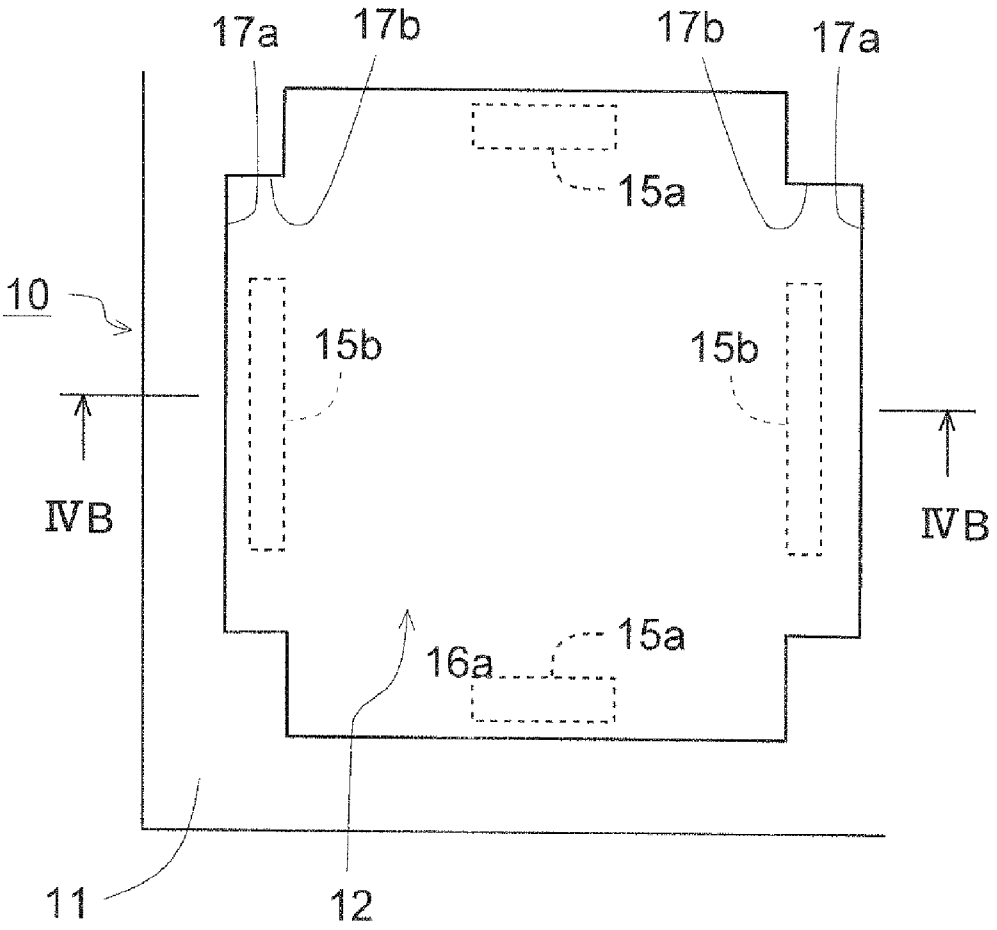

17a
17b
17b
17a
15a
10
15b
15b
IVB
IVB
15a
16a
11
12

FIG. 4B

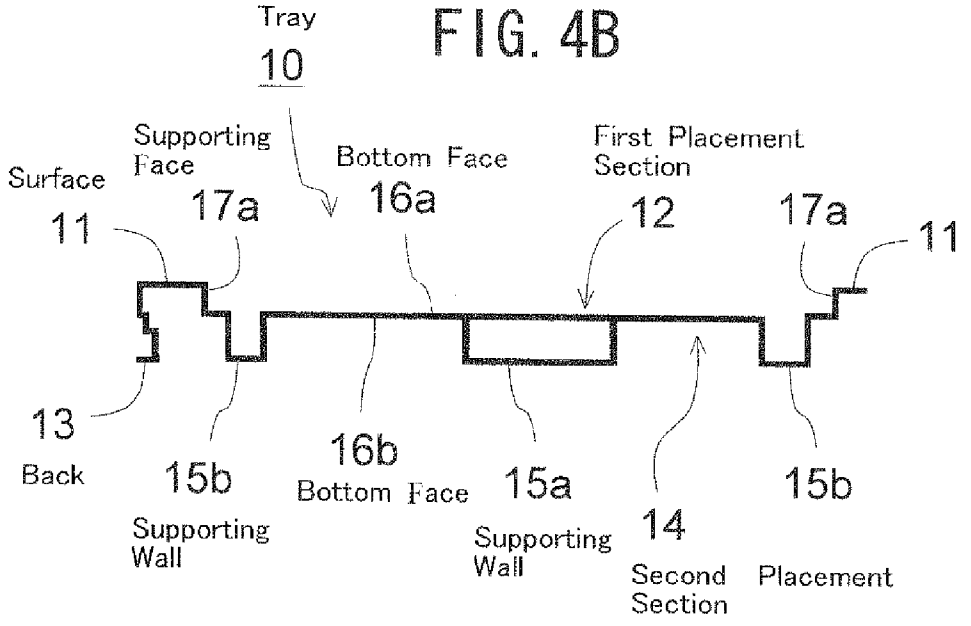

Tray
10
Supporting Face
Surface
Bottom Face
First Placement Section
11
17a
16a
12
17a
11
13
Back
15b
Supporting Wall
16b
Bottom Face
15a
Supporting Wall
14
Second Section
15b
Placement

FIG. 5A

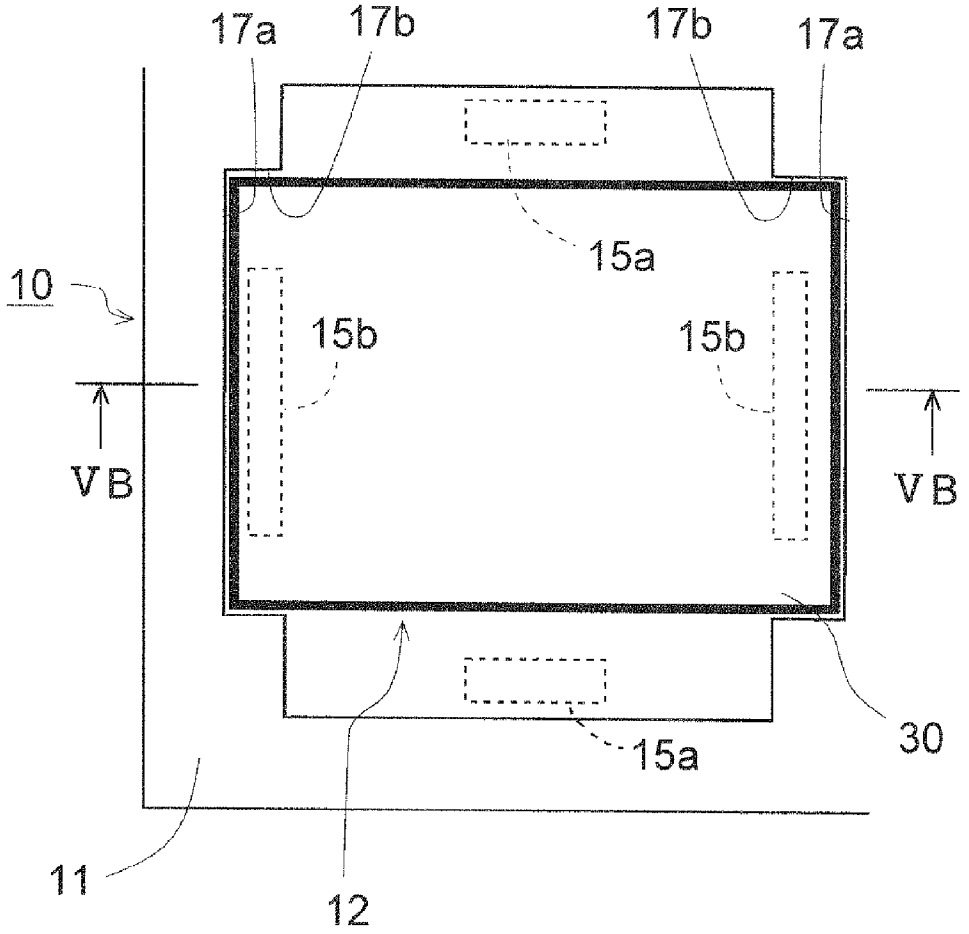

17a
17b
17b
17a
15a
10
15b
15b
VB
VB
30
15a
11
12

FIG. 5B

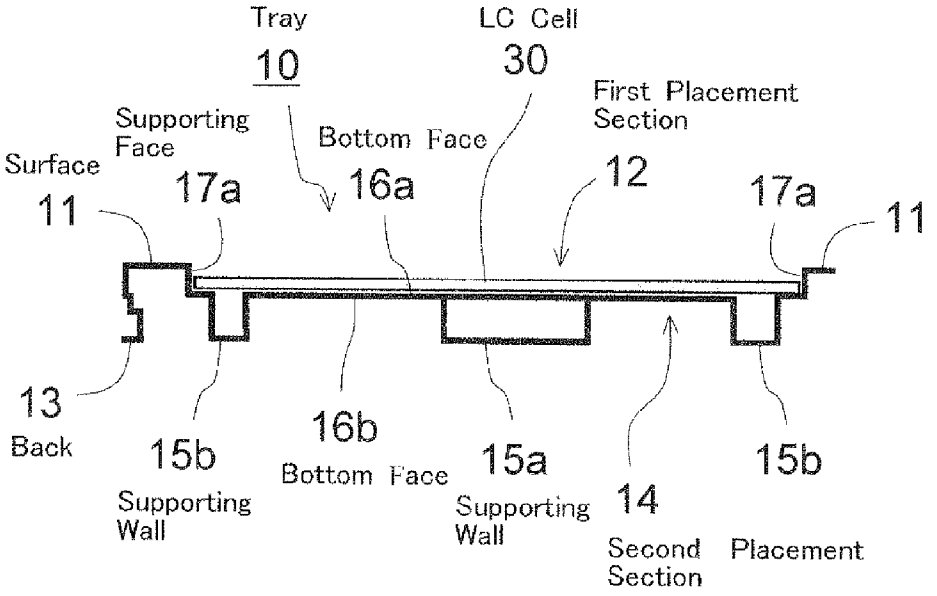

Tray
10
LC Cell
30
First Placement Section
Supporting Face
Surface
Bottom Face
11
17a
16a
12
17a
11
13
Back
15b
Supporting Wall
16b
Bottom Face
15a
Supporting Wall
14
Second Placement Section
15b

FIG. 6A

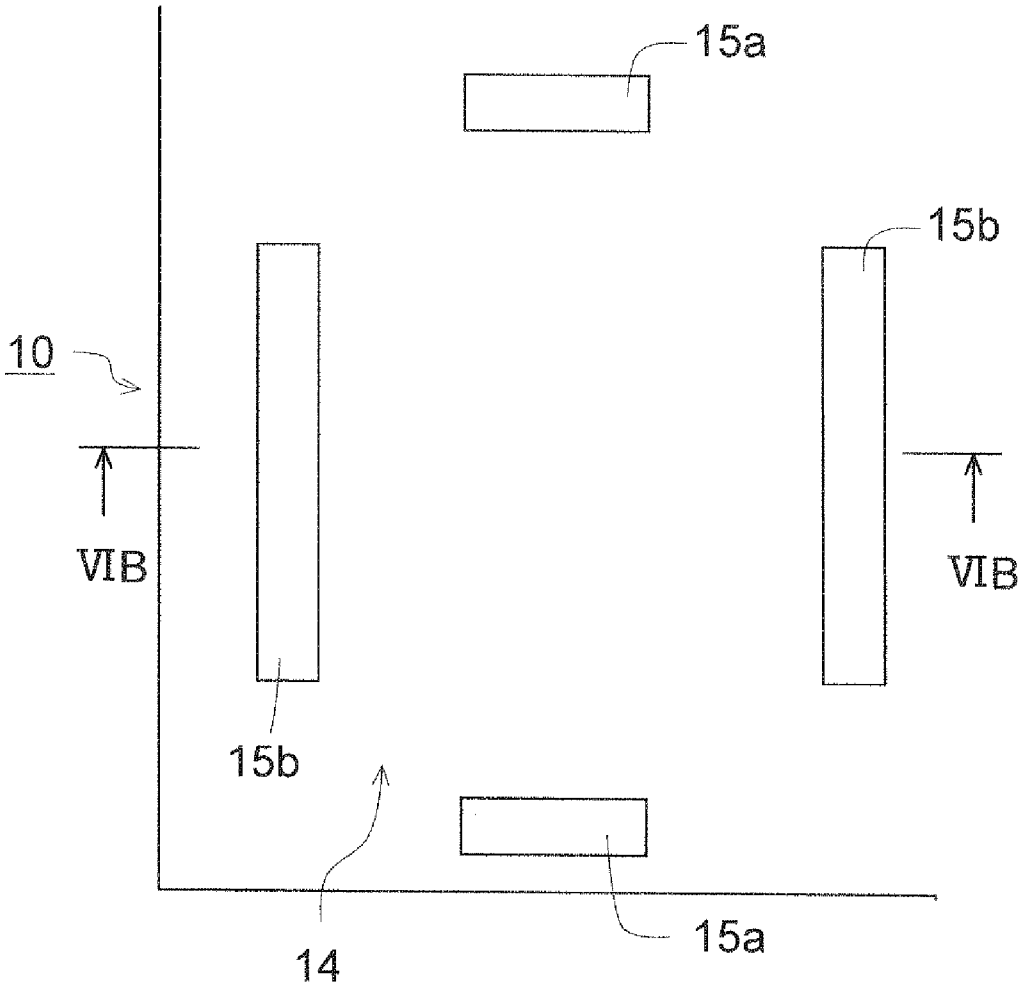

15a
15b
10
VIB
VIB
15b
14
15a

FIG. 6B

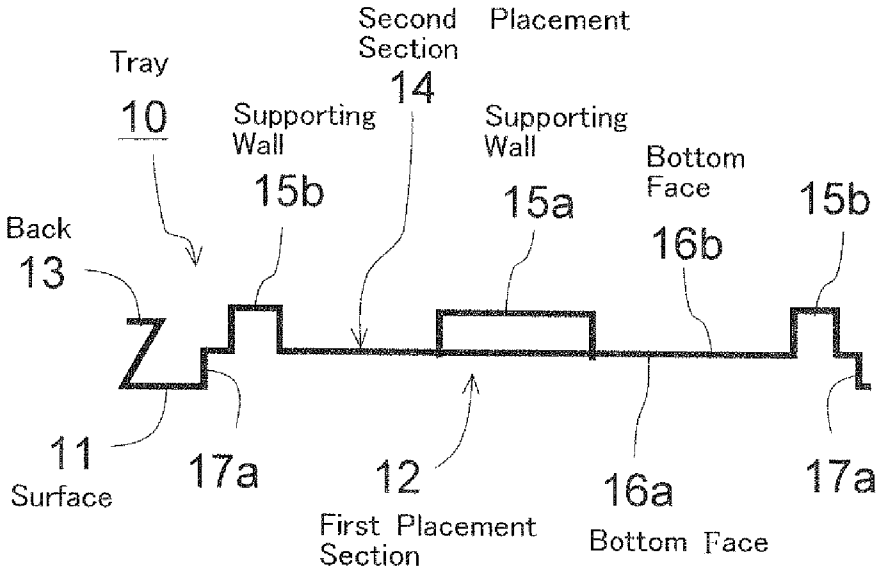

Second Placement Section
14
Tray
10
Supporting Wall
15b
Supporting Wall
15a
Bottom Face
16b
15b
Back
13
11
Surface
17a
12
First Placement Section
16a
Bottom Face
17a

