United States Patent Application Publication	20250261321
Kind Code	A1
Publication Date	August 14, 2025
Inventor(s)	KIM; Yongseong

DISPLAY DEVICE

Abstract

Disclosed is a display device. The display device includes: a display panel; a composite material plate located at the rear of the display panel; and a side frame located between the display panel and the composite material plate, fixed to the composite material plate, and to which the display panel is coupled, wherein the composite material plate may include: a front skin forming the front thereof; a rear skin forming the rear thereof and facing the front skin; a core that is located between the front skin and the rear skin and includes fibers; a receiving portion in which the front skin and the core is compressed to form a step difference that lowers the front skin; and a first cable hole located adjacent to the receiving portion and penetrating the front skin and the rear skin.

Inventors: **KIM; Yongseong (Seoul, KR)**

Applicant: **LG ELECTRONICS INC.** (Seoul, KR)

Family ID: **90478269**

Assignee: **LG ELECTRONICS INC. (Seoul, KR)**

Appl. No.: **19/116646**

Filed (or PCT Filed): **September 30, 2022**

PCT No.: **PCT/KR2022/014822**

Publication Classification

Int. Cl.: **H05K5/02** (20060101)

U.S. Cl.:

CPC **H05K5/0247** (20130101);

Background/Summary

TECHNICAL FIELD

[0001] The present disclosure relates to a display device.

BACKGROUND ART

[0002] As the information society develops, the demand for display devices is also increasing in various forms. In response to this, various display devices such as Liquid Crystal Display Device (LCD), Plasma Display Panel (PDP), Electroluminescent Display (ELD), Vacuum Fluorescent Display (VFD), and Organic Light Emitting Diode (OLED) have been researched and used in recent years.

[0003] Among them, a display device using an organic light emitting diode (OLED) has superior luminance and viewing angle compared to a liquid crystal display device, and may be implemented in an ultra-thin shape as it does not require a backlight unit.

[0004] Recently, much research has been conducted on structures for securing the rigidity of a large-screen ultra-thin display device and for heat dissipation according to high image quality.

DISCLOSURE

Technical Problem

[0005] An object of the present disclosure is to solve the above-described problems and other problems.

[0006] Another object of the present disclosure may be to secure a structural rigidity of a large-screen ultra-thin display device.

[0007] Another object of the present disclosure may be to prevent thermal deformation of the display device and secure high-temperature reliability.

[0008] Another object of the present disclosure may be to provide a display device that can prevent damage to a wired cable.

Technical Solution

[0009] According to an aspect of the present disclosure, there is provided a display device including: a display panel; a material complexed plate located at a rear of the display panel; and a side frame which is located between the display panel and the material complexed plate, fixed to the material complexed plate, and to which the display panel is coupled, in which the material complexed plate includes: a front skin forming a front surface; a rear skin which forms a rear surface, and faces the front skin; a core which is located between the front skin and the rear skin, and contains fibers; a receiving portion in which the front skin and the core is compressed to form a step difference that lowers the front skin; and a first cable hole which is located adjacent to the receiving portion, and penetrates the front skin and the rear skin.

Advantageous Effects

[0010] The effects of the display device according to the present disclosure will be described as follows.

[0011] According to at least one of the embodiments of the present disclosure, it is possible to secure a structural rigidity of a large-screen ultra-thin display device.

[0012] According to at least one of the embodiments of the present disclosure, it is possible to prevent thermal deformation of the display device and secure high-temperature reliability.

[0013] According to at least one of the embodiments of the present disclosure, there is provided a display device that can prevent damage to a wired cable.

[0014] Further scope of applicability of the present disclosure will become apparent from the following detailed description. However, it should be understood that the detailed description and specific embodiments such as preferred embodiments of the present disclosure are given by way of

illustration only, since various changes and modifications within the spirit and scope of the present disclosure may be clearly understood by those skilled in the art.

Description

Description of Drawings

[0015] FIGS. **1** to **29** are diagrams illustrating examples of a display device according to embodiments of the present disclosure.

Mode for Invention

[0016] Description will now be given in detail according to exemplary embodiments disclosed herein, with reference to the accompanying drawings. For the sake of brief description with reference to the drawings, the same or equivalent components may be denoted by the same reference numbers, and description thereof will not be repeated.

[0017] In general, suffixes such as “module” and “unit” may be used to refer to elements or components. Use of such suffixes herein is merely intended to facilitate description of the specification, and the suffixes do not have any special meaning or function.

[0018] In the present disclosure, that which is well known to one of ordinary skill in the relevant art has generally been omitted for the sake of brevity. The accompanying drawings are used to assist in easy understanding of various technical features and it should be understood that the embodiments presented herein are not limited by the accompanying drawings. As such, the present disclosure should be construed to extend to any alterations, equivalents and substitutes in addition to those which are particularly set out in the accompanying drawings.

[0019] It will be understood that although the terms first, second, etc. may be used herein to describe various elements, these elements should not be limited by these terms. These terms are only used to distinguish one element from another.

[0020] It will be understood that when an element is referred to as being “connected with” another element, there may be intervening elements present. In contrast, it will be understood that when an element is referred to as being “directly connected with” another element, there are no intervening elements present.

[0021] A singular representation may include a plural representation unless context clearly indicates otherwise.

[0022] Although an embodiment is described with reference to a specific drawing, if necessary, reference numerals not appearing in the specific drawing may be mentioned, and reference numerals not appearing in the specific drawing shall be used when the reference numerals appear in the other figures.

[0023] Referring to FIG. **1**, a display device **100** may include a display panel **110**. The display panel **110** may display an image.

[0024] The display device **100** may include a first long side LS**1**, a second long side LS**2** opposite to the first long side LS**1**, a first short side SS**1** adjacent to the first and second long sides LS**1** and LS**2**, and a second short side SS**2** opposite to the first short side SS**1**.

[0025] Meanwhile, for convenience of description, it is illustrated that the lengths of the first and second long sides LS**1** and LS**2** are longer than the lengths of the first and second short sides SS**1** and SS**2**, but it may also be possible that the lengths of the first and second long sides LS**1** and LS**2** are approximately equal to the lengths of the first and second short sides SS**1** and SS**2**.

