



US 20130149482A1

(19) **United States**(12) **Patent Application Publication**
Kuo et al.(10) **Pub. No.: US 2013/0149482 A1**(43) **Pub. Date: Jun. 13, 2013**(54) **SPlicing BACK PLATE OF LIQUID
CRYSTAL DISPLAY MODULE AND SPLICE
STRUCTURE THEREOF**(30) **Foreign Application Priority Data**

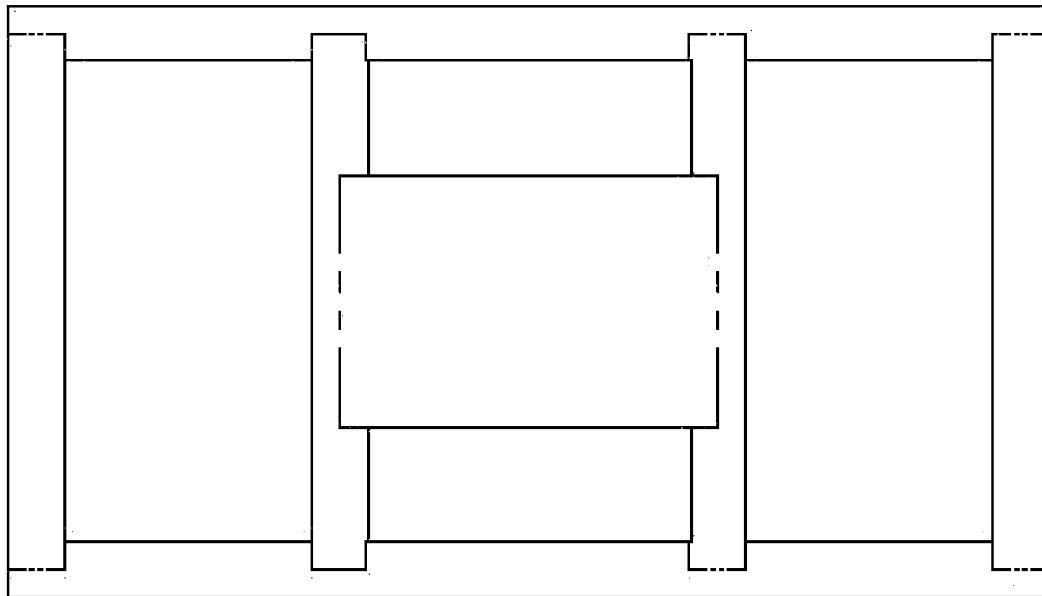
Nov. 18, 2011 (CN) 201110367584.2

Publication Classification(75) Inventors: **Yicheng Kuo**, Shenzhen (CN); **Yu-Chun
Hsiao**, Shenzhen (CN); **Chong Huang**,
Shenzhen (CN); **Jiahe Cheng**, Shenzhen
(CN); **Chengwen Que**, Shenzhen (CN);
Quan Li, Shenzhen (CN); **Li-Yang
Yang**, Shenzhen (CN)(51) **Int. Cl.**
G02F 1/1333 (2006.01)(52) **U.S. Cl.**
CPC **G02F 1/1333** (2013.01)
USPC **428/58; 428/192**(73) Assignee: **SHENZHEN CHINA STAR
OPTOELECTRONICS
TECHNOLOGY CO., LTD.**, Shenzhen
(CN)(21) Appl. No.: **13/381,325**(22) PCT Filed: **Nov. 24, 2011**(86) PCT No.: **PCT/CN11/82890**

§ 371 (c)(1),

(2), (4) Date: **Jun. 18, 2012**(57) **ABSTRACT**

The present invention discloses a splicing back plate of a liquid crystal display (LCD) module and a splice structure thereof. The splicing back plate of the LCD module according to the present invention is assembled at least by a first back plate portion and a second back plate portion, wherein at least one splice structure is defined between the first back plate portion and the second back plate portion, and the shapes of two sides of the splice structure are correspondingly engaged with each other. By the splice structure, the present invention can use different type of material to assemble into the splicing back plate of the LCD module, so as to minimize the thickness and maximize the strength except for decreasing the material cost.