FIG. 7A

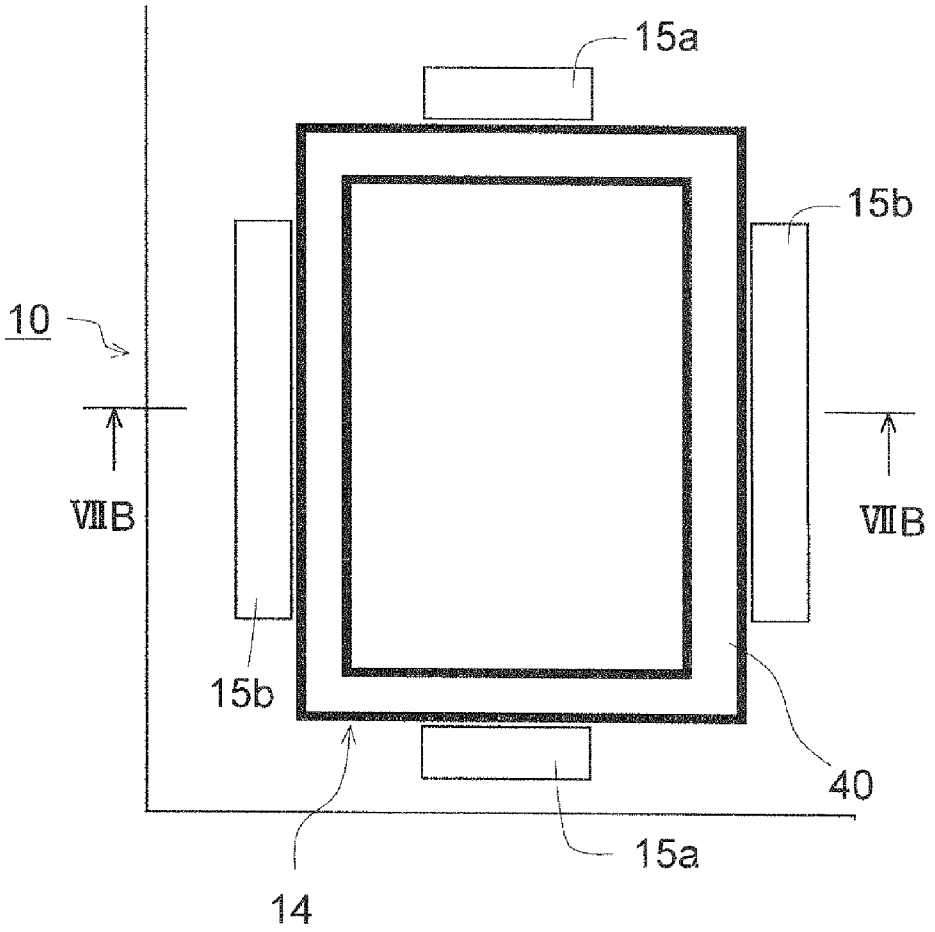

15a
15b
10
VIIB
VIIB
15b
40
15a
14

FIG. 7B

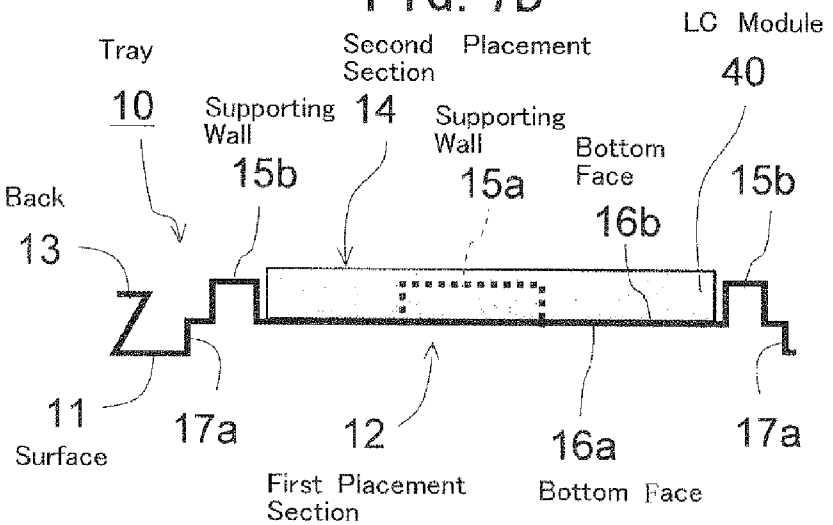

Tray
10
Second Placement Section
14
Supporting Wall
15b
Supporting Wall
15a
Bottom Face
16b
LC Module
40
15b
Back
13
Z
11
Surface
17a
12
First Placement Section
16a
Bottom Face
17a

FIG. 8

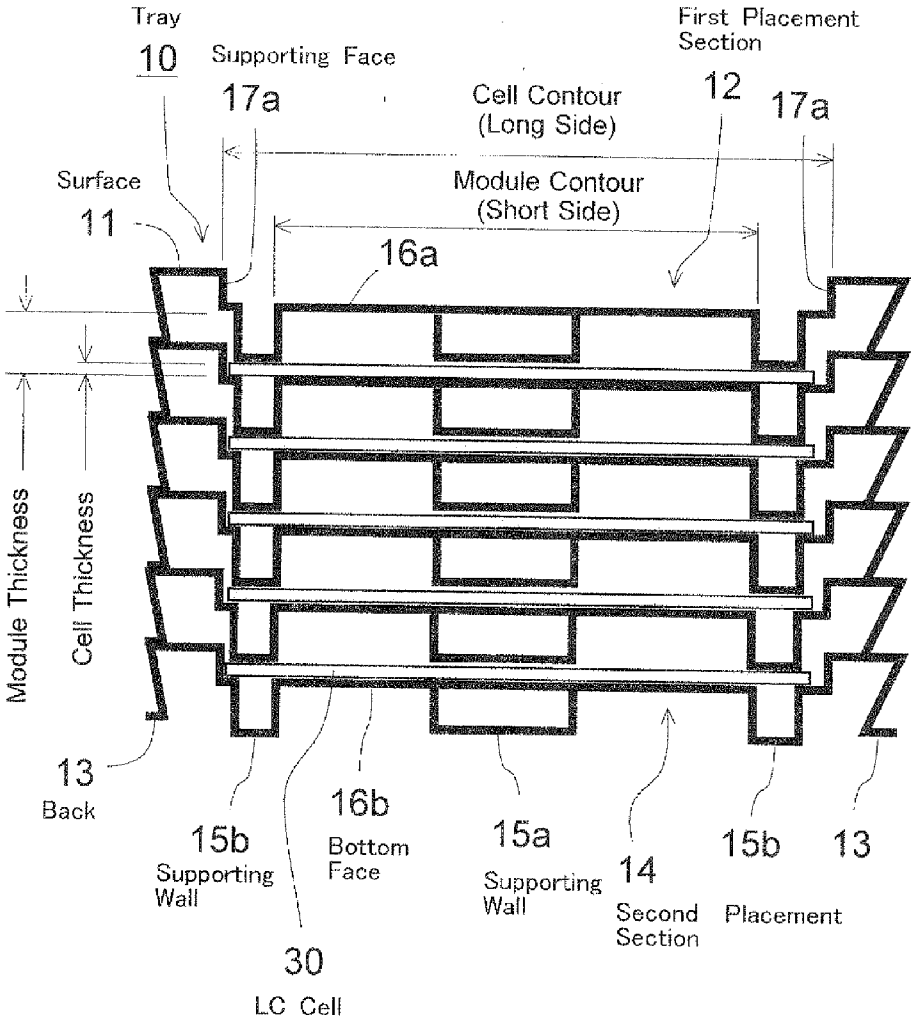
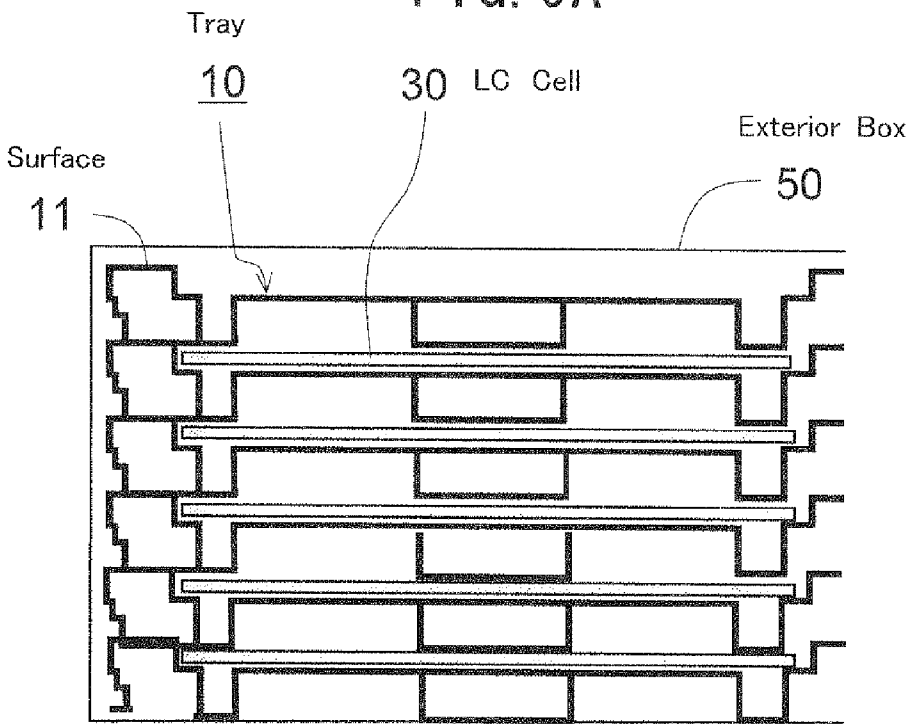

Tray
10
Supporting Face
17a
Cell Contour
(Long Side)
First Placement
Section
12
17a
Surface
11
Module Contour
(Short Side)
16a
Module Thickness
Cell Thickness
13
Back
15b
Supporting
Wall
16b
Bottom
Face
15a
Supporting
Wall
14
Second
Section
Placement
15b
13
30
LC Cell

FIG. 9A


Tray
10
30
LC Cell
Exterior Box
Surface
11
50

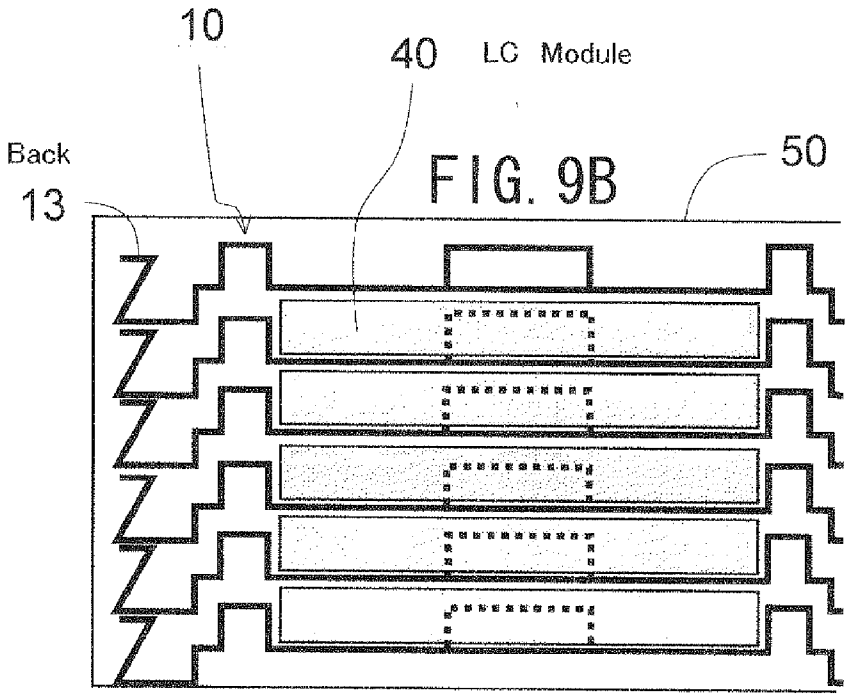

10
40
LC Module
Back
13
50

FIG. 9B

FIG. 10

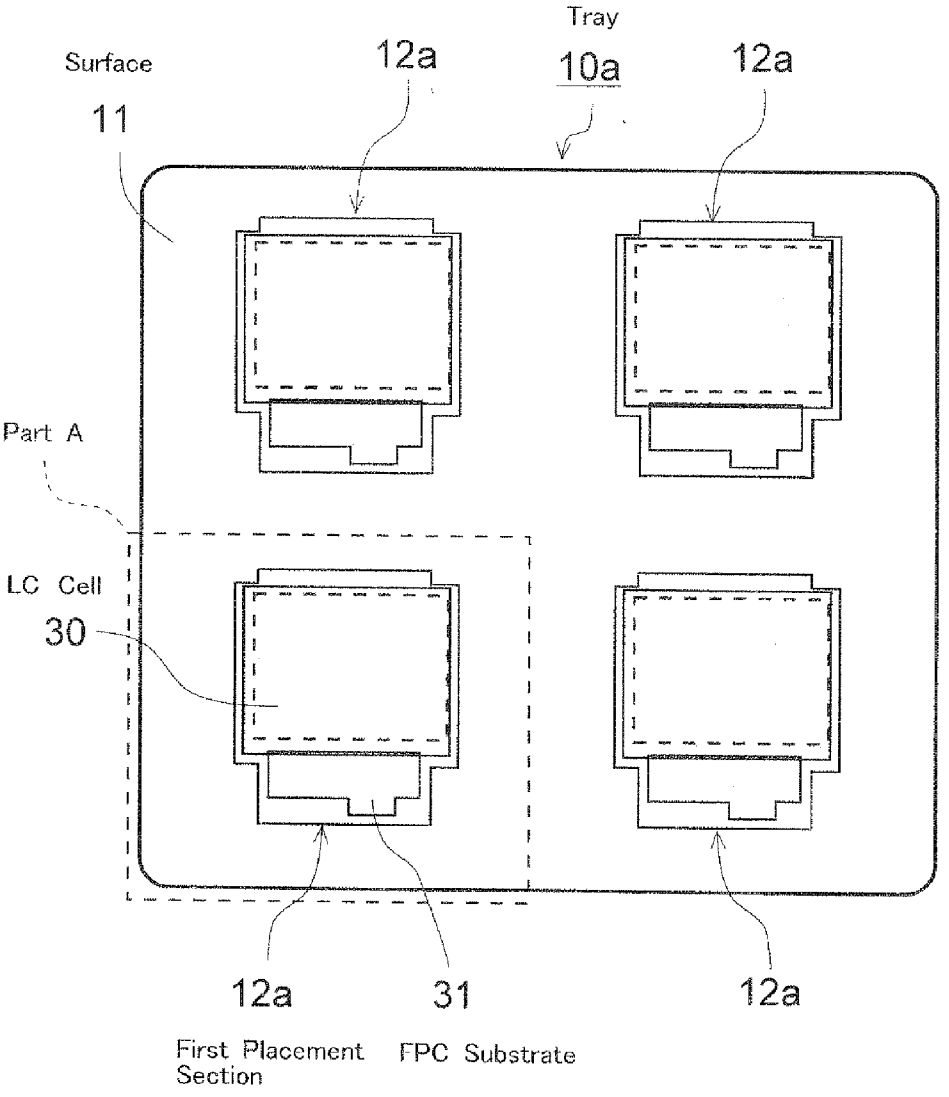

Tray
10a
Surface
11
12a
12a
Part A
LC Cell
30
12a
31
12a
First Placement Section
FPC Substrate

FIG. 11

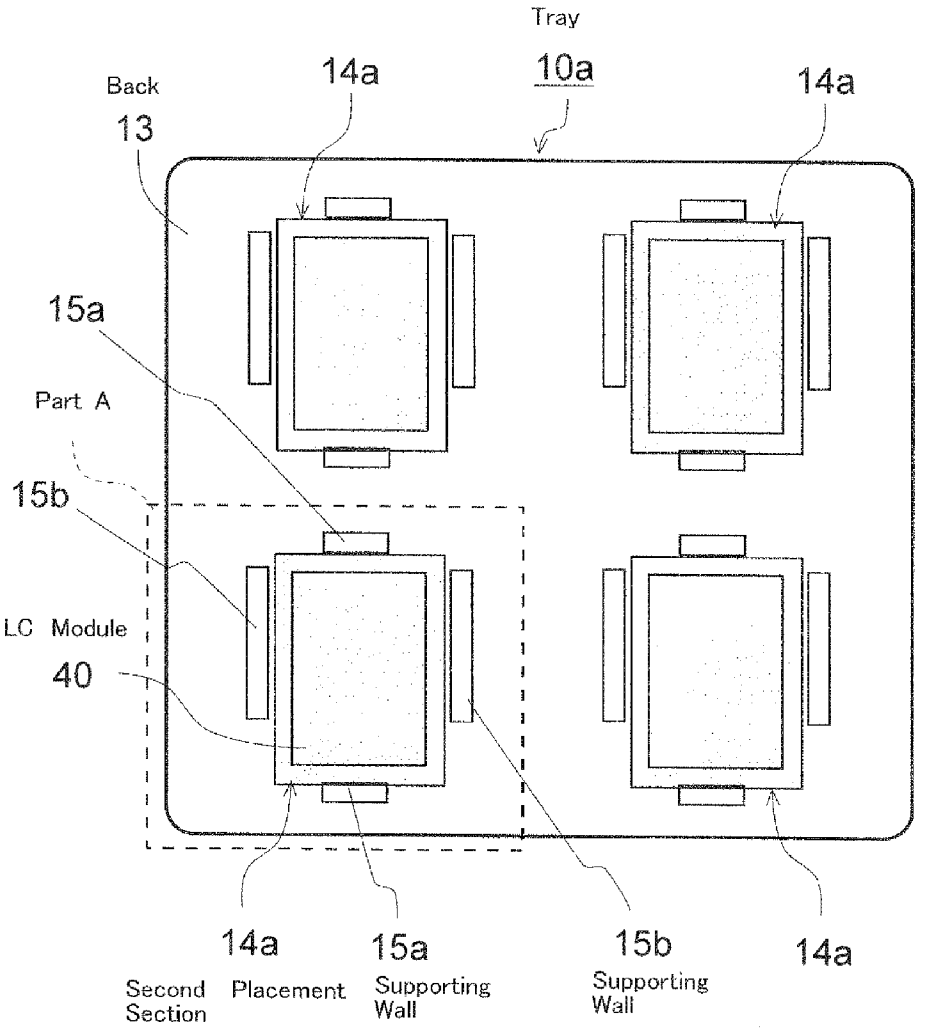

Tray
10a
Back
13
14a
14a
15a
Part A
15b
LC Module
40
14a
Second Section
Placement
15a
Supporting Wall
15b
Supporting Wall
14a

