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Kang et al.

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(54) **BACKLIGHT ASSEMBLY, LIQUID CRYSTAL DISPLAY APPARATUS HAVING THE SAME AND DEVICE FOR FORMING A PARTICLE INTERCEPTOR IN THE BACKLIGHT ASSEMBLY**

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Mar. 12, 2003 (KR) 2003-15334

(51) **Int. Cl.**
G02F 1/1333 (2006.01)

(52) **U.S. Cl.** **349/60**; 349/58

(58) **Field of Classification Search** 349/60, 349/58

See application file for complete search history.

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(57) **ABSTRACT**

To prevent particles from infiltrating into a display apparatus, a liquid crystal display panel supporting member includes a first particle interceptor and a second interceptor. The first particle interceptor is formed along the top face of the first supporting member frame portion facing a bottom plate of a liquid crystal display panel that is to be mounted on the liquid crystal display panel supporting member. The first particle interceptor has at least two cut portions. The second particle interceptor is disposed between the cut portions to prevent particles from infiltrating into the first particle interceptor. Thus, the liquid crystal display apparatus may prevent deterioration of its display quality.

9 Claims, 16 Drawing Sheets

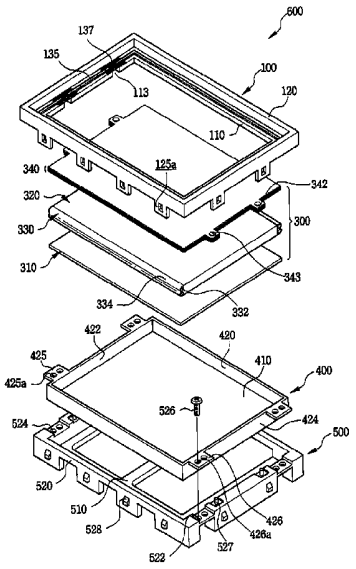

FIG.1

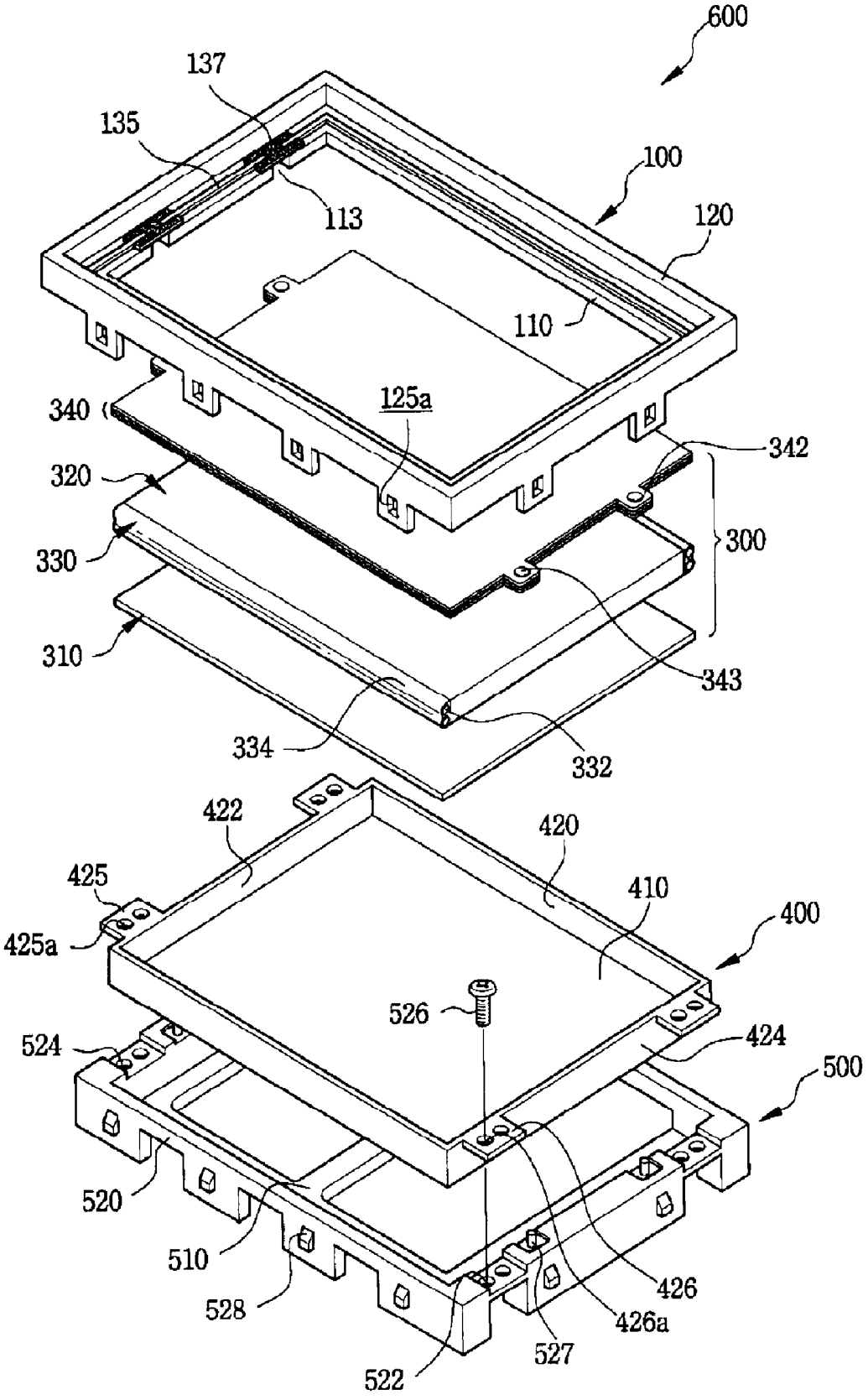
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FIG.2

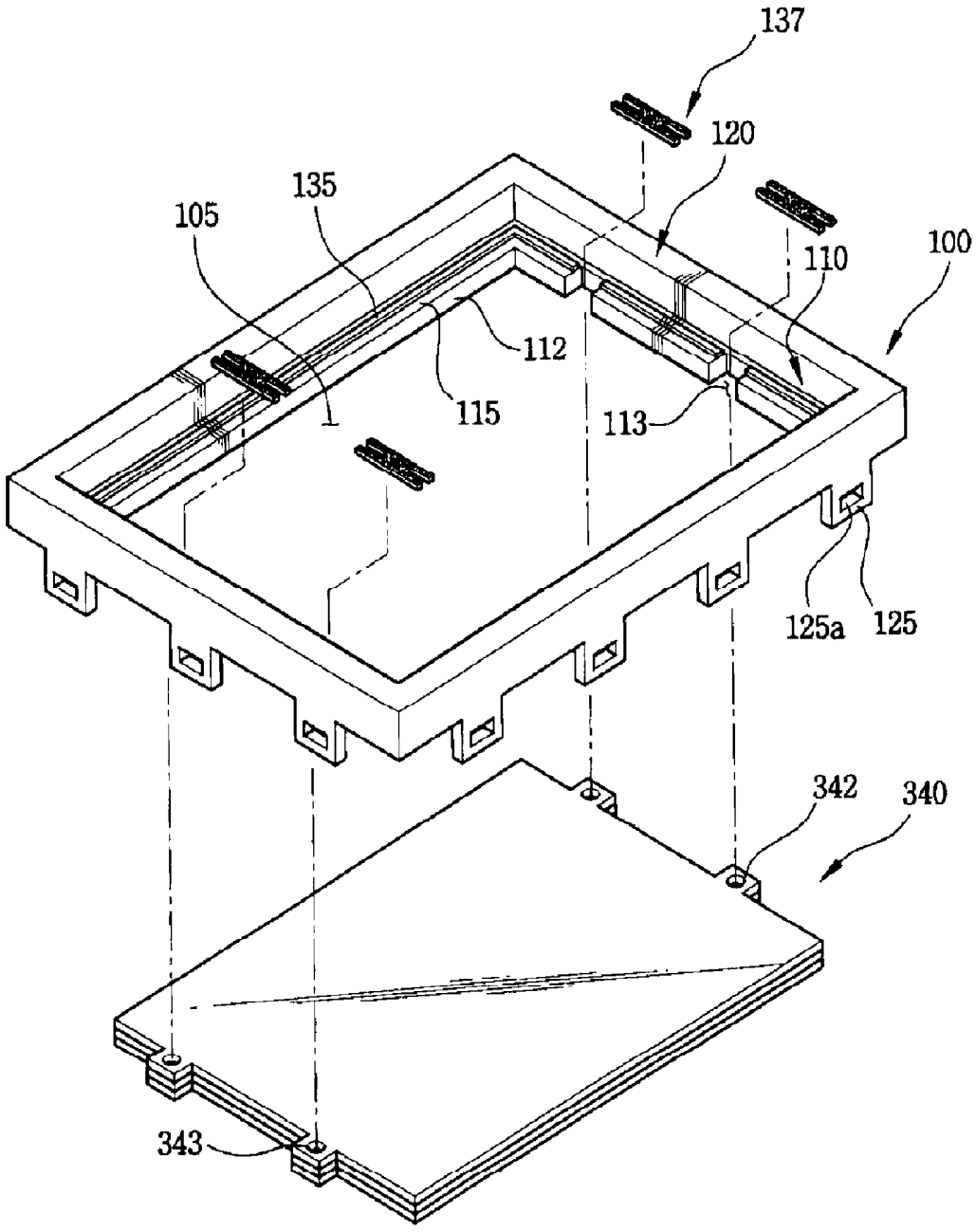


FIG.3

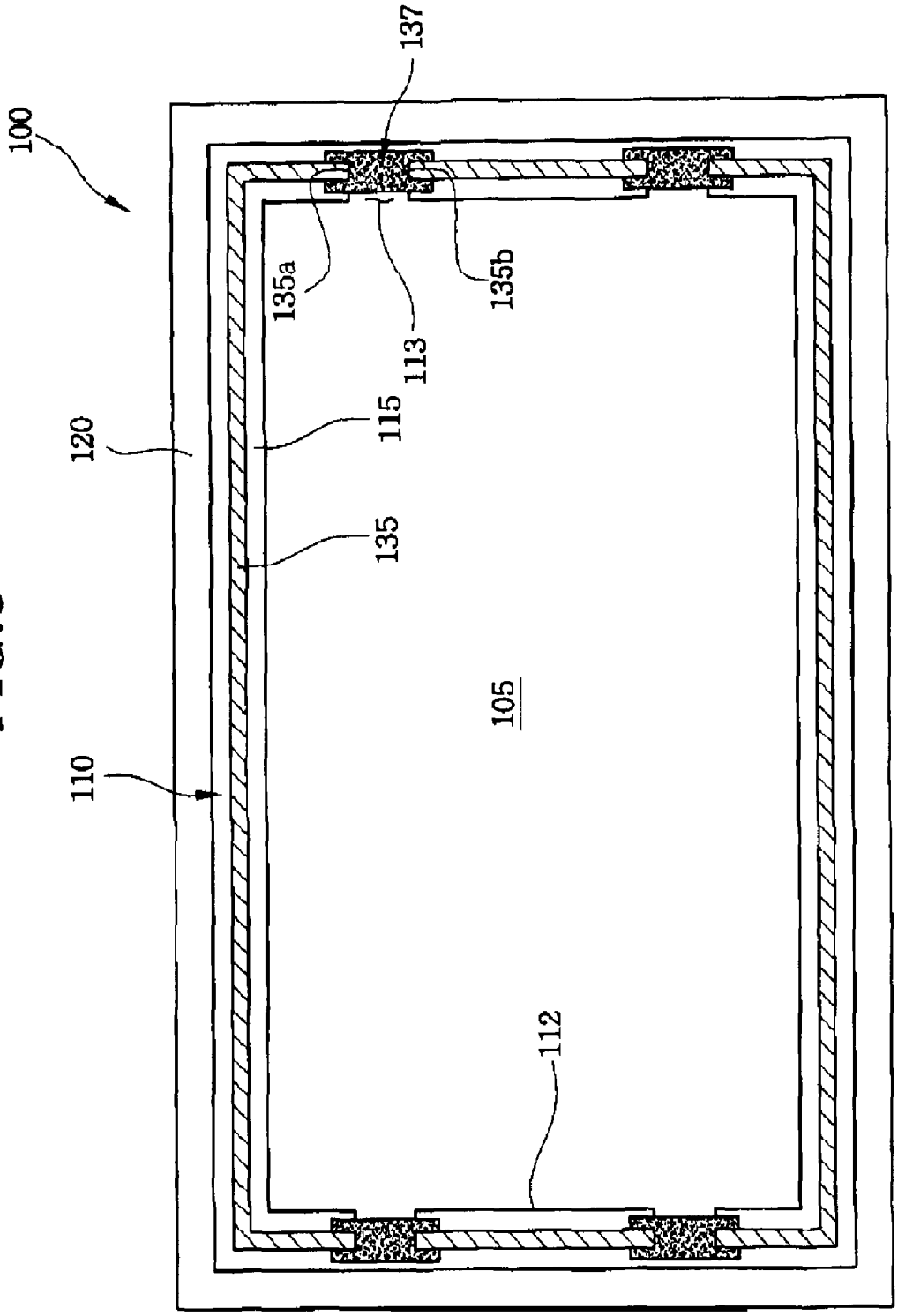
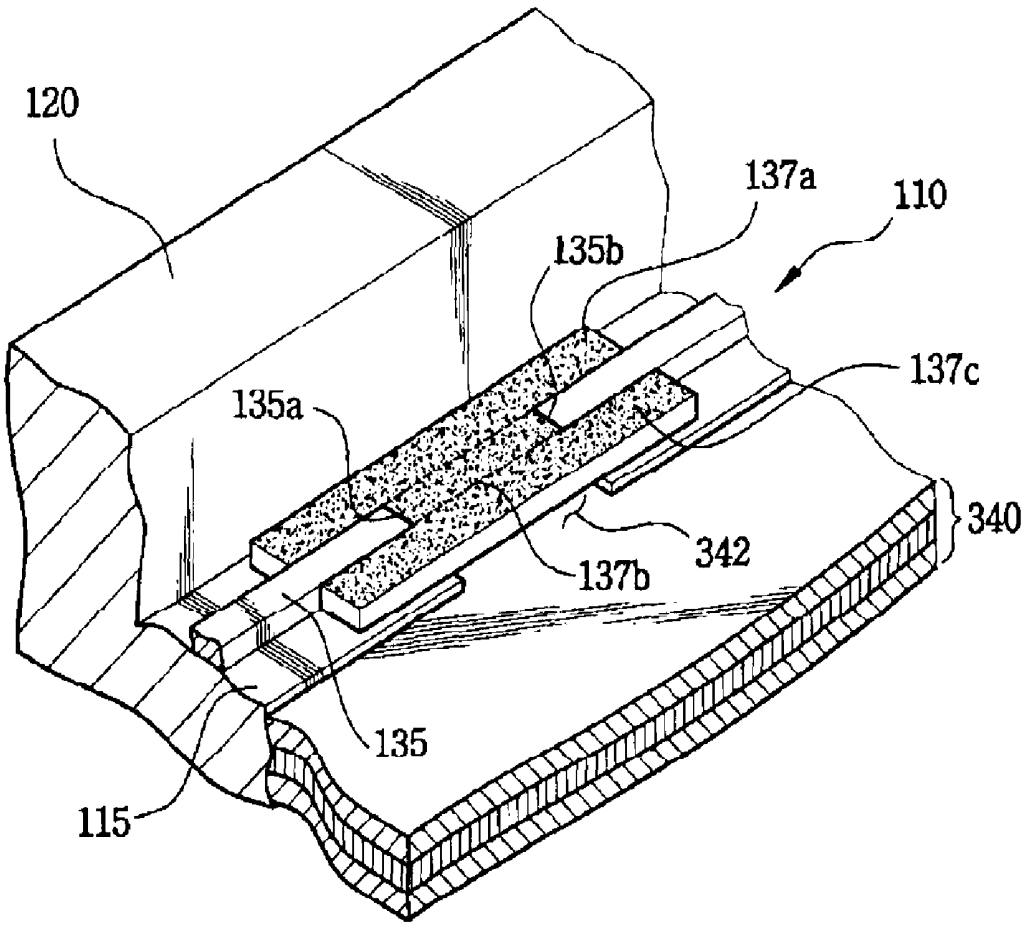


