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(54) **TOP RECEIVING CONTAINER, LIQUID CRYSTAL DISPLAY APPARATUS INCLUDING THE SAME, AND ASSEMBLY METHOD THEREOF**

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(57) **ABSTRACT**

A receiving container includes a first frame contacting a first side of a liquid crystal panel, and a second frame contacting a second side of the liquid crystal panel, wherein the first frame and the second frame are combined to fix the liquid crystal panel and comprise different materials.

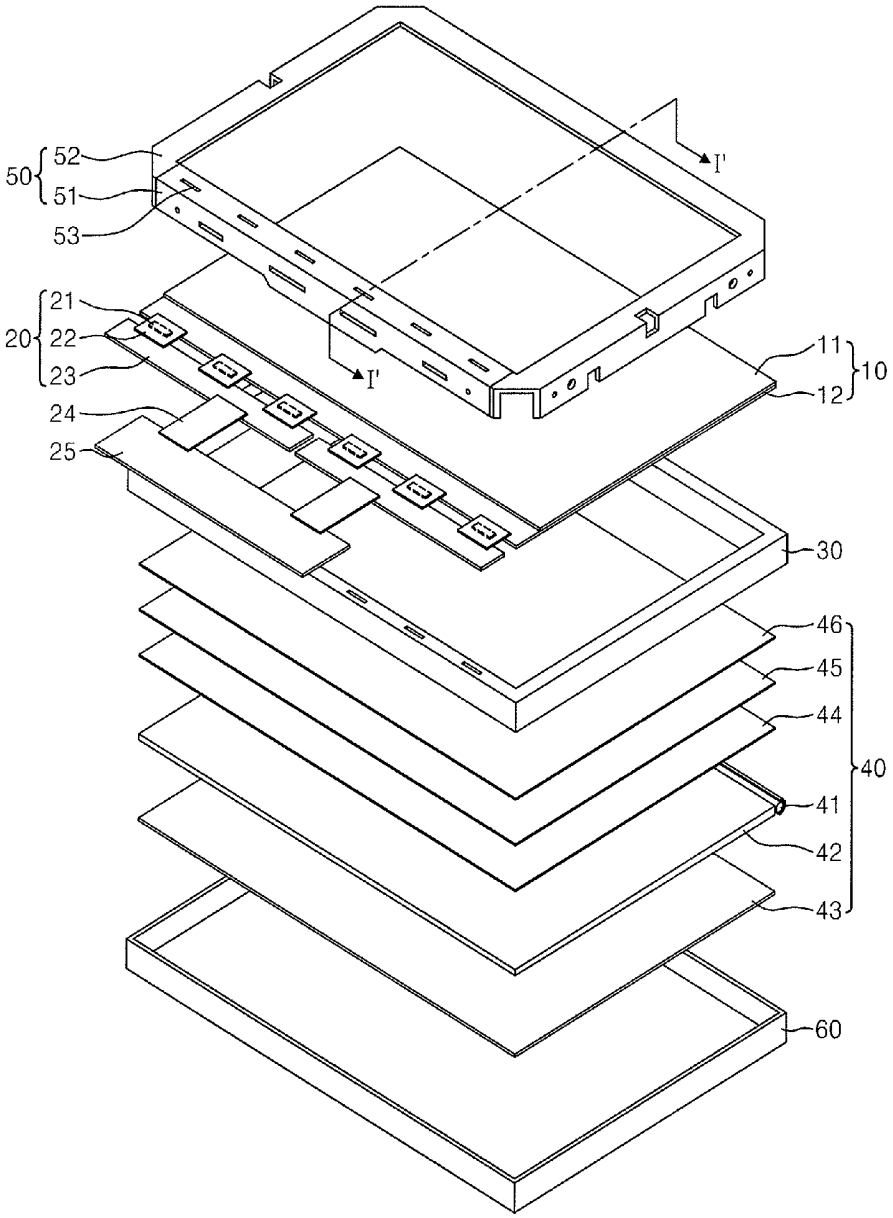


Fig. 1

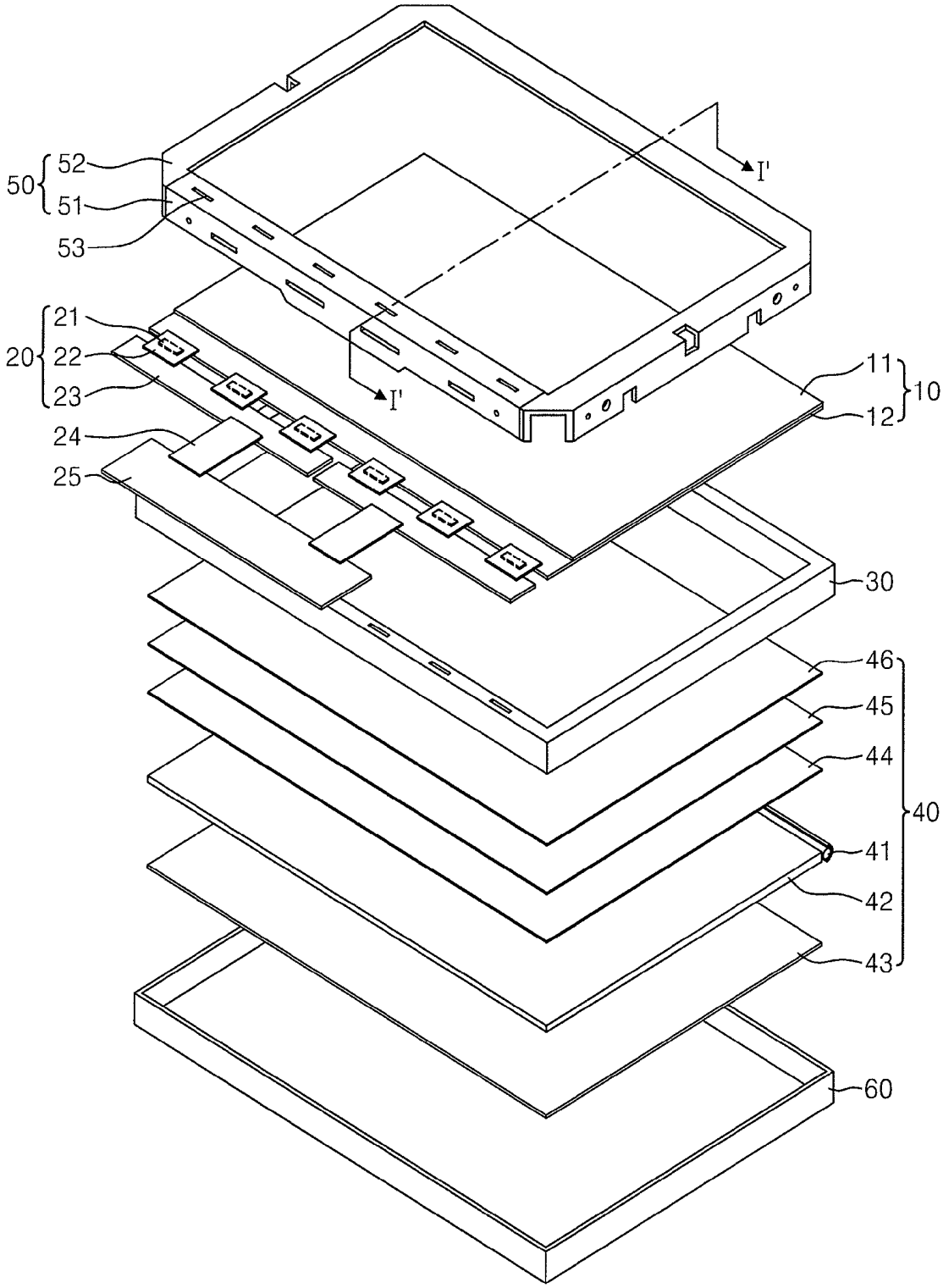


Fig. 2

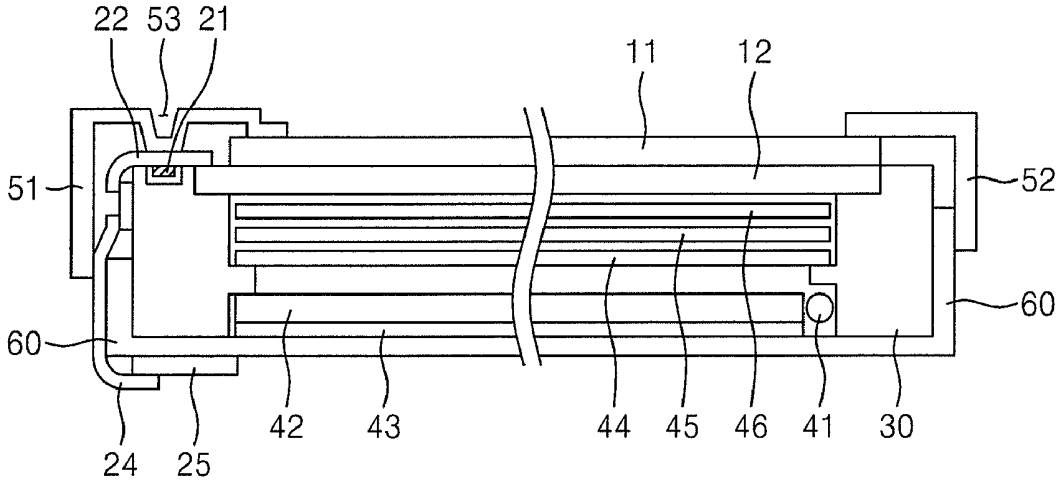


Fig. 3

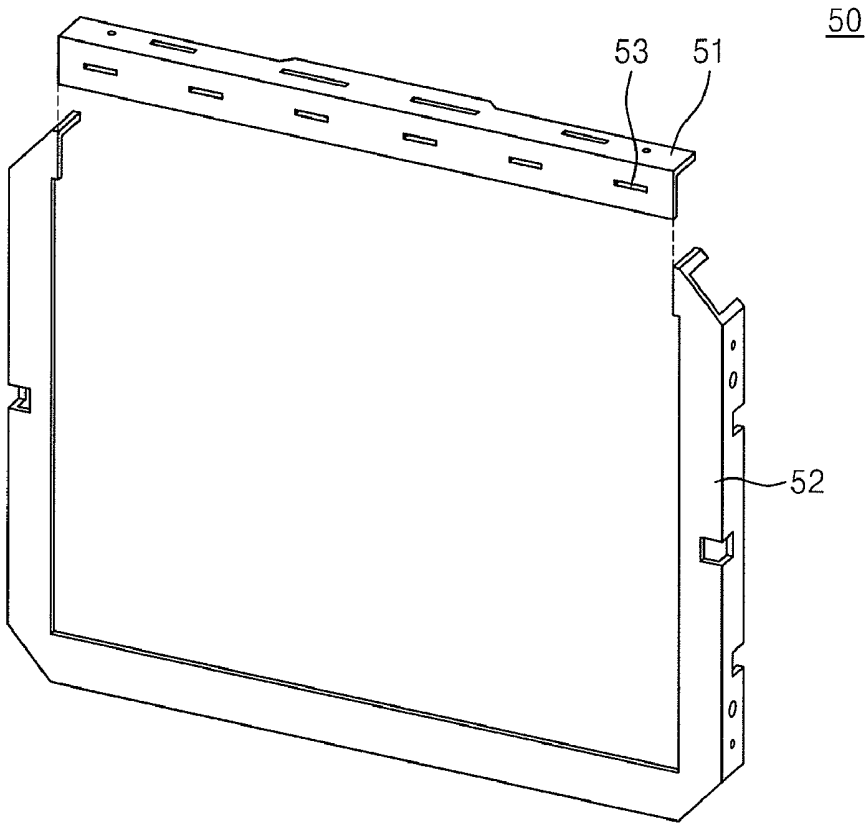


Fig. 4