[0026] The direction parallel to the long sides LS**1** and LS**2** of the display device **100** may be referred to as a left-right direction or a first direction DR**1**. The direction parallel to the short sides SS**1** and SS**2** of the display device **100** may be referred to as a vertical direction or a second direction DR**2**. The direction perpendicular to the long sides LS**1** and LS**2** and the short sides SSI and SS**2** of the display device **100** may be referred to as a forward/rearward direction or a third

direction DR**3**.
[0027] The direction in which the display panel **110** displays images may be referred to as a forward direction (F, z), and the opposite direction may be referred to as a rearward direction R. Here, the direction in which the display panel **110** displays an image may be referred to as a forward direction, and the opposite direction may be referred to as the rearward direction.
[0028] Hereinafter, a display panel using an organic light emitting diode (OLED) will be described as an example for the display panel **110**, but the display panel **110** applicable to the present disclosure is not limited thereto.
[0029] The display panel **110** may form the front surface of the display device **100** and may display an image in a forward direction. The display panel **110** may output an image by dividing the image into a plurality of pixels and adjusting the color, brightness, and saturation for each pixel. The display panel **110** may be divided into an active area where an image is displayed and a de-active area where an image is not displayed. The display panel **110** may generate light corresponding to the color of red, green, or blue according to a control signal.
[0030] Referring to FIG. **2**, a material complexed panel **130** may include a core **131**, a front skin **132**, and a rear skin **133**. The core **131**, the front skin **132**, and the rear skin **133** may be coupled with each other. The material complexed panel **130** may be referred to as a fiber complexed panel **130**, a fiber complexed plate **130**, a material complexed plate **130**, or a middle frame **130**.
[0031] The front skin **132** may form the front surface of the material complexed panel **130**. The rear skin **133** may form the rear surface of the material complexed panel **130**. The front skin **132** and the rear skin **133** may include a metal material.
[0032] For example, the front skin **132** and the rear skin **133** may be galvanized iron. For another example, the front skin **132** and the rear skin **133** may include aluminum Al.
[0033] For example, the thickness of the front skin **132** and the rear skin **133** may be 0.2 to 0.5 millimeters. For another example, the front skin **132** and the rear skin **133** formed of galvanized iron may be 0.27 millimeters. For another example, the front skin **132** and the rear skin **133** including aluminum may be 0.5 millimeters.
[0034] The front skin **132** and the rear skin **133** may be opposite to each other with respect to the core **131** described below. The core **131** may be located between the front skin **132** and the rear skin **133**. The core **131** may include a fiber. The core **131** may be formed of a material complexed. The core **131** may include a main fiber and a binder fiber. The binder fiber may be mixed between the main fibers.
[0035] The front skin **132** and/or the rear skin **133** may be coupled to the core **131** by a hot melt method. A hot melt sheet may be located between the front skin **132** and the core **131**, and a hot melt sheet may be located between the rear skin **133** and the core **131**. The hot melt sheet may be a film. For example, the hot melt sheet may be a film of EVA, acrylic, polyurethane, etc. having a thickness of 50 micrometers or more. After the core **131** is located between the front skin **132** and the rear skin **133** by the hot melt sheet, it may be roll laminated at 190 degrees Celsius for at least 1 minute.
[0036] Accordingly, the bending rigidity and/or torsional rigidity of the display device may be improved.
[0037] Referring to FIGS. **3** and **4**, the material complexed panel **130** may be manufactured through a process of pressing the front skin **132** and the rear skin **133** to the core **131** by using a plurality of rollers, and such a process may be called a roll-to-roll process.
[0038] Referring to FIG. **3**, according to the rotation of the pinch roller Ra performing the function of a driving motor, the front skin **132** may be released from a front drum Da, the rear skin **133** may be released from a rear drum Db, and the core **131** may be moved via a feeding roller Rd. Then, a first adhesive **134***a* for coupling the front skin **132** to the core **131** may be released from the first drum Dc. In addition, a second adhesive **134***b* for coupling the rear skin **133** to the core **131** may be released from the second drum Db. In this case, the front skin **132**, the first adhesive **134***a*, the core

131, the second adhesive **134***b*, and the rear skin **133** may be laminated in this order, and may be guided in the direction toward the oven Ov by a guide roller Rc. The adhesive **134***a*, **134***b* may be a hot melt sheet **134***a*, **134***b*.

[0039] The first and second adhesives **134***a*, **134***b* may be melt in the oven Ov, and each of the front skin **132** and the rear skin **133** may be coupled to the core **131**. For example, the melting points of the first and second adhesives **134***a*, **134***b* may be about 150° C., and the ambient temperature of the oven Ov may be about 200° C. For example, the peel-off force of the first and second adhesives **134***a*, **134***b* may be about 10 kgf or more.

[0040] The front skin **132**, core **131** and rear skin **133** that have passed through the oven Ov may be guided to the pressing roller Rb and pressed by the pressing roller Rb according to the rotation of the pinch roller Ra. Accordingly, the coupling force between the front skin **132**, the core **131** and the rear skin **133** may be further increased. The front skin **132**, core **131** and rear skin **133** that have been mutually coupled may be cut by a cutter Ct after passing through the pinch roller Ra to be manufactured into a material complexed panel **130** of a certain size.

[0041] Referring to FIG. **4**, the pressing roller Rb or the pinch roller Ra may be in contact with the outer surface of each of the front skin **132** and the rear skin **133**. When the pressing roller Rb or pinch roller Ra rotates, the material complexed panel **130** may move in the longitudinal direction (i.e., left-right direction LR) of the core **131**. At this time, the front skin **132** and the rear skin **133** may be sequentially coupled from one end of the core **131** to the other end in the longitudinal direction of the core **131**.

[0042] In addition, the front skin **132** and the rear skin **133** of the material complexed panel **130** may be formed flat. That is, since the rear surface of the rear skin **133** forming the rear surface of the display device **100** is formed flat, it may be easy to perform additional work such as painting or attaching a sheet to the rear surface of the rear skin **133** for aesthetic purposes.

[0043] Meanwhile, in addition to forming the front skin **132** and the rear skin **133** flatly through the roll-to-roll process described above with reference to FIGS. **3** and **4**, it is also possible to couple the core **131**, the front skin **132**, and the rear skin **133** through a process of sequentially laminating the front skin **132**, the core **131**, and the rear skin **133** and then coupling them.

[0044] Referring to FIG. **5**, the material complexed panel **130** may include a flat portion **130**P, a receiving portion **137**, and an outer part **135**. The outer part **135** may be formed around the flat portion **130**P. A first outer part **135***a* may be formed along the upper side of the flat portion **130**P, a second outer part **135***b* may be formed along the left side of the flat portion **130**P, a third outer part **135***c* may be formed along the lower side of the flat portion **130**P, and a fourth outer part **135***d* may be formed along the right side of the flat portion **130**P. The outer part **135** may be formed while the flat portion **130**P is pressed. The outer part **135** may form a step while being lowered from the flat portion **130**P. The thickness of the flat portion **130**P may be greater than the thickness of the outer part **135**.

[0045] A cable hole **136** may be formed by penetrating the front skin **132** (see FIG. **2**) and the rear skin **133** (see FIG. **2**) of the receiving portion **137**. The cable hole **136** may be formed in the receiving portion **137** adjacent to the lower side of the flat portion **130**P. There may be a plurality of cable holes **136**. A first cable hole **136***a* may be located adjacent to a second cable hole **136***b*.