FIG.4



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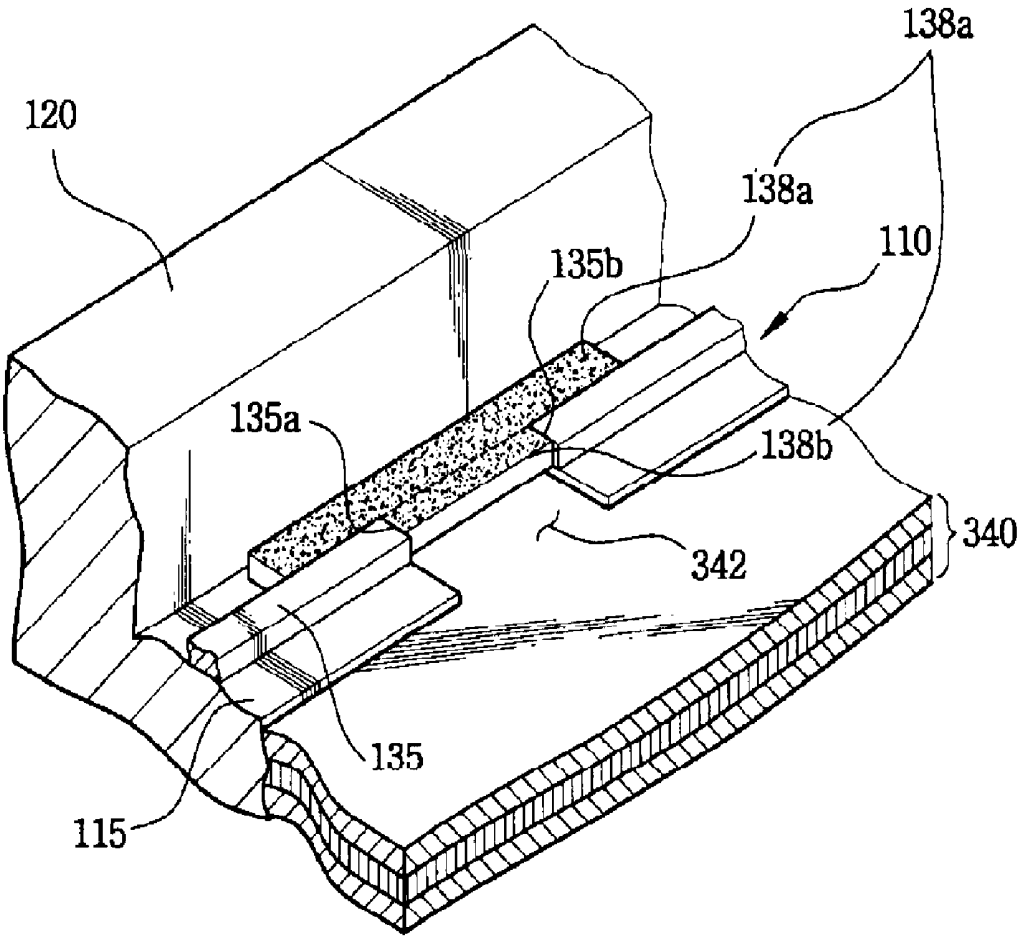

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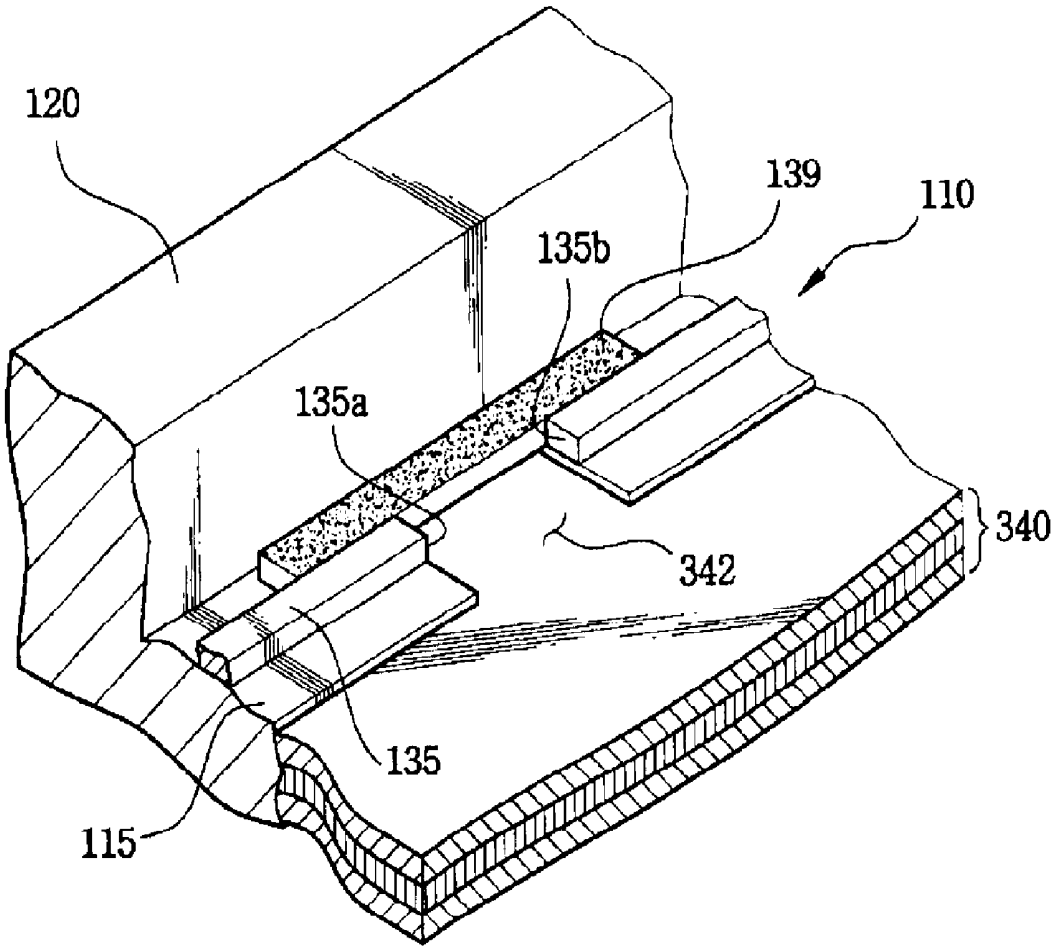

FIG.7

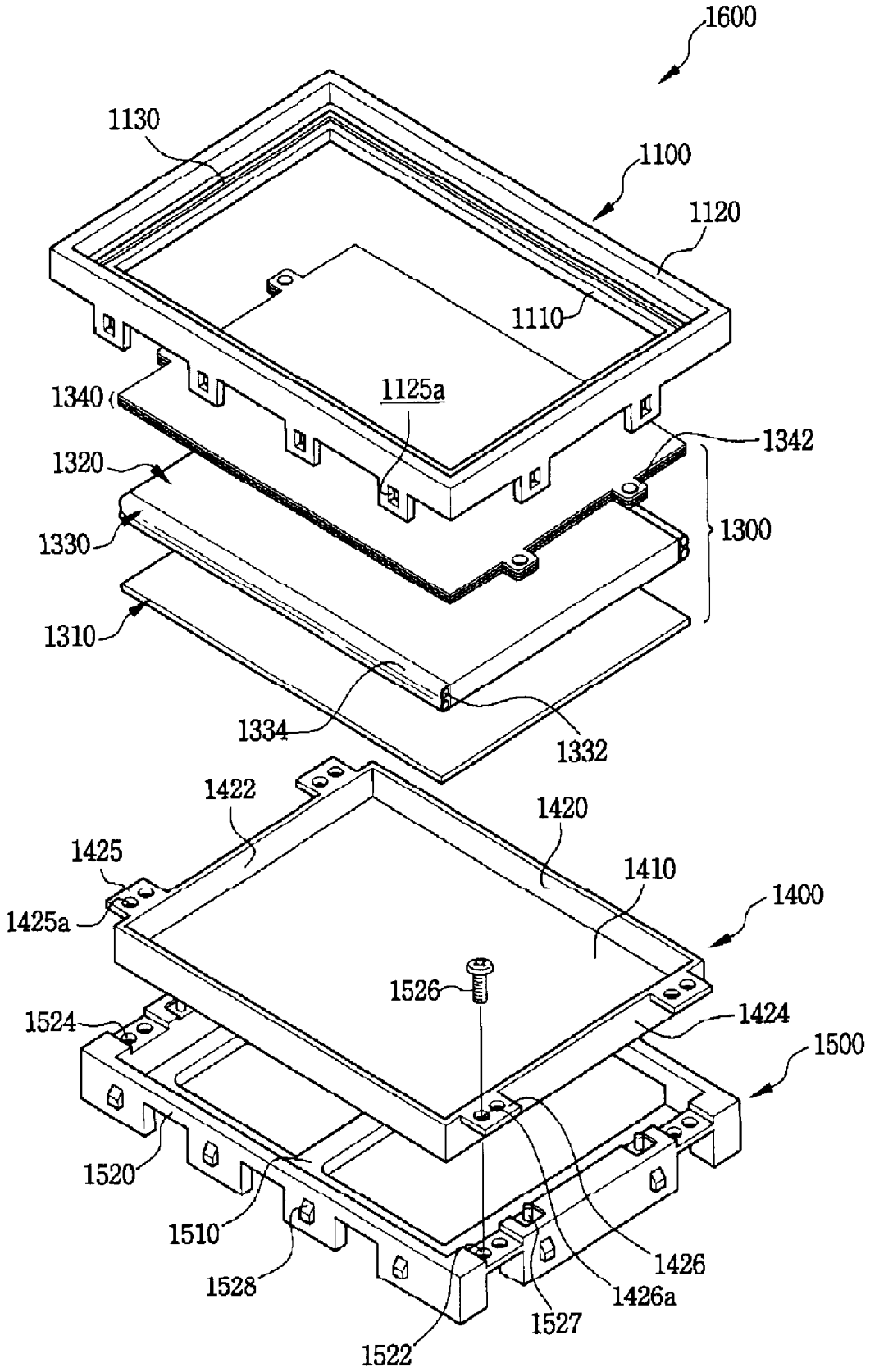
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FIG.8

