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(54) **BACKLIGHT UNIT AND DISPLAY DEVICE HAVING THE SAME**

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See application file for complete search history.

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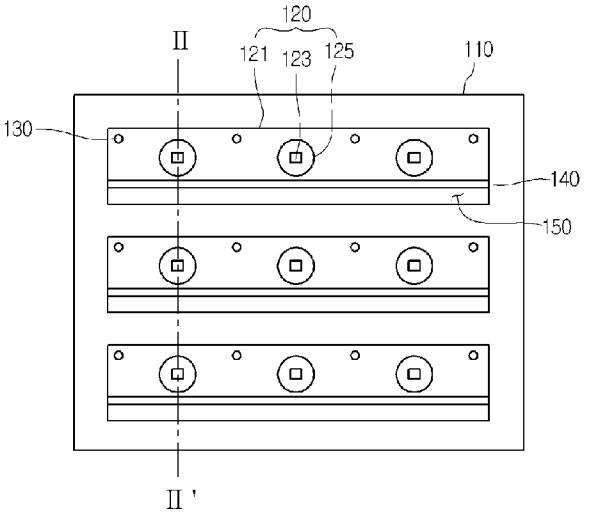
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(57) **ABSTRACT**

Disclosed are a backlight unit and a display device having the same. The backlight unit comprises a light emitting diode (LED) module comprising an LED, a case supporting the LED module and comprising a bending part that guides and fixes an end portion of the LED module, and a fixing part fixing the LED module to the case.

20 Claims, 3 Drawing Sheets



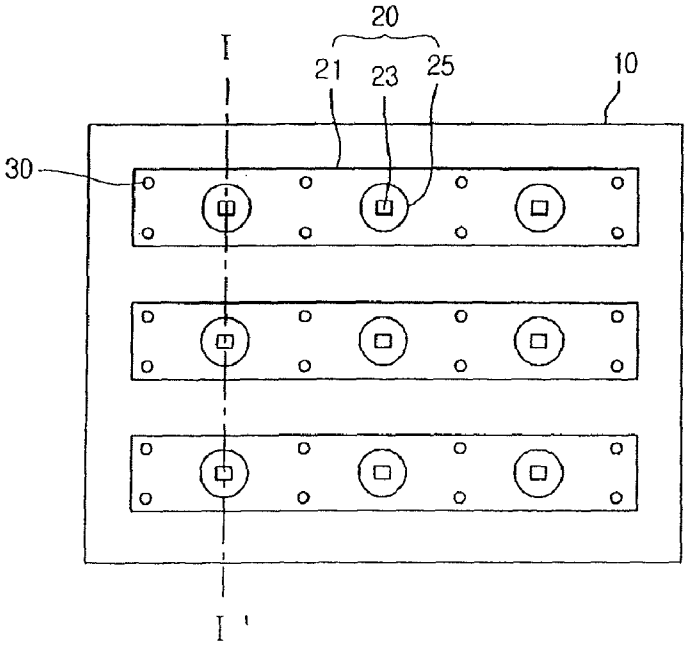
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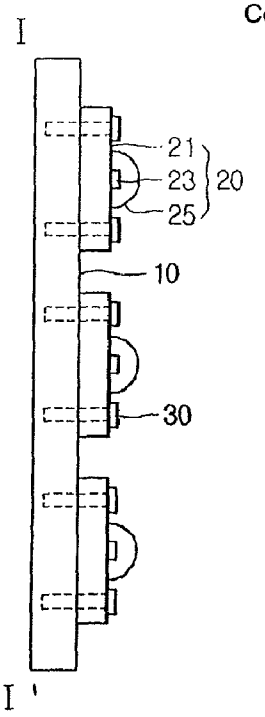
[Fig. 1]