FIG. 12A

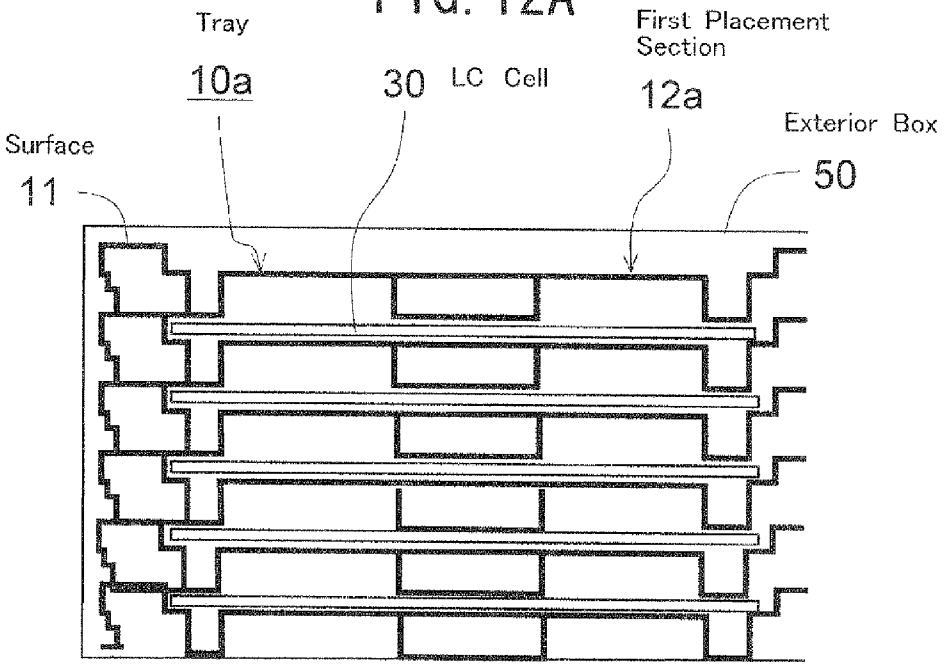


FIG. 12B

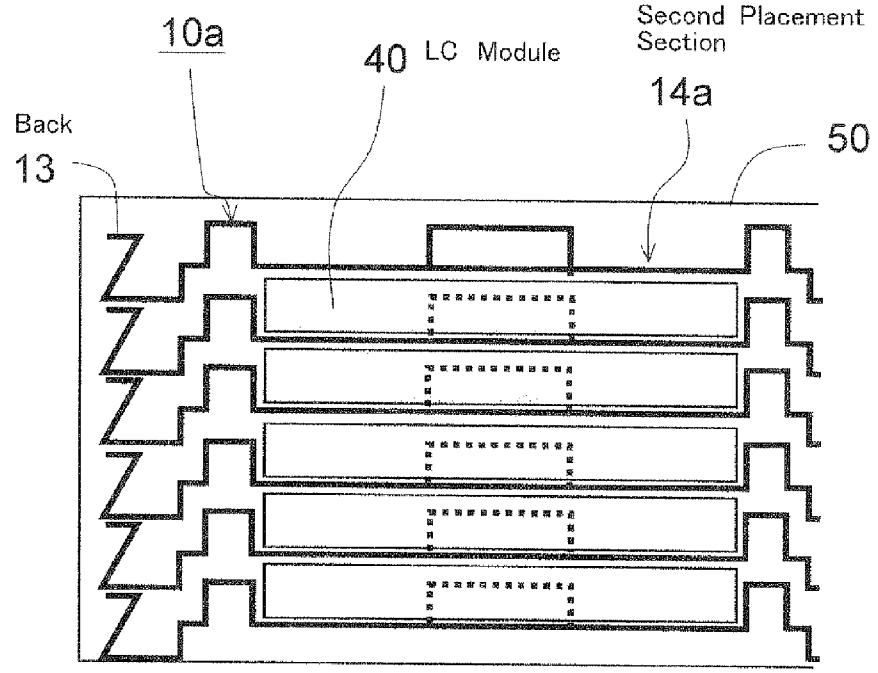


FIG. 13

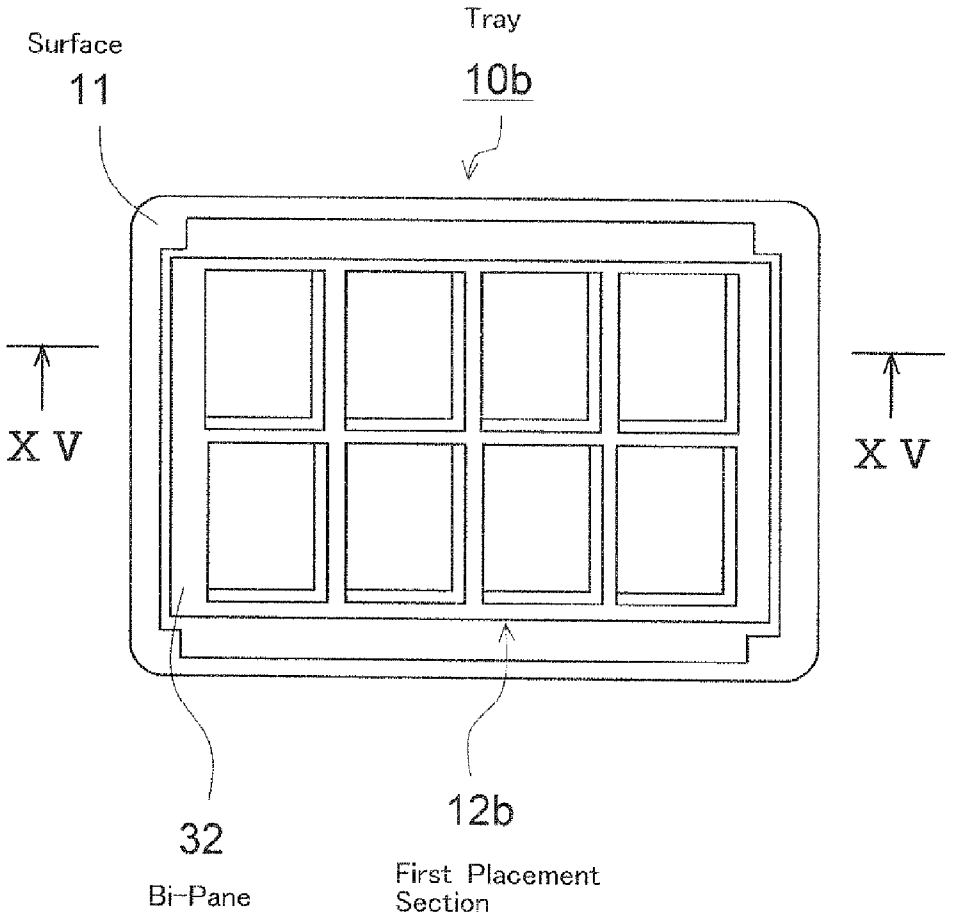

Surface
11
Tray
10b
X V
X V
32
Bi-Pane
12b
First Placement
Section

FIG. 14

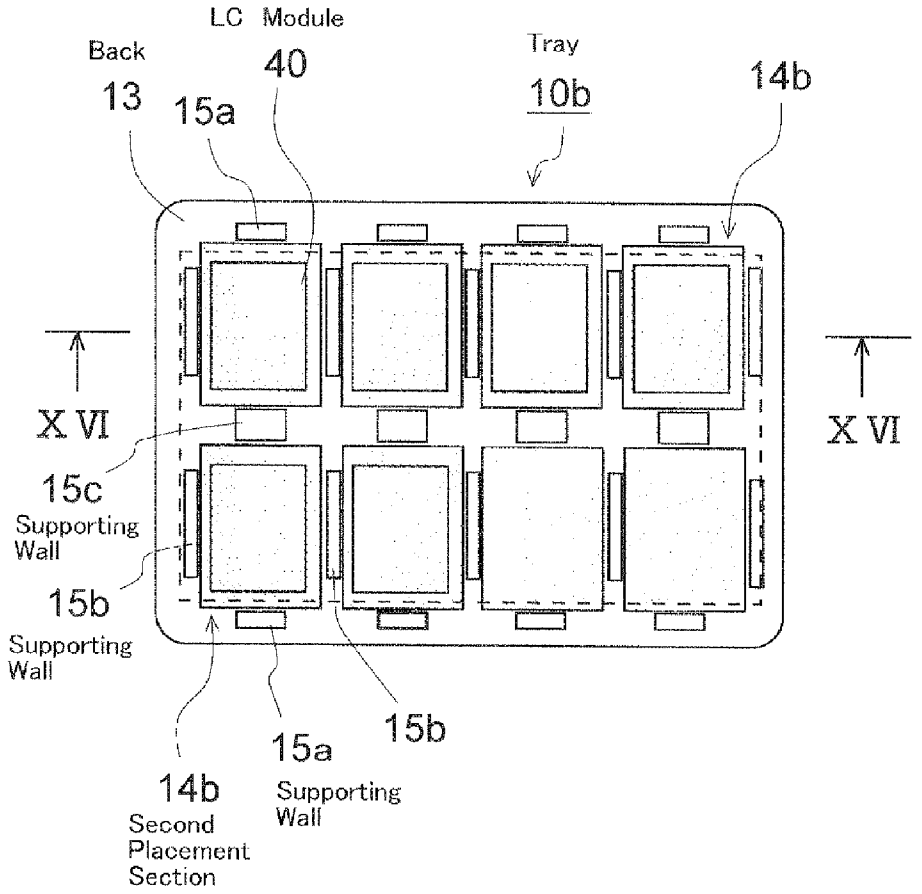

LC Module
40
Back
13
15a
Tray
10b
14b
X VI
X VI
15c
Supporting Wall
15b
Supporting Wall
15b
15a
14b
Second Placement Section
Supporting Wall

FIG. 15

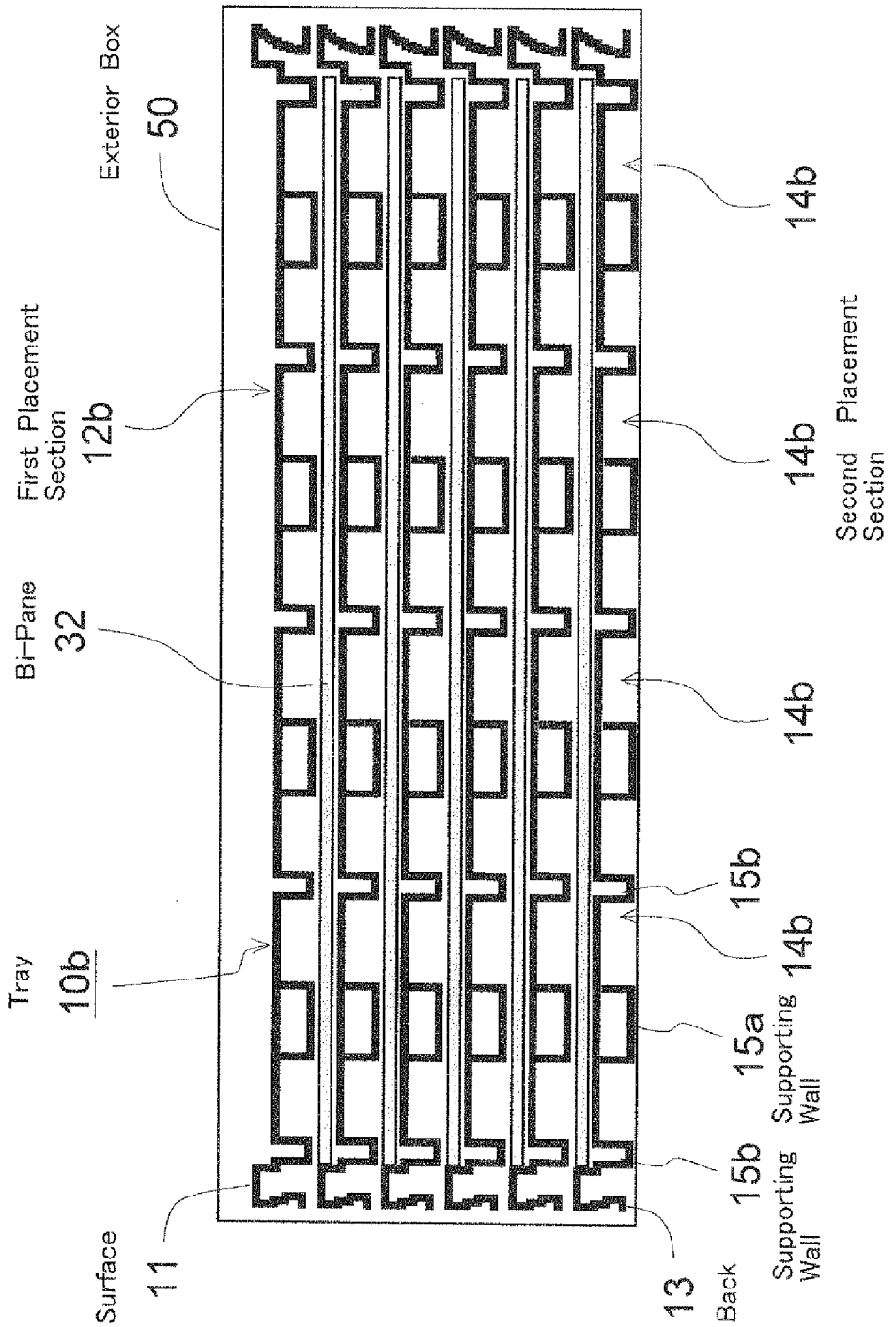

Exterior Box
50
First Placement Section
12b
Second Placement Section
Bi-Pane
32
Tray
10b
Surface
11
Back
13
Supporting Wall
15a
Supporting Wall
15b
14b
15b
14b
14b
14b

FIG. 16

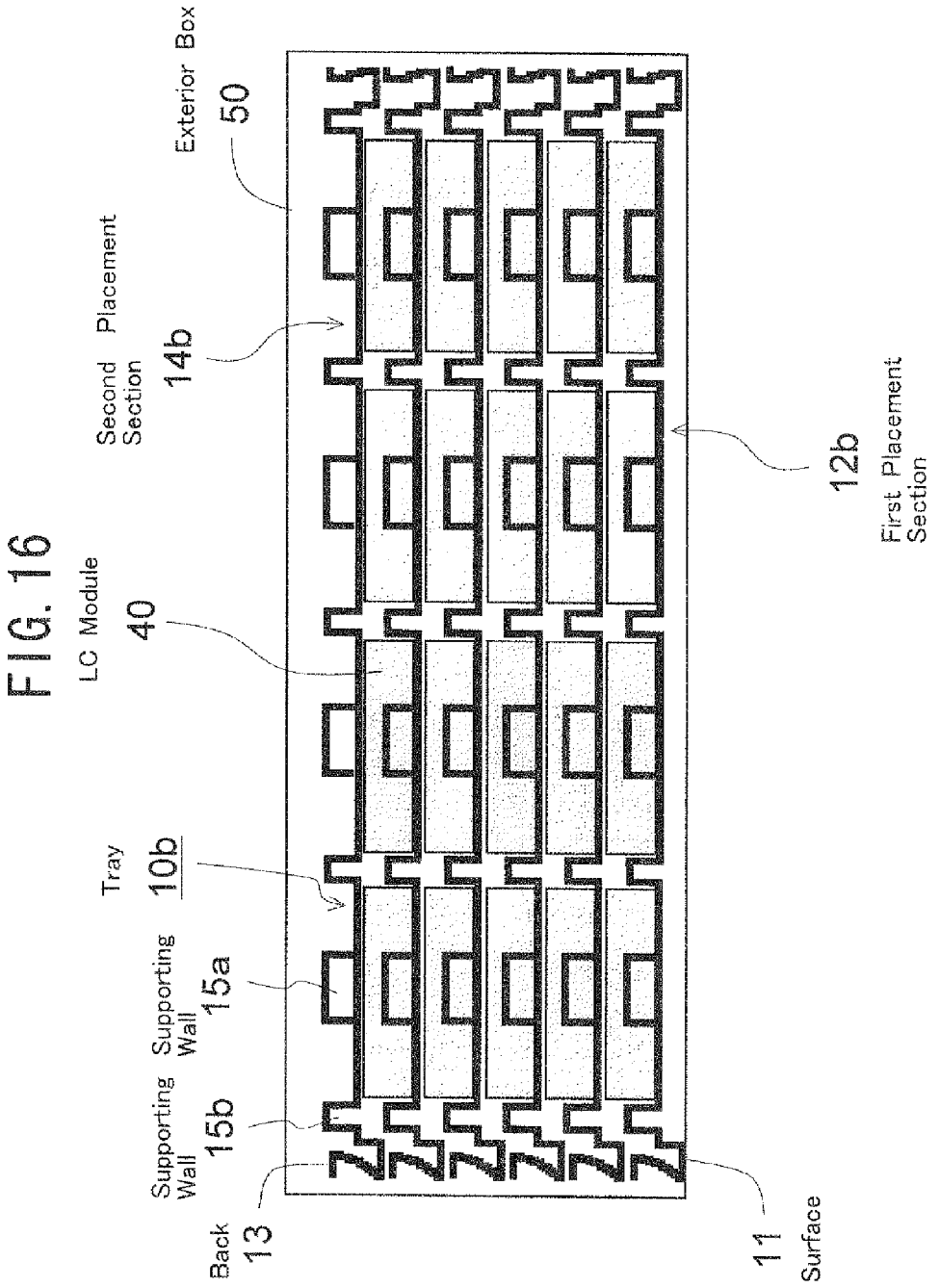

LC Module
40
Exterior Box
50
Second Placement Section
14b
First Placement Section
12b
Tray
10b
Supporting Wall
15a
Supporting Wall
15b
Back
13
Surface
11