[0046] The receiving portion **137** may be formed between the flat portion **130**P and the third outer part **135***c* while being adjacent to the lower side of the flat portion **130**P. There may be a plurality of receiving portions **137**. A first receiving portion **137***a* may be located between the first cable hole **136***a* and the second short side SS**2**. A second receiving portion **137***b* may be located between the second cable hole **136***b* and the first short side SS**1**. The receiving portion **137** may be formed while the flat portion **130**P is pressed. The receiving portion **137** may form a step while being lowered from the flat portion **130**P and/or the outer part **135***c*.

[0047] Referring to FIG. **6**, the receiving portion **137** may be formed while the flat portion **130**P is pressed. The front skin **132** of the receiving portion **137** may form a step D**1** that is lowered from

the front skin **132** of the flat portion **130**P. The rear skin **133** of the receiving portion **137** may form a step D**2** that rises from the rear skin **133** of the flat portion **130**P. At this time, the height of the step D**1** that is lowered from the front skin **132** of the flat portion **130**P to the front skin **132** of the receiving portion **137** may be greater than the height of the step D**2** that rises from the rear skin **133** of the flat portion **130**P to the rear skin **133** of the receiving portion **137**. The thickness T**1** of the flat portion **130**P may be greater than the thickness T**2** of the receiving portion **137**.

[0048] When pressed from the front skin **132** of the flat portion **130**P toward the rear skin **133**, the core **131** of the material complexed panel **130** may absorb external force. The magnitude of the external force applied to the front skin **132** of the flat portion **130**P may be greater than the magnitude of the external force applied to the rear skin **133** of the flat portion **130**P. The core **131** of the material complexed panel **130** may not only secure rigidity but also absorb impact.

[0049] The thickness T**4** of the third outer part **135***c* may be greater than the thickness T**2** of the receiving portion **137**. A step D**2** that is raised from the rear skin **133** of the third outer part **135***c* to the rear skin **133** of the receiving portion **137** may be formed. The height of the step D**2** between the rear skin **133** of the third outer part **135***c* and the rear skin **133** of the receiving portion **137** may be the same as the height of the step D**2** between the rear skin **133** of the receiving portion **137** and the rear skin **133** of the flat portion **130**P.

[0050] A protruding pad **138** may be formed by protruding from the front skin **132** of the third outer part **135***c*. The front skin **132** of the protruding pad **138** may form a step D**4** that is lowered to the front skin **132** of the third outer part **135***c*. The height of the step D**4** formed by the third outer part **135***c* and the protruding pad **138** may be smaller than the height of the step D**1**, D**2** formed by the flat portion **130**P and the receiving portion **137**. A step D**3** may be formed that is lowered from the front skin **132** of the protruding pad **138** to the front skin **132** of the receiving portion **137**. The thickness T**3** of the protruding pad **138** may be larger than the thickness T**4** of the third outer part **135***c*, smaller than the thickness T**1** of the flat portion **130**P, and smaller than the thickness T**2** of the receiving portion **137**.

[0051] The fastening groove H may protrude from the rear skin **133** of the receiving portion **137**. The fastening groove H may be recessed from the front skin **132** of the receiving portion **137** and may protrude from the rear skin **133** of the receiving portion **137**. The center of the fastening groove H may be penetrated.

[0052] Referring to FIGS. **7** and **8**, the fastening groove H may be formed in the flat portion **130**P. The fastening groove H may be formed while the flat portion **130**P is pressed. The front skin **132** of the fastening groove H may be recessed from the front skin **132** of the flat portion **130**P. The rear skin **133** of the flat portion **130**P and the rear skin **133** of the fastening groove H may form the same plane. The thickness T**0** of the fastening groove H may be smaller than the thickness T**1** of the flat portion **130**P.

[0053] A fastening hole h may be formed in the center of the fastening groove H. The fastening hole h may be formed by punching the fastening groove H. The fastening hole h may be formed by penetrating the front skin **132** and the rear skin **133** of the fastening groove H. The length of the shaft SA of the fastening member S may be greater than the thickness TO of the fastening groove H. The shaft SA of the fastening member S may be inserted into the fastening groove H and may protrude outwardly from the rear skin **132** of the fastening groove H through the fastening hole h. The depth D**5** of the fastening groove H may be greater than the thickness of the head SH. The head SH of the fastening member S may be concealed in the fastening groove H.

[0054] Referring to FIGS. **9** and **10** together with FIG. **8**, the PCB plate **150** may be coupled to the rear of the material complexed panel **130**. The PCB plate **150** may be fixed to the rear of the material complexed panel **130** by the fastening member S.

[0055] The PCB plate **150** may be formed by pressing the plate **151** including metal. The PCB plate **150** may have a horizontal portion **152**, a vertical portion **153**, a dome portion **154**, and a recessed portion **155**. The horizontal portion **152** may be formed by protruding from the front to the

rear of the PCB plate **151** and extending long in the left-right direction of the PCB plate **151**. The vertical portion **153** may be formed by protruding from the front to the rear of the PCB plate **151** and extending long in the up-down direction of the PCB plate **150**. The dome portion **154** may protrude from the front to the rear of the PCB plate **150**. The recessed portion **155** may recess in a forward direction from the rear of the vertical portion **153** and/or the horizontal portion **152**.

[0056] The shaft SA of the fastening member S may penetrate the recessed portion **155** formed in the vertical portion **153** and/or the horizontal portion **152** to couple the material complexed panel **130** and the PCB plate **150**. The depth of the recessed portion **155** may be greater than the protrusion length of the shaft SA of the fastening member S that protrudes in a rearward direction by penetrating the material complexed panel **130**.

[0057] Referring to FIGS. **11** and **12**, the side frame **140** may be coupled to the outer part **135** (see FIG. **5**) adjacent to the flat portion **130**P. The side frame **140** may have a first part **141**, a second part **142**, a third part **143**, a fourth part **144**, and a fifth part **145**. The second part **142** may be bent from the first part **141** at a first corner C**1**.

[0058] The first part **141** may have a horizontal portion **141**H and a vertical portion **141**V. The horizontal portion **141**H of the first part **141** may be fixed on a first outer part **135***a* (see FIG. **5**). The second part **142** may have a horizontal portion **142**H and a vertical portion **142**V. The horizontal portion **142**H of the second part **142** may be fixed on a fourth outer part **135***d* (see FIG. **5**).

[0059] A gap G**1** may be formed between the horizontal portion **141**H of the first part **141** and the horizontal portion **142**H of the second part **142**. The vertical portion **141**V of the first part **141** and the vertical portion **142**V of the second part **142** may be connected while being bent. A hole H**1** connected to the gap G**1** may be formed between the horizontal portions **141**H, **142**H while being adjacent to the vertical portions **141**V, **142**V. The size of the hole H**1** or the diameter of the hole H**1** may be larger than the width of the gap G**1**. The description of the first corner C**1** of the side frame **140** may be identically applied to the second corner C**2** of the side frame **140**.