Conventional Art

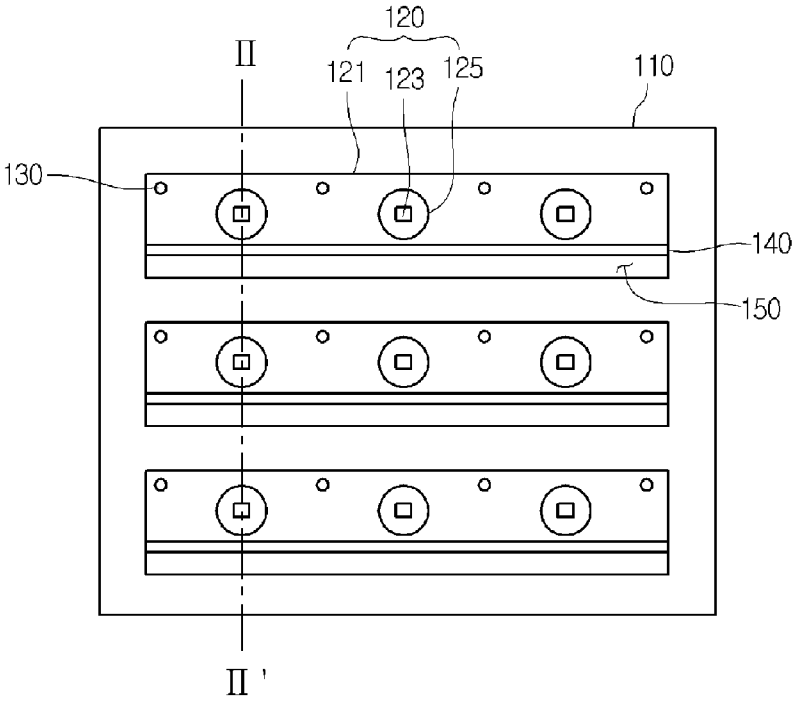


[Fig. 2]

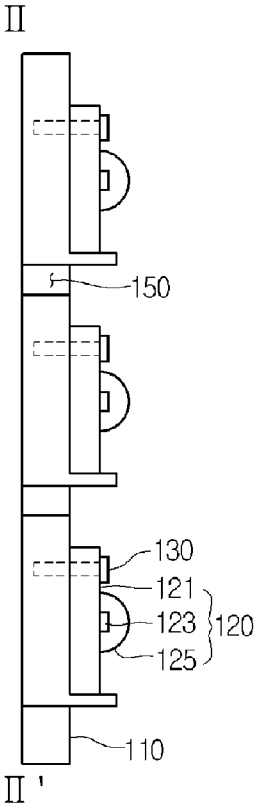
Conventional Art



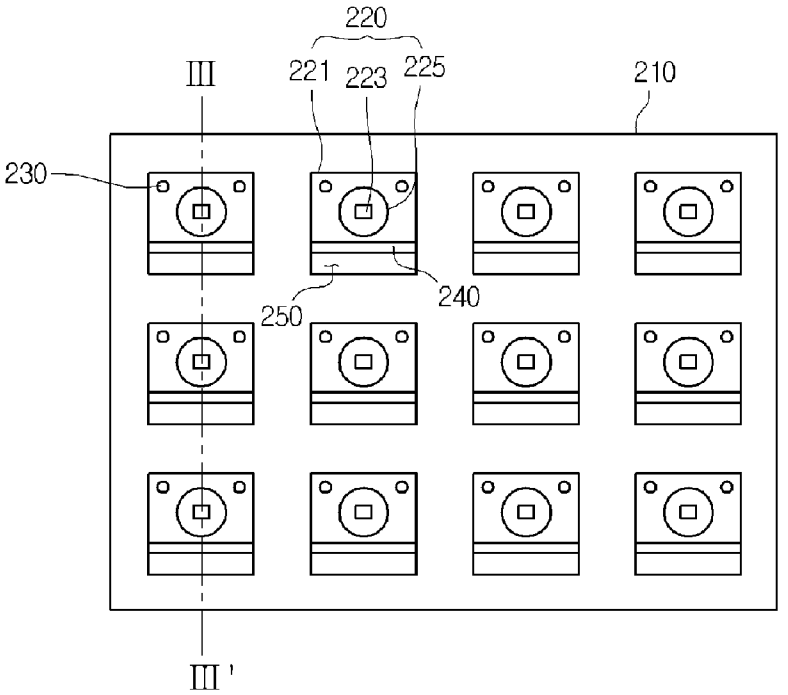
[Fig. 3]


120
II
121
123
125
110
130
140
150
II '

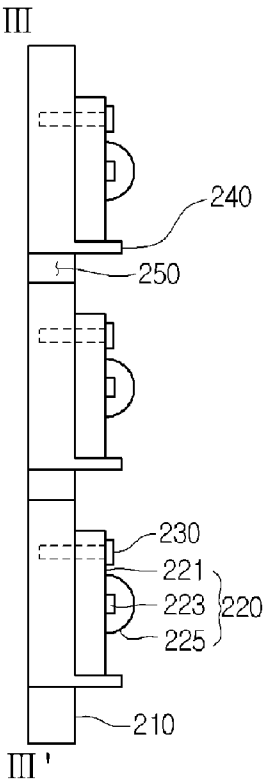
[Fig. 4]


II
150
130
121
123
120
125
110
II '

[Fig. 5]


220
III
221
223
225
210
230
240
250
III'

[Fig. 6]


III
240
250
230
221
223
220
225
210
III'

BACKLIGHT UNIT AND DISPLAY DEVICE HAVING THE SAME

TECHNICAL FIELD

The embodiment relates to a backlight unit and a display device having the same.