FIG. 17

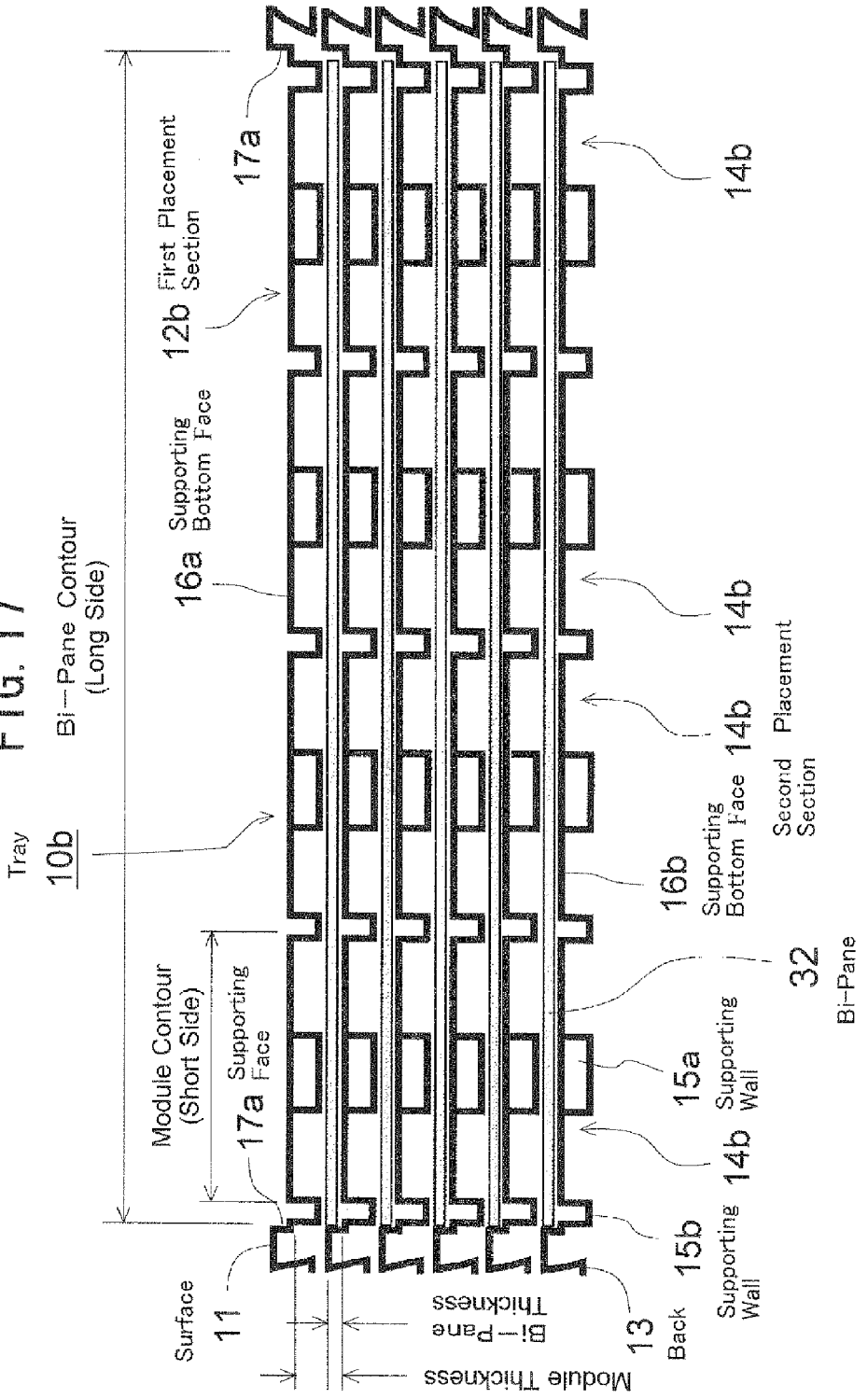

Tray
10b
Bi-Pane Contour
(Long Side)
Module Contour
(Short Side)
17a Supporting Face
16a Supporting Bottom Face
12b First Placement Section
17a
14b
14b
14b
Second Placement Section
16b Supporting Bottom Face
32 Bi-Pane
15a Supporting Wall
14b
15b Supporting Wall
13 Back
Surface
11
Bi-Pane Thickness
Module Thickness