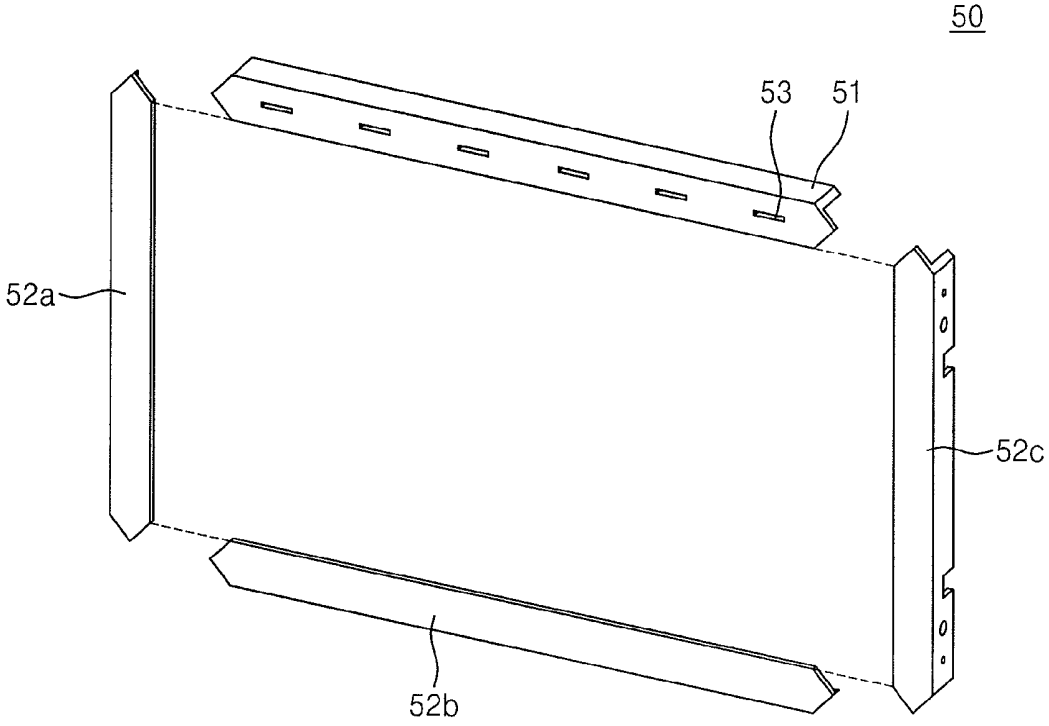


Fig. 5

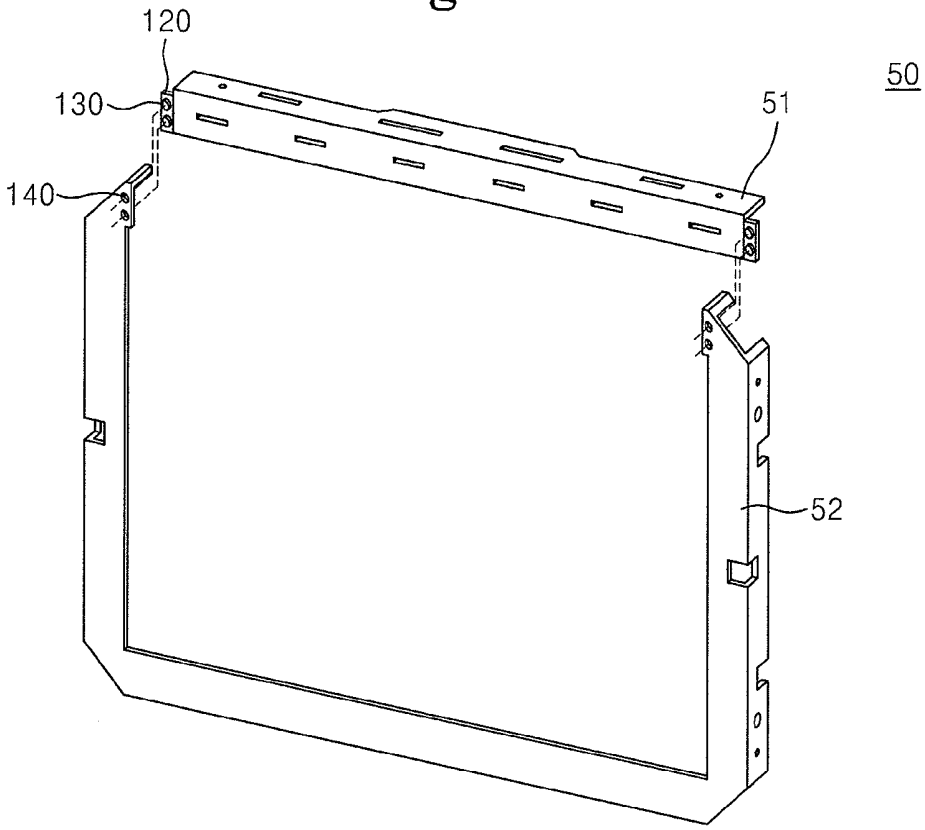


Fig. 6

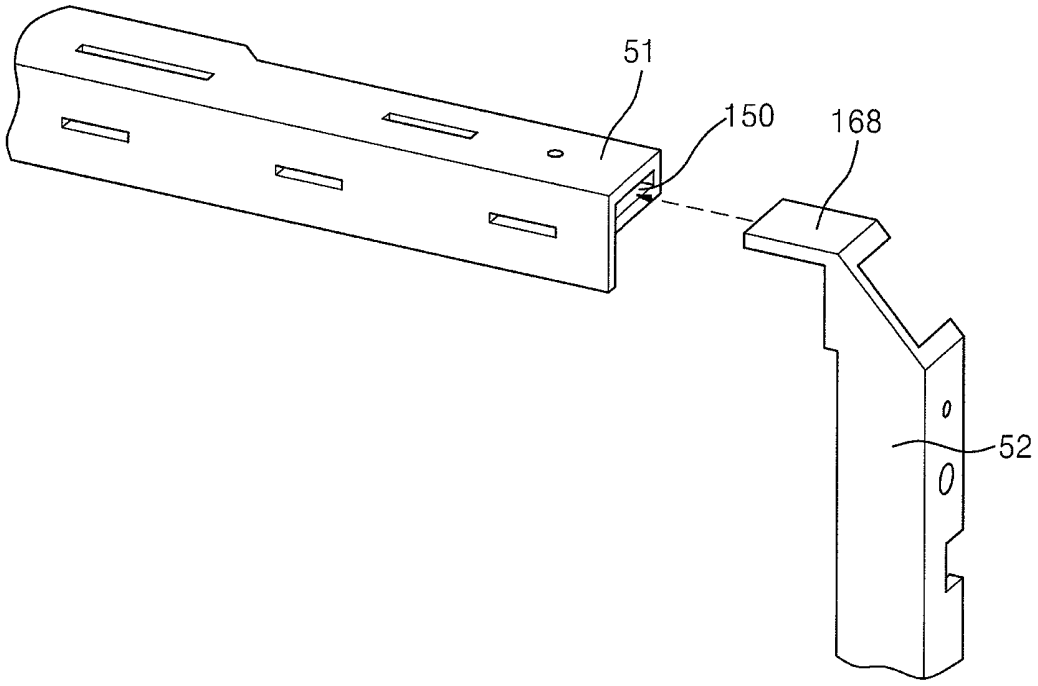


Fig. 7

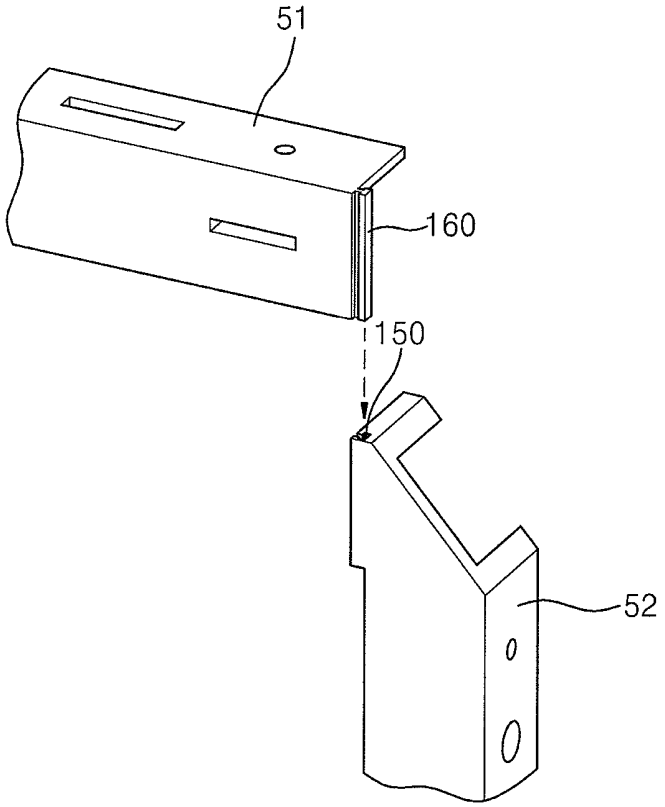


Fig. 8

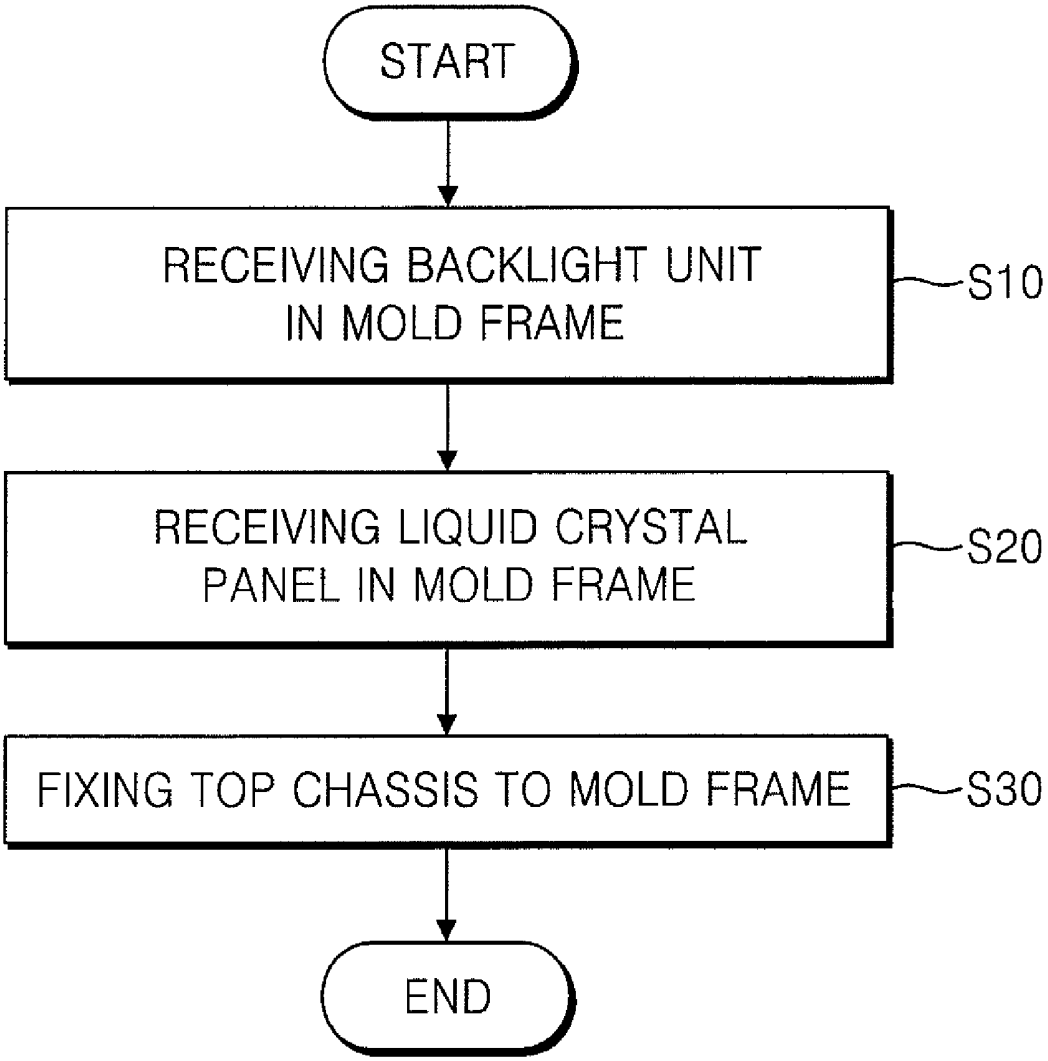

START
RECEIVING BACKLIGHT UNIT IN MOLD FRAME
S10
RECEIVING LIQUID CRYSTAL PANEL IN MOLD FRAME
S20
FIXING TOP CHASSIS TO MOLD FRAME
S30
END