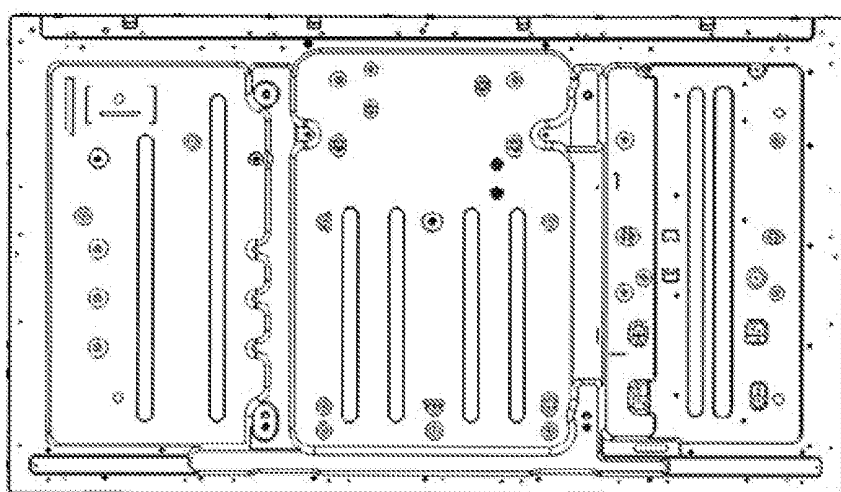


Fig. 1
Prior Art

[0021] In one embodiment of the present invention, a splice mode of the splicing back plate of the LCD module is a frame type.

[0022] In one embodiment of the present invention, the shape of the convex portion and the concave portion is an arc shape or a trapezoid shape, and the length of the convex portion is substantially equal to the width thereof.

[0023] In one embodiment of the present invention, the ratio of the thickness to the width of the convex portion to is smaller than 1:10.

[0024] In one embodiment of the present invention, the splice structure comprises a plurality of the convex portions and the concave portions, wherein an arrangement mode of the convex portions is symmetrical or unsymmetrical type.

[0025] In one embodiment of the present invention, the splice structure comprises a plurality of the convex portions and the concave portions, wherein an arrangement mode of the convex portions is equidistant or non-equidistant type.

[0026] By the splice structure, the present invention can use different type of material to assemble into the splicing back plate of the LCD module, so as to minimize the thickness and maximize the strength except for decreasing the material cost.

DESCRIPTION OF THE DRAWINGS

[0027] FIG. 1 is a front view of a back face of a back plate of a traditional liquid crystal display (LCD) module;

[0028] FIG. 2A is a partially perspective view of a splice structure of a splicing back plate of an LCD module according to a first preferred embodiment of the present invention;

[0029] FIG. 2B is a partially front view of the splice structure of the splicing back plate of the LCD module according to the first preferred embodiment of the present invention;

[0030] FIG. 3 is a partially front view of a splice structure of a splicing back plate of an LCD module according to a second preferred embodiment of the present invention;

[0031] FIG. 4 is a partially front view of a splice structure of a splicing back plate of an LCD module according to a third preferred embodiment of the present invention;

[0032] FIG. 5 is a partially front view of a splice structure of a splicing back plate of an LCD module according to a fourth preferred embodiment of the present invention; and

[0033] FIGS. 6A to 6D are splicing schematic views of the splicing back plate of the LCD module according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0034] The foregoing objects, features and advantages adopted by the present invention can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings.

[0035] A splicing back plate of a liquid crystal display (LCD) module according to the present invention is to take apart a back plate of a traditional big size LCD module, namely segment design, and then splices them into a back plate.

[0036] Referring now to FIGS. 2A and 2B, a partially perspective view of a splice structure of a splicing back plate of an LCD module according to a first preferred embodiment of the present invention is illustrated in FIG. 2A; and a partially front view of the splice structure of the splicing back plate of the LCD module according to the first preferred embodiment of the present invention is illustrated in FIG. 2B. A splicing

back plate of an LCD module according to the present invention is assembled at least by a first back plate portion 10 and a second back plate portion 20, wherein at least one splice structure 100 is defined between the first back plate portion 10 and the second back plate portion 20. The splice structure 100 comprises a first side edge 11 formed on the first back plate portion 10, and a second side edge 12 formed on the second back plate portion 20, and shapes of the first side edge 11 and the second side edge 12 are correspondingly engaged with each other.