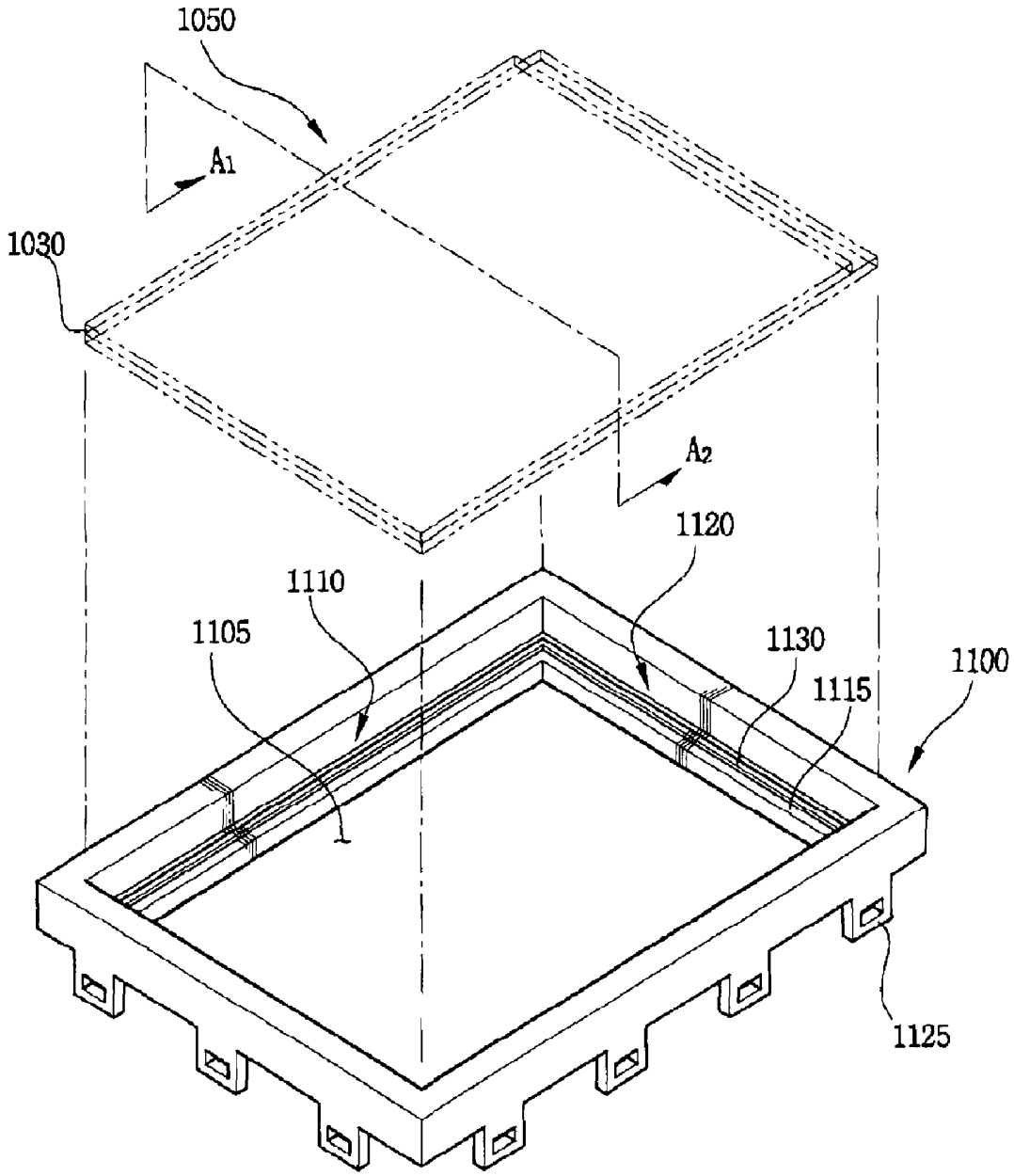

FIG.9

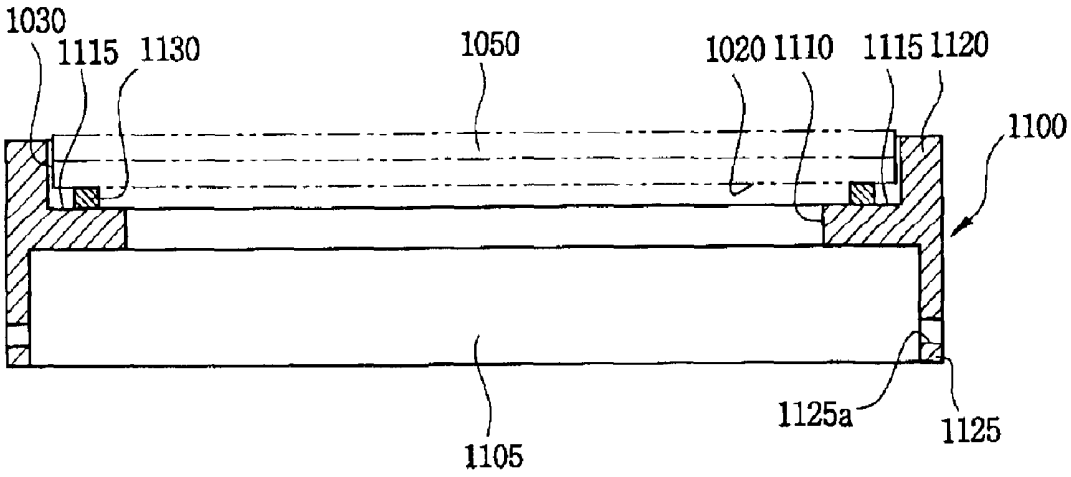
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FIG.10

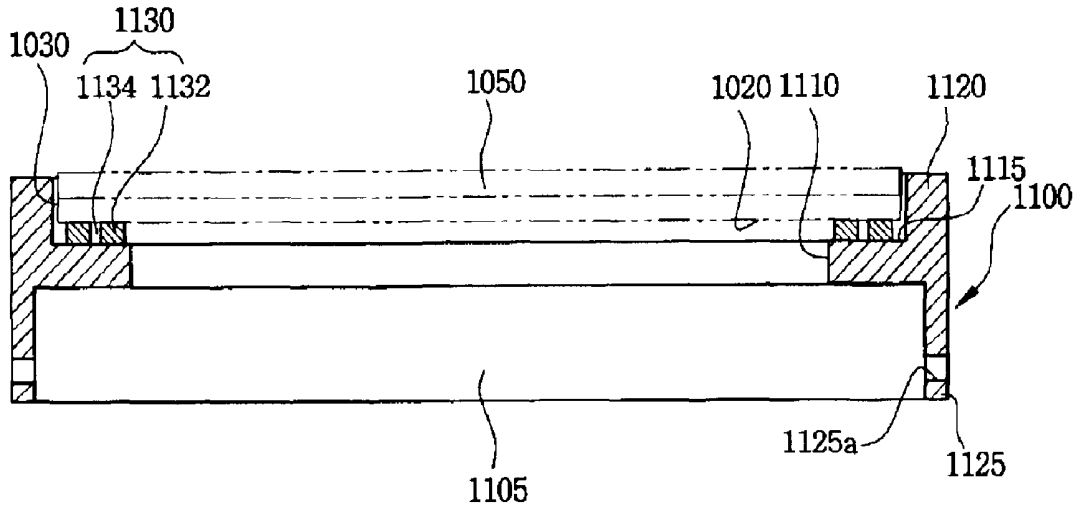
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FIG.11

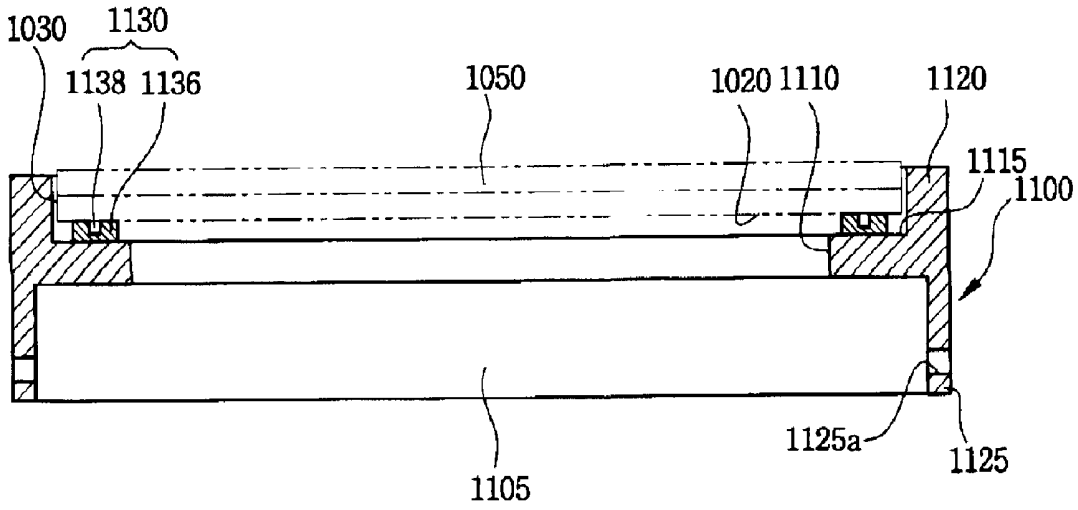
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FIG.12

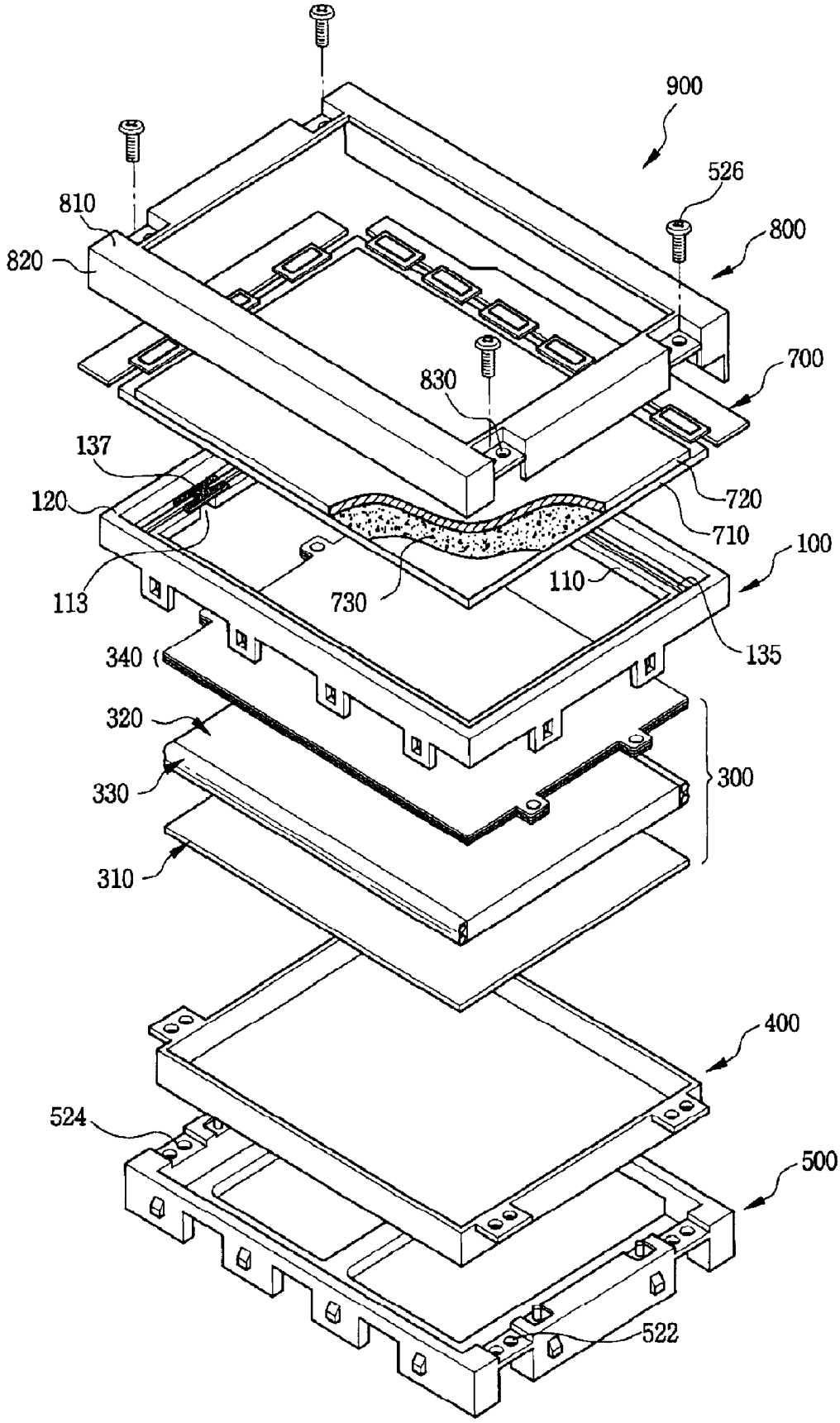
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FIG.13

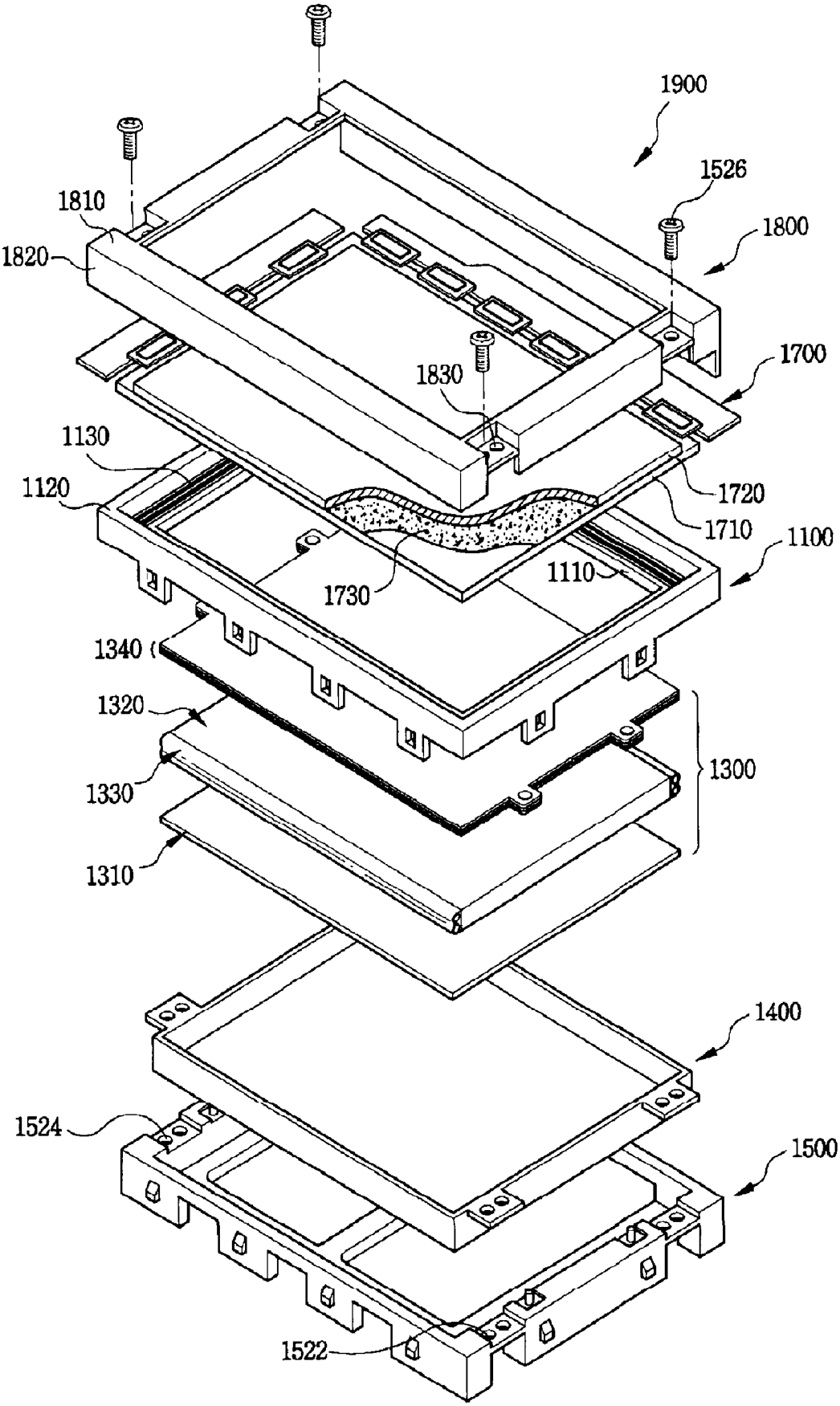
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FIG.14