Fig. 9

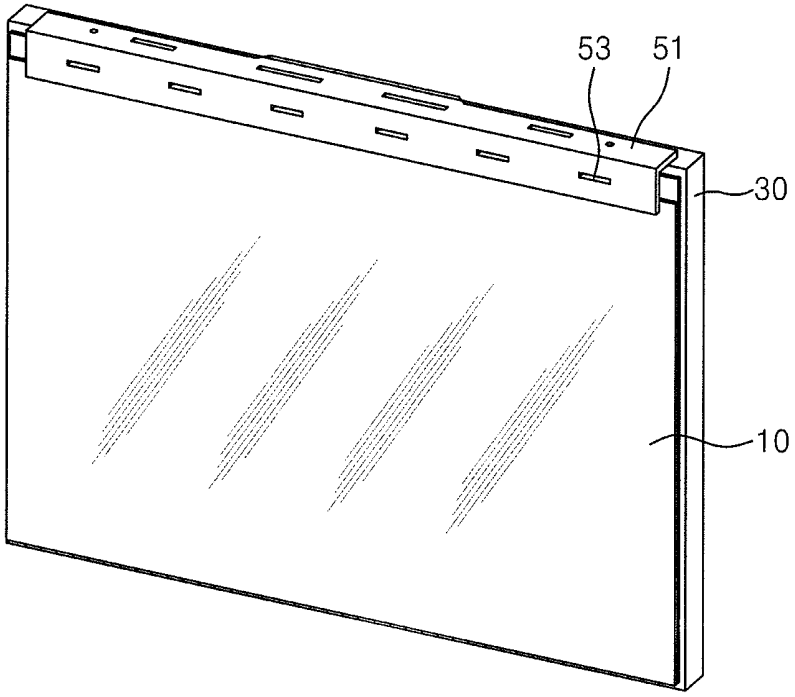


Fig. 10

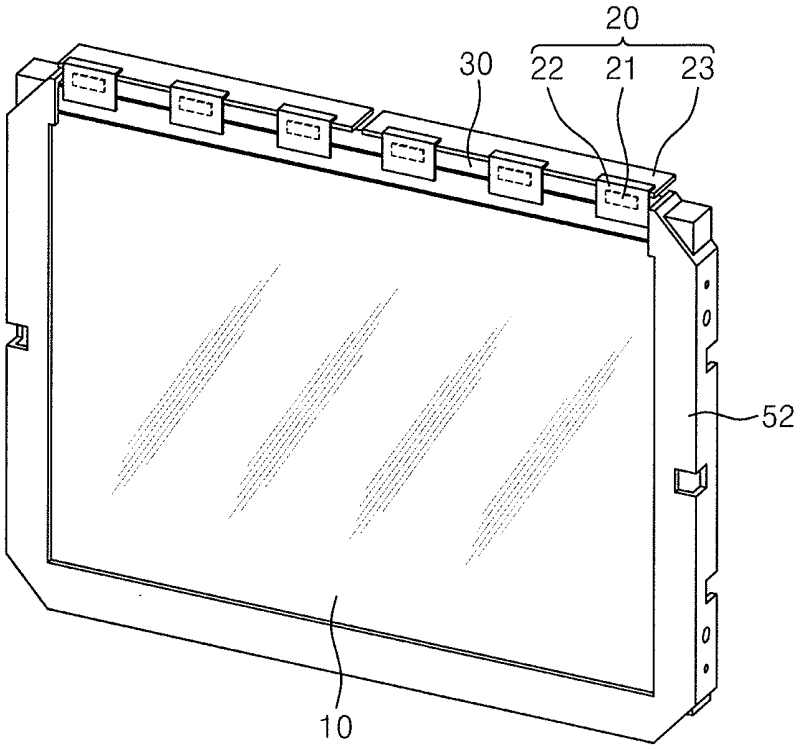


Fig. 11

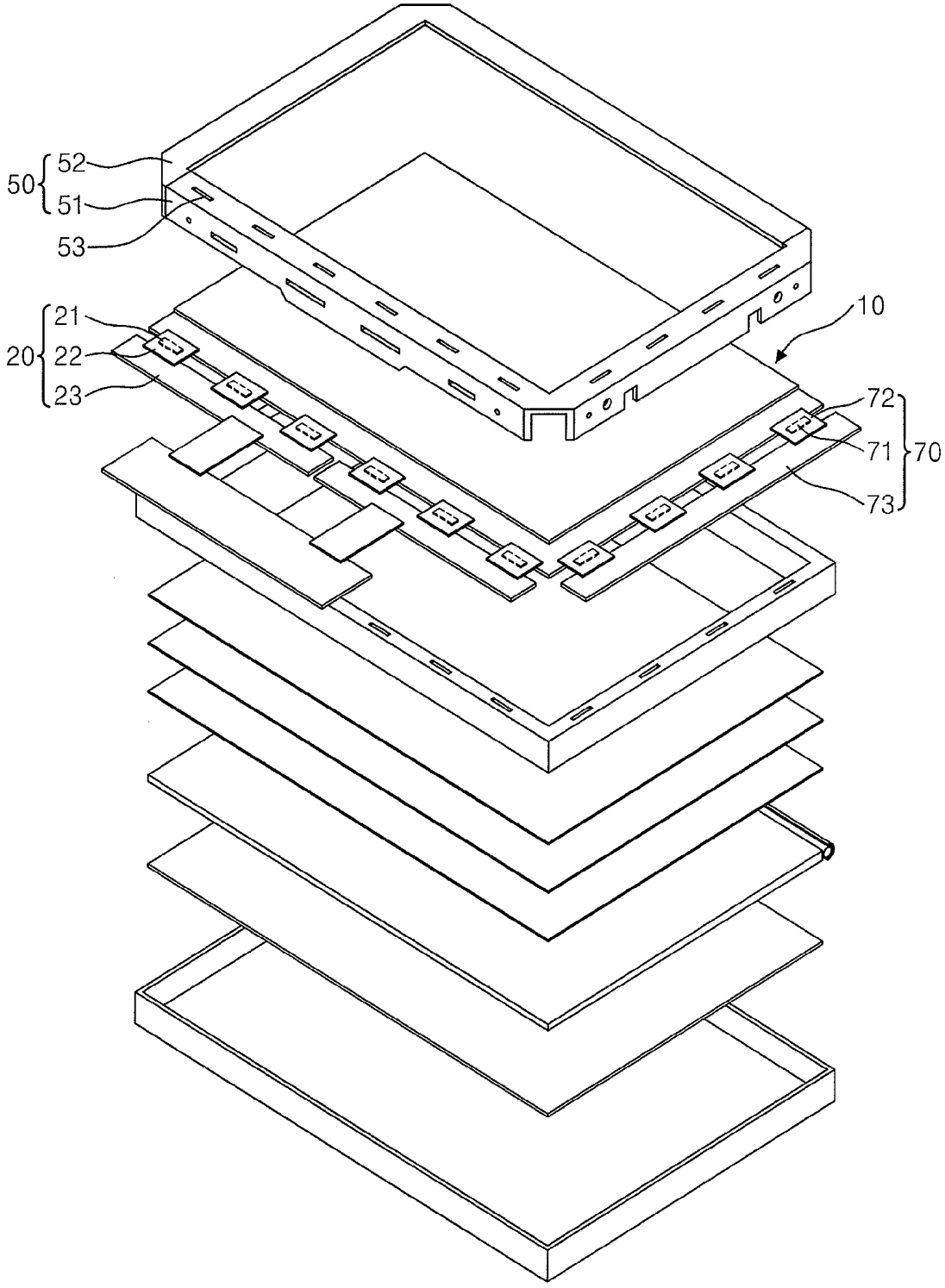


Fig. 12

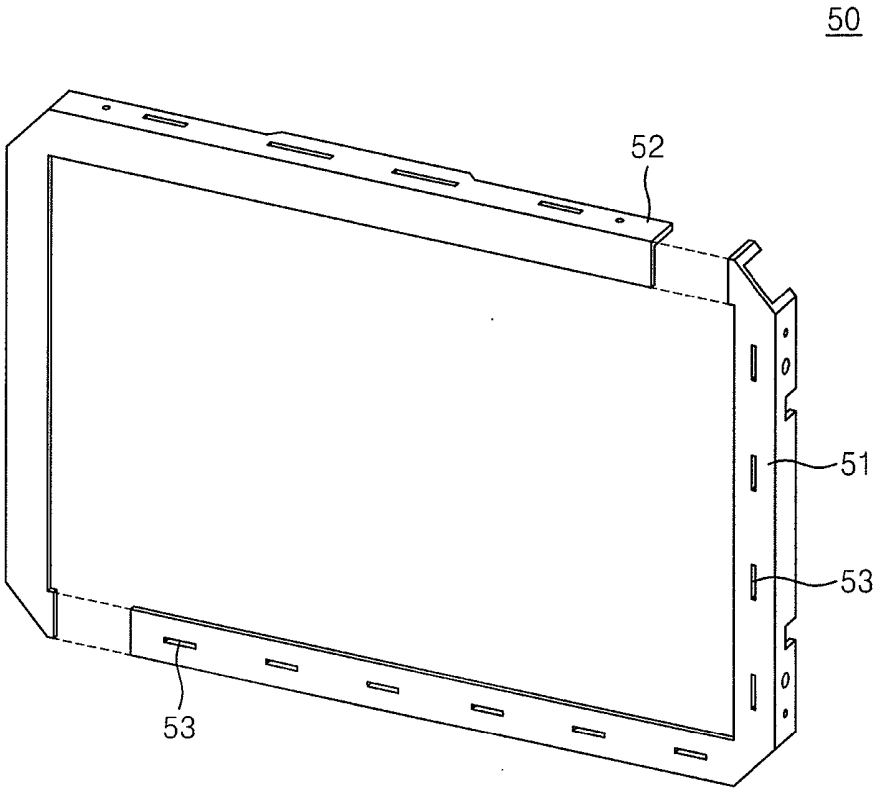
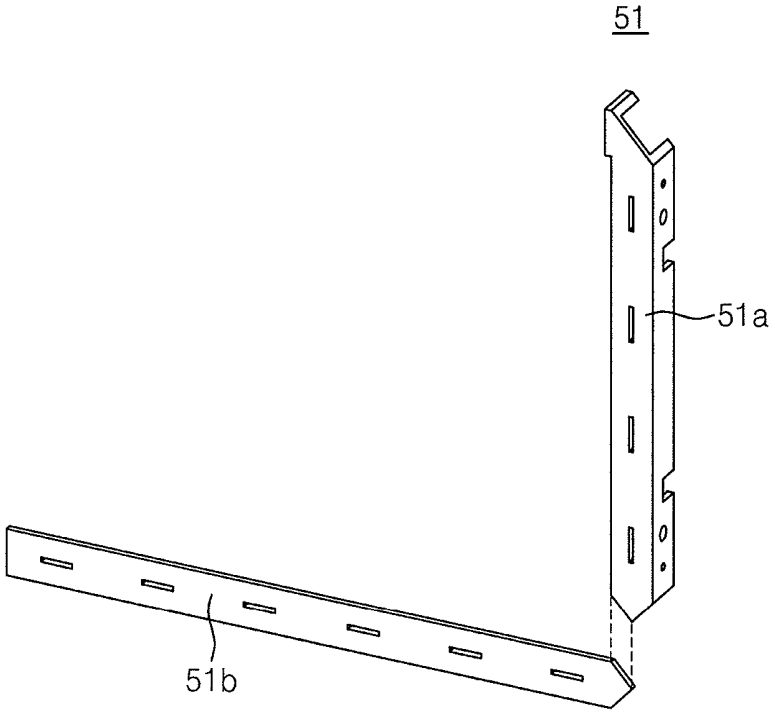


Fig. 13



TOP RECEIVING CONTAINER, LIQUID CRYSTAL DISPLAY APPARATUS INCLUDING THE SAME, AND ASSEMBLY METHOD THEREOF

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to Korean Patent Application No. 10-2007-0053688, filed on Jun. 1, 2007, the disclosure of which is incorporated by reference herein in its entirety.

BACKGROUND OF THE INVENTION

[0002] 1. Technical Field

[0003] The present disclosure relates to a top receiving container, a liquid crystal display ("LCD") apparatus including the top receiving container and an assembly method thereof, and more particularly to an LCD apparatus including the top receiving container including at least two different materials and an assembly method thereof.

[0004] 2. Discussion of the Related Art

[0005] In general, an LCD apparatus includes a liquid crystal panel for displaying an image, a panel driving part driving the liquid crystal panel, a backlight unit providing light to the liquid crystal panel, and a receiving container unit. The receiving container unit receives the liquid crystal panel, the panel driving part and the backlight unit.

[0006] The liquid crystal panel includes a thin film transistor ("TFT") substrate having a TFT array, a color filter substrate having a color filter array, and a liquid crystal layer formed between the two substrates. The liquid crystal panel is driven by voltage difference applied between the two substrates to adjust a transmission ratio of the light emitted from the backlight unit, so that an image is displayed. The backlight unit generates and provides light to the liquid crystal panel.

[0007] The panel driving part includes a gate driving part driving a gate line, a data driving part driving a data line, a power supply part supplying power, and a timing controller controlling driving timing of the gate driving part and the data driving part.

[0008] The gate driving part and the data driving part are electrically connected to one side of the liquid crystal panel. The gate driving part and the data driving part provide the liquid crystal panel with driving signals generated from each of the gate driving part and the data driving part.

[0009] The receiving container unit includes a bottom receiving container and a top receiving container. The bottom receiving container receives and fixes the backlight unit. The top receiving container surrounds an upper outline of the liquid crystal panel and to prevent the liquid crystal panel from moving.

[0010] The top receiving container includes a frame comprising metal formed through a press process. In the press process, the manufacturing cost is increased as a size of a mold for manufacturing the top receiving container is increased. To reduce costs, the top receiving container can be manufactured through a molding process using a polymer material. In the molding process, each of drivers in the gate driving part and the data driving part generates heat when the gate driving part and the data driving part are driven at a high frequency. When the top receiving container includes a polymer material, the heat generated from the gate and data drivers may remain inside the top receiving container. The heat may cause a failure or damage to the drivers.