[0037] As shown in FIGS. 2A and 2B, the first side edge 11 is provided with at least one convex portion 12, and the second side edge 21 is provided with at least one concave portion 22. The shapes of the convex portion 12 and the concave portion 22 are approximately an arc shape, and a maximum width D1 at an outer end of the convex portion 12 is larger than a minimum width D2 at an inner end of the convex portion. (FIG. 2B)

[0038] As above mentioned, through the shapes of corresponding engagement of the convex portion 12 and the concave portion 22, the splice structure 100 according to the present invention can assemble the first back plate portion 10 and the second back plate portion 20 in together. Because the first back plate portion 10 and the second back plate portion 20 are made of metal material, in an appropriate ratio and size, the convex portion 12 and the concave portion 22 can become tight match, so that it is not only un-detached in the horizontal direction but also firmly engaged in the vertical direction. Preferably, the length of the convex portion 12 is substantially equal to the width thereof; and the ratio of the thickness to the width of the convex portion 12 is smaller than 1:10.

[0039] Referring now to FIG. 3, a partially front view of a splice structure of a splicing back plate of an LCD module according to a second preferred embodiment of the present invention is illustrated in FIG. 3. The splice structure 100 of a splicing back plate of an LCD module according to a second preferred embodiment of the present invention is similar to the splice structure 100 of the splicing back plate of the LCD module according to the first preferred embodiment of the present invention, so as to use similar terms and numerals of the foregoing embodiment, the difference of this embodiment is that: the splice structure 100 comprises a plurality of the convex portions 12, wherein an arrangement mode of the convex portions 12 is symmetrical type.

[0040] Referring now to FIG. 4, a partially front view of a splice structure of a splicing back plate of an LCD module according to a third preferred embodiment of the present invention is illustrated in FIG. 4. The splice structure 100 of a splicing back plate of an LCD module according to a third preferred embodiment of the present invention is similar to the splice structure 100 of the splicing back plate of the LCD module according to the second preferred embodiment of the present invention, so as to use similar terms and numerals of the foregoing embodiment, the difference of this embodiment is that: an arrangement mode of the convex portions 12 and the concave portions 22 is unsymmetrical type.

[0041] Referring now to FIG. 5, a partially front view of a splice structure of a splicing back plate of an LCD module according to a fourth preferred embodiment of the present invention is illustrated in FIG. 5. The splice structure 100 of a splicing back plate of an LCD module according to a fourth preferred embodiment of the present invention is similar to the splice structure 100 of the splicing back plate of the LCD module according to the second preferred embodiment of the

present invention, so as to use similar terms and numerals of the foregoing embodiment, the difference of this embodiment is that: the shapes of the convex portion **12** and the concave portion **22** are changed from an arc shape to a trapezoid shape. Thus, the maximal width at the outer end of the convex portion **12** is still larger than the minimum width at the inner end of the convex portion, so that it makes the convex portion **12** and the concave portion **22** is tight match.

[0042] Furthermore, the arrangement mode of the convex portions **12** and the concave portions **22** can be equidistant or non-equidistant type except above mentioned symmetrical or unsymmetrical type.

[0043] Referring now to FIGS. **6A** to **6D**, splicing schematic views of the splicing back plate of the LCD module according to the present invention are illustrated in FIGS. **6A** to **6D**. A splicing back plate of an LCD module according to the present invention is to take apart a back plate of a traditional big size LCD module, namely segment design, and then splices them into a back plate. There are various types of splice modes are shown in FIGS. **2A** to **2D** and as follows:

[0044] In FIG. **6A**, a splice mode of equal separating the right side and left side is disclosed;

[0045] In FIG. **6B**, a splice mode of separating the right side, left side and middle is disclosed;

[0046] In FIG. **6C**, a splice mode of separating the upside, downside, right side and left side is disclosed; and

[0047] In FIG. **6D**, a splice mode of a frame type is disclosed.

[0048] The advantages of the various types of above mentioned splice modes are as follows: the portion installed light emitting diode (LED) light bar is necessary to be dissipated heat, which can use a material of well heat conduction (such as aluminum); and the other portion can use a cheaper material (such as zinc-plated steel plate), so as to lower the cost of material to the lowest. Furthermore, by using of splice and assembly with the same type of material or the different type of material, it can achieve a minimum thickness and a maximum strength, and mold or extra work is unnecessary. Besides, the main part can be further shared to fit splicing back plates into different specifications.