FIG. 18A

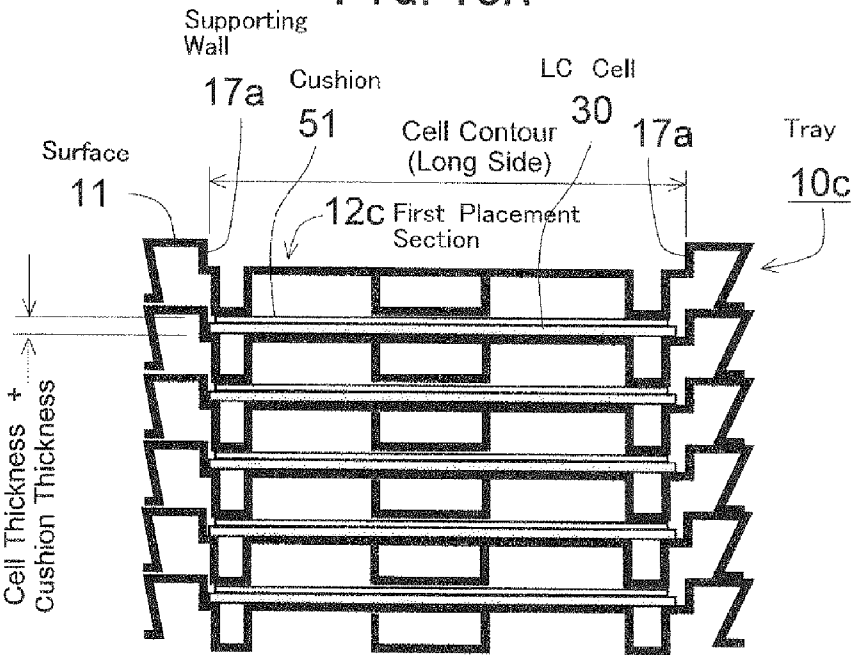


FIG. 18B

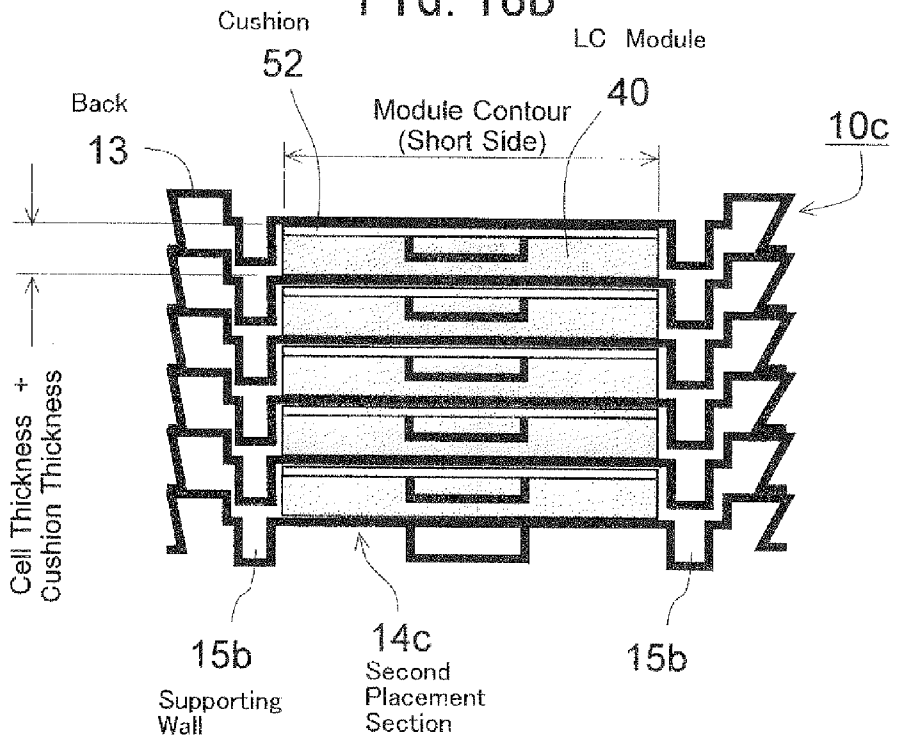


FIG. 19A

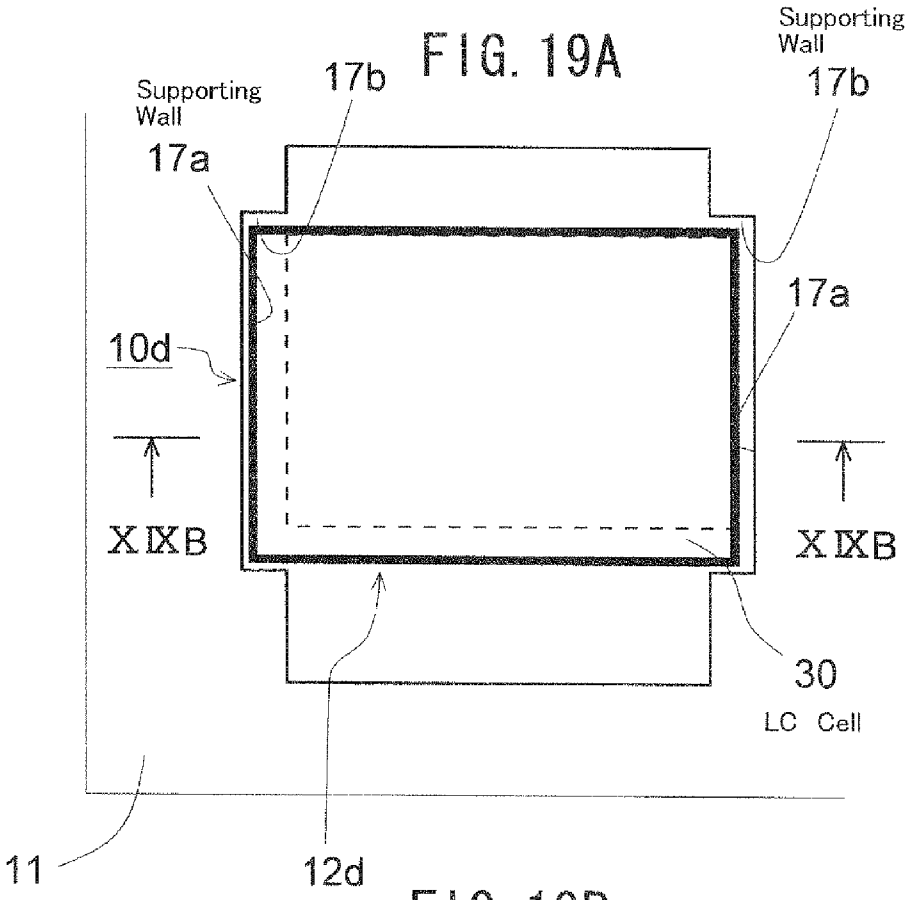


FIG. 19B

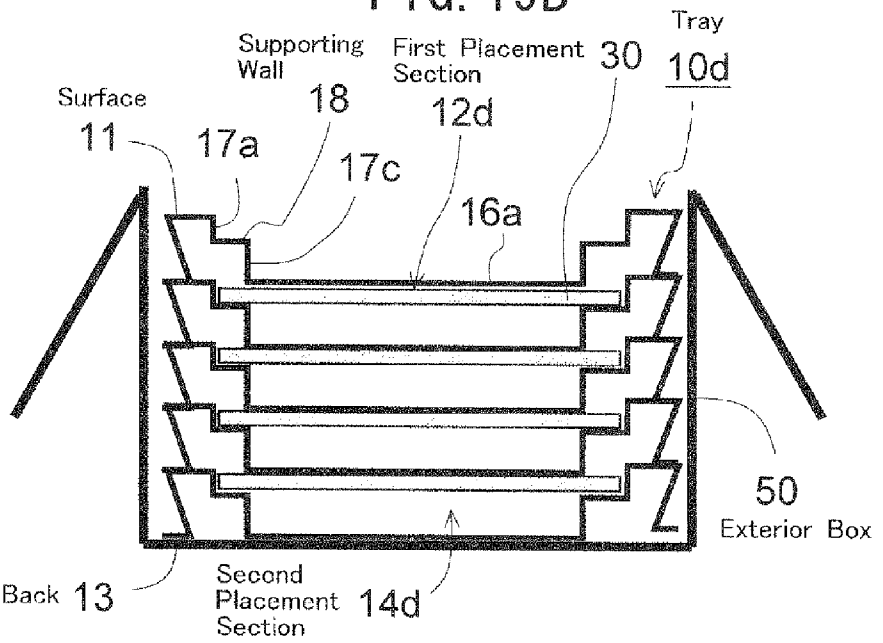


FIG. 20A

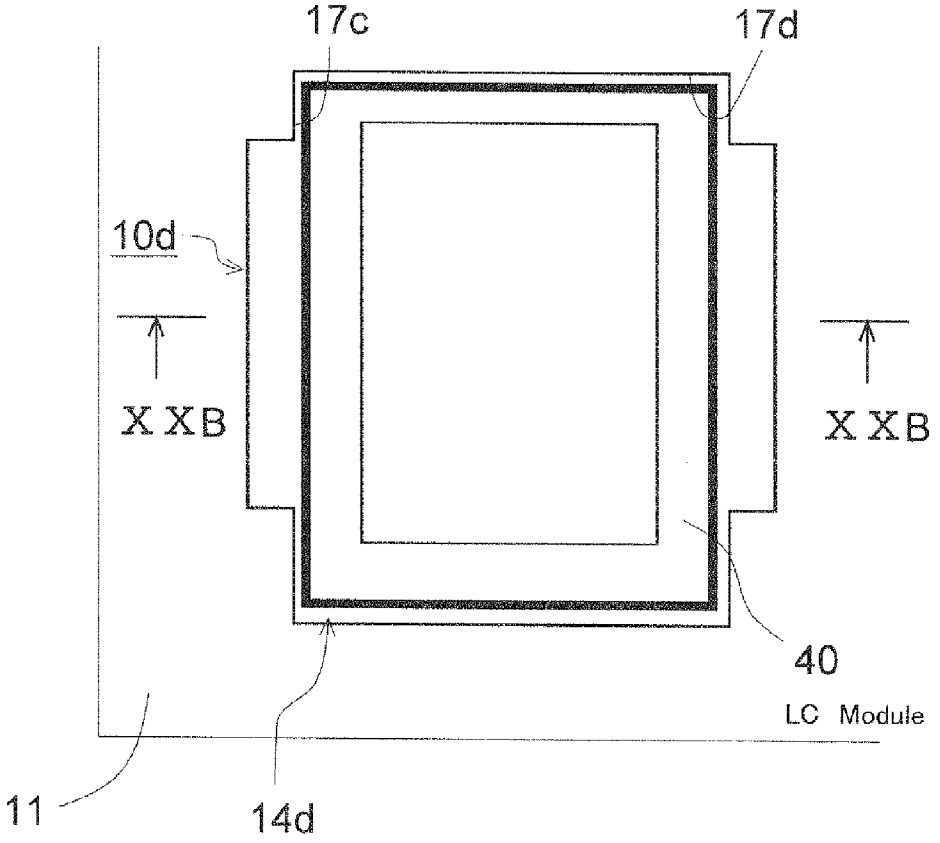


FIG. 20B

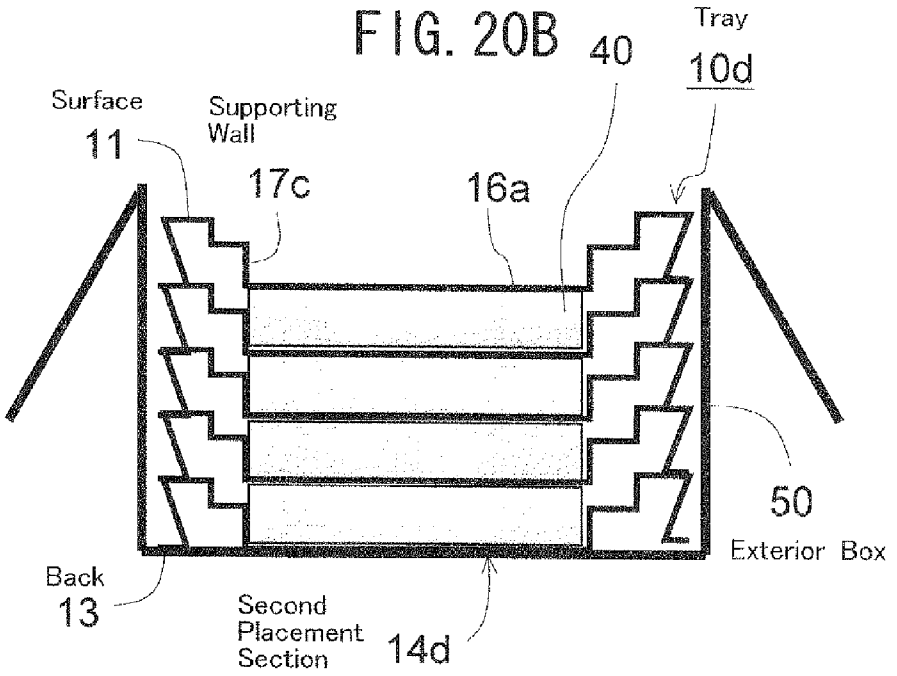


FIG. 21

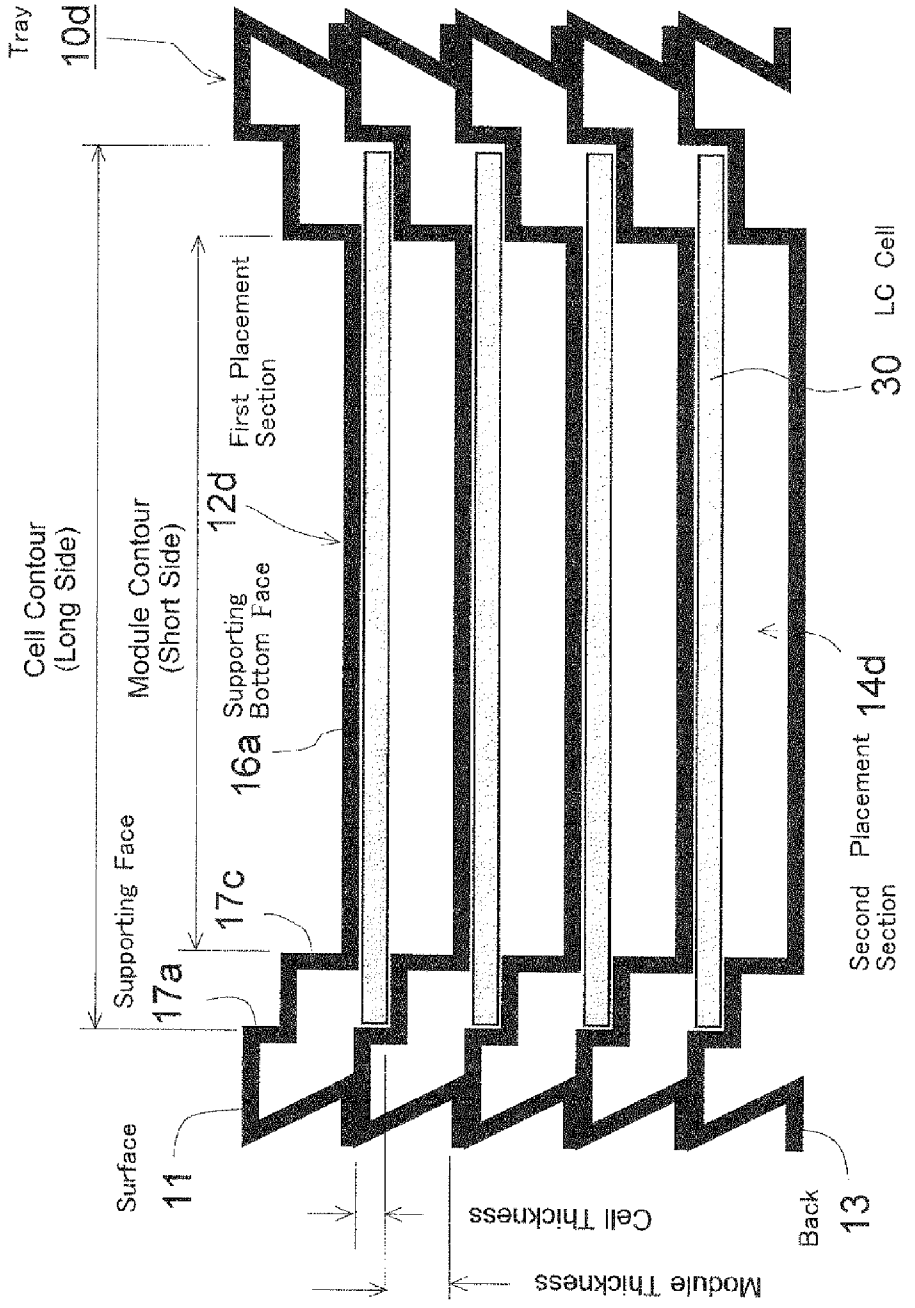

Tray
10d
Cell Contour
(Long Side)
Module Contour
(Short Side)
First Placement
Section
12d
Supporting
Bottom Face
16a
Supporting Face
17a
17c
Surface
11
Cell Thickness
Module Thickness
Back
13
Second Placement
Section
14d
LC Cell
30

FIG. 22A

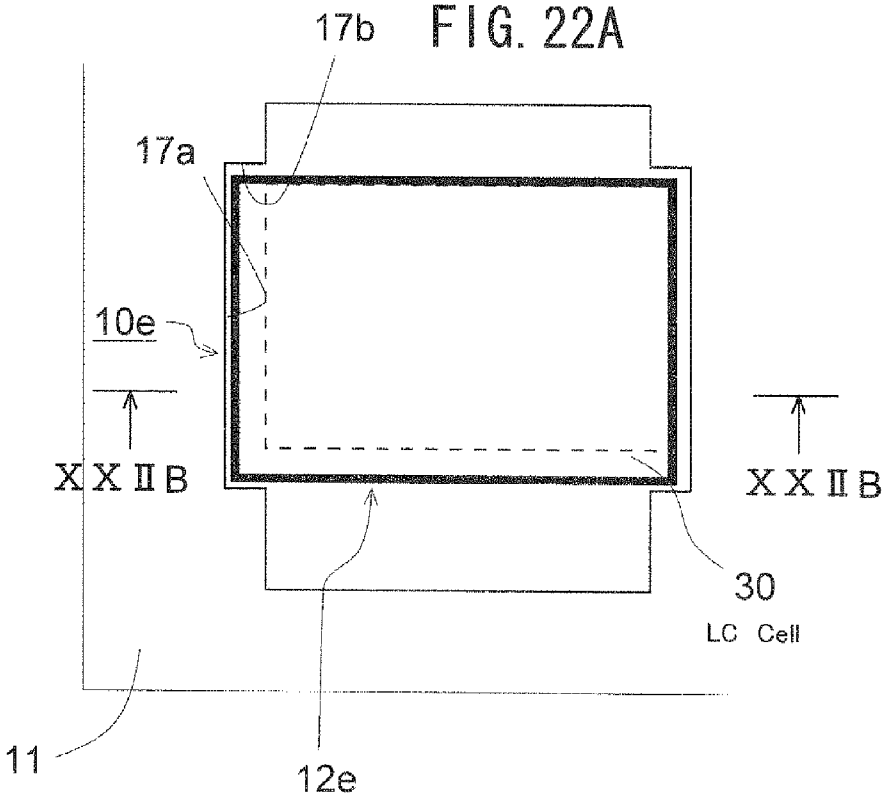


FIG. 22B

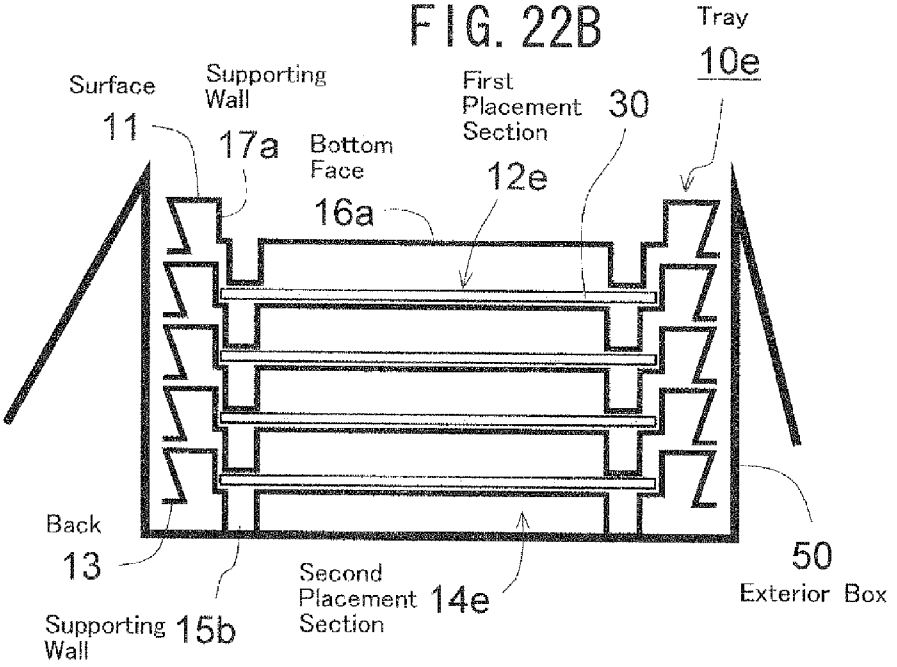


FIG. 23A

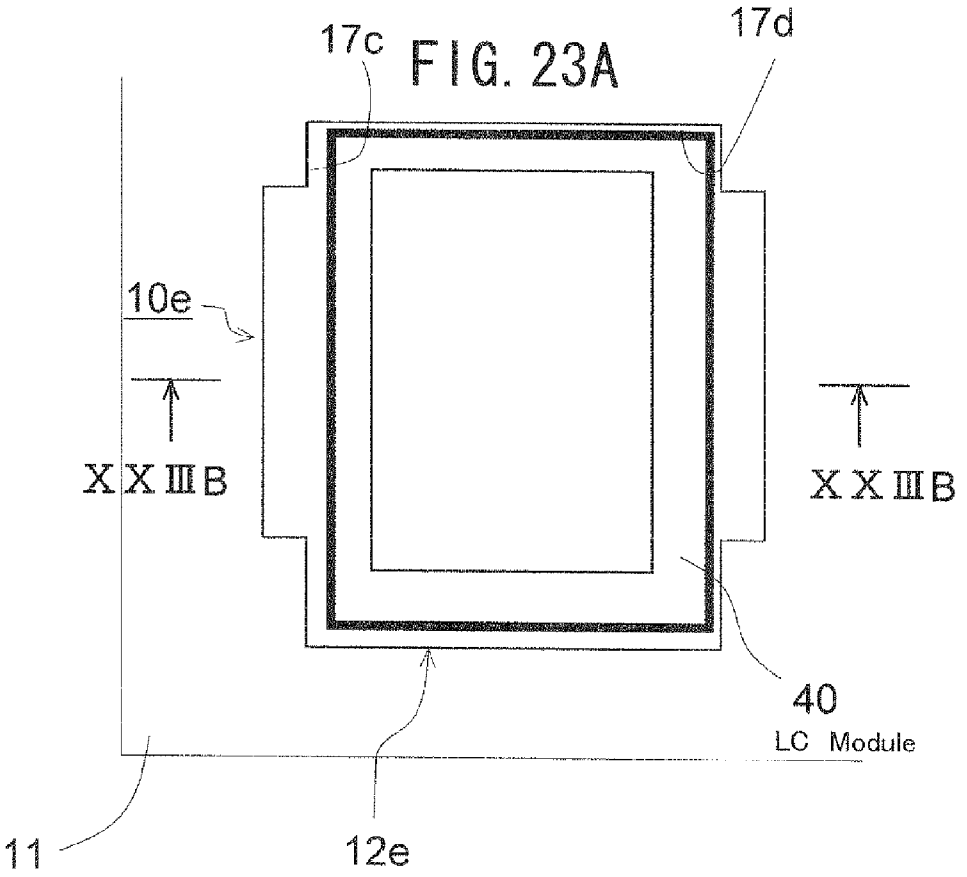


FIG. 23B

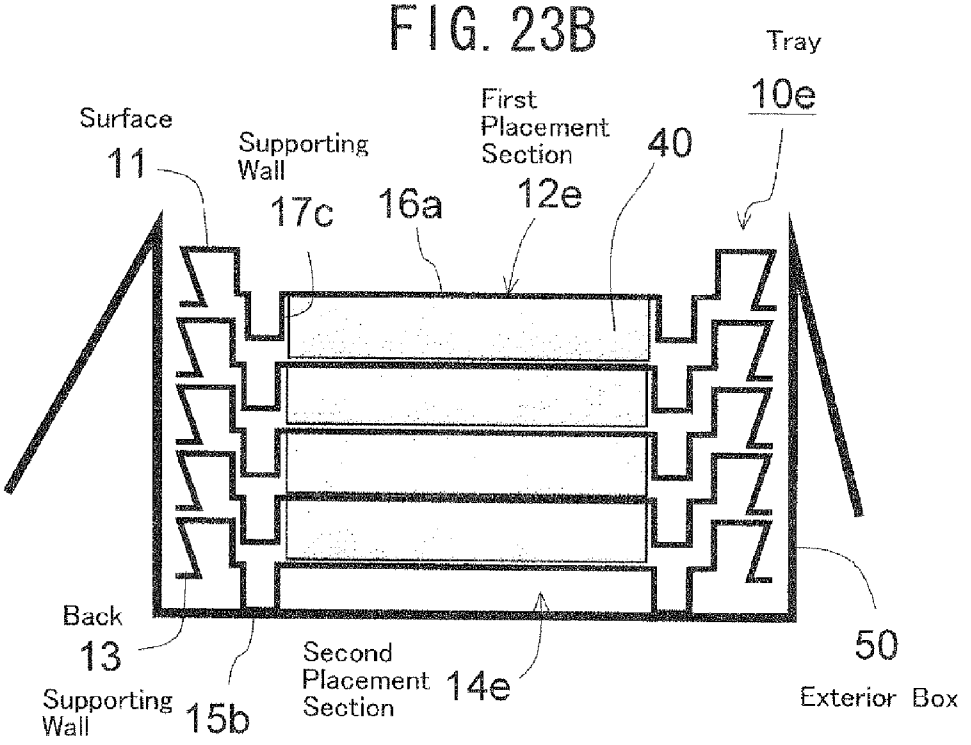


FIG. 24

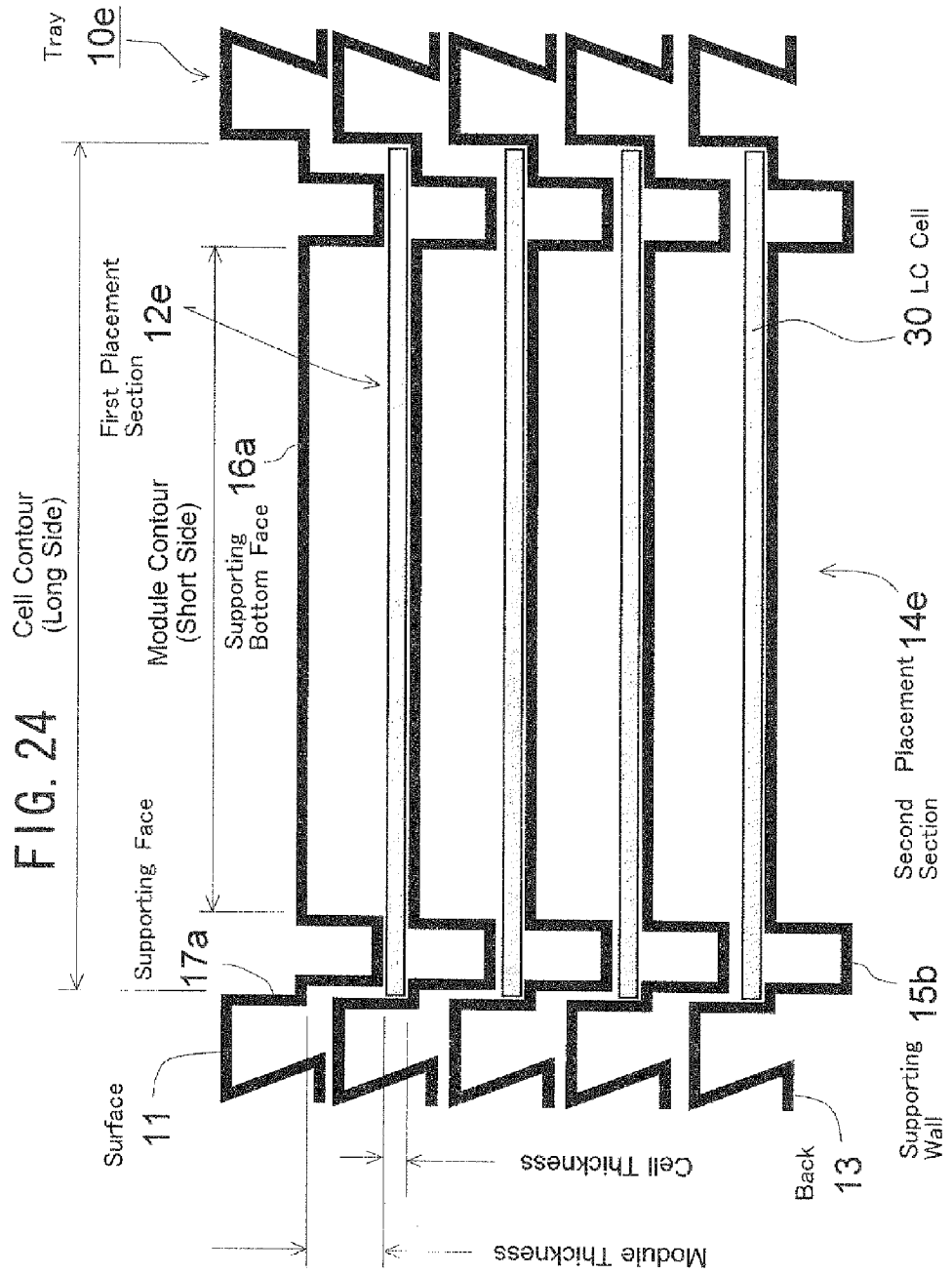
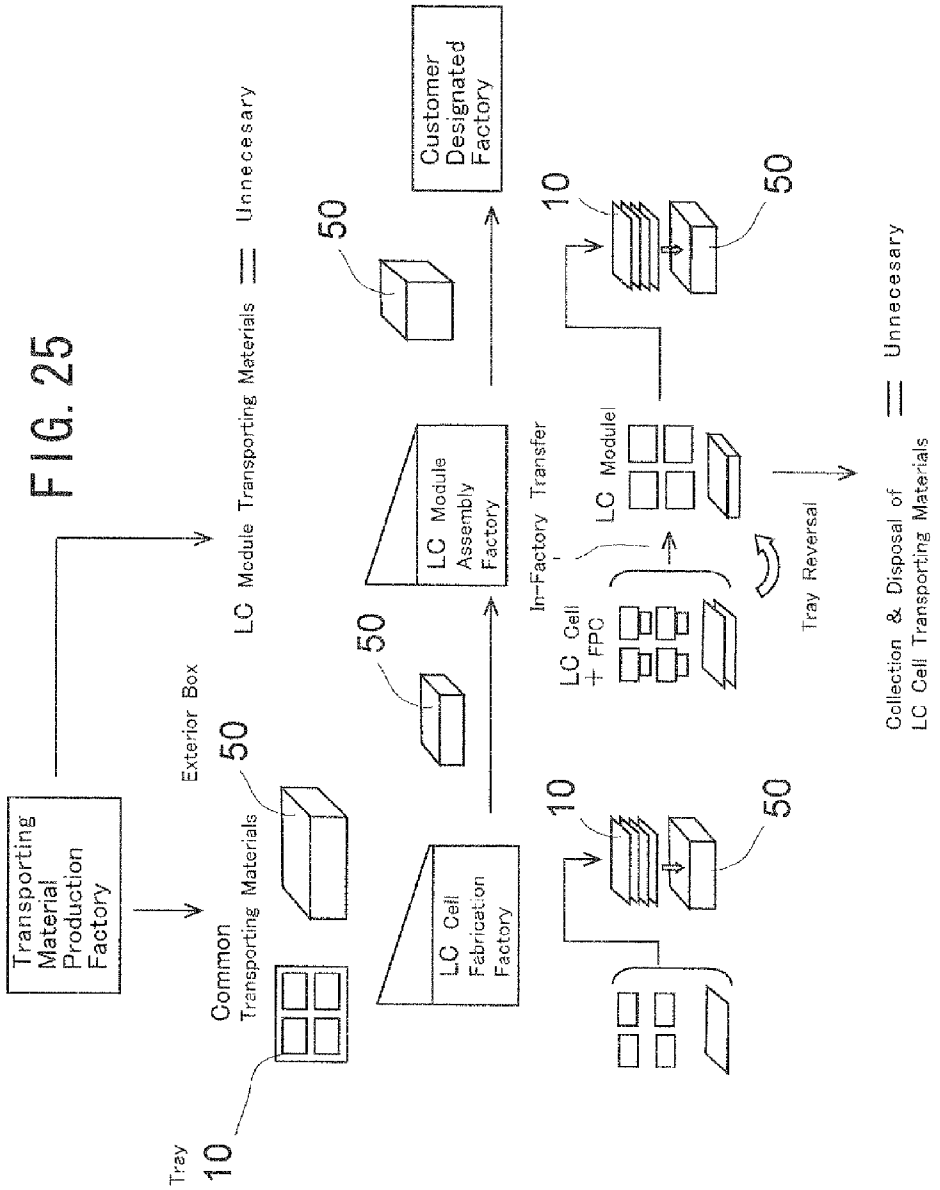