[0011] A driving failure of the liquid crystal panel can be generated by electro-magnetic interference ("EMI") or electrostatic discharge ("ESD") of the liquid crystal panel. The EMI and the ESD are generated by an electromagnetic wave generated from the gate and data drivers.

SUMMARY OF THE INVENTION

[0012] According to an exemplary embodiment of the present invention, a receiving container comprises a first frame disposed at a first side of a liquid crystal panel, and a second frame disposed at a second side of the liquid crystal panel, wherein the first frame and the second frame are combined to fix the liquid crystal panel and comprise different materials.

[0013] The first frame may comprise aluminum.

[0014] The second frame may comprise a polymer material.

[0015] The second frame may comprise metal.

[0016] The receiving container may further comprise a combining part for combining the first frame and the second frame.

[0017] The combining part may comprise a combining protrusion formed at one of the first and second frames and a combining hole formed at the remaining one of the first and second frames, and the combining protrusion and the combining hole are mated with each other.

[0018] The combining part may comprise a guiding protrusion formed at one of the first and second frames and a guiding hole formed at the remaining one of the first and second frames, and the guiding protrusion and the guiding hole are coupled with each other as a sliding structure.

[0019] According to an exemplary embodiment of the present invention, a liquid crystal display apparatus comprises a liquid crystal panel, and a top receiving container including a first frame disposed at a first side of the liquid crystal panel and a second frame disposed at a second side of the liquid crystal panel, wherein the first frame and the second frame are combined to fix the liquid crystal panel and comprise different materials.

[0020] The liquid crystal display apparatus may further comprise a gate driving part and a data driving part driving the liquid crystal panel, wherein the first frame contacts at least one driving part of the gate and data driving parts, and the first frame comprises metal.

[0021] The first frame may comprise aluminum or an aluminum alloy.

[0022] The first frame may comprise a groove part contacting at least one driving part of the gate and data driving parts.

[0023] The first frame electrically may connect at least one driving part of the gate and data driving parts to a ground potential.

[0024] The liquid crystal display apparatus may further comprise a combining part combining the first frame and the second frame.

[0025] The combining part may comprise a combining protrusion formed at one of the first and second frames and a combining hole formed at the remaining one of the first and second frames, and the combining protrusion and the combining hole are mated with each other.

[0026] The combining part may comprise a guiding protrusion formed at one frame of the first and second frames a guiding hole formed at the remaining frame of the first and

second frames, and the guiding protrusion and the guiding hole are coupled with each other as a sliding structure.

[0027] The second frame may comprise a polymer material.

[0028] The second frame may comprise metal.

[0029] The first frame may be divided into a third frame for heat dissipation of the data driving part and a fourth frame for heat dissipation of the gate driving part.