[0060] Referring to FIGS. **11** and **13**, the side frame **140** may be coupled to the outer part **135** (see FIG. **5**) while being adjacent to the flat portion **130**P. The side frame **140** may have a first part **141**, a second part **142**, a third part **143**, a fourth part **144**, and a fifth part **145**. The second part **142** may be bent from the third part **143** at a third corner C**3**.

[0061] The third part **143** may have a horizontal portion **143**H and a vertical portion **143**V. The horizontal portion **143**H of the third part **143** may be fixed on the third outer part **135***c* (see FIG. **5**). The second part **142** may have a horizontal portion **142**H and a vertical portion **142**V. The horizontal portion **142**H of the second part **142** may be fixed on the fourth outer part **135***d* (see FIG. **5**).

[0062] A gap G**3** may be formed between the horizontal portion **143**H of the third part **143** and the horizontal portion **142**H of the second part **142**. The vertical portion **143**V of the third part **143** and the vertical portion **142**V of the second part **142** may be connected while being bent. A hole H**3** may be formed between the horizontal portions **143**H, **142**H while being adjacent to the vertical portions **143**V, **142**V and being connected to the gap G**3**. The size of the hole H**3** or the diameter of the hole H**3** may be larger than the width of the gap G**3**. The description of the first corner C**3** of the side frame **140** may be identically applied to the fourth corner C**4** of the side frame **140**.

[0063] Referring to FIGS. **11** and **14**, the third part **143** and the fourth part **144** of the side frame **140** may be located or fixed on the third outer part **135***c*. The distal end of the third part **143** of the side frame **140** may be coupled with the distal end of the fourth part **144** of the side frame **140**.

[0064] The horizontal portion **144**H of the fourth part **144** may be in contact with the horizontal portion **143**H and the vertical portion **143**V of the third part **143**. The vertical portion **144**V of the fourth part **144** may be in contact with the vertical portion **143**V of the third part **143**. The vertical portion **143**V of the third part **143** may be in contact with the horizontal portion **144**H and the vertical portion **144**V of the fourth part **144**. The distal end of the third part **143** may be fixed to the

distal end of the fourth part **144**. For example, the distal end of the third part **143** and the distal end of the fourth part **144** may be fixed by welding.

[0065] Referring to FIG. **15**, the display panel **110** may be coupled or fixed on the side frame **140**. The horizontal portion **143**H of the side frame **140** may support the rear surface of the display panel **110**, and the vertical portion **143**V may cover the side surface of the display panel **110**. For example, the vertical portion **143**V of the third part **143** of the side frame **140** may cover the side surface of the lower side of the display panel **110**.

[0066] The vertical portion **143**V may cover the side surface of the material complexed panel **130**. For example, the vertical portion **143**V of the third part **143** of the side frame **140** may cover the side surface of the third outer part **135***c* of the material complexed panel **130**.

[0067] The flexible cable **113** may extend from the lower side of the display panel **110** to between the display panel **110** and the horizontal portion **143**H of the side frame **140**. The flexible cable **113** may extend to between the rear surface of the display panel **110** and the material complexed panel **130**. For example, the flexible cable **113** may be a COF **113**.

[0068] The source signal substrate **115** may be electrically connected to the flexible cable **113**. The source signal substrate **115** may be fixed to one surface of the flexible cable **113**. For example, the source signal substrate **115** may be an S-PCB **115**. The source signal substrate **115** may be located in the receiving portion **137** of the material complexed panel **130**.

[0069] The flexible cable **113** may be located between the protruding pad **138** of the material complexed panel **130** and the display panel **110**. The flexible cable **113** may be in contact with the protruding pad **138**. Heat generated from the source signal substrate **115** and/or the flexible cable **113** may be dissipated through the protruding pad **138**.

[0070] A heat dissipation pad **114** may be located between the flexible cable **113** in contact with the protruding pad **138** and the rear surface of the display panel **110**. The heat dissipation pad **114** may have an elastic material **114***a* and a conductive film **114***b*. The core **114***a* of the heat dissipation pad **114** may be formed of an elastic material, and the conductive film **114***b* may cover the core **114***a* of the heat dissipation pad **114**. Accordingly, the flexible cable **113** may be maintained in contact with the protruding pad **138**.

[0071] Referring to FIGS. **16** and **17**, the inner frame **210**, **230** may be formed on the front surface and/or rear surface of the material complexed panel **130**. The inner frame **210**, **230** may be referred to as a pressed frame **210**, **230** or a rigid line **210**, **230**. The inner frame **210**, **230** may be formed as the front skin **132** and/or the rear skin **133** of the material complexed panel **130** is depressed and the core **131** (see FIG. **2**) is compressed.

[0072] The inner frame **210**, **230** may include a front inner line **210**, a rear inner line **230**, and a node hole **220**. The front inner line **210** may be formed by depressing the front skin **132** of the material complexed panel **130**. The rear inner line **230** may be formed by depressing the rear skin **133** of the material complexed panel **130**.

[0073] The front inner line **210** may include a first front horizontal line **211**, a second front horizontal line **212**, a third front horizontal line **213**, a first front vertical line **214**, and a second front vertical line **215**. The first front horizontal line **214** may form an upper side of the front inner line **210**. The third front horizontal line **213** may form a lower side of the front inner line **210**. The second front horizontal line **212** may be located between the first front horizontal line **211** and the third front horizontal line **213**. The first front vertical line **214** may connect one end of the first front horizontal line **211**, one end of the second front horizontal line **212**, and one end of the third front horizontal line **213**. The second front vertical line **215** may connect the other end of the first front horizontal line **211**, the other end of the second front horizontal line **212**, and the other end of the third front horizontal line **213**. For example, the first distance L**1** between the first front horizontal line **211** and the second front horizontal line **212** may be smaller than the second distance L**2** between the second front horizontal line **212** and the third front horizontal line **213**.