BACKGROUND ART

FIG. **1** is a schematic view showing a portion of a conventional backlight unit, and FIG. **2** is a sectional view taken along line I-I' of FIG. **1**.

As shown in FIGS. **1** and **2**, the related art backlight unit comprises a case **10**, an LED module **20**, and a fixing part **30**.

The LED module **20** for providing light comprises a printed circuit board **21**, a light emitting diode (LED) **23** formed on the printed circuit board **21**, and a mold part **25** formed on the LED **23**. A reflective sheet having an opening is formed on the LED module **20** such that the LED **23** is exposed. The reflective sheet reflects light emitted from the LED **23** upward.

The fixing part **30** fixes the LED module **20** to the case **10**. The case **10** may be a cover bottom. For example, the fixing part **30** comprises a screw. The backlight unit having the above structure has a plurality of LED modules **20**.

Meanwhile, the defects of the LED modules **20** may be detected during an inspection process for product release. When detecting the defects of the LED modules **20** as described above, the case **10** must be disassembled and the fixing parts **30** must be separated from the LED modules **20** in order to replace the LED modules **20** with new ones. However, in order to disassemble the case **10** and separate the LED modules **20** from the case **10**, it is inconvenient in that many fixing parts **30** must be separated from the LED modules **20** as shown in FIGS. **1** and **2**. In addition, after the produce release, a user may have to replace the LED modules **20** with new ones due to the occurrence of the defects of the LED modules **20** in use.

Accordingly, a backlight unit, in which the LED module **20** can be easily separated from the case **10** and replaced with new ones, is required.

DISCLOSURE OF INVENTION

Technical Problem

The embodiment provides a backlight unit and a display device having the same, in which parts can be easily replaced with new ones.

Technical Solution

According to the embodiment, a backlight unit comprises a light emitting diode (LED) module comprising an LED; a case supporting the LED module, and comprising a bending part that guides and fixes an end portion of the LED module; and a fixing part fixing the LED module to the case.

According to the embodiment, a display device comprises a backlight unit comprising a light emitting diode (LED) module comprising an LED, a case supporting the LED module, and comprising a bending part that guides and fixes an end portion of the LED module; and a fixing part fixing the LED module to the case; and a display part displaying an image.

Advantageous Effects

In a backlight unit and a display device having the same according to the embodiment, parts thereof can be easily replaced with new ones.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic view showing a portion of a conventional backlight unit.

FIG. **2** is a sectional view taken along line I-I' of FIG. **1**.

FIG. **3** is a schematic view showing a portion of a backlight unit according to the embodiment.

FIG. **4** is a sectional view taken along line II-II' of FIG. **3**.

FIG. **5** is a schematic view showing a backlight unit according to another embodiment.

FIG. **6** is a sectional view taken along line III-III' of FIG. **5**.

MODE FOR THE INVENTION

In the description of an embodiment, it will be understood that, when a layer (or film), a region, a pattern, or a structure is referred to as being "on" or "under" another substrate, another layer (or film), another region, another pad, or another pattern, it can be "directly" or "indirectly" on the other substrate, layer (or film), region, pad, or pattern, or one or more intervening layers may also be present.

Hereinafter, the embodiment will be described with reference to accompanying drawings.

FIG. **3** is a schematic view showing a portion of a backlight unit according to the embodiment, and FIG. **4** is a sectional view taken along line II-II' of FIG. **3**.

As shown in FIGS. **3** and **4**, the backlight unit according to the embodiment comprises a case **110**, an LED module **120**, a fixing part **130**, and a bending part **140**.

The LED module **120** for providing light comprises a printed circuit board **121**, a light emitting diode **123** formed on the printed circuit board **121**, and a mold part **125** formed on the LED **123**. The LED **123** can be mounted on the printed circuit board **121**.

The LED module **120** may be formed as the plural number, and at least one LED module **120** comprises a plurality of LEDs. And the LED module **120** may be formed as the plural number, and each LED module **120** comprises an LED.