[0030] According to an exemplary embodiment of the present invention, a method for assembling a liquid crystal display apparatus comprises receiving a backlight unit in a mold frame, fixing a liquid crystal panel at the mold frame, combining a first frame and a second frame through a combining part, fixing the first frame to the mold frame, and fixing the second frame to the mold frame, wherein the first frame is disposed at a first side where one of the gate and data driving parts is formed, and the second frame is disposed at a second side of the liquid crystal panel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031] Exemplary embodiments of the present invention can be understood in more detail from the following descriptions taken in conjunction with the accompanying drawings, in which:

[0032] FIG. **1** is an exploded perspective view of an LCD apparatus in accordance with an exemplary embodiment of the present invention;

[0033] FIG. **2** is a cross-sectional view taken along the line I-I' in FIG. **1** according to an exemplary embodiment of the present invention;

[0034] FIGS. **3** and **4** are perspective views illustrating various shapes of a top receiving container of an LCD apparatus in accordance with an exemplary embodiment of the present invention;

[0035] FIGS. **5** to **7** are perspective views illustrating a combining method of a top receiving container of an LCD apparatus in accordance with an exemplary embodiment of the present invention;

[0036] FIG. **8** is a flow chart illustrating a method for assembling an LCD apparatus in accordance with an exemplary embodiment of the present invention;

[0037] FIGS. **9** and **10** are perspective views illustrating a method for assembling an LCD apparatus in accordance with an exemplary embodiment of the present invention;

[0038] FIG. **11** is an exploded perspective view of an LCD apparatus in accordance with an exemplary embodiment of the present invention;

[0039] FIG. **12** is a perspective view illustrating a top receiving container of an LCD apparatus according to an exemplary embodiment of the present invention; and

[0040] FIG. **13** is an exploded perspective view illustrating a first frame according to an exemplary embodiment of the present invention.

DESCRIPTION OF EXEMPLARY EMBODIMENTS

[0041] The present invention is described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown. The present invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein.

[0042] FIG. **1** is an exploded perspective view of a liquid crystal display ("LCD") apparatus in accordance with an exemplary embodiment of the present invention.

[0043] FIG. **2** is a cross-sectional view taken along the line I-I' in FIG. **1** according to an exemplary embodiment of the present invention.

[0044] Referring to FIGS. **1** and **2**, an LCD apparatus includes a liquid crystal panel **10**, a panel driving part, a backlight unit **40** and a receiving container unit.

[0045] The liquid crystal panel **10** includes a thin film transistor ("TFT") substrate **12** having a TFT array, a color filter substrate **11** having a color filter array, and a liquid crystal layer disposed between the two substrates **11** and **12**.

[0046] The liquid crystal panel **10** includes a liquid crystal cell driven by a TFT formed at each pixel area. The liquid crystal panel **10** provides a pixel voltage received from the data line to a liquid crystal cell in response to a scan signal received from the gate line, and displays an image by driving the liquid crystal cell.

[0047] The panel driving part includes a gate driving part, a data driving part **20**, a power supplying part, and a timing controller.

[0048] In an exemplary embodiment, the gate driving part is integrated in the liquid crystal panel **10**. The gate driving part may be mounted as an integrated circuit in the liquid crystal panel **10**. Alternatively, the gate driving part may be integrated in the liquid crystal panel **10**. The gate driving part provides a gate driving signal to the gate line formed in the liquid crystal **10**. In an exemplary embodiment, the gate driving part may sequentially provide a gate on voltage and a gate off voltage to the liquid crystal panel **10**.

[0049] The data driving part **20** is electrically connected to one side of the liquid crystal panel **10**, and provides the pixel voltage to the data line of the liquid crystal **10**. The data driving part **20** includes a data tape carrier package ("TCP") **22** and a data printed circuit board ("PCB") **23**. The data TCP **22** integrates a data driver **21** on a film. The data PCB **23** is electrically connected to the data TCP **22**.

[0050] A side of the data TCP **22** is electrically connected to the TFT substrate **12** included in the liquid crystal panel **10**. The other side of the data TCP **22** is electrically connected to the data PCB **23**.

[0051] The timing controller provides a timing signal to the gate driving part and the data driving part **20**, and provides a pixel data signal to the data driving part **20**.

[0052] The power supplying part provides a gate on voltage and a gate off voltage to the gate driving part, and provides an analog driving voltage to the data driving part **20**, and provides a common voltage to the liquid crystal panel **10**, respectively.

[0053] The timing controller and the power supplying part can be mounted on a control PCB **25**. An LCD apparatus used in, for example, a wide television may include two data PCBs **23** and an additional control PCB **25** as illustrated in FIG. **1**. The control PCB **25** may be electrically connected to the timing controller and the power supplying part through each of the data PCB **23** and a connector **24**. The control PCB **25** may transfer signals, generated in the timing controller and the power supplying part, to the data PCB **23**.

[0054] The backlight unit **40** provides light to the liquid crystal panel **10**. The backlight unit **40** may be an edge type backlight unit or a direct lighting type backlight unit. The edge type backlight unit may supply light through a side of the liquid crystal panel **10**. The direct lighting type backlight unit

may supply light through the bottom surface of the liquid crystal panel **10**. In an exemplary embodiment of the present invention, the edge type backlight unit is used.

[0055] The backlight unit **40** includes at least one lamp **41**, a light guide plate **42**, a reflection sheet **43**, a diffusive sheet **44**, a prism sheet **45** and a protection sheet **46**. The lamp **41** generates light and supplies the light to a side surface light entering part of the light guide plate **42**. The light guide plate **42** guides the light from the lamp **41** to the liquid crystal panel **10**. The reflection sheet **43** reflects the light provided downwardly toward the liquid crystal panel **10**.

[0056] The diffusive sheet **44** diffuses the light provided from the light guide plate **42** to protect a bright line and a dark line. The prism sheet **45** increases straight characteristic of the diffusive light at the diffusive sheet **44**, so that high brightness is provided to the liquid crystal panel **10**. The protection sheet **46** protects against defects such as scratches when the backlight unit **40** is transported. In an exemplary embodiment, a light emitting diode (LED) may be used as a light source.

[0057] The backlight unit **40** is received and fixed by the mold frame **30** and the bottom receiving container **60**.

[0058] A receiving part is formed to receive and fix the liquid crystal panel **10** in the mold frame **30**, and a groove for preventing the data driver **21** from moving may be formed at a side of the mold frame **30**. The liquid crystal panel **10** is received in the receiving part formed in the mold frame **30** after the backlight unit **40** is received in the mold frame **30**. The liquid crystal panel **10** can be fixed with an adhesive member such as, for example, a double sided tape.

[0059] The receiving container unit includes the bottom receiving container **60** and the top receiving container **50**. The bottom receiving container **60** receives and fixes the diffusive sheet **44**, the prism sheet **45** and the protection sheet **46** fixed at the mold frame **30**. The bottom receiving container **60** may include metal to prevent the backlight unit **40** from moving, and to protect the backlight unit **40** from an external physical shock.

[0060] The control PCB **25** can be adhered and fixed behind the bottom receiving container **60**.

[0061] The top receiving container **50** has a reverse 'L' shape to receive a corner of an upper surface of the liquid crystal panel **10**. The top receiving container **50** may include at least two different materials.

[0062] FIG. **3** is a perspective view illustrating a shape of a top receiving container of an LCD apparatus in accordance with an exemplary embodiment of the present invention.

[0063] The top receiving container **50** includes a first frame **51** and a second frame **52**.

[0064] The first frame **51** includes a thermal conductive and electric conductive material such as, for example, metal. The first frame **51** overlaps the data driving part **20** to contact the data driving part **20**. The first frame **51** overlaps the data driving part **20**, so that heat generated by driving the data driving part **20** is transmitted to the first frame **51**.

[0065] The first frame **51** includes an electric conductive material to be electrically connected to a ground potential of the data driving part **20**, so that a distortion of driving signals by an electromagnetic wave can be prevented. The electromagnetic wave can be a high frequency caused by a driving frequency of the gate driving part **70** and the data driving part **20**. For example, the first frame **51** may be electrically connected to a grounding line formed in the data TCP **22** of the data driving part **20**. Thus, the first frame **51** may be worked as a ground potential and may enhance a ground potential of the data TCP **22**.

[0066] The first frame **51** contacts an edge of the liquid crystal panel **10**, and static electricity is electrically transmitted to the first frame **51**, so that the liquid crystal panel **10** may be protected from the ESD. An area of the first frame **51**, which contacts with the liquid crystal panel **10**, may be extended toward the liquid crystal panel **10**.

[0067] The first frame **51** may reduce a manufacturing cost when the first frame **51** is manufactured in a press process or an extrusion molding process because the first frame **51** has a small size in the above manufacturing process. According to an exemplary embodiment of the present invention, a mold size for manufacturing the first frame **51** is decreased. According to an exemplary embodiment of the present invention, manufacturing time can be decreased when the first frame **51** is manufactured in an injection molding process.

[0068] The first frame **51** may comprise, for example, metal having a good thermal and electric conductivity. The metal can be aluminum (Al) or an Al alloy. In an exemplary embodiment, the first frame **51** may include galvarium. The galvarium, which is an alloy of Al and Zn, has light-weight, good thermal and electric conductivity, and good strength.

[0069] The first frame **51** may include at least one groove part **53** for receiving the data driving part **20**.