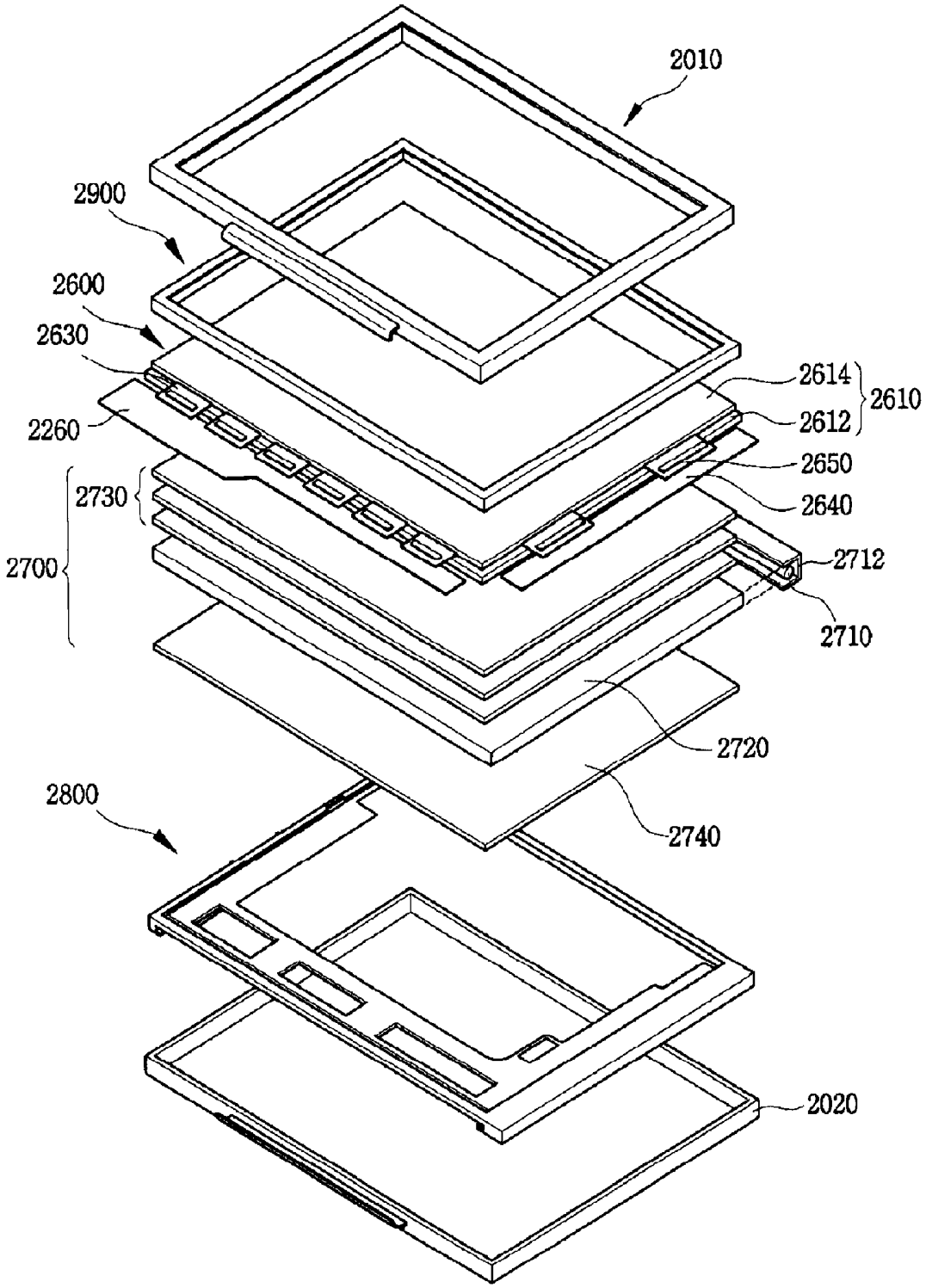
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FIG.15

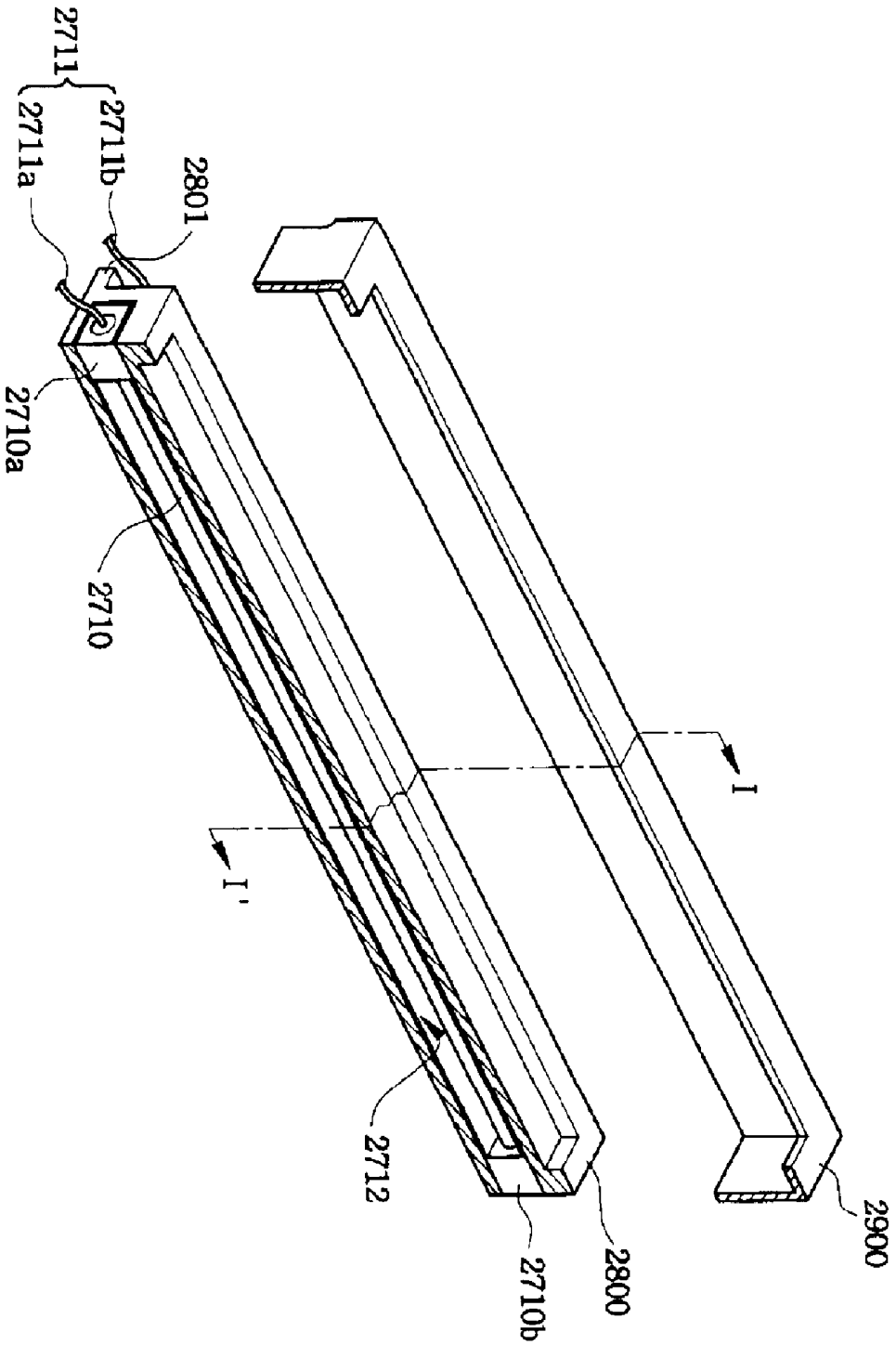


FIG.16

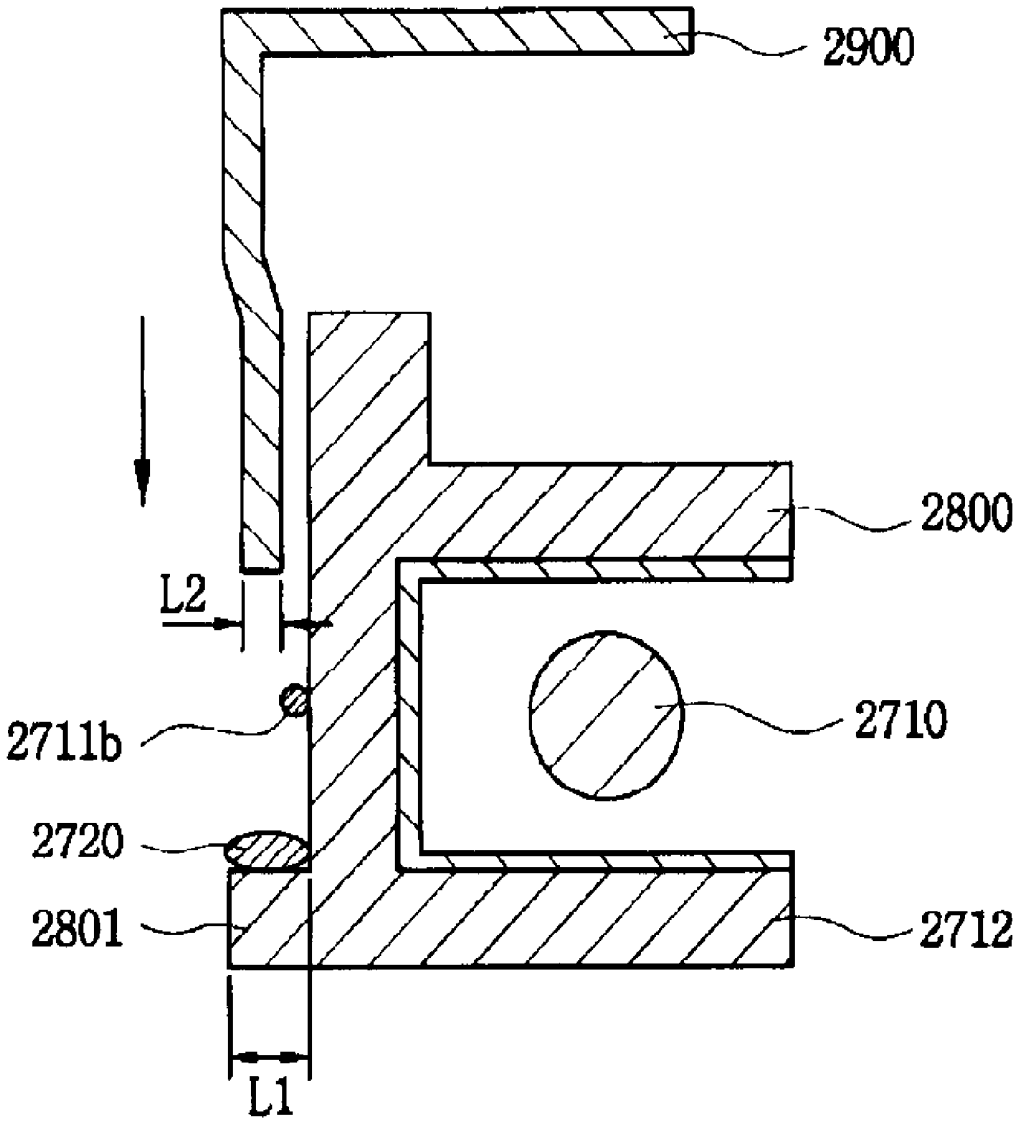
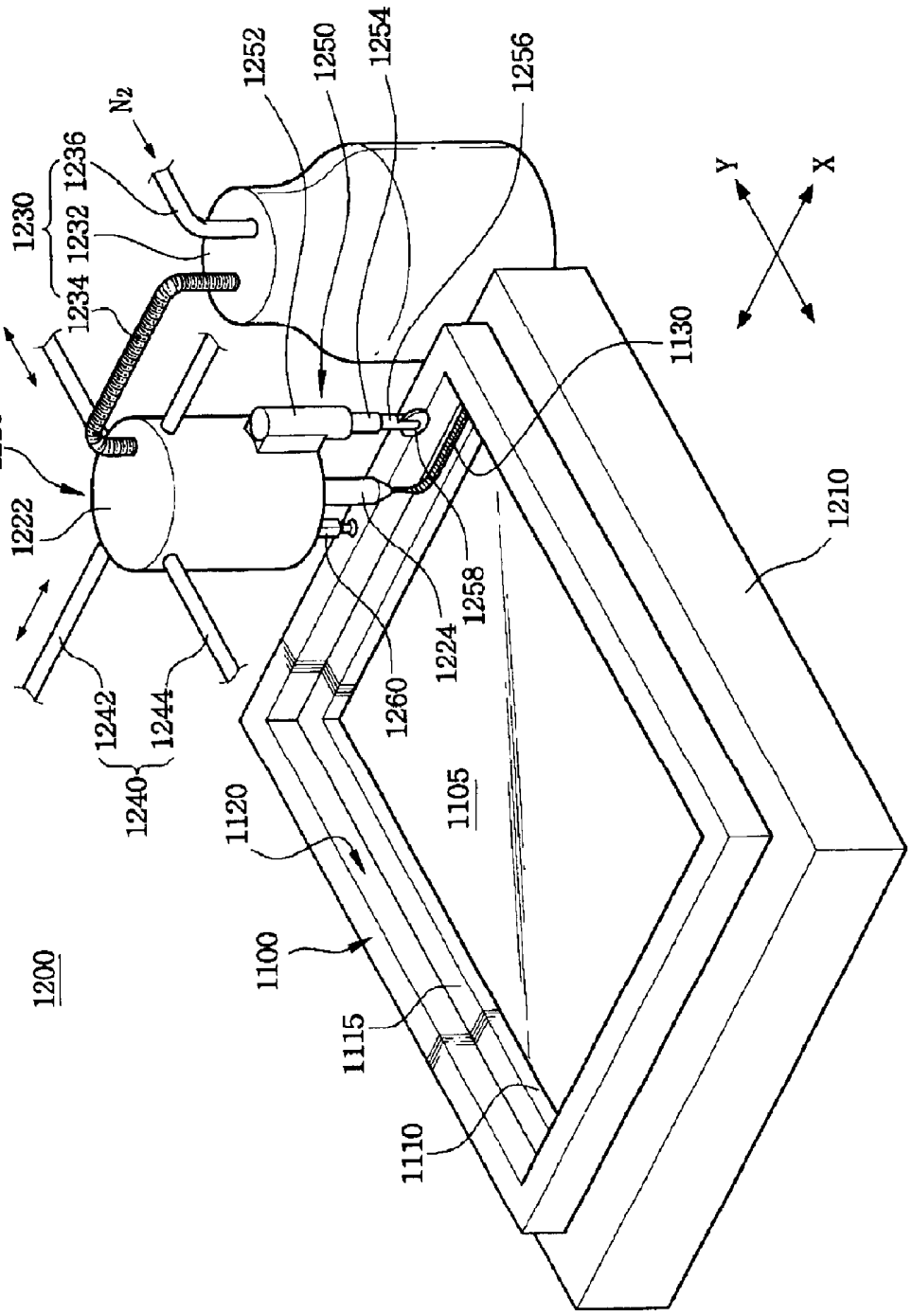