A reflective sheet having an opening is formed on the LED module **120** such that the LED **123** can be exposed. The reflective sheet reflects light emitted from the LED **123** upward.

The case **110** supports the LED module **120**, and is formed with a bending part **140** for guiding and fixing an end portion of the LED module **120**. The bending part **140** has the same length as that of the LED module **120** and is located corresponding to a fixing position of the LED module **120**. The bending part **140** has a length longer than or shorter than a length of the LED module **120**. The bending part **140** may be formed by bending an area corresponding to an opening **150** of the case **110**. The case **110** may be formed of a Steel Use Stainless (SUS) material. The bending part **140** may be integrated with the case **110** in the manufacturing process of the case **110**.

The fixing part **130** fixes the LED module **120** on the case **110**. The case **110** may be cover bottom. The fixing part **130** may be formed as a screw, a nail. The fixing part **130** can be inserted into the case **110**, or can extend by passing through the case **110**. The coupling position of the fixing part **130** may be variously changed according to the design of the backlight unit.

In this case, in the backlight unit according to the embodiment, the fixing part **130** fixes the LED module **120** to the case **110** such that the fixing part **130** is coupled to the LED module **120** in another end area of the LED module **120** in which the bending part **140** is not formed.

In the backlight unit according to the embodiment, the LED module **120** may be fixed onto the case **110** by the fixing part **130** and the bending part **140** formed at the first end of the LED module **120**. Accordingly, when comparing the backlight unit with the conventional backlight unit as shown in FIGS. **1** and **2**, the number of the fixing parts **130** may be remarkably reduced, so that the LED module **120** may be more simply separated from the case **110**.

As described above, in the backlight unit according to the embodiment, the LED module **120** may be easily separated from the case **110** and replaced.

The backlight unit having the above structure comprises a plurality of LED module **120**. The number of the LED modules **120** may be variously changed according to an example in which the backlight unit is employed. In addition, the LED modules **120** may be variously arranged.

Although the bending part **140** may be integrated with the case **110** as described above, the bending part **110** may be formed as a separated member.

The backlight unit according to the embodiment may be employed for various display devices requiring a light source. For example, the backlight unit may be adopted for a liquid crystal display equipped with a liquid crystal panel. The liquid crystal display displays an image on a display part of the liquid crystal panel by using light emitted from the backlight unit.

Meanwhile, FIG. **5** is a schematic view showing a backlight unit according to another embodiment, and FIG. **6** is a sectional view taken along line III-III' of FIG. **5**.

As shown in FIGS. **5** and **6**, the backlight unit according to the embodiment comprises a case **210**, an LED module **220**, a fixing part **230**, and a bending part **240**.

The LED module **220** for providing light comprises a printed circuit board **221**, a light emitting diode **223** formed on the printed circuit board **221**, and a mold part **225** formed on the LED **223**. The LED **123** can be mounted on the printed circuit board **121**.

The LED module **220** may be formed as the plural number, and each LED module **220** comprises an LED such as the FIG. **5**. Also the LED module **220** may be formed as the plural number, and at least one LED module **220** comprises a plurality of LEDs.

A reflective sheet having an opening is formed above the LED module **220** such that the LED **223** can be exposed. The reflective sheet reflects light emitted from the LED **223** upward.

The case **210** supports the LED module **220**, and is formed with a bending part **240** for guiding and fixing one end portion of the LED module **220**. The bending part **240** has a length shorter than that of the LED module **220** and is located corresponding to a position in which the LED module **220** is fixed. The bending part **140** has a length longer than or substantially identical to a length of the LED module **120**. The bending part **240** may be formed by bending an area corresponding to the opening **250** of the case **210**. The bending part **240** comprises at least one bent area such that the LED module **220** is stably fixed. The case **210** may be formed of a SUS material, and the bending part **240** may be integrated with the case **210** in the manufacturing process of the case **210**.

The fixing part **230** fixes the LED module **220** on the case **210**. The case **210** may be cover bottom. The fixing part **230** may be formed as a screw, a nail. In the FIG. **5**, the fixing part **230** comprises two screws per one LED module. The fixing part **230** can be inserted into the case **210**, or can extend by passing through the case **210**. The coupling position of the fixing part **230** may be variously changed according to the design of the backlight unit.

In this case, in the backlight unit according to the embodiment, the fixing part **230** fixes the LED module **220** to the case **210** such that the fixing part **230** is coupled to the LED module **220** in another end area of the LED module **220** in which the bending part **240** is not formed.