[0070] Referring to FIGS. **1** to **3**, the groove part **53** formed at the top receiving container **50** extends toward the data driving part **20**. The groove part **53** directly contacts the data TCP **22** and is physically connected to the data driver **21** of the data TCP **22**. Since the groove part **53** physically contacts the data driver **21**, heat generated by the data driver **21** is transmitted to the top receiving container **50**.

[0071] The groove part **53** may be electrically connected to a ground line of the data TCP **22**. Since the groove part **53** and the ground line of the data TCP **22** are electrically connected, failures such as the EMI or the ESD, generated by a high driving frequency of the data driver **21**, may be prevented and a driving failure of the liquid crystal panel **10** may be prevented. A same number of the groove part **53** and the data TCP **22** may be formed.

[0072] The second frame **52** overlaps a peripheral area of the liquid crystal panel **10** where the data driving part **20** is not disposed. The second frame **52** fixes the overlapped peripheral area of the liquid crystal panel **10**. The second frame **52** includes a polymer material. The second frame **52** may be manufactured by a molding method.

[0073] The second frame **52** may include a conductive material. For example, the second frame **52** may include a conductive plastic material, so that the EMI or the ESD may be prevented.

[0074] The second frame **52** may include metal, for example, a metal which is cheaper than aluminum (Al) or an Al alloy. In an exemplary embodiment, the second frame **52** may be manufactured by the same method as the first frame **51**.

[0075] FIG. **4** is perspective view illustrating a top receiving container of an LCD apparatus in accordance with an exemplary embodiment of the present invention. In an exemplary embodiment, the top receiving container **50** may include four frames.

[0076] Referring to FIG. **4**, the second frame **52** may include three frames **52***a*, **52***b* and **52***c*, and the three frames may be fixed at sides of the liquid crystal panel using a variety

of methods. Alternatively, each of the frames **52***a*, **52***b* and **52***c* may be assembled prior to being fixed to three sides of the liquid crystal panel.

[0077] In an exemplary embodiment, the first frame **51** and the second frame **52** may be coupled to each other using, for example, a screw. In an exemplary embodiment, the first and second frames **51** and **52** may be assembled separately and respectively before being combined.

[0078] FIG. **5** is a perspective view illustrating a combining method of a first frame and a second frame of a top receiving container according to an exemplary embodiment of the present invention.

[0079] In an exemplary embodiment, first frame **51** and the second frame **52** are combined by inserting a combining protrusion **130** into a combining hole **140**. The combining protrusion **130** is formed at the first frame **51**, and the combining hole **140** is formed at the second frame **52**.

[0080] The first frame **51** includes an extension part **120** and the combining protrusion **130**. The extension part **120** is protruded from both ends of the first frame **51**. The combining protrusion **130** is protruded from the extension part **120**.

[0081] The extension part **120** and the first frame **51** may be formed using substantially the same process. The process includes, for example, a press process or a mold injection process.

[0082] The combining protrusion **130** and the first frame **51** may be formed using substantially the same process. The process includes, for example, a press process or a mold injection process. At least one combining protrusion **130** is protruded from an upper surface of the extension part **120**. An end portion of the combining protrusion **130** may have a circular shape or a polygon shape. The end portion of the combining protrusion **130** may have a wedge shape. A center portion of the combining protrusion **130** may be divided into, for example, two or four pieces.

[0083] The combining hole **140** is formed at the second frame **52**. The combining hole **140** corresponds to the combining protrusion **130**. The combining hole **140** is formed in substantially the same shape as the combining protrusion **130**, so that the combining protrusion **130** may be inserted into the combining hole **140**.

[0084] The combining protrusion **130** and the combining hole **140** are mated to combine the first frame **51** and the second frame **52**.

[0085] Alternatively, the combination protrusion **130** may be formed at the second frame **52**, and the combination hole **140** may be formed at the first frame **51**.

[0086] In an exemplary embodiment, the combining hole **140** may have a size corresponding to a combining hole of the second frame **52**. The holes of the first frame **51** and the second frame **52** may be mated with a screw.

[0087] FIGS. **6** and **7** are perspective views illustrating a method of combining a first frame and a second frame according to an exemplary embodiment of the present invention.

[0088] Referring to FIG. **6**, a guide groove **150** formed at the first frame **51** and a guide protrusion **160** formed at the second frame **52** are mated to combine the first frame **51** and the second frame **52**.

[0089] The guide groove **150** is formed at both end portions of the first frame **51**. The guide protrusion **160** corresponding to the guide groove **150** is formed at both end portions of the second frame **52**.

[0090] The guide groove **150** is formed at both end portions of the first frame **51**. A side surface of the first frame **51** is bent toward an inside as a 'U' shape to form the guide groove **150**. The guide groove **150** is formed at an area which does not overlap the liquid crystal panel **10**. The area where the guide groove **150** is formed receives the mold frame **30** or the bottom receiving container **60** such that a thickness of the LCD apparatus can be reduced.

[0091] The guide protrusion **160** is protruded from both end portions of the second frame **52**. The guide protrusion **160** may be inserted into the guide groove **150** formed at the first frame **51**. The guide groove **150** and the guide protrusion **160** may be mated by a torx method to combine the first frame **51** and the second frame **52**.

[0092] A cross-sectional shape of the guide groove **150** and the guide protrusion **160** may be formed as a circular shape, an oval shape, a polygon shape or a rectangular shape. A plurality of guide grooves and guide protrusions may be formed at the first frame and the second frame, respectively. The guide protrusion **160** in FIG. **6** may be formed at the first frame **51**, and the guide groove **150** may be formed at the second frame **52**.

[0093] The guide groove **150** and the guide protrusion **160** may be mated in a vertical direction with respect to each other. Referring to FIG. **7**, the guide protrusion **160** is formed at the first frame **51**, and the guide groove **150** is formed at the second frame **52**.

[0094] The guide protrusion **160** can be formed at an end portion of the first frame **51**. The guide protrusion **160** can be formed at a first end portion of the first frame **51**, and the substantially same guide protrusion **160** may be formed at a second end portion of the first frame **51**. The guide protrusion **160** is extruded toward the end portions of the first frame **51** to be mated with the guide groove **150** in a vertical direction. A groove is formed in a perpendicular direction with respect to the guide protrusion **160**. The groove formed in the perpendicular direction may be formed as a protruded shape.

[0095] The guide groove **150** is formed near the end portion of the second frame **52** in a perpendicular direction. The guide protrusion **160** may be inserted into the guide groove **150**. The guide protrusion **160** is inserted into the guide groove **150** using a sliding structure.

[0096] Alternatively, the guide groove **150** may be formed at the first frame **51**, and the guide protrusion **160** may be formed at the second frame **52**.

[0097] FIG. **8** is a flow chart illustrating a method for assembling an LCD apparatus in accordance with an exemplary embodiment of the present invention.

[0098] A backlight unit is received in a mold frame at step S**10**, and a liquid crystal panel is received in the mold frame at step S**20**, and a top receiving container is fixed to the mold frame at step S**30**.

[0099] Referring to FIGS. **1** and **8**, in step S**10**, the diffusive sheet **44**, the prism sheet **45** and the protection sheet **46** are received in an upper portion of the mold frame **30**. The lamp **41**, the light guide plate **42** and the reflection sheet **43** are received behind the mold frame **30**.

[0100] In step S**20**, the liquid crystal panel **10** is received in an upper portion of the mold frame **30**. The liquid crystal panel **10** may be received in an area of the mold frame **30** where the protection sheet **46** is received. The liquid crystal panel **10** is fixed to the mold frame **30** with an adhesive member such as, for example, a double sided tape. A receiving part, formed as a stepped shape to receive the liquid crystal panel **10**, is formed at the mold frame **30**. An adhesive

member such as, for example, a bonding agent is formed at the receiving part of the mold frame **30**, thereby the liquid crystal panel **10** is fixed.

[0101] Referring to FIGS. **8-10**, in step S**30**, the first frame **51** is fixed at one side of the mold frame **30** where the data TCP **22** of the liquid crystal panel **10** is adhered. Then, the second frame **52** is fixed at the mold frame **30**.

[0102] After the second frame **52** is fixed at the mold frame **30**, the first frame **51** is fixed at the mold frame **30**. The mold frame **30** and the top receiving container **50** may be fixed through, for example, a bolt or a hook.

[0103] Referring to FIG. **5**, the first and second frames **51** and **52** may be combined by a torx method through the combining protrusion **130** and the combining hole **140**, and may be fixed at the mold frame **30**. Referring to FIGS. **6** and **7**, the first and second frames **51** and **52** may be combined by the guide groove **150** and the guide protrusion **160** through a sliding method, and may be fixed at the mold frame **30**.