FIG. 17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BACKLIGHT ASSEMBLY, LIQUID CRYSTAL DISPLAY APPARATUS HAVING THE SAME AND DEVICE FOR FORMING A PARTICLE INTERCEPTOR IN THE BACKLIGHT ASSEMBLY

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a divisional application of U.S. patent application Ser. No. 10/798,814, filed on Mar. 10, 2004, which relies for priority upon Korean Patent Application No. 2003-14688 filed on Mar. 10, 2003, Korean Patent Application No. 2003-15334 filed on Mar. 12, 2003 and Korean Patent Application No. 2003-15026 filed on Mar. 11, 2003, the contents of which are herein incorporated by reference in their entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a backlight assembly, a liquid crystal display apparatus having the backlight assembly, and a device for forming a particle interceptor in the backlight assembly. More particularly, the present invention relates to a backlight assembly that prevents particles from infiltrating or diffusing into an image display region, a liquid crystal display apparatus having the backlight assembly, and a device for forming a particle interceptor in the backlight assembly.

2. Description of the Related Art

A liquid crystal display apparatus is a kind of a flat panel display apparatus that displays an image using liquid crystal. The liquid crystal display apparatus includes a liquid crystal control device and a light generating device. The liquid crystal control device and the light generating device are received in a receiving container.

Particles may adhere to the light generating device and/or the liquid crystal control device. The particles block passages of light to deteriorate the display quality of the liquid crystal display apparatus. To prevent generation of particles, the light generating device and the liquid crystal control device are preferably manufactured and then assembled in a clean room.

Since most liquid crystal display apparatuses are operated under conditions having many particles, the particles may infiltrate or diffuse into the light generating deice and/or the liquid crystal control device. Thus, the display quality of the liquid crystal display apparatus may be lowered.

To solve above problem, a particle interceptor has been adhered to the receiving container adjacent to the bottom plate of the light generating device. The particle interceptor includes an elastic material such as rubber, silicone, etc. The particle interceptor has a sufficient height to block inflow of the particles.

However, when the receiving container has a groove or an opening, the particle interceptor including a high reflowability material may not be coated on the groove or the opening.

SUMMARY OF THE INVENTION

Accordingly, the present invention is provided to substantially obviate one or more problems due to limitations and disadvantages of the related art.

The present invention provides a backlight assembly that prevents particles from infiltrating into an image display region of a display apparatus.

The present invention also provides a liquid crystal display apparatus having the backlight assembly.

The present invention also provides a device for forming a particle interceptor in the backlight assembly.

According to an exemplary backlight assembly of the present invention, the backlight assembly includes a receiving container, a light exiting device and a liquid crystal display panel supporting member. The receiving container includes a bottom plate and sidewalls protruded from edges of the bottom plate to form a receiving space. The light exiting device is disposed in the receiving space. The liquid crystal display panel supporting member includes a first supporting member frame portion, a second supporting member frame portion, a first particle interceptor and a second particle interceptor. The first supporting member frame portion has an opening, an opening face formed in an internal face of the first supporting member frame portion to define the opening, and a connection groove carved from the opening face. The second supporting member frame portion is vertically extended from the first supporting member frame portion. The side face of the liquid crystal display panel that is to be mounted on the liquid crystal display panel supporting member faces the inner side face of the second supporting member frame portion. The second supporting member frame portion fixes the liquid crystal display panel. The first particle interceptor is formed along the top face of the first supporting member frame portion facing to the bottom plate of the liquid crystal display panel. The first particle interceptor has at least two cut portions near the connection groove. The second particle interceptor is disposed between the cut portions to prevent particles from infiltrating into the first particle interceptor.

According to another exemplary backlight assembly of the present invention, the backlight assembly includes a receiving container, a light exiting device and a liquid crystal display panel supporting member. The receiving container includes a bottom plate and sidewalls protruded from edges of the bottom plate to form a receiving space. The light exiting device is disposed in the receiving space. The liquid crystal display panel supporting member includes a first supporting member frame portion, a second supporting member frame portion and a particle interceptor. The first supporting member frame portion has an opening formed in an internal face of the first supporting member frame portion. The second supporting member frame portion is vertically extended from the first supporting member frame portion. The side face of the liquid crystal display panel that is to be mounted on the liquid crystal display panel supporting member faces the inner side face of the second supporting member frame portion. The second supporting member frame portion fixes the liquid crystal display panel. The particle interceptor is formed in a shape of a closed loop along a first face of the first supporting member frame portion facing the bottom plate of the liquid crystal display panel. The particle interceptor prevents particles from infiltrating into the particle interceptor.

According to an exemplary liquid crystal display apparatus, the liquid crystal display apparatus includes a receiving container, a light exiting device, a liquid crystal display panel supporting member, a liquid crystal display panel assembly and a chassis. The receiving container includes a bottom plate and sidewalls protruded from edges of the bottom plate to form a receiving space. The light exiting device is disposed in the receiving space. The liquid crystal display panel supporting member includes a first supporting member frame portion, a second supporting member frame portion, a first particle interceptor and a second particle interceptor. The first supporting member frame portion has an opening, an opening face formed in an internal face of the first supporting member

frame portion to define the opening, and a connection groove carved from the opening face. The second supporting member frame portion is vertically extended from the first supporting member frame portion. The side face of the liquid crystal display panel that is to be mounted on the liquid crystal display panel supporting member faces the inner side face of the second supporting member frame portion. The second supporting member frame portion fixes the liquid crystal display panel. The first particle interceptor is formed along the top face of the first supporting member frame portion facing the bottom plate of the liquid crystal display panel. The first particle interceptor has at least two cut portions near the connection groove. The second particle interceptor is disposed between the cut portions to prevent particles from infiltrating into the first particle interceptor. The liquid crystal display panel assembly is mounted on the first supporting member frame portion. The liquid crystal display panel assembly is fixed by the second supporting member frame portion. The chassis fixes the liquid crystal display panel assembly.

According to an exemplary liquid crystal display apparatus, the liquid crystal display apparatus includes a receiving container, a light exiting device, a liquid crystal display panel, a liquid crystal display panel supporting member and a chassis. The receiving container includes a bottom plate and sidewalls protruded from edges of the bottom plate to form a receiving space. The light exiting device is disposed in the receiving space to exit a light. The liquid crystal display panel converts the light into an image light. The liquid crystal display panel supporting member includes a first supporting member frame portion, a second supporting member frame portion and a particle interceptor. The first supporting member frame portion has an opening formed in an internal face of the first supporting member frame portion. The second supporting member frame portion is vertically extended from the first supporting member frame portion. The side face of the liquid crystal display panel that is to be mounted on the liquid crystal display panel supporting member faces the inner side face of the second supporting member frame portion. The second supporting member frame portion fixes the liquid crystal display panel. The particle interceptor is formed in a shape of a closed loop along a first face of the first supporting member frame portion facing the bottom plate of the liquid crystal display panel. The particle interceptor prevents particles from infiltrating into the particle interceptor. The chassis is received in the receiving container, and the chassis covers edges of a top face of the liquid crystal display panel.

According to an exemplary liquid crystal display apparatus, the liquid crystal display apparatus includes a display panel, a lamp, a receiving container and a top chassis. The display panel displays an image. The lamp provides a light to the display panel. The receiving container receives the display panel and the lamp. The top chassis is combined with the receiving container to fix the display unit in the receiving container, wherein a side face of the receiving container corresponds to a side face of the top chassis, and the receiving container has a protruding portion being laterally protruded from a bottom plate of the receiving container, wherein the side face of the top chassis is mounted on the protruding portion.

According to an exemplary device for forming a particle interceptor in a backlight assembly, the device includes a base body, a dispenser, a supply member and a transporting member. The base body supports a liquid crystal display panel supporting member including a first supporting member frame portion having an opening and supporting a liquid crystal display panel, and a second supporting member frame portion extended from the first supporting member frame portion to fix the side face of the liquid crystal display panel. The dispenser has at least one nozzle to coat a material used for forming the particle interceptor in the first supporting member frame portion. The supply member provides the material to the dispenser. The transporting member transports the dispenser to the first supporting member frame portion.

Therefore, a display quality of the liquid crystal display apparatus may not be deteriorated.

BRIEF DESCRIPTION OF THE DRAWINGS

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

FIG. **1** is an exploded perspective view illustrating a backlight assembly according to an embodiment of the present invention;

FIG. **2** is a partially exploded perspective view illustrating the liquid crystal display panel supporting member and the optical sheets shown in FIG. **1**;

FIG. **3** is a plan view illustrating the liquid crystal display panel supporting member in FIG. **1**;

FIG. **4** is a partially cut perspective view enlarging the second particle interceptor portion in FIG. **1**;

FIG. **5** is a partially cut enlarged and perspective view illustrating a second particle interceptor portion in a backlight assembly according to another embodiment of the present invention;

FIG. **6** is a partially cut enlarged and perspective view illustrating a second particle interceptor portion in a backlight assembly according to still another embodiment of the present invention;

FIG. **7** is an exploded perspective view illustrating a backlight assembly according to still another embodiment of the present invention;

FIG. **8** is a perspective view illustrating a virtual liquid crystal display panel, the liquid crystal display panel supporting member and the optical sheets shown in FIG. **7**;

FIG. **9** is a cross-sectional view taken along a line A_1-A_2 in FIG. **7**;

FIG. **10** is a cross-sectional view illustrating the liquid crystal display panel supporting member of a backlight assembly according to sill another embodiment of the present invention;

FIG. **11** is a cross-sectional view illustrating the liquid crystal display panel supporting member of a backlight assembly according to still another embodiment of the present invention;

FIG. **12** is an exploded perspective view illustrating a liquid crystal display apparatus according to an embodiment of the present invention;

FIG. **13** is an exploded perspective view illustrating a liquid crystal display apparatus according to another embodiment of the present invention;

FIG. **14** is an exploded perspective view illustrating a liquid crystal display apparatus according to still another embodiment of the present invention;

FIG. **15** is an exploded perspective view illustrating a mold frame that receives a lamp unit and a top chassis;

FIG. **16** is a cross-sectional view taken along a line I-I' in FIG. **15**; and

FIG. **17** is a perspective view illustrating a device for forming a particle interceptor for the liquid crystal display apparatus.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Hereinafter, the preferred embodiment of the invention will be described in detail with reference to the accompanying drawings.

Backlight Assembly

FIG. **1** is an exploded perspective view illustrating a backlight assembly according to an embodiment of the present invention.

Referring to FIG. **1**, the backlight assembly **600** includes a liquid crystal display panel supporting member **100**, a first receiving container **400** and a light exiting device **300**.

The liquid crystal display panel supporting member **100** has a first supporting member frame portion **110**, a second supporting member frame portion **120**, a first particle interceptor **135** and a second particle interceptor **137**. The first supporting member frame portion **110** has a connection groove **113** and a first connection hole **125***a*.

The first receiving container **400** has a first bottom plate **410** and first sidewalls **420**. The first receiving container **400** may include various materials. In this embodiment, the first receiving container **400** includes metal.

The first bottom plate **410** has a rectangular plate shape. Each of the first sidewalls **420** is protruded from each edge of the first bottom plate **410** to form a receiving space. Portions **422** and **424** of the first sidewalls **420** are extended upwardly from edges of the first bottom plate **410**, and the portions **422** and **424** include brackets **425** and **426**, respectively. The first receiving container **400** is fixed to a second receiving container **500** by the brackets **425** and **426**. The brackets **425** and **426** have first screw connection holes **425***a* and **426***a* formed therein.

The light exiting device **300** is disposed in the receiving space of the first receiving container **400**. The light exiting device **300** includes a reflection plate **310**, a light guide plate **320**, a lamp assembly **330** and optical sheets **340**.

The reflection plate **310** is disposed on the bottom plate **410** of the first receiving container **400**. For example, the reflection plate **310** includes a synthetic resin having high reflectivity. The light guide plate **320** is disposed on the reflection plate **310**. For example, the light guide plate **320** has a shape of rectangular plate of which thickness is uniform or decreases.