Tray
10e
Cell Contour
(Long Side)
First Placement
Section
12e
Module Contour
(Short Side)
Supporting
Bottom Face
16a
Supporting Face
17a
30 LC Cell
Second Placement 14e
Section
15b
Supporting
Wall
Surface
11
Back
13
Cell Thickness
Module Thickness

FIG. 25


Transporting Material Production Factory
Exterior Box
Common Transporting Materials
50
Tray
10
LC Module Transporting Materials = Unnecesary
LC Cell Fabrication Factory
50
LC Module Assembly Factory
50
Customer Designated Factory
In-Factory Transfer
LC Cell + FPC
10
LC Module
50
Tray Reversal
10
50
Collection & Disposal of LC Cell Transporting Materials = Unnecesary

TRANSPORT TRAY, AND TRANSPORTING PACKAGE AND METHOD USING THE SAME

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to a transport tray, and a transporting package and a transporting method using the same. More particularly, the present invention relates to a transport tray capable of alternately transporting two articles whose shapes and thickness are different from each other, and a transporting package using the tray, and a transporting method using the tray.

[0003] 2. Description of the Related Art

[0004] Recently, it has been becoming popular for companies to assemble liquid crystal modules (which will be abbreviated as "LC modules" hereinafter) by utilizing so-called EMS (Electronics Manufacturing Service), i.e., by entrusting a factory other than the companies' factories with the assembling operation. In many cases, as shown in FIG. **1**, the factory for manufacturing liquid crystal cells (which will be abbreviated as "LC cells" hereinafter) and the factory for assembling LC modules are distant from each other. Therefore, the LC cells fabricated in the LC cell fabrication factory are packed and then, transported to the LC module assembly factory. The LC modules finished in the LC module assembly factory are packed again and transported to the entrusting company or the customer designated place.

[0005] Since the LC cell and the LC modules have different shapes and different thicknesses, the LC cell and the LC modules have been transported using different packing materials so far. Thus, there is the strong need to save the resources and reduce the transportation cost by contriving these packing and transporting materials. To address this need, various improvements about the packing materials have been proposed.

[0006] A first example of the aforementioned improvements is a container disclosed by the Japanese Unexamined Patent Publication No. 2006-273347. This container is capable of receiving different sized semiconductor chips, and comprises a placement section formed on the surface and an auxiliary placement section formed on the back. When two of the containers whose surfaces are oriented upward are stacked vertically and turned upside down, the semiconductor chip received in the placement section is moved to the auxiliary placement section and received therein. Thus, faceup and facedown of the semiconductor chips can be chosen without transferring the semiconductor chips themselves.

[0007] A second example of the aforementioned improvements is a placement jig or tray disclosed by the Japanese Unexamined Patent Publication No. 2006-143246. This jig comprises three types of depressed parts whose opening areas are different from each other formed in the pocket section, in which the side wall of the pocket section is stepped. Different sized semiconductor chips can be received in the same pocket section. Moreover, inter-layer materials are inserted into the gaps so that the semiconductor chip placed in the pocket section does not jolt during transfer.

[0008] A third example of the aforementioned improvements is a transport tray disclosed by the Japanese Unexamined Patent Publication No. 2010-235142. This transport tray is commonly used for transportation of sub-modules (half-finished goods) and transportation of modules (finished goods) into which the sub-modules are assembled. This tray comprises a first depressed part formed in the first region, a second depressed part formed in the second region which is included in the first region, and a first protruded part formed in the second region which is included in the second region. The sub-module is held in the first depressed part and the module is held in the second depressed part, which means that this tray can be commonly used for both of the sub-module and the module.

[0009] A fourth example of the aforementioned improvements is a placement tray disclosed by the Japanese Unexamined Patent Publication No. 2008-127062. This placement tray comprises two supporting parts in the depressed part for placement, in which the supporting parts have different depths. The article held in the upper position is contacted with the article held in the lower position and held by the same.

[0010] With the container disclosed by the Publication No. 2006-273347 and the placement jig disclosed by the Publication No. 2006-143246, different sized semiconductor chips can be held and transported. However, this container and this jig are adaptable only for change of the semiconductor chip size, and invented taking in-factory transfer into consideration. Therefore, they cannot be used for the aforementioned inter-factory transportation of the LC cells and the LC modules having different shapes and different thicknesses.

[0011] The transport tray disclosed by the Publication No. 2010-235142 can be commonly used for transportation of the sub-modules (half-finished goods) and transportation of modules (finished goods) having different shapes and different thicknesses. However, when the trays are stacked vertically, the overall thickness (height) of this stack varies dependent upon the thickness of the sub-module and the thickness of the module. Thus, an exterior box for receiving the stack of the trays cannot be commonly used.

[0012] With the placement tray disclosed by the Publication No. 2008-127062, the two plate-shaped articles can be received in the depressed part. However, the aim of this tray is to raise the reception or packing density of the same article. Thus, this tray cannot be used for the aforementioned inter-factory transportation of the LC cells and the LC modules having different shapes and different thicknesses.

SUMMARY OF THE INVENTION

[0013] The present invention was created to solve the aforementioned existing problems while taking the above-described conventional techniques into consideration.

[0014] An object of the present invention is to provide a transport tray that can be used commonly for inter-factory transportation of two articles (here, a LC cell and a LC module) having different shapes and different thicknesses and that makes it possible to use an exterior box commonly for the inter-factory transportation, and a transporting package and a transporting method using the tray.

[0015] Another object of the present invention is to provide a transport tray that realizes resource saving of the transporting materials and reduction of the transportation cost easily.

[0016] The above objects together with others not specifically mentioned will become clear to those skilled in the art from the following description.

[0017] According to the first aspect of the present invention, a transport tray is provided. This tray, which is formed by molding a sheet-shaped base material to have a desired shape, comprises:

[0018] a first placement section formed on a surface side of the base material; and

[0019] a second placement section formed to overlap with the first placement section on a back side of the base material;

[0020] wherein the first placement section comprises a depressed part having an enough depth for receiving a thin plate-shaped first article;

[0021] the first article placed in the depressed part is held at a predetermined position by a bottom face and a side face that constitute the depressed part;

[0022] the second placement section is formed by a supporting wall having an enough depth for receiving a thin plate-shaped second article, the supporting wall protruding to the back side; and

[0023] the second article placed in a region surrounded by a supporting wall is held at a predetermined position by a bottom face and a side face that constitute the region;

[0024] and wherein when the trays each including the first articles placed in the first placement sections are stacked, the supporting wall of one of the trays is contacted with the first article of another of the trays adjoining thereto is contacted with the first article placed in another of the trays; and

[0025] when the trays each including the second articles placed in the second placement sections are stacked, the bottom face that constitutes the depressed part of one of the trays is contacted with the second article of another of the trays adjoining thereto.

[0026] With the transport tray according to the first aspect of the present invention, the aforementioned structure is provided and therefore, if the first article (e.g., a LC cell) is placed in the first placement section formed on the surface side of the sheet-shaped base material in each of the trays, and these trays are stacked, the supporting wall of one of the trays is contacted with the first article placed in another of the trays adjoining thereto. Thus, the first article can be held in the first placement section stably.

[0027] More over, if the second article (e.g., a LC module) is placed in the second placement section formed on the back side of the sheet-shaped base material in each of the trays, and these trays are stacked, the bottom face that constitutes the depressed part of one of the trays is contacted with the second article placed in another of the trays adjoining thereto. Thus, the second article can be held in the second placement section stably.

[0028] Accordingly, this tray can be used commonly for inter-factory transportation of two articles i.e., the first article and the second article, having different shapes and different thicknesses.

[0029] Furthermore, since the first placement section comprises the depressed part having an enough depth for receiving the first article, the first article is entirely received in the first placement section. Similarly, since the second placement section is formed by the supporting wall having an enough depth for receiving the second article, the second article is entirely received in the second placement section. Thus, the overall height (thickness) of the tray stack formed by stacking the trays in the case where the first article is received in the first placement section is equal to the overall height (thickness) of the tray stack formed by stacking the trays in the case where the second article is received in the second placement section. Accordingly, the same exterior box can be used for transportation of the first article and the transportation of the second article by turning the tray stack upside down.

[0030] In this way, with the transport tray according to the first aspect of the present invention, not only the tray but also the exterior box can be used commonly for the transportation of the first article and that of the second article and as a result, resource saving of the transporting materials and reduction of the transportation cost can be realized easily.

[0031] In a preferred embodiment of the transport tray according to the first aspect of the present invention, the supporting wall is located in such a way that when the trays each including the second articles placed in the second placement sections are stacked, the supporting wall of one of the trays does not interfere with the second article of another of the trays adjoining thereto.

[0032] In another preferred embodiment of the transport tray according to the first aspect of the present invention, the first placement section has an enough size for receiving the first article and an attachment for the first article (e.g., a FPC substrate attached to a LC cell).

[0033] In still another preferred embodiment of the transport tray according to the first aspect of the present invention, the depressed part of the first placement section has an enough depth for receiving the first article and a first cushion, and the supporting wall of the second placement section has an enough depth for receiving the second article and a second cushion.

[0034] In a further preferred embodiment of the transport tray according to the first aspect of the present invention, the first placement section has an enough size for receiving the first article having a size equal to a multiple of a size of the second article to be placed in the second placement section or greater.

[0035] According to the second aspect of the present invention, another transport tray is provided. This tray, which is formed by molding a sheet-shaped base material to have a desired shape, comprises:

[0036] a first placement section formed on a surface side of the base material; and

[0037] a second placement section formed to overlap with the first placement section on the surface side of the base material;

[0038] wherein the first placement section and the second placement section are formed in a depressed part whose side wall is stepped;

[0039] a first portion of the depressed part corresponding to the first placement section is located relatively closer to a surface of the base material and has an enough depth for receiving a thin plate-shaped first article;

[0040] the first article placed in the first portion is held at a predetermined position by a bottom face and a side face that constitutes the first portion;

[0041] a second portion of the depressed part corresponding to the second placement section is located relatively more distant to the surface of the base material and has an enough depth for receiving a thin plate-shaped second article;

[0042] the second article placed in the second portion is held at a predetermined position by a bottom face and a side face that constitutes the second portion;

[0043] and wherein when the trays each including the first articles placed in the first placement sections are stacked, the bottom face that constitutes the first portion of one of the trays is contacted with the first article of another of the trays adjoining thereto; and

[0044] when the trays each including the second articles placed in the second placement sections are stacked, the bottom face that constitutes the second portion of one of the trays is contacted with the second article of another of the trays adjoining thereto.

[0045] With the transport tray according to the second aspect of the present invention, the aforementioned structure is provided and therefore, if the first article (e.g., a LC cell) is placed in the first placement section in each of the trays, and these trays are stacked, the bottom face that constitutes the second part of one of the trays is contacted with the first article placed in another of the trays adjoining thereto. Thus, the first article can be held in the first placement section stably.

[0046] Moreover, if the second article (e.g., a LC module) is placed in the second placement section in each of the trays, and these trays are stacked, the bottom face that constitutes the second part of one of the trays is contacted with the second article placed in another of the trays adjoining thereto. Thus, the second article can be held in the second placement section stably.

[0047] Accordingly, this tray can be used commonly for inter-factory transportation of two articles i.e., the first article and the second article, having different shapes and different thicknesses.

[0048] Furthermore, since the first part of the depressed part corresponding to the first placement section has an enough depth for receiving the first article, the first article is entirely received in the first placement section. Similarly, since the second part of the depressed part corresponding to the second placement section has an enough depth for receiving the second article, the second article is entirely received in the second placement section. Thus, the overall height (thickness) of the tray stack formed by stacking the trays in the case where the first article is received in the first placement section is equal to the overall height (thickness) of the tray stack formed by stacking the trays in the case where the second article is received in the second placement section. Accordingly, the same exterior box can be used for transportation of the first article and the transportation of the second article without turning the tray stack upside down.

[0049] In this way, with the transport tray according to the second aspect of the present invention, not only the tray but also the exterior box can be used commonly for the transportation of the first article and that of the second article and as a result, resource saving of the transporting materials and reduction of the transportation cost can be realized easily.

[0050] In a preferred embodiment of the transport tray according to the second aspect of the present invention, the first portion of the depressed part corresponding to the first placement section has an enough depth for receiving the first article and a first cushion; and the second portion of the depressed part corresponding to the second placement section has an enough depth for receiving the second article and a second cushion.

[0051] According to the third aspect of the present invention, still another transport tray is provided. This tray, which is formed by molding a sheet-shaped base material to have a desired shape, comprises:

[0052] a first placement section formed on a surface side of the base material; and

[0053] a second placement section formed to overlap with the first placement section on a back side of the base material;

[0054] wherein the first placement section comprises a depressed part having an enough depth for receiving a thin plate-shaped first article, the first article placed in the depressed part being held at a predetermined position by a bottom face and a side face that constitutes the depressed part;

[0055] the second section is formed by a supporting wall protruding to the back side of the base material, the supporting wall having an enough depth for receiving a thin plate-shaped second article; the second article placed in a region surrounded by the supporting wall being held at a predetermined position by a bottom face and a side face that constitutes the region;

[0056] and wherein when the trays each including the first articles placed in the first placement sections are stacked, the supporting wall of one of the trays is contacted with the first article of another of the trays adjoining thereto; and

[0057] when the trays each including the second articles placed in the second placement sections are stacked, the supporting wall of one of the trays is not contacted with the second article of another of the trays adjoining thereto, and the bottom face that constitutes the region is contacted with the second article of another of the trays adjoining thereto.

[0058] With the transport tray according to the third aspect of the present invention, the aforementioned structure is provided and therefore, if the first article (e.g., a LC cell) is placed in the first placement section formed on the surface side of the sheet-shaped base material in each of the trays, and these trays are stacked, the supporting wall of one of the trays is contacted with the first article placed in another of the trays adjoining thereto. Thus, the first article can be held in the first placement section stably.

[0059] Moreover, if the second article (e.g., a LC module) is placed in the second placement section formed on the back side of the sheet-shaped base material in each of the trays, and these trays are stacked, the supporting wall of one of the trays is not contacted with the second article placed in another of the trays adjoining thereto but the bottom face that constitutes the region is contacted with the second article placed in another of the trays adjoining thereto. Thus, the second article can be held in the second placement section stably.

[0060] Accordingly, this tray can be used commonly for inter-factory transportation of two articles i.e., the first article and the second article, having different shapes and different thicknesses.

[0061] Furthermore, since the first placement section comprises the depressed part having an enough depth for receiving the first article, the first article is entirely received in the first placement section. Similarly, since the second placement section is formed by the supporting wall having an enough depth for receiving the second article, the second article is entirely received in the second placement section. Thus, the overall height (thickness) of the tray stack formed by stacking the trays in the case where the first article is received in the first placement section is equal to the overall height (thickness) of the tray stack formed by stacking the trays in the case where the second article is received in the second placement section. Accordingly, the same exterior box can be used for transportation of the first article and the transportation of the second article without turning the tray stack upside down.

[0062] In this way, with the transport tray according to the third aspect of the present invention, not only the tray but also the exterior box can be used commonly for the transportation of the first article and that of the second article and as a result, resource saving of the transporting materials and reduction of the transportation cost can be realized easily.

[0063] In a preferred embodiment of the transport tray according to the third aspect of the present invention, the depressed part of the first placement section has an enough depth for receiving the first article and a first cushion, and the

supporting wall of the second placement section has an enough depth for receiving the second article and a second cushion.

[0064] According to the fourth aspect of the present invention, a transporting package is provided, which comprises:

[0065] the transport tray according to the first, second, or third aspect of the present invention; and

[0066] an exterior box for receiving a stack of the transport trays (a tray stack).

[0067] With the transporting package according to the fourth aspect of the present invention, the exterior box for receiving a stack of the transport trays according to the first, second, or third aspect of the present invention (a tray stack) is provided and therefore, resource saving of the transporting materials and reduction of the transportation cost can be realized easily.

[0068] According to the fifth aspect of the present invention, a transporting method is provided, which comprises:

[0069] using the transporting package according to the fourth aspect of the present invention.