[0104] When the second frame **52** includes three frames, each of the frames of the second frame **52** may be fixed at the mold frame **30** in sequence. Each of the frames of the second frame **52** may be combined first and then be fixed at the mold frame **30**.

[0105] FIG. **11** is an exploded perspective view illustrating an LCD apparatus in accordance with an exemplary embodiment of the present invention. Referring to FIG. **11**, a gate driving part **70** is attached to a liquid crystal panel **10**. A first frame **51** is formed at one side of a top receiving container **50** where the gate driving part **70** and a data driving part **20** are formed. A second frame **52** is formed at the remaining sides of the top receiving container **50** where the gate driving part **70** and the data driving part **20** are not formed.

[0106] The LCD apparatus in accordance with an exemplary embodiment of the present invention includes the top receiving container **50** having the first frame **51** and the second frame **52**. The first frame **51** is disposed at the side of the liquid crystal panel **10** where the gate driving part **70** and the data driving part **20** are attached, and the second frame **52** is disposed at the remaining sides of the liquid crystal panel **10**.

[0107] The gate driving part **70** is attached to one side of the liquid crystal panel **10**. The gate driving part **70** includes a gate driver **71**, a gate TCP **72** on which the gate driver **71** is mounted, and a gate PCB **73** electrically connected to the gate TCP **72**.

[0108] The gate driver **71** is mounted on the gate TCP **72**. The gate driver **71** is mounted on a film of the gate TCP **72**, and one end portion of the gate TCP **72** is electrically connected to the liquid crystal panel **10** and the other end portion of the gate TCP **72** is electrically connected to the gate PCB **73**.

[0109] The gate PCB **73** provides gate on/off voltages and control signals to the gate TCP **72**. The gate on/off voltages and the control signals are inputted from the power supplying part via the data driving part **20**. The gate PCB **73** may be omitted. For example, when a signal line electrically connected to the gate driver **71** is formed at the liquid crystal panel **10**, a gate driving signal may be provided through the signal line to the gate driver **71**, thereby the gate PCB **73** may be omitted.

[0110] The top receiving container **50** includes the first frame **51** and the second frame **52**. The first frame **51** is formed in an area of the liquid crystal panel **10** connected to the gate TCP **72** and the data TCP **22**, and the second frame **53** is formed in the remaining area of the liquid crystal panel **10**.

[0111] FIG. **12** is a perspective view illustrating a top receiving container of an LCD apparatus according to an exemplary embodiment of the present invention.

[0112] The first frame **51** receives an area where the gate driving part **70** and the data driving part **20** are connected to the liquid crystal panel **10**. The first frame **51** is physically connected to the gate driving part **70** and the data driving part **20**. The first frame is formed as an 'L' shape, and one side of the first frame **51** contacts the gate TCP **72**, and the remaining side of the first frame contacts the data TCP **22**.

[0113] The first frame **51** transmits heat generated in the gate TCP **72** and the data TCP **22**. Since the first frame **51** is electrically connected to a grounding line formed at each of the gate TCP **72** and the data TCP **22**, the EMI caused by a high speed operation of the gate driver **71** and the data driver **21** may be prevented.

[0114] The first frame **51** may further include a groove part **53** for electrically connecting with the gate TCP **72**. The groove part **53** and the data TCP **22** can be formed with substantially the same method.

[0115] Referring to FIG. **13**, the first frame **51** may be divided into a third frame **51***a* connected to the gate driving part **70** and a fourth frame **51***b* connected to the data driving part **20**.

[0116] The first frame **51** may be formed by, for example, a press process or an injection molding process. The first frame **51** may include aluminum (Al) or an Al alloy. In an exemplary embodiment, the first frame **51** may include Al—Zn alloy.

[0117] The second frame **52** is formed except for an area where the first frame **51** is fixed at the liquid crystal panel **10**. The second frame **52** includes one of a polymer material or metal. The second frame **52** may include a conductive material when the second frame **52** includes the polymer material.

[0118] An LCD apparatus and a method for manufacturing the LCD apparatus in accordance with exemplary embodiments of the present invention use a top receiving container having two different materials.

[0119] A first frame of the top receiving container may include a thermally conductive material. As such, heat generated at drivers for driving a liquid crystal panel may be transmitted effectively to an outside.

[0120] A conductive rubber formed at an end portion of the top receiving container can be omitted.

[0121] Since conductive areas of the panel driving part and the top receiving container are electrically connected to each other, a driving failure such as the EMI or the ESD generated at the panel driving part may be prevented.

[0122] Although the illustrative embodiments of the present invention have been described herein with reference to the accompanying drawings, it is to be understood that the present invention should not be limited to those precise embodiments and that various other changes and modifications may be affected therein by one of ordinary skill in the related art without departing from the scope or spirit of the invention. All such changes and modifications are intended to be included within the scope of the invention as defined by the appended claims.

What is claimed is:

1. A receiving container comprising:

a first frame disposed at a first side of a liquid crystal panel; and

a second frame disposed at a second side of the liquid crystal panel,

wherein the first frame and the second frame are combined to fix the liquid crystal panel and comprise different materials.

2. The receiving container of claim **1**, wherein the first frame comprises aluminum.

3. The receiving container of claim **1**, wherein the second frame comprises a polymer material.

4. The receiving container of claim **1**, wherein the second frame comprises metal.

5. The receiving container of claim **1**, further comprising a combining part for combining the first frame and the second frame.

6. The receiving container of claim **5**, wherein the combining part comprises a combining protrusion formed at one of the first and second frames and a combining hole formed at the remaining one of the first and second frames, and the combining protrusion and the combining hole are mated with each other.

7. The receiving container of claim **5**, wherein the combining part comprises a guiding protrusion formed at one of the first and second frames and a guiding hole formed at the remaining one of the first and second frames, and the guiding protrusion and the guiding hole are coupled with each other as a sliding structure.

8. A liquid crystal display apparatus comprising:

a liquid crystal panel; and

a top receiving container including a first frame disposed at a first side of the liquid crystal panel and a second frame disposed at a second side of the liquid crystal panel, wherein the first frame and the second frame are combined to fix the liquid crystal panel and comprise different materials.

9. The liquid crystal display apparatus of claim **8**, further comprising a gate driving part and a data driving part driving the liquid crystal panel, wherein the first frame contacts at least one driving part of the gate and data driving parts, and the first frame comprises metal.

10. The liquid crystal display apparatus of claim **9**, wherein the first frame comprises aluminum or an aluminum alloy.

11. The liquid crystal display apparatus of claim **10**, wherein the first frame comprises a groove part contacting at least one driving part of the gate and data driving parts.

12. The liquid crystal display apparatus of claim **11**, wherein the first frame electrically connects at least one driving part of the gate and data driving parts to a ground potential.

13. The liquid crystal display apparatus of claim **12**, further comprising a combining part combining the first frame and the second frame.

14. The liquid crystal display apparatus of claim **13**, wherein the combining part comprises a combining protrusion formed at one of the first and second frames and a combining hole formed at the remaining one of the first and second frames, and the combining protrusion and the combining hole are mated with each other.

15. The liquid crystal display apparatus of claim **13**, wherein the combining part comprises a guiding protrusion formed at one frame of the first and second frames a guiding hole formed at the remaining frame of the first and second frames, and the guiding protrusion and the guiding hole are coupled with each other as a sliding structure.

16. The liquid crystal display apparatus of claim **12**, wherein the second frame comprises a polymer material.

17. The liquid crystal display apparatus of claim **12**, wherein the second frame comprises metal.

18. The liquid crystal display apparatus of claim **12**, wherein the first frame is divided into a third frame for heat dissipation of the data driving part and a fourth frame for heat dissipation of the gate driving part.

19. A method for assembling a liquid crystal display apparatus comprising:

receiving a backlight unit in a mold frame;

fixing a liquid crystal panel at the mold frame;

combining a first frame and a second frame through a combining part fixing the first frame to the mold frame; and

fixing the second frame to the mold frame,

wherein the first frame is disposed at a first side where one of the gate and data driving parts is formed, and the second frame is disposed at a second side of the liquid crystal panel.

* * * * *

专利名称(译)	顶部接收容器，包括其的液晶显示装置及其组装方法		
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摘要(译)

接收容器包括接触液晶面板的第一侧的第一框架和接触液晶面板的第二侧的第二框架，其中第一框架和第二框架组合以固定液晶面板并且包括不同的液晶面板材料。