The lamp assembly **330** may be disposed on both sides of the light guide plate **320**. The lamp assembly **330** includes a lamp **332** and a lamp cover **334**.

The lamp **332** is disposed adjacent to the side face of the light guide plate **320**. A cold cathode fluorescent lamp may be used as the lamp **332**. The lamp cover **334** covers the lamp **332** to dispose the lamp **332** at the side face of the light guide plate **320**.

The optical sheets **340** are disposed on the light guide plate **320**. The optical sheets **340** enhance uniformity of the brightness of the light exiting from the light guide plate **320**. The optical sheets **340** also improve the uniformity of brightness distribution of the light. The optical sheets **340** include one or more diffusion sheets and one or more prism sheets. The optical sheets **340** have at least one protruded fixing portion **342**. A second connection hole **343** is formed in the fixing portion **342**.

The second receiving container **500** is manufactured to have a shape suitable to receive the first receiving container **400**. The second receiving container **500** has a shape of rectangular parallelepiped box with a top face open.

The second receiving container **500** has a second bottom plate **510** and second sidewalls **520**. Portions of the second sidewalls **520** corresponding to the first screw connection holes **425***a* and **426***b* in the brackets **425** and **426** of the first receiving container **400** have second screw connection holes **522** and **524**. Screws **526** combine the first receiving container **400** with the second receiving container **500** through the first screw connection holes **425***a* and **426***a* and the second connection holes **522** and **524**.

The second receiving container **500** has a fixing boss **527** formed on the top face of the sidewalls **520** thereof. The fixing boss **527** is combined with the second connection hole **343** formed in the fixing portion **342** of the optical sheets **340**.

A connection protrusion **528** formed on the side face of the second sidewalls **520** is hooked to the first connection hole **125***a* to combine the second receiving container **500** with the liquid crystal display panel supporting member **100**.

FIG. **2** is a partially exploded perspective view illustrating the liquid crystal display panel supporting member and the optical sheets shown in FIG. **1**. FIG. **3** is a plan view illustrating the liquid crystal display panel supporting member in FIG. **1**.

The liquid crystal display panel supporting member **100** receives a liquid crystal display panel (not shown) to fix the liquid crystal display panel. To prevent moving of the liquid crystal display panel, the liquid crystal display panel supporting member **100** has a shape corresponding to that of the liquid crystal display panel.

In this embodiment, the liquid crystal display panel has a shape of rectangular plate. Thus, the liquid crystal display panel supporting member **100** has a rectangular frame shape having an opening to supporting member the liquid crystal display panel.

The first supporting member frame portion **110** supports the bottom plate of the liquid crystal display panel. The first supporting member frame portion **110** has a shape of rectangular frame with an opening **105**. The edges of the bottom plate of the liquid crystal display panel are in contact with the first supporting member frame portion **110**. A light is provided to the liquid crystal display panel through the opening **105** of the first supporting member frame portion **110**.

The first supporting member frame portion **110** has an opening face **112** in an internal face thereof to define the area and the shape of the opening **105**. The first supporting member frame portion **110** has the connection groove **113** carved from the opening face **112**. At least one connection groove **113** may be formed in the first supporting member frame portion **110**. In this embodiment, two connection grooves **113** are respectively formed on two opposite faces of the opening faces **112**.

The optical sheets **340** are combined with the connection groove **113**. The optical sheets **340** generally changes the optical characteristic of the light provided to the liquid crystal display panel. The protruded fixing portion **342** of the optical sheets **340** is combined with the connection groove **113**.

The second supporting member frame portion **120** is vertically extended from the first supporting member frame portion **110**. The side face of the liquid crystal display panel faces the inner side face of the second supporting member frame portion **120**. The second supporting member frame portion **120** fixes the liquid crystal display panel. The first and second supporting member frame portions **110** and **120** are integrally formed by injection molding method. Alternatively, the first supporting member frame portion **110** may be attached to the second supporting member frame portion **120**.

The first supporting member frame **120** has a connection member **125** to connect the second supporting member frame portion **120** to another member such as a receiving container. The connection member **125** is protruded from the first sup-

porting member frame portion **110** in a reverse direction to the extension direction of the second supporting member frame portion **120**. The connection member **125** has the first connection hole **125***a*.

The first particle interceptor **135** prevents particles from passing through the space between the first supporting member frame portion **110** and the bottom plate of the liquid crystal display panel.

Referring again to FIG. **2**, the first particle interceptor **135** is formed along the top face **115** of the first supporting member frame portion **110** facing the bottom plate of the liquid crystal display panel.

The first particle interceptor **135** is preferably formed in a shape of closed loop. In practice, since connection groove **113** is formed in the path where the first particle interceptor **135** is to be formed, forming the first particle interceptor in a closed loop becomes very hard.

The first particle interceptor **135** is not disposed in the connection groove **113**, thus particles may infiltrate into this portion. When the first particle interceptor **135** includes rubber or silicone having high flowability, the materials in the first particle interceptor **135** may flow into and contaminate the connection groove **113**.

Since the first supporting member frame portion **110** has at least one connection groove **113**, the first particle interceptor **135** has at least two cut portions **135***a* and **135***b* near the connection groove **113** (see FIG. **3**).

The first particle interceptor **135** may not possibly have a shape of closed loop because of the cut portions **135***a* and **135***b*. Display quality of the display apparatus may be deteriorated due to particles infiltrated into the end portions **135** and **135***b* of the first particle interceptor **135**. To solve this, the second particle interceptor **137** is disposed on the first supporting member frame portion **110**.

FIG. **4** is a partially cut perspective view enlarging the second particle interceptor portion of FIG. **1**.

Referring to FIGS. **3** and **4**, the second particle interceptor **137** is formed to prevent the particles from infiltrating into the cut portions **135***a* and **135***b* of the first particle interceptor **135**.

For example, the second particle interceptor **137** includes polyethyleneterephthalate (PET). The second particle interceptor **137** may include other synthetic resins.

The second particle interceptor **137** has a first body **137***a*, a second body **137***b* and a third body **137***c*. Each of the first and third bodies **137***a* and **137***c* has a rectangular parallelepiped rod shape. The first and third bodies **137***a* and **137***c* stick to the side face of the first particle interceptor **135**, respectively. The first and third bodies **137***a* and **137***c* are disposed adjacent to the cut portions **135***a* and **135***b* of the first particle interceptor **135**. Preferably, the first body **137***a* and the third body **137***c* are substantially parallel to each other. The cut portions **135***a* and **135***b* of the first particle interceptor **135** are disposed between the first body **137***a* and the third body **137***c*. For example, the second particle interceptor **137** has a shape of an alphabet 'H'.

When the first body **137***a* and the third body **137***c* are individually formed, the first and third body **137***a* and **137***c* are attached to the first supporting member frame portion **110** by a separate process. Hence, required manufacturing processes are increased and processing time thereof is also increased.

To simplify the manufacturing process and reduce processing time thereof, the first body **137***a* is combined with the third body **137***c* by the second body **137***b*. The second body **137***b* is interposed between the cut portions **135***a* and **135***b* of the first particle interceptor **135** to combine the first body **137***a* with the third body **137***c*. Although the first to third bodies **137***a*, **137***b* and **137***c* are separated by a dotted line in FIG. **4**, the dotted line is solely given for the illustration of structures of the second particle interceptor **137**. In practice, the first to third bodies **137***a*, **137***b* and **137***c* are integrally formed.

The face of the second particle interceptor **137** facing the first supporting member frame portion **110** may be coated with an adhesive material. The second particle interceptor **137** adheres to the first supporting member frame portion **110** by the adhesive material.

The second particle interceptor **137** according to the present invention prevents particles from infiltrating into an image display region through the cut portions **135***a* and **135***b* of the first particle interceptor **135**.

FIG. **5** is a partially cut enlarged and perspective view illustrating a second particle interceptor portion in a backlight assembly according to another embodiment of the present invention. In this embodiment, the backlight assembly has a structure substantially identical with that of the above described backlight assembly except for the second particle interceptor. Thus, the same reference numerals will be used for identical elements and any further explanation will be omitted.

Referring to FIG. **5**, the second particle interceptor **138** includes a first body **138***a* and a second body **138***b*. The first body **138***a* has a rectangular parallelepiped rod shape. The first body **138***a* is disposed adjacent to the cut portions **135***a* and **135***b* of the first particle interceptor **135**. Preferably, the first body **138***a* is substantially parallel to the first particle interceptor **135**. The side face of the first particle interceptor **135** sticks to the side face of the first body **138***a* of the second particle interceptor **138** to prevent the particles from infiltrating into the space between the first particle interceptor **135** and the second particle interceptor **138**.

The second body **138***b* is connected to the first body **138***a* to effectively block infiltration of particles. The second body **138***b* is interposed between the cut portions **135***a* and **135***b* of the first particle interceptor **135** to prevent the particles from infiltrating into the space between the cut portions **135***a* and **135***b* of the first particle interceptor **135**. For example, the second particle interceptor **137** has a shape of character 'T'. Although the first and second bodies **138***a* and **138***b* are separated by a dotted line (or virtual line) in FIG. **5**, the dotted line is solely given for the illustration of structures of the second particle interceptor **138**. In practice, the first and second bodies **138***a* and **138***b* are integrally formed.

The face of the second particle interceptor **138** facing to the first supporting member frame portion **110** may be coated with an adhesive material. The second particle interceptor **138** adheres to the first supporting member frame portion **110** by the adhesive material.

FIG. **6** is a partially cut enlarged and perspective view illustrating a second particle interceptor portion in a backlight assembly according to still another embodiment of the present invention. In this embodiment, the backlight assembly has a structure substantially identical with that of the above described backlight assembly except for the second particle interceptor. Thus, the same reference numerals will be used for identical elements and any further explanation will be omitted.

Referring to FIG. **6**, the second particle interceptor **139** has a rectangular parallelepiped rod shape. The second particle interceptor **139** is disposed adjacent to the cut portions **135***a* and **135***b* of the first particle interceptor **135**. The second particle interceptor **139** has a shape of band. Preferably, the second particle interceptor **139** is substantially parallel to the

first particle interceptor **135**. The side face of the first particle interceptor **135** sticks to the side face of the second particle interceptor **139** to prevent the particles from infiltrating into the space between the first particle interceptor **135** and the second particle interceptor **139**.

The face of the second particle interceptor **139** facing the first supporting member frame portion **110** may be coated with an adhesive material. The second particle interceptor **139** adheres to the first supporting member frame portion **110** by the adhesive material.

FIG. **7** is an exploded perspective view illustrating a backlight assembly according to still another embodiment of the present invention. FIG. **8** is a perspective view illustrating a virtual liquid crystal display panel, the liquid crystal display panel supporting member and the optical sheets shown in FIG. **7**. FIG. **9** is a cross-sectional view taken along a line A_1-A_2 in FIG. **7**.

Referring to FIG. **7**, the backlight assembly **1600** includes a liquid crystal display panel supporting member **1100**, a first receiving container **1400** and a lightexiting device **1300**.

The liquid crystal display panel supporting member **1100** has a first supporting member frame portion **1110** and a second supporting member frame portion **1120**. The first supporting member frame portion **1110** has a first connection hole **1125***a*.

The first receiving container **1400** has a first bottom plate **1410** and first sidewalls **1420**. The first receiving container **1400** may include various materials. In this embodiment, the first receiving container **1400** includes metal.

The first bottom plate **1410** has a shape of rectangular plate. Each of the first sidewalls **1420** is protruded from each edge of the first bottom plate **1410** to form a receiving space. Portions **1422** and **1424** of the first sidewalls **1420** are extended from an edge of the first bottom plate **1410** in a substantially perpendicular direction, and the portions **1422** and **1424** include brackets **1425** and **1426**, respectively. The first receiving container **1400** is fixed to a second receiving container **1500** by the brackets **1425** and **1426**. The brackets **1425** and **1426** have first screw connection holes **1425***a* and **1426***a* formed therein.

The light exiting device **1300** is disposed in the receiving space of the first receiving container **1400**. The light exiting device **1300** includes a reflection plate **1310**, a light guide plate **1320**, a lamp assembly **1330** and optical sheets **1340**.

The reflection plate **1310** is disposed on the bottom plate **1410** of the first receiving container **1400**. The reflection plate **1310**, for example, includes a synthetic resin having high reflectivity. The light guide plate **1320** is disposed on the reflection plate **1310**. The light guide plate **1320** has a shape of rectangular plate of which thickness is uniform or decreases.

The lamp assembly **1330** may be disposed on both sides of the light guide plate **1320**. The lamp assembly **1330** includes a lamp **1332** and a lamp cover **1334**.

The lamp **1332** is disposed adjacent to the side face of the light guide plate **1320**. A cold cathode fluorescent lamp may be used as the lamp **1332**. The lamp cover **1334** covers the lamp **1332** to combine the lamp **1332** with the side face of the light guide plate **1320**.

The optical sheets **1340** are disposed on the light guide plate **1320**. The optical sheets **1340** enhance uniformity of the brightness of the light exited from the light guide plate **1320**. The optical sheets **1340** also improve the uniformity of brightness distribution of the light. The optical sheets **1340** include one or more diffusion sheets and one or more prism sheets. The optical sheets **1340** have at least one protruded fixing portion **1342**. A second connection hole **1343** is formed in the fixing portion **1342**.

The second receiving container **1500** is manufactured to have a shape suitable to receive the first receiving container **1400**. The second receiving container **1500** has a shape of rectangular parallelepiped box with a top face open.

The second receiving container **1500** has a second bottom plate **1510** and second sidewalls **1520**. Portions of the second sidewalls **1520** corresponding to the first screw connection holes **1425***a* and **1426***b* in the brackets **1425** and **1426** of the first receiving container **1400** have second screw connection holes **1522** and **1524**. Screws **1526** combine the first receiving container **1400** with the second receiving container **1500** through the first screw connection holes **1425***a* and **1426***a* and the second connection holes **1522** and **1524**.