[0074] The node hole **220** may be formed at a point where the front horizontal line **211**, **212**, **213**

and the front vertical line **214**, **215** meet. The node hole **220** may be formed by penetrating the front skin **132**, the core **131**, and the rear skin **133** of the material complexed panel **130**.
[0075] The rear inner line **230** may include a first rear horizontal line **231**, a second rear horizontal line **232**, a third rear horizontal line **233**, a first rear vertical line **234**, and a second rear vertical line **235** (not shown). The first rear horizontal line **234** may form an upper side of the rear inner line **230**. The third rear horizontal line **233** may form a lower side of the rear inner line **230**. The second rear horizontal line **232** may be located between the first rear horizontal line **231** and the third rear horizontal line **233**. The first rear vertical line **234** may connect one end of the first rear horizontal line **231**, one end of the second rear horizontal line **232**, and one end of the third rear horizontal line **233**. The second rear vertical line **235** (not shown) may connect the other end of the first rear horizontal line **231**, the other end of the second rear horizontal line **232**, and the other end of the third rear horizontal line **233**. For example, the third distance L**3** between the first rear horizontal line **231** and the second rear horizontal line **232** may be smaller than the fourth distance L**4** between the second rear horizontal line **232** and the third rear horizontal line **233**.
[0076] The node hole **220** may be formed at a point where the rear horizontal line **231**, **232**, **233** and the rear vertical line **234**, **235** meet. The node hole **220** may be formed by penetrating the front skin **132**, the core **131**, and the rear skin **133** of the material complexed panel **130**.
[0077] The length of the rear inner line **230** may be smaller than the length of the PCB plate **150**. The width of the rear inner line **230** may be smaller than the width of the PCB plate **150**. The PCB plate **150** may cover the rear inner line **230**. The PCB plate **150** may include a cable hole **156**. The cable hole **156** of the PCB plate **150** may correspond to the cable hole **136** of the material complexed panel **130**.
[0078] Accordingly, the bending rigidity and/or torsional rigidity of the material complexed panel **130** may be improved.
[0079] Referring to FIG. **18**, there may be a plurality of node holes **220**. The plurality of node holes **220** may include a first node hole **221**, a second node hole **222**, a third node hole **223**, a fourth node hole **224**, a fifth node hole **225**, and a sixth node hole **226**.
[0080] The first node hole **221** may be located at a corner C**2** formed by the first horizontal line **211**, **231** and the first vertical line **214**, **234**. The first node hole **221** may be formed by penetrating the material complexed panel **130** at the corner C**2** of the first horizontal line **211**, **231** and the first vertical line **214**, **234**.
[0081] The second node hole **222** may be located at a corner Cl formed by the first horizontal line **211**, **231** and the second vertical line **212**, **232**. The second node hole **222** may be formed by penetrating the material complexed panel **130** at the corner C**1** of the first horizontal line **211**, **231** and the second vertical line **212**, **232**.
[0082] The third node hole **223** may be located at a node M**2** formed by the second horizontal line **212**, **232** and the first vertical line **214**, **234**. The third node hole **223** may be formed by penetrating the material complexed panel **130** at the node M**2** of the second horizontal line **212**, **232** and the first vertical line **214**, **234**.
[0083] The fourth node hole **224** may be located at a node M**1** formed by the second horizontal line **212**, **232** and the second vertical line **212**, **232**. The fourth node hole **224** may be formed by penetrating the material complexed panel **130** at the node M**1** of the second horizontal line **212**, **232** and the second vertical line **212**, **232**.
[0084] The fifth node hole **225** may be located at a corner C**4** formed by the third horizontal line **213**, **233** and the first vertical line **214**, **234**. The fifth node hole **225** may be formed by penetrating the material complexed panel **130** at the corner C**4** of the third horizontal line **213**, **233** and the first vertical line **214**, **234**.
[0085] The sixth node hole **226** may be located at a corner C**3** formed by the third horizontal line **213**, **233** and the second vertical line **212**, **232**. The sixth node hole **226** may be formed by penetrating the material complexed panel **130** at the corner C**3** of the third horizontal line **213**, **233**

and the second vertical line **212**, **232**.
[0086] Accordingly, the bending rigidity and/or torsional rigidity of the material complexed panel **130** may be improved, as well as the flatness of the display panel **110** coupled to the material complexed panel **130** may be improved.
[0087] Referring to FIG. **19**, the size of the sixth node hole **226** may be larger than the width of the third horizontal line **213**, **233** and/or the second vertical line **215**, **235**. For example, if the sixth node hole **226** is square, the width A, B of the sixth node hole **226** may be larger than the width W of the third horizontal line **213**, **233** and/or the second vertical line **215**, **235**. For another example, if the sixth node hole **226** is circular, the diameter of the sixth node hole **226** may be larger than the width of the third horizontal line **213**, **233** and/or the second vertical line **215**, **235**. The description of the sixth node hole **226** may be applied to the first node hole **221**, the second node hole **222**, and/or the fifth node hole **225**.
[0088] Referring to FIG. **20**, the size of the fourth node hole **224** may be larger than the width of the second horizontal line **212**, **232** and/or the second vertical line **215**, **235**. For example, if the fourth node hole **224** is square, the width A, B of the fourth node hole **224** may be larger than the width of the second horizontal line **212**, **232** and/or the second vertical line **215**, **235**. For another example, if the fourth node hole **224** is circular, the diameter of the fourth node hole **224** may be larger than the width of the second horizontal line **212**, **232** and/or the second vertical line **215**, **235**. The description of the fourth node hole **224** may also be applied to the third node hole **223**.
[0089] Referring to FIG. **21**, the front inner line **210** may be formed in the material complexed panel **130** by allowing the front skin **132** to be recessed as the core **131** is compressed. The rear inner line **230** may be formed in the material complexed panel **130** by allowing the rear skin **133** to be recessed as the core **131** is compressed.
[0090] The front inner line **210** and the rear inner line **230** may be symmetrical with respect to the core **131**. For example, the width W of the front inner line **210** may be substantially the same as the width W of the rear inner line **230**. For another example, the depth D**10** of the front inner line **210** may be substantially the same as the depth D**11** of the rear inner line **230**.
[0091] A pressed area PA in which the core **131** is compressed may be formed between the front inner line **210** and the rear inner line **230**. The density of the core **131** in the pressed area PA may be greater than the density of the core **131** in a non-pressed area.
[0092] Accordingly, the bending rigidity and/or torsional rigidity of the material complexed panel **130** may be improved.
[0093] Referring to FIG. **22**, the adhesive member AD may be arranged on the flat portion **130**P of the material complexed panel **130**. The adhesive member AD may be adhered to the front skin **132** of the material complexed panel **130**. There may be a plurality of adhesive members AD.
[0094] A first adhesive member AD**1** may be fixed to the first part **141** of the side frame **140**. The first adhesive member AD**1** may be extended along the longitudinal direction of the first part **141** of the side frame **140**. A second adhesive member AD**2** may be extended along the longitudinal direction of the second part **142** of the side frame **140** and may be fixed to the second part **142**. A third adhesive member AD**3** may be extended along the second part **142** of the side frame **140**, may be parallel to the second part **142**, and may be spaced apart from the first adhesive member AD**1** so as to be fixed to the flat portion **130**P.
[0095] A fifth adhesive member AD**5** may be extended along the longitudinal direction of the fifth part **145** of the side frame **140** and may be fixed to the fifth part **145**. A fourth adhesive member AD**4** may be extended along the fifth part **145** of the side frame **140**, parallel to the fifth part **145**, and spaced apart from the fifth adhesive member AD**5** so as to be fixed to the flat portion **130**P.
[0096] A sixth adhesive member AD**6** may be extended along the longitudinal direction of the first part **141** of the side frame **140**, and spaced apart from the first adhesive member AD**1** so as to be fixed to the flat portion **130**P. A fourteenth distance G**14** from the first part **141** of the side frame **140** to the sixth adhesive member AD**6** may be smaller than a fifteenth distance G**15** from the sixth