[0049] As described above, in comparison with the traditional LCD module that uses aluminum or zinc-plated steel plate as material, and is formed an integral back plate by punching. If the entire back plate uses the aluminum material, the cost is too high, and the structure strength is worse; but if the entire back plate uses the zinc-plated steel plate, the heat-dissipation is worse, and lower the performance of product. A splicing back plate of an LCD module according to the present invention is assembled at least by a least one first back plate portion **10** and a second back plate portion **20**, wherein at least one splice structure **100** is defined between the first back plate portion **10** and the second back plate portion **20**, and the shapes of two sides of the splice structure **100** are correspondingly engaged with each other. Through the splice structure **100** that uses different type of material to assemble into the splicing back plate of the LCD module, so as to minimize the thickness and maximize the strength except for decreasing the material cost

[0050] The present invention has been described with a preferred embodiment thereof and it is understood that many changes and modifications to the described embodiment can be carried out without departing from the scope and the spirit

of the invention that is intended to be limited only by the appended claims.

1. A splice structure of a splicing back plate of a liquid crystal display (LCD) module, characterized in that: the splicing back plate of the LCD module is assembled at least by a first back plate portion and a second back plate portion, wherein at least one splice structure is defined between the first back plate portion and the second back plate portion, and the splice structure comprises a first side edge formed on the first back plate portion and a second side edge formed on the second back plate portion; and

the first side edge is provided with at least one convex portion, and the second side edge is provided with at least one concave portion, and shapes of the first side edge and the second side edge are correspondingly engaged with each other;

wherein a maximum width at an outer end of the convex portion is larger than a minimum width at an inner end of the convex portion.

2. The splice structure of the splicing back plate of the LCD module according to claim 1, characterized in that: the shape of the convex portion and the concave portion is an arc shape or a trapezoid shape, and the length of the convex portion is substantially equal to the width thereof.

3. The splice structure of the splicing back plate of the LCD module according to claim 1, characterized in that: the ratio of the thickness to the width of the convex portion is smaller than 1:10.

4. The splice structure of the splicing back plate of the LCD module according to claim 1, characterized in that: the splice structure comprises a plurality of the convex portions and the concave portions, wherein an arrangement mode of the convex portions is symmetrical or unsymmetrical type.

5. The splice structure of the splicing back plate of the LCD module according to claim 1, characterized in that: the splice structure comprises a plurality of the convex portions and the concave portions, wherein an arrangement mode of the convex portions is equidistant or non-equidistant type.

6. A splicing back plate of an LCD module, characterized in that: the splicing back plate of the LCD module is assembled at least by a first back plate portion and a second back plate portion, wherein at least one splice structure is defined between the first back plate portion and the second back plate portion, and the splice structure comprises a first side edge formed on the first back plate portion, and a second side edge formed on the second back plate portion; and

the first side edge is provided with at least one convex portion, and the second side edge is provided with at least one concave portion, and shapes of the first side edge and the second side edge are correspondingly engaged with each other;

wherein a maximum width at an outer end of the convex portion is larger than a minimum width at an inner end of the convex portion.

7. The splicing back plate of the LCD module according to claim 6, characterized in that: material of the first back plate portion and the second back plate portion is the same or different.

8. The splicing back plate of the LCD module according to claim 6, characterized in that: a heat-dissipation property of the material of the first back plate portion is better than that of the second back plate portion, and the first back plate portion is disposed relatively close to an installation location of a backlight source.

9. The splicing back plate of the LCD module according to claim 6, characterized in that: a splice mode of the splicing back plate of the LCD module is symmetrical or unsymmetrical type.

10. The splicing back plate of the LCD module according to claim 6, characterized in that: a splice mode of the splicing back plate of the LCD module is a frame type.

11. The splicing back plate of the LCD module according to claim 6, characterized in that: the shape of the convex portion and the concave portion is an arc shape or a trapezoid shape, and the length of the convex portion is substantially equal to the width thereof.