The second receiving container **1500** has a fixing boss **1527** formed on the top face of the sidewalls **1520** thereof. The fixing boss **1527** is combined with the second connection hole **1343** formed in the fixing portion **1342** of the optical sheets **1340**.

A connection protrusion **1528** formed on the side face of the second sidewalls **1520** is hooked to the first connection hole **1125***a* to combine the second receiving container **1500** with the liquid crystal display panel supporting member **1100**.

Referring to FIGS. **7** to **9**, the liquid crystal display panel supporting member **1100** fixes the virtual liquid crystal display panel **1050** shown in FIG. **8**. Thus, the liquid crystal display panel supporting member **1100** has a shape corresponding to the liquid crystal display panel **1050**. In this embodiment, the liquid crystal display panel **1050** has a rectangular plate shape, and the liquid crystal display panel supporting member **1100** has a rectangular frame with an opening to support the liquid crystal display panel **1050**.

The liquid crystal display panel supporting member **1100** has the first supporting member frame portion **1110**, the second supporting member frame portion **1120** and a particle interceptor **1130**.

Referring to FIGS. **8** and **9**, the first supporting member frame portion **1110** supports the bottom plate **1020** of the liquid crystal display panel **1050**. The edges of the bottom plate **1020** of the liquid crystal display panel **1050** are in contact with the first supporting member frame portion **1110**. Since the bottom plate **1020** of the liquid crystal display panel **1050** has a rectangular shape, the first supporting member frame portion **1100** has a rectangular frame shape.

The second supporting member frame portion **1120** is vertically extended from the first supporting member frame portion **1110**. The side face of the liquid crystal display panel **1050** faces the inner side face of the second supporting member frame portion **1120**. The second supporting member frame portion **1120** fixes the liquid crystal display panel **1050**. The first and second supporting member frame portions **1110** and **1120** are integrally formed by injection molding method. Alternatively, the first supporting member frame portion **1110** may be attached to the second supporting member frame portion **1120**.

The first supporting member frame **1120** has a connection member **1125** to connect the second supporting member frame portion **1120** to another member such as a receiving container. The connection member **1125** is protruded from the first supporting member frame portion **1110** in a reverse direction to the extension direction of the second supporting member frame portion **1120**. The connection member **1125** has the first connection hole **1125***a*.

The particle interceptor **1130** prevents particles from passing through the space between the first supporting member frame portion **1110** and the bottom plate of the liquid crystal display panel **1050**.

Referring again to FIGS. **7** to **9**, the particle interceptor **1130** corresponds to a particle intercepting protrusion coated on the first supporting member frame portion **1110**. In this embodiment, same reference numeral will be used for the particle interceptor and the particle intercepting protrusion.

The particle intercepting protrusion **1130** is formed on the first supporting member frame portion **1110** in a closed loop shape. In particular, a material containing an adhesive material is coated on the first supporting member frame portion **1110** to have a predetermined height. The material is then solidified to form the particle intercepting protrusion **1130**.

The material that is used for forming the particle intercepting protrusion **1130** includes a material having an elastic force such as silicone or rubber. The material may stick to the liquid crystal display panel **1050** without damaging the liquid crystal display panel **1050**. In this embodiment, a silicone material will be described as an example.

The particle intercepting protrusion **1130** sticks to the bottom plate **1020** of the liquid crystal display panel **1050** in a shape of closed loop. Thus, particles may not infiltrate into the space between the first supporting member frame portion **1110** and the bottom plate **1020** of the liquid crystal display panel **1050**.

Particularly, the liquid crystal display panel **1020** is mounted on the fist supporting member frame portion **1110** after the particle intercepting protrusion **1130** is formed as a closed loop shape in the first supporting member frame portion **1110**. Thus, infiltrating of particles may be prevented.

As described above, the particle intercepting protrusion having a shape of closed loop blocks infiltration of particles. Thus, deterioration of display quality of a display apparatus may be reduced.

FIG. **10** is a cross-sectional view illustrating the liquid crystal display panel supporting member of a backlight assembly according to sill another embodiment of the present invention. In this embodiment, the backlight assembly has a structure substantially identical with that of the above described backlight assembly except for the particle interceptor. Thus, the same reference numerals will be used for identical elements and any further explanation will be omitted.

Referring to FIG. **10**, the particle interceptor **1130** has particle intercepting protrusions **1132** and particle intercepting recesses **1134**.

The particle intercepting protrusions **1132** are formed on the first face **1115** of the first supporting member frame portion **1110** in at least two rows. The two rows of the particle intercepting protrusions **1132** are spaced apart from each other. Each of the particle intercepting protrusions **1132** includes silicone. The particle intercepting protrusion **1132** is formed in a shape of closed loop.

The space between a plurality of particle intercepting protrusions **1132** gives the particle intercepting recess **1134**. The number of particle intercepting protrusions **1132** determines the number of particle intercepting recesses **1134**.

When the liquid crystal display panel **1050** sticks to the particle intercepting protrusion **1132**, particles may not infiltrate into the space between the bottom plate **1020** of the liquid crystal display panel **1050** and the particle intercepting protrusion **1132** due to the height of the particle intercepting protrusion **1132**. Further, the particle intercepting recess **1134** collects some particles still infiltrated through the particle intercepting protrusion **1132** by gravity.

As described above, the particle intercepting protrusions are formed on the first supporting member frame portion in at least two rows in closed loop. The particle intercepting protrusions prevent particles from jumping over the particle intercepting protrusions. Further, the recess between adjacent particle intercepting protrusions collects the particles infiltrating the particle intercepting protrusion to maintain the display quality of a display apparatus.

FIG. **11** is a cross-sectional view illustrating the liquid crystal display panel supporting member of a backlight assembly according to still another embodiment of the present invention. In this embodiment, the backlight assembly has a structure substantially identical with that of the above described backlight assembly except for the second particle interceptor. Thus, the same reference numerals will be used for identical elements and any further explanation will be omitted.

Referring to FIG. **11**, a first supporting member frame **1110** has a first particle interceptor **1130**. The particle interceptor **1130** includes a particle intercepting protruding portions **1136** and a particle intercepting recess **1138**.

To form the particle interceptor **1130**, the first face **1115** of the first supporting member frame portion **1110** is coated with a material containing silicone, such that the particle interceptor **1130** has a predetermined width. The coated silicone material is then compressed along the first face **1115**.

During the compression process, the compression force applied to the silicone material may not be homogeneous. A greater force, for example, is applied to the central portion of the silicone material than the other portions.

Accordingly, the portion compressed by a greater force than the other portions becomes the particle intercepting recess **1138**, and the other portions become the particle intercepting protruding portions **1136**.

The number of particle intercepting protruding portions **1136** determines the number of particle intercepting recess **1138**. The particle intercepting protruding portions **1136** and the particle intercepting recess **1138** have a shape of closed loop respectively.

When the liquid crystal display panel **1050** sticks to the particle intercepting protruding portions **1136**, particles may not infiltrate into the space between the bottom plate **1020** of the liquid crystal display panel **1050** and the particle intercepting protruding portions **1136** due to the height of the particle intercepting protruding portions **1136**. The particle interceptor recess **1138** collects some particles infiltrated through the particle intercepting protruding portions **1136** by gravity.

As described above, particles may be collected at least twice by the particle intercepting protruding portions and the particle intercepting recess. The display quality of the display apparatus may not be deteriorated. Further, at least two particle intercepting protruding portions and the particle interceptor recess are formed by a single process. Thus, manufacturing process and processing time thereof may be decreased.

Liquid Crystal Display Apparatus

FIG. **12** is an exploded perspective view illustrating a liquid crystal display apparatus according to an embodiment of the present invention.

Referring to FIG. **12**, the liquid crystal display apparatus **900** includes a first receiving container **400**, a light exiting device **300**, a liquid crystal display panel **700**, a liquid crystal display panel supporting member **100**, a second receiving container **500** and a chassis **800**.

The first receiving container **400**, the light exiting device **300** and the liquid crystal display panel supporting member

100 have been described above with reference to foregoing embodiments, and are therefore not described in further detail here.

The liquid crystal display panel **700** is disposed in the first supporting member frame portion **110** of the liquid crystal display panel supporting member **100**. Additionally, the liquid crystal display panel **700** is fixed by the second frame portion **120** of the liquid crystal display panel supporting member **100**.

The liquid crystal display panel **700** includes a thin film transistor (TFT) substrate **710**, a liquid crystal layer **730** and a color filter substrate **720**. The TFT substrate **710** corresponds to the color filter substrate **720**. The liquid crystal layer **730** is interposed between the TFT substrate **710** and the color filter substrate **720**.

The chassis **800** fixes the liquid crystal display panel **700**, and protects the liquid crystal display panel **700** from external impact.

The chassis **800** includes a first chassis face **810** and a second chassis face **820** extended from the first chassis face **810**.

The first chassis face **810** has a shape of rectangular plate to cover the edges of the color filter substrate **720**. The second chassis face **820** is extended from the first chassis face **810** in a direction substantially parallel to the fist sidewalls **420** of the first receiving container **400**. The second chassis **820** has a shape to cover the first sidewalls **420** of the first receiving container **400**.

The chassis **800** has third screw connection holes **830**. The third screw connection holes **830** are formed in a position of the chassis **800** corresponding to the second screw connection holes **522** and **524** of the second receiving container **500**. The screws **526** combine the chassis **800** with the second receiving container **500** through the first screw connection holes **425***a* and **426***a*, the second screw connection holes **522** and **524**, and the third screw connection holes **830**.

FIG. **13** is an exploded perspective view illustrating a liquid crystal display apparatus according to another embodiment of the present invention.

Referring to FIG. **13**, the liquid crystal display apparatus **1900** includes a first receiving container **1400**, a light exiting device **1300**, a liquid crystal display panel **1700**, a liquid crystal display panel supporting member **1100**, a second receiving container **1500** and a chassis **1800**.

The first receiving container **1400**, the light exiting device **1300** and the liquid crystal display panel supporting member **1100** have been described above with reference to foregoing embodiments, and are therefore not described in further detail here.

The liquid crystal display panel **1700** is disposed in the first supporting member frame portion **1110** of the liquid crystal display panel supporting member **1100**. Additionally, the liquid crystal display panel **1700** is fixed by the second supporting member frame portion **1120** of the liquid crystal display panel supporting member **1100**.

The liquid crystal display panel **1700** includes a thin film transistor (TFT) substrate **1710**, a liquid crystal layer **1730** and a color filter substrate **1720**. The TFT substrate **1710** corresponds to the color filter substrate **1720**. The liquid crystal layer **1730** is interposed between the thin film transistor substrate **1710** and the color filter substrate **1720**.

The chassis **1800** fixes the liquid crystal display panel **1700**, and protects the liquid crystal display panel **1700** from an external impact.

The chassis **1800** includes a first chassis face **1810** and a second chassis face **1820** extended from the first chassis face **1810**.

The first chassis face **1810** has a shape of rectangular plate to cover the edges of the color filter substrate **1720**. The second chassis face **1820** is extended from the first chassis face **1810** in a direction substantially parallel to the fist sidewalls **1420** of the first receiving container **1400**. The second chassis **1820** has a shape to cover the first sidewalls **1420** of the first receiving container **1400**.

The chassis **1800** has third screw connection holes **1830**. The third screw connection holes **1830** are formed in a position corresponding to the second screw connection holes **1522** and **1524** of the second receiving container **1500**. The screws **1526** combine the chassis **1800** with the second receiving container **1500** through the first screw connection holes **1425***a* and **1426***a*, the second screw connection holes **1522** and **1524** and the third screw connection holes **1830**.

FIG. **14** is an exploded perspective view illustrating a liquid crystal display apparatus according to sill another embodiment of the present invention.

Referring to FIG. **14**, the liquid crystal display apparatus includes a liquid crystal display module, a front case **2010** and a rear case **2020**. The liquid crystal display module displays an image using an image signal, and the front and rear cases **2020** and **2030** receive the liquid crystal display module.

The liquid crystal display module includes a display unit **2600** having a liquid crystal display panel **2610**. The display unit **2600** further includes a data printed circuit board **2260**, a data tape carrier package **2630**, a gate printed circuit board **2640** and a gate tape carrier package **2650**.

The liquid crystal display panel **2610** includes a thin film transistor (TFT) substrate **2612**, a color filter substrate **2614** and a liquid crystal layer (not shown).

The thin film transistor substrate **2612** corresponds to a glass substrate having thin film transistors formed thereon in a matrix shape. A source electrode of the TFT is electrically connected to a data line, and a gate electrode of the TFT is electrically connected to a gate line. A pixel electrode is formed on the TFT substrate **2612** having TFTs to be connected to the gate electrode. The pixel electrode includes an optically transparent and electrically conductive material such as indium thin oxide (ITO), indium zinc oxide (IZO), etc.

Electrical signals provided to the data line and the gate line are transferred to the source electrode and the gate electrode of the TFT, respectively. The TFT is turned on/off according to the electrical signals. The electrical signals are then transferred to the drain electrode to form a pixel.

The color filter substrate **2614** corresponds to the TFT substrate **2612**. The color filter substrate **2614** has RGB pixels formed by a thin film manufacturing process. The RGB pixels correspond to color pixels showing colors as light passes therethrough. A common electrode is formed on the color filter substrate **2612**. The common electrode includes an optically transparent and electrically conductive material such as indium thin oxide (ITO), indium zinc oxide (IZO), etc.

When an electric power is supplied to the gate electrode and the source electrode to turn on the TFT, an electric field is generated between the pixel electrode and the common electrode. The electric fields change the arrangement of the liquid crystal interposed between the TFT substrate **2612** and the color filter substrate **2614** so as to give an image.

A drive signal and a timing signal are applied to the gate line and the data line of the TFT to adjust the arrangement and timing for arrangement of the liquid crystal.

As shown in FIG. **14**, the data tape carrier package **2630** is attached to a source region of the liquid crystal display panel **2610**. The data tape carrier package **2630** is a kind of flexible circuit board that determines the timing to apply the data drive

signal. The gate tape carrier package **2650** is attached to a gate region of the liquid crystal display panel **2610** so as to determine the timing to apply the gate drive signal.