adhesive member AD**6** to the first front horizontal inner line **211**.
[0097] A seventh adhesive member AD**7** may extend along the longitudinal direction of the sixth adhesive member AD**6**, and be fixed to the flat portion **130**P at between the first front vertical line **214** and the fourth adhesive member AD**4**. The seventh adhesive member AD**7** may be located between the sixth adhesive member AD**6** and a ninth adhesive member AD**9**. A sixteenth distance G**16** from the fourth adhesive member AD**4** to one distal end of the seventh adhesive member AD**7** may be smaller than a seventeenth distance G**17** from the first front vertical line **214** to the other distal end of the seventh adhesive member AD**7**.
[0098] The ninth adhesive member AD**9** may extend along the longitudinal direction of the sixth adhesive member AD**6**, and be fixed to the flat portion **130**P at between the first front vertical line **214** and the fourth adhesive member AD**4**. The ninth adhesive member AD**9** may be located between the seventh adhesive member AD**7** and the receiving portion **137**. An eighteenth distance G**18** from the fourth adhesive member AD**4** to one distal end of the ninth adhesive member AD**9** may be smaller than a nineteenth distance G**19** from the first front vertical line **214** to the other distal end of the ninth adhesive member AD**9**.
[0099] An eighth adhesive member AD**8** may extend along the longitudinal direction of the sixth adhesive member AD**6** and may be fixed to the flat portion **130**P at between the second front vertical line **215** and the third adhesive member AD**3**. The eighth adhesive member AD**8** may be located between the sixth adhesive member AD**6** and the receiving portion **137**. A twentieth distance G**20** from the third adhesive member AD**3** to one distal end of the eighth adhesive member AD**8** may be smaller than a twenty-first distance G**21** from the second front vertical line **215** to the other distal end of the eighth adhesive member AD**8**.
[0100] A tenth adhesive member AD**10** may extend along the longitudinal direction of the sixth adhesive member AD**6** and may be fixed to the flat portion **130**P at between the second front vertical line **215** and the third adhesive member AD**3**. The tenth adhesive member AD**10** may be located between the eighth adhesive member AD**8** and the receiving portion **137**. A 22nd distance G**22** from the third adhesive member AD**3** to one distal end of the tenth adhesive member AD**10** may be smaller than a 23rd distance G**23** from the second front vertical line **215** to the other distal end of the tenth adhesive member AD**10**.
[0101] An eleventh adhesive member AD**11** may be extended along the longitudinal direction of the second front horizontal line **212** and may be fixed to the flat portion **130**P at between the second front horizontal line **212** and the third front horizontal line **213**. A twelfth adhesive member AD**12** may be extended along the longitudinal direction of the second front horizontal line **212**, and may be located between the first front horizontal line **211** and the second front horizontal line **212**. The length of the twelfth adhesive member AD**12** may be smaller than the length of the eleventh adhesive member AD**11**.
[0102] A tenth distance G**10** between the first front horizontal line **211** and the twelfth adhesive member AD**12** may be smaller than an eleventh distance G**11** between the twelfth adhesive member AD**12** and the second front horizontal line **212**. For example, the tenth distance G**10** may be 40 millimeters or more. For example, the distance between one distal end of the twelfth adhesive member AD**12** and the first vertical front line **214** may be 20 millimeters or more. For another example, the distance between the other distal end of the twelfth adhesive member AD**12** and the second vertical front line **215** may be 20 millimeters or more.
[0103] A twelfth distance G**12** between the second front horizontal line **212** and the eleventh adhesive member AD**11** may be larger than a thirteenth distance G**13** between the eleventh adhesive member AD**11** and the third front horizontal line **213**. For example, the thirteenth distance G**13** may be 40 millimeters or more.
[0104] The display panel **110** may be coupled or fixed to the material complexed panel **130** by the adhesive member AD. Accordingly, the display panel **110** may be fixed flatly to the material complexed panel **130**.

[0105] Referring to FIGS. **23** and **24** together with FIG. **17**, the receiving portion **137** may include an inner receiving portion **137***c* and an outer receiving portion **137***d*. The inner receiving portion **137***c* may form a step lowered from the flat portion **130**P and may be located between the outer receiving portion **137***d* and the flat portion **130**P. The outer receiving portion **137***d* may form a step lowered from the inner receiving portion **137***c*. The cable hole **136** may be formed by penetrating the inner receiving portion **137***c* and/or the outer receiving portion **137***d*. The cable hole **136** may be formed by penetrating the boundary between the inner receiving portion **137***c* and the outer receiving portion **137***d*.

[0106] The PCB plate **150** may include a hole side part **1561**, **1562**, **1563**. The hole side part **1561**, **1562**, **1563** may form a perimeter of the cable hole **156** of the PCB plate **150**. The size of the cable hole **156** of the PCB plate **150** may be smaller than the size of the cable hole **136** of the material complexed panel **130**.

[0107] The hole side part **1561**, **1562**, **1563** may include a first side part **1561**, a second side part **1562**, and a third side part **1563**. The first side part **1561** may form the upper side of the cable hole **156** of the PCB plate **150**. The second side part **1562** may form the right side of the cable hole **156** of the PCB plate **150**. The third side part **1563** may form the left side of the cable hole **156** of the PCB plate **150**.

[0108] The first side part **1561** may include a first rear part **1561***a* and a first front part **1561***b*. The first rear part **1561***a* may be connected to the plate **151** of the PCB plate **150**. The first front part **1561***b* may be formed by folding or curling the first rear part **1561***a*. The first front part **1561***b* may face the front surface of the first rear part **1561***a*.

[0109] The second side part **1562** may include a second rear part **1562***a* and a second front part **1562***b*. The second rear part **1562***a* may be connected to the plate **151** of the PCB plate **150**. The second front part **1562***b* may be formed by folding or curling the second rear part **1562***a*. The second front part **1562***b* may face the front surface of the second rear part **1562***a*.

[0110] The third side part **1563** may include a third rear part **1563***a* and a third front part **1563***b*. The third rear part **1563***a* may be connected to the plate **151** of the PCB plate **150**. The third front part **1563***b* may be formed by folding or curling the third rear part **1563***a*. The third front part **1563***b* may face the front surface of the third rear part **1563***a*.