[0070] With the transporting method according to the fifth aspect of the present invention, the transporting package according to the fourth aspect of the present invention is used, resource saving of the transporting materials and reduction of the transportation cost can be realized easily.

BRIEF DESCRIPTION OF THE DRAWINGS

[0071] In order that the present invention may be readily carried into effect, it will now be described with reference to the accompanying drawings.

[0072] FIG. **1** is a conceptual drawing showing a conventional method for transporting LC cells and LC modules.

[0073] FIG. **2** is a plan view showing the structure of a transport tray according to a first embodiment of the present invention.

[0074] FIG. **3** is a bottom view showing the structure of the transport tray according to the first embodiment of the present invention.

[0075] FIG. **4**A is a partial plan view showing the structure of the first placement section of the transport tray according to the first embodiment of the present invention.

[0076] FIG. **4**B is a partial cross-sectional view along the IVB-IVB line in FIG. **4**A.

[0077] FIG. **5**A is a partial bottom view showing the state in which a LC cell is placed in the first placement section of the transport tray according to the first embodiment of the present invention.

[0078] FIG. **5**B is a partial cross-sectional view along the VB-VB line in FIG. **5**A.

[0079] FIG. **6**A is a partial plan view showing the structure of the second placement section of the transport tray according to the first embodiment of the present invention.

[0080] FIG. **6**B is a partial cross-sectional view along the VIB-VIB line in FIG. **6**A.

[0081] FIG. **7**A is a partial bottom view showing the state in which a LC module is placed in the second placement section of the transport tray according to the first embodiment of the present invention.

[0082] FIG. **7**B is a partial cross-sectional view along the VIIB-VIIB line in FIG. **7**A.

[0083] FIG. **8** is a partial cross-sectional view showing the dimensional relationship of the transport tray according to the first embodiment of the present invention.

[0084] FIG. **9**A is a partial cross-sectional view showing the state in which the transport trays according to the first embodiment of the present invention are stacked and put into an exterior box, wherein a LC cell is placed in the first placement section of each of the transport trays.

[0085] FIG. **9**B is a partial cross-sectional view showing the state in which the transport trays according to the first embodiment of the present invention are stacked, wherein a LC module is placed in the second placement section of each of the transport trays.

[0086] FIG. **10** is a plan view showing the structure of a transport tray according to a second embodiment of the present invention, wherein a LC cell having a FPC substrate is placed in the first placement section thereof.

[0087] FIG. **11** is a bottom view showing the structure of the transport tray according to the second embodiment of the present invention, wherein a LC module is placed in the second placement section thereof.

[0088] FIG. **12**A is a partial cross-sectional view showing the state in which the transport trays according to the second embodiment of the present invention are stacked and put into an exterior box, wherein a LC cell is placed in the first placement section of each of the transport trays.

[0089] FIG. **12**B is a partial cross-sectional view showing the state in which the transport trays according to the second embodiment of the present invention are stacked and put into an exterior box, wherein a LC module is placed in the second placement section of each of the transport trays.

[0090] FIG. **13** is a plan view showing the structure of a transport tray according to a third embodiment of the present invention, wherein a Bi-Pane is placed in the first placement section thereof.

[0091] FIG. **14** is a plan view showing the structure of a transport tray according to the third embodiment of the present invention, wherein a LC module is placed in the second placement section thereof.

[0092] FIG. **15** is a cross-sectional view showing the state in which the transport trays according to the third embodiment of the present invention are stacked and put into an exterior box, wherein a Bi-Pane is placed in the first placement section of each of the transport trays.

[0093] FIG. **16** is a cross-sectional view showing the state in which the transport trays according to the third embodiment of the present invention are stacked and put into an exterior box, wherein a LC module is placed in the second placement section of each of the transport trays.

[0094] FIG. **17** is a cross-sectional view showing the dimensional relationship of the transport tray according to the third embodiment of the present invention.

[0095] FIG. **18**A is a partial cross-sectional view showing the state in which a LC cell having a FPC substrate and a cushion are placed in the first placement section of a transport tray according to a fourth embodiment of the present invention.

[0096] FIG. **18**B is a partial cross-sectional view showing the state in which a LC module and a cushion are placed in the second placement section of the transport tray according to the fourth embodiment of the present invention.

[0097] FIG. **19**A is a partial plan view showing the state in which a LC cell is placed in the first placement section of a transport tray according to a fifth embodiment of the present invention.

[0098] FIG. **19**B is a cross-sectional view showing the state in which the transport trays according to the fifth embodiment

of the present invention are stacked and put into an exterior box, wherein a LC cell is placed in the first placement section of each of the transport trays.

[0099] FIG. **20**A is a partial plan view showing the state in which a LC module is placed in the second placement section of the transport tray according to the fifth embodiment of the present invention.

[0100] FIG. **20**B is a partial cross-sectional view showing the state in which the transport trays according to the fifth embodiment of the present invention are stacked and put into an exterior box, wherein a LC module is placed in the second placement section of each of the transport trays.

[0101] FIG. **21** is a partial cross-sectional view showing the dimensional relationship of the transport tray according to the fifth embodiment of the present invention.

[0102] FIG. **22**A is a plan view showing the state in which a LC cell is placed in the first placement section of a transport tray according to a sixth embodiment of the present invention.

[0103] FIG. **22**B is a partial cross-sectional view showing the state in which the transport trays according to the sixth embodiment of the present invention are stacked and put into an exterior box, wherein a LC cell is placed in the first placement section of each of the transport trays.

[0104] FIG. **23**A is a plan view showing the state in which a LC module is placed in the second placement section of the transport tray according to the sixth embodiment of the present invention.

[0105] FIG. **23**B is a partial cross-sectional view showing the state in which the transport trays according to the sixth embodiment of the present invention are stacked and put into an exterior box, wherein a LC module is placed in the second placement section of each of the transport trays.

[0106] FIG. **24** is a partial cross-sectional view showing the dimensional relationship of the transport tray according to the sixth embodiment of the present invention.

[0107] FIG. **25** is a conceptual drawing showing a method for transporting LC cells and LC modules, in which the transport tray according to the present invention is commonly used for transportation of LC cells and LC modules.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0108] Preferred embodiments of the present invention will be described in detail below while referring to the drawings attached.

First Embodiment

[0109] The structure of a transport tray according to a first embodiment of the present invention is shown in FIGS. **2** and **3**.

[0110] As shown in FIGS. **2** and **3**, the transport tray **10** according to the first embodiment, which is formed to have a desired shape by molding a sheet-shaped base material or member, comprises a first placement section **12** for receiving a LC cell **30** formed on the side of a surface **11** and a second placement section **14** for receiving a LC module **40** formed on the side of a back **13**. The tray **10** can be formed by, for example, the popular vacuum forming method

[0111] The LC cell **30** is placed in the first placement section **12** in such a way that the longitudinal direction of the cell **30** is along the lateral direction of FIG. **2**. However, the LC module **40** is placed in the second placement section **14** in such a way that the longitudinal direction of the module **40** is along the vertical direction of FIG. **3**. Thus, the LC cell **30** and the LC module **40** are placed to be intersected perpendicularly.

[0112] As shown in FIGS. **4**A, **4**B, **5**A and **5**B, the first placement section **12** is formed by an approximately rectangular depressed part having an enough size for receiving the LC cell **30**. The LC cell **30** is placed in this depressed part to have a direction shown in FIG. **2** in such a way as to be fit into there. In other words, the LC cell **30** placed in the first placement section **12** (approximately rectangular depressed part) is supported by the bottom face **16***a* of the first placement section **12** formed on its surface side, and is contacted and engaged with the supporting faces **17***a* and **17***b* which are formed on the inner side faces of the non-depressed part that surrounds the first placement section **12**, and as a result, the cell **30** is held (positioned) in the first placement section **12**. The first placement section **12** (approximately rectangular depressed part) is defined by the bottom face **16***a* and the supporting faces **17***a* and **17***b* and has a plan shape shown in FIG. **4**A.

[0113] As shown in FIGS. **6**A, **6**B, **7**A and **7**B, the second placement section **14** is formed by a pair of supporting walls **15***a* and a pair of supporting walls **15***b* which are arranged so as to define a rectangular region having an enough size for receiving the LC module **40**. The pair of supporting walls **15***a* are located to have a predetermine distance between them along the vertical direction of FIG. **6**A. The pair of supporting walls **15***b* are located to have a predetermine distance between them along the lateral direction of FIG. **6**A. The LC module **40** is placed in the rectangular region to have a direction shown in FIG. **3** in such a way as to be fit into there. In other words, the LC module **40** placed in the second placement section **14** (rectangular region) is supported by the bottom face **16***b* of the second placement section **14** formed on its back side, and is contacted and engaged with the supporting walls **15***a* and **15***b* that surround the second placement section **14**, and as a result, the module **40** is held (positioned) in the second placement section **14**. The second placement section **14** (rectangular region) is defined by the bottom face **16***b* and the supporting walls **15***a* and **15***b* and has a plan shape shown in FIG. **5**A.

[0114] Since the supporting walls **15***a* and **15***b* are formed by selectively pressing the sheet-shaped base material or member constituting the tray **10** toward the side of the back **13**, the first placement section **12** located on the side of the surface comprises four grooves formed corresponding to the supporting walls **15***a* and **15***b*.

[0115] On the side of the surface **11** of the tray **10**, the part other than the first placement section **12**, i.e., the surrounding area of the first placement section **12**, is formed by selectively pressing the sheet-shaped base material or member constituting the tray **10** toward the side of the surface **11**. Thus, the second placement section **14** located on the side of the back **12** comprises a depression formed corresponding to the shape of the surrounding area.

[0116] In addition, in FIGS. **2** to **7**B, gaps are formed between the LC cells **30** placed in the first placement section **12** and the bottom face **16***a*, and the supporting faces **17***a* and **17***b*, and gaps are formed between the LC modules **40** placed in the second placement section **14** and the bottom face **16***b*, and the supporting walls **15***a* and **15***b*. These gaps are provided to facilitate understanding of the present invention. Actually, the LC cells **30** and the LC modules **40** fit into first

and second placement sections **12** and **14**, respectively, these gaps are scarcely generated except for the gaps caused by dimensional errors.

[0117] The dimensional relationship of the transport tray **10** according to the first embodiment is shown in FIG. **8**. Specifically, the distance between the opposing supporting faces **17***a* of the first placement section **12** on the side of the surface **11** is set to be equal to the length of the long sides of the contour of the LC cell **30**, and the distance between the inner faces of the opposing supporting walls **15***b* of the second placement section **14** on the side of the back **13** is set to be equal to the length of the short sides of the contour of the LC cell **30**.

[0118] When the trays **10** are stacked vertically, the distance between the outer end faces of the supporting walls **15***a* and **15***b* of one of the stacked trays **10** and the bottom face **16***a* of another of the stacked trays **10** adjoining thereto is set to be approximately equal to the thickness of the LC cell **30**. This is to make it possible to receive the entire cell **30**. The distance between the bottom face **16***a* of one of the stacked trays **10** and the bottom face **16***b* of another of the stacked trays **10** adjoining thereto is set to be approximately equal to the thickness of the LC module **40**. This is to make it possible to receive the entire module **40**.

[0119] The state in which the trays **10** are stacked and put into an exterior box (packing box) **50** is shown in FIGS. **9**A and **9**B. As shown in FIG. **9**A, the LC cell **30** is placed between the outer end faces of the supporting walls **15***a* and **15***b* of one of the stacked trays **10** and the bottom face **16***a* of another of the stacked trays **10** adjoining thereto downward. As shown in FIG. **9**B, the LC module **40** is placed between the bottom face **16***a* of one of the stacked trays **10** and the bottom face **16***b* of another of the stacked trays **10** adjoining thereto upward, wherein the stacked trays **10** are turned upside down compared with the state of FIG. **9**A.

[0120] In this way, the only difference between the case where the LC cells **30** are placed in the trays **10** and transported and the case where the LC modules **40** are placed in the trays **10** and transported is whether the stacked trays **10** are turned upside down or not. Therefore, the same exterior box **50** can be used commonly for these two cases.

[0121] With the transport tray **10** according to the first embodiment of the present invention, as explained above, the first placement section **12** is formed on the side of the surface **11** and the second placement section **14** is formed on the side of the back **13**. The first placement section **12** comprises the depressed part having an enough size for receiving the LC cell **30** (a first article to be placed). The depressed part comprises the bottom face **16***a* for supporting the LC cell **30** and the supporting faces **17***a* and **17***b* for preventing displacement of the LC cell **30** along the main surface of the tray **10**. The second placement section **14** comprises the protruded part having an enough size for receiving the LC module **40** (a second article to be placed) which are different in shape and thickness from the LC cell **30**. The protruded part comprises the bottom face **16***b* for supporting the LC module **40** and the supporting walls **15***a* and **15***b* for preventing displacement of the LC module **40** along the main surface of the tray **10**. For this reason, the tray **10** can be used commonly for inter-factory transportation of two articles (here, the LC cell **30** and the LC module **40**) having different shapes and different thicknesses.

[0122] Moreover, the height (thickness) of the stacked trays in the case where the LC cells **30** are placed and transported is equal to that in the case where the LC modules **40** are placed and transported. Therefore, the same exterior box **50** can be used for both of the transportation of the cell **30** and that of the module **40** by turning the stacked trays **10** upside down, and as a result, the exterior box **50** can be used commonly for the transportation of the cell **30** and that of the module **40**.

[0123] In this way, with the transport tray **10** according to the first embodiment of the present invention, both of the tray **10** and the exterior box **50** can be used commonly for the transportation of the cell **30** and that of the module **40** and as a result, resource saving of the transporting materials and reduction of the transportation cost can be realized easily.

[0124] FIG. **25** is a conceptual drawing showing a transporting method according to the first embodiment of the invention. In this method, the transport tray **10** according to the first embodiment and the exterior box **50** are used.

[0125] First, in the LC cell fabrication factory, the LC cells **30** fabricated are placed in the transport tray **10**. Next, the trays **10** are stacked and put into the exterior box **50**. Thereafter, the box **50** is transported to the LC module assembly factory.

[0126] In the LC module assembly factory, a FPC substrate **31** is connected to the LC cell **30** and necessary components and/or parts are assembled into the LC cell **30**, fabricating the LC modules **40**. The LC module **40** fabricated in this way is placed in the transport tray **10** which has been used for transporting the LC cells **30**. Subsequently, these trays **10** are stacked vertically and put into the exterior box **50** which has been used for transporting the LC cells **30**, and finally, transported toward a Customer designated factory.

[0127] With the transporting method according to the first embodiment, both of the tray **10** and the exterior box **50** can be used commonly for the transportation of the cell **30** and that of the module **40** and as a result, resource saving of the transporting materials and reduction of the transportation cost can be realized easily.

Second Embodiment

[0128] FIGS. **10**, **11**, **12**A and **12**B show a transport tray according to a second embodiment of the present invention.

[0129] The transport tray **10***a* according to the second embodiment has the same structure as that of the transport tray **10** according to the aforementioned first embodiment except that a first placement section **12***a* is set to be larger than that of the tray **10** so that the LC cell **30** to which a FPC substrate **31** is connected can be transferred and that the shape of a second placement section **14***a* is changed according to the first placement section **12***a*. Therefore, an explanation about the same structure is omitted here by attaching the same reference numerals or signs to the same structural elements, and an explanation about the different structure only is provided below.

[0130] As apparent from FIG. **10**, the first placement section **12***a* is widened downward so that the LC cell **30** to which a FPC substrate **31** is connected can be received. As apparent from FIG. **11**, a second placement section **14***a* is widened downward so corresponding to this.

[0131] When the LC cell **30** with the FPC substrate **31** is placed in the first placement section **12***a*, the tray **10***a* is stacked as shown in FIG. **12**A. When the LC module **40** is placed in the second placement section **14***a*, the tray **10***a* is stacked as shown in FIG. **12**B.

[0132] With the transport tray **10***a* according to the second embodiment of the present invention also, similar to the

aforementioned first embodiment, the tray **10***a* can be used commonly for inter-factory transportation of two articles (here, the LC cell **30** and the LC module **40**) having different shapes and different thicknesses and the exterior box **50** also can be commonly used. Therefore, resource saving of the transporting materials and reduction of the transportation cost can be realized easily.

Third Embodiment

[0133] FIGS. **13** to **17** show a transport tray according to a third embodiment of the present invention.

[0134] The transport tray **10***b* according to the third embodiment has the same structure as that of the transport tray **10** according to the aforementioned first embodiment except that a first placement section **12***ab* is designed so that one Bi-Pane **32** having a size approximately equal to the combination of the eight LC modules **40** can be received and that the shape of a second placement section **14***b* is changed according to the first placement section **12***a*. Therefore, an explanation about the same structure is omitted here by attaching the same reference numerals or signs to the same structural elements, and an explanation about the different structure only is provided below.

[0135] As shown in FIGS. **13** and **15**, the first placement section **12***b* is formed to have an enough size for receiving the Bi-Pane **32** having a size approximately equal to the combination of the eight LC modules **40** and as a result, the first placement section **12***b* is far larger than the first placement section **12** of the first embodiment. On the other hand, as shown in FIGS. **14** and **16**, the eight second placement sections **14***b* are formed so that the eight LC modules **40** can be received separately, wherein the size of the second placement sections **14** is approximately equal to that of the second placement section **14** of the aforementioned first embodiment.

[0136] When the Bi-Pane **32** is placed in the first placement section **12***b*, the trays **10***b* are stacked as shown in FIG. **15** and put into the exterior box **50**. When the LC modules **40** are placed in the second placement section **14***b*, the trays **10***b* are turned upside down and then, stacked as shown in FIG. **16**, and put into the exterior box **50**.