The data printed circuit board **2260** and the gate printed circuit board **2640** are electrically connected to the data tape carrier package **2630** and the gate tape carrier package **2650**, respectively. Drive signals generated from an external device are applied to the gate line and the data line via the data printed circuit board **2260** and the gate printed circuit board **2640**. The data printed circuit board **2260** has a source portion to supply the data drive signal to the liquid crystal display panel **2610** from the image signal generated in an external information processing device (not shown) such as a computer. The gate printed circuit board **2640** has a gate portion to supply the gate drive signal to the liquid crystal display panel **2610** from the image signal generated in an external information processing device such as a computer.

The data printed circuit board **2260** and the gate printed circuit board **2640** generate a gate drive signal, a data signal and a plurality of timing signals. The gate drive signal and the data signal are applied to the liquid crystal display apparatus to operate the apparatus, and the timing signals determine the timing to apply the gate drive signal and the gate signal. The gate drive signal is applied to the gate line of the liquid crystal display panel **2610** through the gate tape carrier package **2650**, and the data signal is applied to the data line of the liquid crystal display panel **2610** through the data tape carrier package **2630**.

A backlight assembly **2700** is disposed under the display unit **2600** to provide light. The backlight assembly **2700** includes a lamp **2710** that generates light. A lamp cover **2712** protects the lamp **2710**.

The light guide plate **2720** is disposed under the liquid crystal display panel **2610**. The light guide plate **2720** has a size substantially identical with that of the liquid crystal display panel **2610** of the display unit **2600**. The light guide plate **2720** guides the light generated in the lamp **2710** toward the display unit **2600** to convert the light path.

A plurality of optical sheets **2730** are disposed over the light guide plate **2720**. The optical sheets **2730** enhance uniformity of the brightness of the light that is exited from the light guide plate **320** and is incident to the liquid crystal display panel **2610**. A reflection plate **2740** is disposed under the light guide plate **2720** to reflect the light leaked from the light guide plate **2720** back to the light guide plate **2720**.

A mold frame **2800** fixes the display unit **2600** and the backlight assembly **2700**. In this embodiment, the mold frame **2800** has a protruding portion.

A top chassis **2900** is provided to combine with the mold frame **2800**. The top chassis **2800** fixes the display unit **2600** and the backlight assembly **2700**. The top chassis **2900** fixes the data printed circuit board **2260** and the gate printed circuit board **2640** to the bottom plate of the mold frame **2800**.

FIG. **15** is an exploded perspective view illustrating a mold frame that receives a lamp unit and a top chassis. FIG. **16** is a cross-sectional view taken along a line I-I' in FIG. **15**.

Referring to FIGS. **15** and **16**, the lamp cover **2712** receives the lamp **2710**, and the mold frame **2800** receives the lamp cover **2712** at one end portion of the mold frame **2800**. Additionally, the mold frame **2800** receives the reflection plate **2740**, the light guide plate **2720** and the optical sheets **2730** (see FIG. **13**) to provide the light exited from the lamp **2710** to the liquid crystal display panel **2610**.

Lamp holders **2710***a* and **2710***b* are disposed at both ends of the lamp **2710** to fix the lamp **2710** received in the lamp cover **2712**. A hot electrode **2711***a* and a ground electrode **2711***b* are respectively connected to both ends of the lamp **2710**. A relatively high voltage is applied to the hot electrode **2711***a*, and a low relatively voltage is applied to the ground electrode **2711***b*.

The hot electrode **2711***a* and the ground electrode **2711***b* are respectively connected to external connectors (not shown) at one end portion of the mold frame **2800**. For this, the ground electrode **2711***b* is extended from one end portion of the lamp **2710** to the other end portion of the lamp **2710** that has the hot electrode **2711***a*. The hot electrode **2711***a* is externally extended, and is connected to the connector.

A protruding portion **2801** is formed on the bottom plate of the one end portion of the mold frame **2800**. The protruding portion **2810** is laterally extended along the substantially longitudinal direction of the lamp **2710** from the bottom plate of the mold frame **2800**. The protruding portion **2801** has a width L**1** greater than the thickness L**2** of the top chassis **2900**. The side face of the mold frame **2800** corresponds to the side face of the top chassis **2900**. The side face of the top chassis **2900** is mounted on the protruding portion **2801**.

The ground electrode **2711***b* and the hot electrode **2711***a* may not be detached from the outer face of the mold frame **2800** because of the protruding portion **2801**. Thus, wires covering the ground electrode **2711***b* and the hot electrode **2711***a* may not be torn. Even when the ground electrode **2711***b* and the hot electrode **2711***a* are detached from the mold frame **2800**, the wires may not be torn because the thickness of the top chassis L**2** is smaller than the width L**1** of the mold frame **2800**.

In addition, the protruding portion **2801** forms a space between the mold frame **2800** and the top chassis **2900**. Since the space does not face the liquid crystal display panel **2610**, particles infiltration may be reduced.

Referring to FIG. **16**, an adhesive material **2720** may be coated on the protruding portion **2801** of the mold frame **2800** to effectively prevent particles from infiltrating into the space.

Device for Forming Particle Interceptor

A device for forming a particle interceptor in a first supporting member frame portion of a liquid crystal display panel supporting member of a backlight assembly will be described with reference to accompanied drawings.

FIG. **17** is a perspective view illustrating a device for forming a particle interceptor in a backlight assembly.

Referring to FIG. **17**, the particle interceptor **1200** includes a base body **1210**, a dispenser **1220**, a supply member **1230** and a transporting member **1240**.

A liquid crystal display panel supporting member **1100** including a first supporting member frame portion **1110** and a second supporting member frame portion **1120** is installed on the base body **1210**.

The dispenser **1220** has a dispenser body **1222** and a nozzle **1224**. A material, for example, a silicone material is provided to the dispenser **1220** from the supply member **1230**, thereby forming a particle interceptor **1130** on the first supporting member frame portion **1110**.

A receiving space (not shown) is formed inside the dispenser body **1222** to receive the silicone material provided from the supply member **1230**.

The nozzle **1224** is formed on the bottom plate of the dispenser body **1222**. The nozzle **1224** dispenses the silicone material in the receiving space to coat the first supporting member frame **1110** with the silicone material. In this embodiment, the dispenser **1220** has one nozzle **1224**. Alternatively, at least two nozzles **1224** may be used.

The supply member **1230** includes a container **1232**, a supply duct **1234** and a gas inlet duct **1236**.

The container **1232** contains the silicone material that is used to form the particle interceptor **1130**.

The container **1232** is connected to the dispenser body **1222** by the supply duct **1234**. The silicone material in the container **1232** is supplied to the receiving space. Here, one end of the supply duct **1234** is connected to the container **1232**, and the other end of the supply duct **1234** is connected to the dispenser body **1222**.

The gas inlet duct **1236** is connected to the container **1232**. A nitrogen gas is supplied to the container **1232** through the gas inlet duct **1236**, and then the silicone material in the container **1232** is pushed toward the supply duct **1234**.

The transporting member **1240** includes a first guide bar **1242** and a second guide bar **1244**. The first guide bar **1240** penetrates the dispenser body **1222** along an X-axis, and the second guide bar **1244** penetrates the dispenser body **1222** along a Y-axis. The first guide bar **1242** transports the dispenser **1220** along the X-axis, and the second guide bar **1244** transports the dispenser **1220** along the Y-axis.

The first and second guide bars **1242** and **1244** are connected to a guide rail, and are moved by a driving motor (not shown).

The operation mechanism of the transporting member **1240** is well known in the art, and is therefore not described in further detail here.

The device of forming the particle interceptor in the backlight assembly according to the present invention is suitable for forming the particle interceptor in FIGS. **7** to **10**. In case of forming the particle interceptor recess **1138** by compressing the silicone material as shown in FIG. **11**, a compression roller **1250** is additionally provided as shown in FIG. **17**.

The compression roller **1250** includes a roller body **1252**, a rod **1254**, a connection portion **1256** and a rotational roller **1258**.

The roller body **1252** is installed in the dispenser **1220**, and the rod **1254** is connected to the compression roller **1252** facing the liquid crystal display panel supporting member **1100**.

The rotational roller **1258** is connected to the rod **1254** by the connection portion **1256**.

The silicone material is compressed by the rotational roller **1258** to form the particle interceptor **1136** as shown in FIG. **11**.

As shown in FIG. **17**, a charge-coupled device (CCD) camera **1260** is used to precisely change the moving direction of the dispenser **1220**. Alternatively, a predetermined value may be input to a controlling member (not shown) to change the moving direction of the dispenser **1220** from the X-axis to the Y-axis.

The function of operating the device will be described with reference to FIG. **17**.

A liquid crystal display panel supporting member **1100** is disposed under the top face of the base body **1210**.

A nitrogen gas is supplied to the gas inlet duct **1236**. The nitrogen gas pushes the silicone material in the container **1232** toward the supply duct **1234**. The silicone material is then supplied to the receiving space in the dispenser body **1222** through the supply duct **1234**.

The silicone material incorporated into the dispenser body **1122** is dispensed toward outside through the nozzle **1224**. The transporting member **1240** moves the dispenser **1220** toward a specific direction such as the X-axis.

At least one row of particle interceptor **1130** is formed on the first supporting member frame portion **1110** of the liquid crystal display panel supporting member **1100**.

The dispenser **1220** moves along the X-axis to the corner of the first frame portion **1110**. The dispenser **1220** then turns to the Y-axis along the second guide bar **1244**. The silicone material is continuously coated on the first supporting member frame portion **1110**. The above described procedure was repeated to form the particle interceptor **1130** having a closed loop on the first frame portion **1110**.

When particle intercepting recess **1138** is formed in the particle interceptor **1130**, the rod **1254** of the compression roller **1250** is descended toward the first supporting member frame portion **1110**. The rotational roller **1258** moves along the dispenser **1220** to compress the silicone material coated on the first supporting member frame portion **1110**, thereby forming the particle intercepting recess **1138**.

Having described the exemplary embodiments of the invention and its advantages, it is noted that various changes, substitutions and alterations can be made herein without departing from the spirit and scope of the invention as defined by appended claims.

What is claimed is:

1. A backlight assembly comprising:

a receiving container including a bottom plate and sidewalls protruded from edges of the bottom plate to form a receiving space;

a light exiting device disposed in the receiving space; and

a liquid crystal display panel supporting member including a first supporting member frame portion, a second supporting member frame portion, a first particle interceptor and a second particle interceptor, the first supporting member frame portion having an opening, an opening face formed in an internal face of the first supporting member frame portion to define the opening, and a connection groove carved from the opening face, the second supporting member frame portion being vertically extended from the first supporting member frame portion, the side face of the liquid crystal display panel that is to be mounted on the liquid crystal display panel supporting member facing the inner side face of the second supporting member frame portion, the second supporting member frame portion fixing the liquid crystal display panel, the first particle interceptor being formed along the top face of the first supporting member frame portion facing the bottom plate of the liquid crystal display panel, the first particle interceptor having at least two cut portions near the connection groove, the second particle interceptor being disposed between the cut portions to prevent particles from infiltrating into the first particle interceptor.

2. The backlight assembly of claim **1**, wherein the second particle interceptor includes a first body sticking to the side face of the first particle interceptor, a second body extended from the first body and interposed between the cut portions, and a third body connected to the second body and being substantially parallel to the first body.

3. The backlight assembly of claim **2**, wherein the second particle interceptor has an H-shape.

4. The backlight assembly of claim **1**, wherein the second particle interceptor includes a first body sticking to the side face of the first particle interceptor, and a second body extended from the first body and interposed between the cut portions.

5. The backlight assembly of claim **4**, wherein the second particle interceptor has T-shape.

6. The backlight assembly of claim **1**, wherein the second particle interceptor having a shape of band sticks to the side face of the first particle interceptor.

7. The backlight assembly of claim **1**, wherein the second particle interceptor comprises polyethylenterephthalate (PET), and an adhesive material is coated on a surface of the second particle interceptor.

8. The backlight assembly of claim 1, wherein the connection groove combines with a protruded fixing portion of optical sheets.

9. A liquid crystal display apparatus comprising:

a receiving container including a bottom plate and sidewalls, the sidewalls protruded from edges of the bottom plate to form a receiving space;

a light exiting device disposed in the receiving space;

a liquid crystal display panel supporting member including a first supporting member frame portion, a second supporting member frame portion, a first particle interceptor and a second particle interceptor, the first supporting member frame portion having an opening, an opening face formed in an internal face of the first supporting member frame portion to define the opening, and a connection groove carved from the opening face, the second supporting member frame portion being vertically extended from the first supporting member frame portion, the side face of the liquid crystal display panel that is to be mounted on the liquid crystal display panel supporting member facing the inner side face of the second supporting member frame portion, the second supporting member frame portion fixing the liquid crystal display panel, the first particle interceptor being formed along the top face of the first supporting member frame portion facing the bottom plate of the liquid crystal display panel, the first particle interceptor having at least two cut portions near the connection groove, the second particle interceptor being disposed between the cut portions to prevent particles from infiltrating into the first particle interceptor;

a liquid crystal display panel assembly mounted on the first supporting member frame portion, the liquid crystal display panel assembly being fixed by the second supporting member frame portion; and

a chassis that fixes the liquid crystal display panel assembly.

* * * * *

专利名称(译)	背光组件，具有该背光组件的液晶显示装置和用于在背光组件中形成粒子拦截器的装置		
公开(公告)号	US7907233	公开(公告)日	2011-03-15
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[标]申请(专利权)人(译)	三星电子株式会社		
申请(专利权)人(译)	SAMSUNG ELECTRONICS CO.，LTD.		
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摘要(译)

为了防止颗粒渗透到显示装置中，液晶显示面板支撑构件包括第一颗粒拦截器和第二拦截器。第一颗粒拦截器沿着第一支撑构件框架部分的顶面形成，该顶面面向将安装在液晶显示面板支撑构件上的液晶显示面板的底板。第一粒子拦截器具有至少两个切口部分。第二粒子拦截器设置在切口部分之间，以防止粒子渗透到第一粒子拦截器中。因此，液晶显示装置可以防止其显示质量的劣化。