In the backlight unit according to the embodiment, the LED module **220** may be fixed onto the case **210** by the fixing part **230** and the bending part **240** formed at the first end of the LED module **220**. Accordingly, when comparing the backlight unit with the conventional backlight unit as shown in FIGS. **1** and **2**, the number of the fixing parts **230** may be remarkably reduced, so that the LED module **220** may be more simply separated from the case **110**.

As described above, in the backlight unit according to the embodiment, the LED module **220** may be easily separated from the case **210** and replaced.

The backlight unit having the above structure comprises a plurality of LED module **220**. The number of the LED modules **220** may be variously changed according to an example employing the backlight unit. In addition, the LED modules **220** may be variously arranged.

Although the bending part **240** may be integrated with the case **210** as described above, the bending part **210** may be formed as a separated member.

The backlight unit according to the embodiment may be employed for various display devices requiring a light source. For example, the backlight unit may be adopted for a liquid crystal display equipped with a liquid crystal panel. The liquid crystal display displays an image on a display part of the liquid crystal panel by using light emitted from the backlight unit.

Any reference in this specification to "one embodiment", "an embodiment", "example embodiment", etc., means that a particular feature, structure, or characteristic described in connection with the embodiment is comprised in at least one embodiment of the invention. The appearances of such phrases in various places in the specification are not necessarily all referring to the same embodiment. Further, when a particular feature, structure, or characteristic is described in connection with any embodiment, it is submitted that it is within the purview of one skilled in the art to effect such feature, structure, or characteristic in connection with other ones of the embodiments.

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 spirit and 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.

Industrial Applicability

As described above, in a backlight unit and a display device having the same, parts can be easily replaced.

The invention claimed is:

1. A backlight unit comprising:

a light emitting diode (LED) module comprising an LED;

a case supporting the LED module, and comprising a bending part that guides and fixes an end portion of the LED module; and

a fixing part fixing the LED module to the case.

2. The backlight unit as claimed in claim **1**, wherein the LED module comprises a printed circuit board, the LED on the printed circuit board, and a mold part on the LED.

3. The backlight unit as claimed in claim **1**, wherein the bending part has a length substantially identical to or shorter than a length of the LED module, and is located corresponding to a fixing position of the LED module.

4. The backlight unit as claimed in claim **1**, wherein the bending part comprises at least one bent area formed corresponding to a fixing position of the LED module.

5. The backlight unit as claimed in claim **1**, wherein the case is formed of a Steel Use Stainless (SUS) material.

6. The backlight unit as claimed in claim **1**, comprising a reflective sheet on the LED module comprising an opening such that the LED is exposed.

7. The backlight unit as claimed in claim **6**, wherein the reflective sheet reflects light emitted from the LED upward.

8. The backlight unit as claimed in claim **1**, wherein the fixing part fixes the LED module to the case in another end area of the LED module in which the bending part is not formed.

9. The backlight unit as claimed in claim **1**, wherein the bending part is integrated with the case.

10. The backlight unit as claimed in claim **1**, wherein the bending part is formed with a member separated from the case.

11. The backlight unit as claimed in claim **1**, wherein the LED module is formed as the plural number, and at least one LED module comprises a plurality of LEDs.

12. The backlight unit as claimed in claim **1**, wherein the LED module is formed as the plural number, and each LED module comprises an LED.

13. A display device comprising:

a backlight unit comprising a light emitting diode (LED) module comprising an LED, a case supporting the LED module, and comprising a bending part that guides and fixes an end portion of the LED module; and a fixing part fixing the LED module to the case; and

a display part displaying an image.

14. The display device as claimed in claim **13**, wherein the display part is a liquid crystal panel.

15. The display device as claimed in claim **13**, wherein the LED module comprises a printed circuit board, the LED on the printed circuit board, and a mold part on the LED.

16. The display device as claimed in claim **13**, wherein the bending part has a length identical to or shorter than a length of the LED module, and is located corresponding to a fixing position of the LED module.

17. The display device as claimed in claim **13**, wherein the bending part comprises at least one bent area formed corresponding to a fixing position of the LED module.

18. The display device as claimed in claim **13**, comprising a reflective sheet on the LED module comprising an opening such that the LED is exposed.

19. The display device as claimed in claim **13**, wherein the fixing part fixes the LED module to the case in another end area of the LED module in which the bending part is not formed.

20. The display device as claimed in claim **13**, wherein the bending part is formed integrally with or separately from the case.

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