[0137] The dimensional relationship of the transport tray **10***b* according to the third embodiment is shown in FIG. **17**. Specifically, the distance between the opposing supporting faces **17***a* of the first placement section **12***b* on the side of the surface **11** is set to be equal to the length of the long sides of the contour of the Bi-Pane **32**, and the distance between the inner faces of the opposing supporting walls **15***b* of the second placement section **14***b* on the side of the back **13** is set to be equal to the length of the short sides of the contour of the LC modules **40**.

[0138] When the trays **10***b* are stacked vertically, the distance between the outer end faces of the supporting walls **15***a* and **15***b* of one of the stacked trays **10***b* and the bottom face **16***a* of another of the stacked trays **10***b* adjoining thereto is set to be approximately equal to the thickness of the Bi-Pane **32**. This is to make it possible to receive the entire Bi-Pane **32**. The distance between the bottom face **16***a* of one of the stacked trays **10***b* and the bottom face **16***b* of another of the stacked trays **10***b* adjoining thereto is set to be approximately equal to the thickness of the LC module **40**. This is to make it possible to receive the entire module **40**.

[0139] With the transport tray **10***b* according to the third embodiment of the present invention also, similar to the aforementioned first embodiment, the tray **10***b* can be used commonly for inter-factory transportation of two articles (here, the Bi-Pane **32** and the LC module **40**) having different shapes and different thicknesses and the exterior box **50** also can be commonly used. Therefore, resource saving of the transporting materials and reduction of the transportation cost can be realized easily.

Fourth Embodiment

[0140] FIGS. **18**A and **18**B show a transport tray according to a fourth embodiment of the present invention.

[0141] The transport tray **10***c* according to the fourth embodiment corresponds to one obtained by adding a sheet-shaped cushion **51** to between the LC cell **30** and the tray **10***c* and adding a sheet-shaped cushion **52** to between the LC module **40** and the tray **10***c*. The other structure is the same as that of the tray **10** of the aforementioned first embodiment.

[0142] The shape and the size of the cushion **51** are the same as those of the LC cell **30**, respectively. The shape and the size of the cushion **52** are the same as those of the LC module **40**, respectively.

[0143] The dimensional relationship of the transport tray **10***c* according to the fourth embodiment is shown in FIGS. **18**A and **18**B. Specifically, when the trays **10***c* are stacked vertically, the distance between the outer end faces of the supporting walls **15***b* of one of the stacked trays **10***c* and the bottom face **16***a* of another of the stacked trays **10***b* adjoining thereto is set to be approximately equal to the sum of the thickness of the LC cell **30** and the thickness of the cushion **51**. This is to make it possible to receive the entire cell **30** and the entire cushion **51**. The distance between the bottom face **16***a* of one of the stacked trays **10***c* and the bottom face **16***b* of another of the stacked trays **10***b* adjoining thereto is set to be approximately equal to the sum of the thickness of the LC module **40** and the thickness of the cushion **52**. This is to make it possible to receive the entire module **40** and the entire cushion **52**.

[0144] With the transport tray **10***c* according to the fourth embodiment, in addition to the advantages of the transport tray **10** of the aforementioned first embodiment, an additional advantage that stress (shock) applied to the LC cells **30** and the LC modules **40** during transportation is relaxed is obtained.

Fifth Embodiment

[0145] FIGS. **19**A, **19**B, **20**A, **20**B, **21**A, and **21**B show a transport tray according to a fifth embodiment of the present invention.

[0146] Different from the transport trays **10**, **10***a*, **10***b*, and **10***c* according to the aforementioned first to fourth embodiments, the transport tray **10***d* according to the fifth embodiment receives both of the LC cell **30** and the LC module **40** on the side of the surface **11**.

[0147] Specifically, the transport tray **10***d*, which is formed to have a desired shape by molding a sheet-shaped base material or member like the above-described first embodiment, comprises a first placement section **12***d* for receiving the LC cell **30** formed on the side of the surface **11** and a second placement section **14***d* for receiving the LC module **40** formed on the side of the surface **11**.

[0148] The LC cell **30** is placed in the first placement section **12***d* in such a way that the longitudinal direction of the cell **30** is along the lateral direction of FIG. **19**A. However, the LC module **40** is placed in the second placement section **14***d*

in such a way that the longitudinal direction of the module **40** is along the vertical direction of FIG. **20**A. Thus, the LC cell **30** and the LC module **40** are placed to be intersected perpendicularly.

[0149] The first placement section **12***d* and the second placement section **14***d* are formed by one depressed part having an enough size for receiving both the LC cell **30** and the LC module **40**. The side wall of this depressed part is stepped and comprises, in an upward order from the bottom face **16***a*, a supporting face **17***c* perpendicular to the bottom face **16***a*, a supporting face **18** parallel to the bottom face **16***a*, and a supporting face **17***a* perpendicular to the bottom face **16***a*. The first placement section **12***d* is defined by the supporting face **18** and the supporting faces **17***a* and **17***b*. The second placement section **14***d* is defined by the bottom face **16***a* and the supporting faces **17***c* and **17***d*. Therefore, on the side of the surface **11**, the second placement section **14***d* is formed at a position closer to the bottom face **16***a* (at a lower position), and the first placement section **12***d* is formed at a position more distant from the bottom face **16***a* (at an upper position).

[0150] As seen from the placement state of the LC cell **30** and the LC module **40** shown in FIGS. **19**A, **19**B, **20**A, and **20**B, the LC cell **30** placed in the first placement section **12***d* and the LC module **40** placed in the second placement section **14***d* interfere with each other. Therefore, the LC cell **30** cannot be placed in the first placement section **12***d* simultaneously with placement of the LC module **40** in the second placement section **14***d*, wherein the cell **30** is placed to overlap with the underlying module **40**.

[0151] As shown in FIGS. **19**A and **19**B, the LC cell **30** placed in the first placement section **12***d* is supported by the supporting face **18** in such a way as to be apart form the bottom face **16***a* on the side of the surface **11**, and positioned by the supporting faces **17***a* and **17***b*. As shown in FIGS. **20**A and **20**B, the LC module **40** placed in the second placement section **14***d* is supported by the bottom face **16***a*, and positioned by the supporting faces **17***c* and **17***d*.

[0152] In addition, in FIGS. **19**A, **19**B, **20**A, **20**B, **21**A, and **21**B, gaps are formed between the LC module **40** placed in the second placement section **14***d* and the bottom face **16***a* and the supporting faces **17***c* and **17***d*, and gaps are formed between the LC cell **30** placed in the first placement section **12***d* and the bottom face **16***a* and the supporting faces **17***a* and **18**. These gaps are provided to facilitate understanding of the present invention. Actually, these gaps are scarcely generated except for the gaps caused by dimensional errors.

[0153] The dimensional relationship of the transport tray **10***d* according to the fifth embodiment is shown in FIG. **21**. Specifically, the distance between the opposing supporting faces **17***a* of the first placement section **12***d* is set to be equal to the length of the long sides of the contour of the LC cell **30**, and the distance between the supporting faces **17***c* of the second placement section **14***d* is set to be equal to the length of the short sides of the contour of the LC module **40**.

[0154] When the trays **10***d* are stacked vertically, the distance between the supporting face **18** of one of the stacked trays **10***d* and the bottom face **16***b* of another of the stacked trays **10***d* adjoining thereto is set to be approximately equal to the thickness of the LC cell **30**. This is to make it possible to receive the entire cell **30**. The distance between the bottom face **16***a* of one of the stacked trays **10***d* and the bottom face **16***b* of another of the stacked trays **10***d* adjoining thereto is set to be approximately equal to the thickness of the LC module **40**. This is to make it possible to receive the entire module **40**.

[0155] The state in which the trays **10***d* are stacked and put into the exterior box **50** is shown in FIGS. **19**B and **20**B.

[0156] With the transport tray **10***d* according to the fifth embodiment, the stacked trays **10***d* are not turned upside down between the case where the LC cells **30** are placed and transferred and the case where the LC modules **40** are placed and transferred and therefore, it is apparent that the same exterior box **50** can be commonly used. In addition, in the fifth embodiment also, cushions can be used so as to superpose on the LC cells and the LC modules in the same manner as described in the aforementioned fourth embodiment.

[0157] With the transport tray **10***d* according to the fifth embodiment of the present invention, as explained above, the tray **10***d* comprises the first placement section **12***d* formed on the side of the surface **11** and the second placement section **14***d* formed on the same side. The first placement section **12***d* comprises the depressed part having an enough size for receiving the LC cell **30** (a first article to be placed), and the supporting face **18** for supporting the LC cell **30** and the supporting faces **17***a* and **17***b* for preventing displacement of the LC cell **30** along the main surface of the tray **10***d* are formed in the depressed part. The second placement section **14***d* is formed in the same depressed part as the first placement section **12***d* to have an enough size for receiving the LC module (a second article to be placed) which are different in shape and thickness from the LC cell **30**. The second placement section **14***d* comprises the bottom face **16***a* for supporting the LC module **40** and the supporting walls **17***c* and **17***d* for preventing displacement of the LC module **40** along the main surface of the tray **10***d*. For this reason, the tray **10***d* can be used commonly for inter-factory transportation of two articles (here, the LC cell **30** and the LC module **40**) having different shapes and different thicknesses.

[0158] Moreover, the height (thickness) of the stacked trays **10***d* in the case where the LC cells **30** are placed and transported is equal to that in the case where the LC modules **40** are placed and transported. Therefore, the same exterior box **50** can be used for both of the transportation of the cell **30** and that of the module **40** without turning the stacked trays **10***d* upside down, and as a result, the exterior box **50** can be used commonly for the transportation of the cell **30** and that of the module **40**.

[0159] In this way, with the transport tray **10***d* according to the fifth embodiment of the present invention, both of the tray **10***d* and the exterior box **50** can be used commonly for the transportation of the cell **30** and that of the module **40** and as a result, resource saving of the transporting materials and reduction of the transportation cost can be realized easily.

Sixth Embodiment

[0160] FIGS. **22**A, **22**B, **23**A, **23**B, and **24** show a transport tray according to a sixth embodiment of the present invention.

[0161] The transport tray **10***e* according to the sixth embodiment has the same structure as that of the transport tray **10***d* according to the aforementioned fifth embodiment except for the following.

[0162] In the transport tray **10***d* of the aforementioned fifth embodiment, both of the LC cell **30** and the LC module **40** are placed on the side of the surface **11**. However, the LC cell **30** thus placed is apart from the bottom face **16***a* and only the peripheral area of the cell **30** is supported by the supporting face **18**. Therefore, there is an anxiety that the cell **30** is

pressed by the bottom face **16***b* of the adjoining tray **10***d* to be broken or damaged during transportation. In the tray **10***e* of the sixth embodiment, this anxiety is eliminated in the following way.

[0163] Specifically, like the above-described first embodiment, the supporting wall **15***b* is formed to protrude on the side of the back **13**, thereby raising the bottom face **16***a*. Thus, the approximately entirety of the cell **30** placed is supported by the bottom face **16***a*. For this reason, there is no anxiety that the cell **30** is pressed by the bottom face **16***b* of the adjoining tray **10***d* to be broken or damaged during transportation.

[0164] When the LC cell **30** is placed in the first placement section **12***e*, the cell **30** is supported by the bottom face **16***a* of one of the stacked trays **10***e*, as shown in FIG. **22**B, and positioned by the supporting faces **17***a* and **17***b* along the main surface of the tray **10***e*. Since the cell **30** is contacted with the supporting wall **15***b* of another of the stacked trays **10***e* adjoining thereto upward, the cell **30** is positioned along the direction perpendicular to the main surface of the tray **10***e*.

[0165] When the LC module **40** is placed in the second placement section **14***e*, the module **40** is supported by the bottom face **16***a* of one of the stacked trays **10***e*, as shown in FIG. **23**B, and positioned by the supporting faces **17***c* and **17***d* along the main surface of the tray **10***e*. Since the module **40** is contacted with the bottom face **16***b* of another of the stacked trays **10***e* adjoining thereto upward, the module **40** is positioned along the direction perpendicular to the main surface of the tray **10***e*.

[0166] The stacked trays **10***e* are not turned upside down in the case of transporting the LC cells **30** and in the case of transporting the LC modules **40**.

[0167] In the sixth embodiment also, cushions can be used so as to superpose on the LC cells and the LC modules in the same manner as described in the aforementioned fourth embodiment.

[0168] With the transport tray **10***e* according to the sixth embodiment of the present invention, the tray **10***e* can be used commonly for the transportation of the cell **30** and that of the module **40**. Moreover, the exterior box **50** can be used commonly for the transportation of the cell **30** and that of the module **40**. As a result, resource saving of the transporting materials and reduction of the transportation cost can be realized easily.

VARIATIONS

[0169] The above-described first to sixth embodiments are embodied examples of the present invention. Therefore, it is needless to say that the present invention is not limited to these embodiments and any other modification is applicable to these embodiments without departing the spirit of the present invention.

[0170] For example, placement and transportation of the LC cell **30** and the LC module **40** each having a rectangular plan shape is explained in the aforementioned embodiments. However, the present invention is not limited to this. Any other articles can be placed and transported by the transport tray according to the present invention. No limit is applied to the shape and thickness of articles to be placed and transported.

1. A transport tray formed by molding a sheet-shaped base material to have a desired shape, comprising:

a first placement section formed on a surface side of the base material; and

a second placement section formed to overlap with the first placement section on a back side of the base material;

wherein the first placement section comprises a depressed part having an enough depth for receiving a thin plate-shaped first article;

the first article placed in the depressed part is held at a predetermined position by a bottom face and a side face that constitute the depressed part;

the second placement section is formed by a supporting wall protruding to the back side of the base material, the supporting wall having an enough depth for receiving a thin plate-shaped second article; and

the second article placed in a region surrounded by the supporting wall is held at a predetermined position by a bottom face and a side face that constitute the region;

and wherein when the trays each including the first articles placed in the first placement sections are stacked, the supporting wall of one of the trays is contacted with the first article of another of the trays adjoining thereto; and

when the trays each including the second articles placed in the second placement sections are stacked, the bottom face that constitutes the depressed part of one of the trays is contacted with the second article of another of the trays adjoining thereto.

2. The tray according to claim **1**, wherein the supporting wall is located in such a way that when the trays each including the second articles placed in the second placement sections are stacked, the supporting wall of the second placement section of one of the trays does not interfere with the second article of another of the trays adjoining thereto.

3. The tray according to claim **1**, wherein the first placement section has an enough size for receiving the first article and an attachment for the first article.

4. The tray according to claim **1**, wherein the depressed part of the first placement section has an enough depth for receiving the first article and a cushion, and the supporting wall of the second placement section has an enough depth for receiving the second article and a cushion.

5. The tray according to claim **1**, wherein the first placement section has an enough size for receiving the first article having a size equal to a multiple of a size of the second article to be placed in the second placement section or greater.

6. A transport tray formed by molding a sheet-shaped base material to have a desired shape, comprising:

a first placement section formed on a surface side of the base material; and

a second placement section formed to overlap with the first placement section on the surface side of the base material;

wherein the first placement section and the second placement section are formed in a depressed part whose side face is stepped;

a first portion of the depressed part corresponding to the first placement section is located relatively closer to a surface of the base material and has an enough depth for receiving a thin plate-shaped first article;

the first article placed in the first portion is held at a predetermined position by a bottom face and a side face that constitutes the first portion;

a second portion of the depressed part corresponding to the second placement section is located relatively more distant to the surface of the base material and has an enough depth for receiving a thin plate-shaped second article;

the second article placed in the second portion is held at a predetermined position by a bottom face and a side face that constitutes the second portion;

and wherein when the trays each including the first articles placed in the first placement sections are stacked, the bottom face that constitutes the second portion of one of the trays is contacted with the first article of another of the trays adjoining thereto; and

when the trays each including the second articles placed in the second placement sections are stacked, the bottom face that constitutes the second portion of one of the trays is contacted with the second article of another of the trays adjoining thereto.

7. The tray according to claim **6**, wherein the first portion of the depressed part corresponding to the first placement section has an enough depth for receiving the first article and a first cushion; and

the second portion of the depressed part corresponding to the second placement section has an enough depth for receiving the second article and a second cushion.

8. A transport tray formed by molding a sheet-shaped base material to have a desired shape, comprising:

a first placement section formed on a surface side of the base material; and

a second placement section formed to overlap with the first placement section on a back side of the base material;

wherein the first placement section comprises a depressed part having an enough depth for receiving a thin plate-shaped first article;

the first article placed in the depressed part is held at a predetermined position by a bottom face and a side face that constitutes the depressed part;

the second placement section is formed by a supporting wall protruding to the back side of the base material, the supporting wall having an enough depth for receiving a thin plate-shaped second article; and

the second article placed in a region surrounded by the supporting wall is held at a predetermined position by a bottom face and a side face that constitutes the region;

and wherein when the trays each including the first articles placed in the first placement sections are stacked, the supporting wall of one of the trays is contacted with the first article of another of the trays adjoining thereto; and

when the trays each including the second articles placed in the second placement sections are stacked, the supporting wall of one of the trays is not contacted with the second article of another of the trays adjoining thereto, and the bottom face that constitutes the region is contacted with the second article of another of the trays adjoining thereto.

9. The tray according to claim **8**, wherein the depressed part of the first placement section has an enough depth for receiving the first article and a cushion, and the supporting wall of the second placement section has an enough depth for receiving the second article and a cushion.

10. A transporting package comprising:

the transport tray according to claim **1**; and

an exterior box for receiving a stack of the transport trays.

11. A transporting method comprising:

using the transporting package according to claim **10**.

12. A transporting package comprising:

the transport tray according to claim **6**; and

an exterior box for receiving a stack of the transport trays.

13. A transporting package comprising:

the transport tray according to claim **8**; and

an exterior box for receiving a stack of the transport trays.

* * * * *