[0111] Referring to FIGS. **25** and **26**, the PCB plate **150** may include a hole side part **1561**, **1562**, **1563**, **1564**. The hole side part **1561**, **1562**, **1563**, **1564** may form a perimeter of the cable hole **156** of the PCB plate **150**. The size of the cable hole **156** of the PCB plate **150** may be smaller than the size of the cable hole **136** of the material complexed panel **130**.

[0112] The hole side part **1561**, **1562**, **1563**, **1564** may include a first side part **1561**, a second side part **1562**, a third side part **1563**, and a fourth side part **1564**. The first side part **1561** may form the upper side of the cable hole **156** of the PCB plate **150**. The second side part **1562** may form the right side of the cable hole **156** of the PCB plate **150**. The third side part **1563** may form the left side of the cable hole **156** of the PCB plate **150**. The fourth side part **1564** may form the lower side of the cable hole **156** of the PCB plate **150**.

[0113] The first side part **1561** may include a first rear part **1561***a* and a first front part **1561***b*. The first rear part **1561***a* may be connected to the plate **151** (see FIG. **17**) of the PCB plate **150**. The first front part **1561***b* may be formed by folding or curling the first rear part **1561***a*. The first front part **1561***b* may face the front surface of the first rear part **1561***a*.

[0114] The second side part **1562** may include a second rear part **1562***a* and a second front part **1562***b*. The second rear part **1562***a* may be connected to the plate **151** of the PCB plate **150**. The second front part **1562***b* may be formed by folding or curling the second rear part **1562***a*. The second front part **1562***b* may face the front surface of the second rear part **1562***a*.

[0115] The third side part **1563** may include a third rear part **1563***a* and a third front part **1563***b*. The third rear part **1563***a* may be connected to the plate **151** of the PCB plate **150**. The third front part **1563***b* may be formed by folding or curling the third rear part **1563***a*. The third front part

1563*b* may face the front surface of the third rear part **1563***a*.
[0116] The fourth side part **1564** may be connected to the plate **151** of the PCB plate **150**.
[0117] Referring to FIGS. **27** and **28**, the PCB plate **150** may include a hole side part **1561**, **1562**, **1563**, **1564**. The hole side part **1561**, **1562**, **1563**, **1564** may form the perimeter of the cable hole **156** of the PCB plate **150**. The size of the cable hole **156** of the PCB plate **150** may be smaller than the size of the cable hole **136** of the material complexed panel **130**.
[0118] The hole side part **1561**, **1562**, **1563**, **1564** may include a first side part **1561**, a second side part **1562**, a third side part **1563**, and a fourth side part **1564**. The first side part **1561** may form the upper side of the cable hole **156** of the PCB plate **150**. The second side part **1562** may form the right side of the cable hole **156** of the PCB plate **150**. The third side part **1563** may form the left side of the cable hole **156** of the PCB plate **150**. The fourth side part **1564** may form the lower side of the cable hole **156** of the PCB plate **150**.
[0119] The first side part **1561** may include a first rear part **1561***a* and a first front part **1561***b*. The first rear part **1561***a* may be connected to the plate **151** (see FIG. **17**) of the PCB plate **150**. The first front part **1561***b* may be formed by folding or curling the first rear part **1561***a*. The first front part **1561***b* may face the front surface of the first rear part **1561***a*.
[0120] The second side part **1562** may include a second rear part **1562***a* and a second front part **1562***b*. The second rear part **1562***a* may be connected to the plate **151** of the PCB plate **150**. The second front part **1562***b* may be formed by folding or curling the second rear part **1562***a*. There may be a plurality of second front parts **1562***b*. The second front part **1562***b* may face the front surface of the second rear part **1562***a*.
[0121] The third side part **1563** may include a third rear part **1563***a* and a third front part **1563***b*. The third rear part **1563***a* may be connected to the plate **151** of the PCB plate **150**. The third front part **1563***b* may be formed by folding or curling the third rear part **1563***a*. There may be a plurality of third front parts **1563***b*. The third front part **1563***b* may face the front surface of the third rear part **1563***a*.
[0122] The fourth side part **1564** may include a fourth rear part **1564***a* and a fourth front part **1564***b*. The fourth rear part **1564***a* may be connected to the plate **151** of the PCB plate **150**. The fourth front part **1564***b* may be formed by folding or curling the fourth rear part **1564***a*. The fourth front part **1564***b* may face the front surface of the fourth rear part **1564***a*.
[0123] Referring to FIG. **29** together with FIG. **15**, the display panel **110** may be coupled to the front surface of the material complexed panel **130**. The source signal substrate **115** may be electrically connected to the display panel **110**. The source signal substrate **115** may be connected to the display panel **110** by the flexible cable **113**. The source signal substrate **115** may be located between the rear surface of the display panel **110** and the receiving portion **137** of the material complexed panel **130**. The source signal substrate **115** may be located in a space formed between the receiving portion **137** of the material complexed panel **130** and the rear surface of the display panel **110**.
[0124] The source signal substrate **115** may be adjacent to or overlapped with the cable hole **136** of the material complexed panel **130**. The cable hole **156** of the PCB plate **150** may be aligned with the cable hole **136** of the material complexed panel **130**. A flexible flat cable CB may be connected to the source signal substrate **115**. The flexible flat cable CB may be connected to the source signal substrate **115** by the connector CN.
[0125] The flexible flat cable CB may pass through the cable hole **136** of the material complexed panel **130** and the cable hole **156** of the PCB plate **150** and extend to the rear of the PCB plate **150**. The fracture surface of the front skin **132** (see FIG. **2**) and/or the rear skin **133** through which the cable hole **136** is penetrated may be formed roughly, and the cable CB passing through the cable hole **136** may be damaged.
[0126] The flexible flat cable CB may be in contact with the hole side part **1561**, **1562**, **1564** of the PCB plate **150** or may be supported by the hole side part **1561**, **1562**, **1564**. Accordingly, the

flexible flat cable CB may be prevented from being damaged.
[0127] Referring to FIGS. **1** to **29**, the display device includes: a display panel **110**; a material complexed plate **130** located at a rear of the display panel **110**; and a side frame **140** which is located between the display panel **110** and the material complexed plate **130**, fixed to the material complexed plate **130**, and to which the display panel **110** is coupled, in which the material complexed plate **130** includes: a front skin **132** forming a front surface; a rear skin **133** which forms a rear surface, and faces the front skin **132**; a core **131** which is located between the front skin **132** and the rear skin **133**, and contains fibers; a receiving portion **137** in which the front skin **132** and the core **131** is compressed to form a step difference that lowers the front skin **132**; and a first cable hole **136** which is located adjacent to the receiving portion **137**, and penetrates the front skin **132** and the rear skin **133**.
[0128] The display device further includes a PCB plate **150** which is located at a rear of the material complexed plate **130**, coupled to a rear surface of the material complexed plate **130**, and covers the first cable hole **136**, in which the PCB plate **150** includes a second cable hole **156** facing the first cable hole **136**.
[0129] A size of the second cable hole **156** is smaller than a size of the first cable hole **136**.
[0130] The PCB plate **150** includes a hole side part forming a perimeter of the second cable hole **156**, in which the hole side part includes: a first side part **1561** forming an upper side; a second side part **1564** forming a lower side facing the upper side; a third side part **1563** connecting the first side part **1561** and the second side part **1564**; and a fourth side part **1562** which faces the third side part **1563**, and connects the first side part **1561** and the second side part **1564**, in which at least one of the first side part **1561**, the second side part **1564**, the third side part **1563**, and the fourth side part **1562** is exposed to a front surface of the material complexed plate **130** by the first cable hole **136**.
[0131] The PCB plate **150** includes a hole side part **1561**, **1562**, **1563**, **1564** forming a perimeter of the second cable hole **156**, in which the hole side part **1561**, **1562**, **1563**, **1564** includes: a rear part **1561***a*, **1562***a*, **1563***a*, **1564***a* connected to the PCB plate **150**; and a front part **1561***b*, **1562***b*, **1563***b*, **1564***b* that extends while being folded or bent from the rear part **1561***a*, **1562***a*, **1563***a*, **1564***a*.
[0132] The display device further includes: a source signal substrate **115** located in the receiving portion **137** at between the display panel **110** and the material complexed plate **130**; and a flexible flat cable CB, FFC which is connected to the source signal substrate **115**, and extends from a front of the material complexed plate **130** to a rear of the material complexed plate **130** through the first cable hole **136**.
[0133] The display device further includes a flexible cable **113** connecting the source signal substrate **115** and the display panel **110**, in which the flexible cable **113** is located between the display panel **110** and the material complexed plate **130**.
[0134] The display device further includes a PCB plate **150** which is located at a rear of the material complexed plate **130**, coupled to a rear surface of the material complexed plate **130**, and covers the first cable hole **136**, [0135] in which the PCB plate **150** includes a second cable hole **156** facing the first cable hole **136**, in which the flexible flat cable CB, FFC extends to a rear of the PCB plate **150** through the first cable hole **136** and the second cable hole **156**.
[0136] The PCB plate **150** includes a hole side part **1561**, **1562**, **1563**, **1564** forming a perimeter of the second cable hole **156**, in which the hole side part **1561**, **1562**, **1563**, **1564** includes: a rear part **1561***a*, **1562***a*, **1563***a*, **1564***a* connected to the PCB plate **150**; and a front part **1561***b*, **1562***b*, **1563***b*, **1564***b* that extends while being folded or bent from the rear part **1561***a*, **1562***a*, **1563***a*, **1564***a*.
[0137] A size of the second cable hole **156** is smaller than a size of the first cable hole **136**.
[0138] The front surface of the second cable hole **156** is exposed to the front of the material complexed plate **130** through the first cable hole **136**.
[0139] Certain embodiments or other embodiments of the invention described above are not

mutually exclusive or distinct from each other. Any or all elements of the embodiments of the invention described above may be combined or combined with each other in configuration or function.

[0140] For example, a configuration “A” described in one embodiment of the invention and the drawings and a configuration “B” described in another embodiment of the invention and the drawings may be combined with each other. Namely, although the combination between the configurations is not directly described, the combination is possible except in the case where it is described that the combination is impossible.

[0141] Although embodiments have been described with reference to a number of illustrative embodiments thereof, it should be understood that numerous other modifications and embodiments can be devised by those skilled in the art that will fall within the scope of the principles of this disclosure. More particularly, various variations and modifications are possible in the component parts and/or arrangements of the subject combination arrangement within the scope of the disclosure, the drawings and the appended claims. In addition to variations and modifications in the component parts and/or arrangements, alternative uses will also be apparent to those skilled in the art.

Claims

1. A display device comprising: a display panel; a material complexed plate located at a rear of the display panel; and a side frame which is located between the display panel and the material complexed plate, fixed to the material complexed plate, and to which the display panel is coupled, wherein the material complexed plate comprises: a front skin forming a front surface; a rear skin which forms a rear surface, and faces the front skin; a core which is located between the front skin and the rear skin, and contains fibers; a receiving portion in which the front skin and the core is compressed to form a step difference that lowers the front skin; and a first cable hole which is located adjacent to the receiving portion, and penetrates the front skin and the rear skin.

2. The display device of claim 1, further comprising a PCB plate which is located at a rear of the material complexed plate, coupled to a rear surface of the material complexed plate, and covers the first cable hole, wherein the PCB plate comprises a second cable hole facing the first cable hole.

3. The display device of claim 2, wherein a size of the second cable hole is smaller than a size of the first cable hole.

4. The display device of claim 2, wherein the PCB plate comprises a hole side part forming a perimeter of the second cable hole, wherein the hole side part comprises: a first side part forming an upper side; a second side part forming a lower side facing the upper side; a third side part connecting the first side part and the second side part; and a fourth side part which faces the third side part, and connects the first side part and the second side part, wherein at least one of the first side part, the second side part, the third side part, and the fourth side part is exposed to a front surface of the material complexed plate by the first cable hole.

5. The display device of claim 2, wherein the PCB plate comprises a hole side part forming a perimeter of the second cable hole, wherein the hole side part comprises: a rear part connected to the PCB plate; and a front part that extends while being folded or bent from the rear part.

6. The display device of claim 1, further comprising: a source signal substrate located in the receiving portion at between the display panel and the material complexed plate; and a flexible flat cable which is connected to the source signal substrate, and extends from a front of the material complexed plate to a rear of the material complexed plate through the first cable hole.

7. The display device of claim 6, further comprising a flexible cable connecting the source signal substrate and the display panel, wherein the flexible cable is located between the display panel and the material complexed plate.

8. The display device of claim 6, further comprising a PCB plate which is located at a rear of the

material complexed plate, coupled to a rear surface of the material complexed plate, and covers the first cable hole, wherein the PCB plate comprises a second cable hole facing the first cable hole, wherein the flexible flat cable extends to a rear of the PCB plate through the first cable hole and the second cable hole.

9. The display device of claim 8, wherein the PCB plate comprises a hole side part forming a perimeter of the second cable hole, wherein the hole side part comprises: a rear part connected to the PCB plate; and a front part that extends while being folded or bent from the rear part.

10. The display device of claim 9, wherein a size of the second cable hole is smaller than a size of the first cable hole.

11. The display device of claim 9, wherein the hole side part is exposed to the front of the material complexed plate through the first cable hole.