12. The splicing back plate of the LCD module according to claim 6, characterized in that: the ratio of the thickness to the width of the convex portion is smaller than 1:10.

13. The splicing back plate of the LCD module according to claim 6, characterized in that: the splice structure comprises a plurality of the convex portions and the concave portions, wherein an arrangement mode of the convex portions is symmetrical or unsymmetrical type.

14. The splicing back plate of the LCD module according to claim 6, characterized in that: the splice structure comprises a plurality of the convex portions and the concave portions, wherein an arrangement mode of the convex portions is equidistant or non-equidistant type.

* * * * *

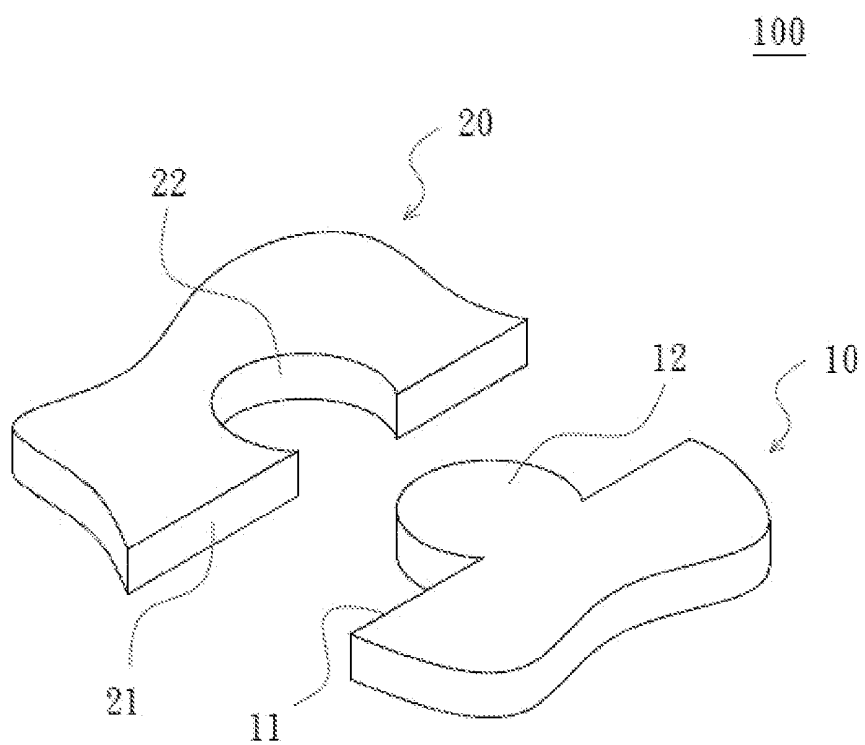


Fig. 2A

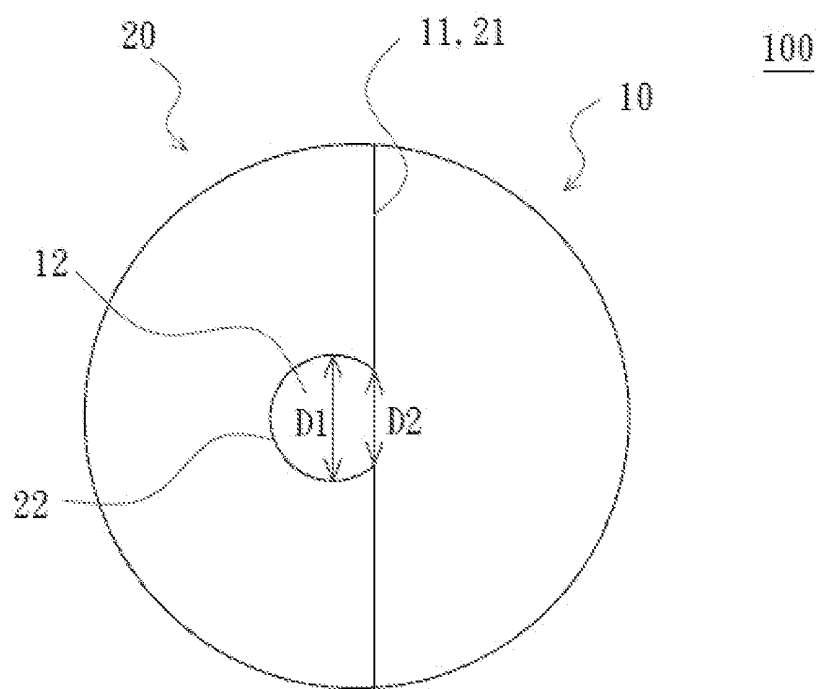


Fig. 2B

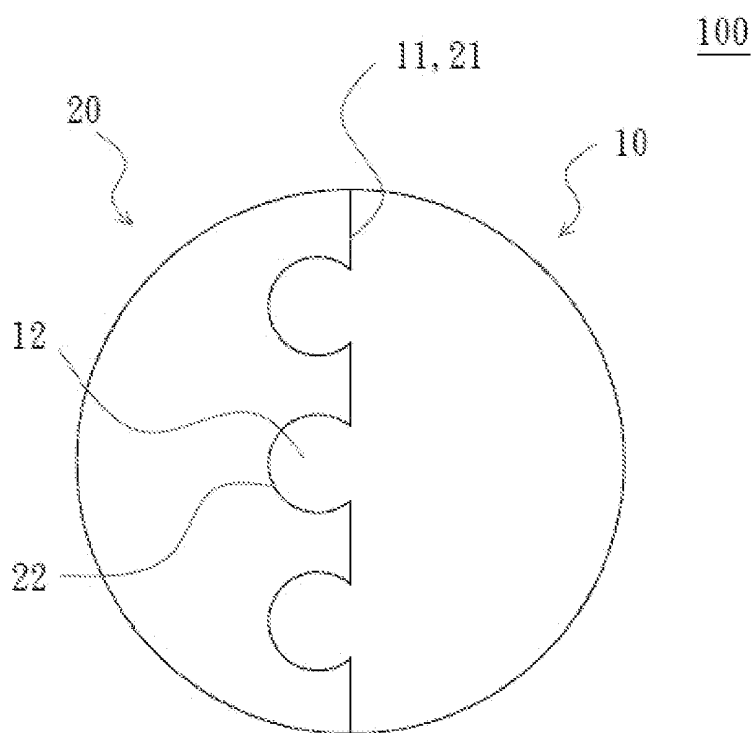


Fig. 3

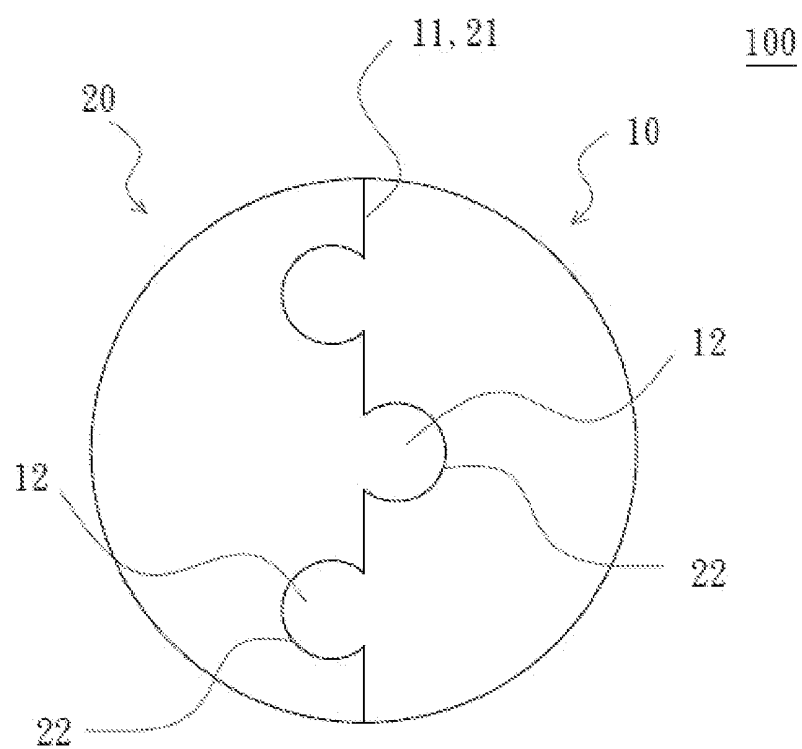


Fig. 4

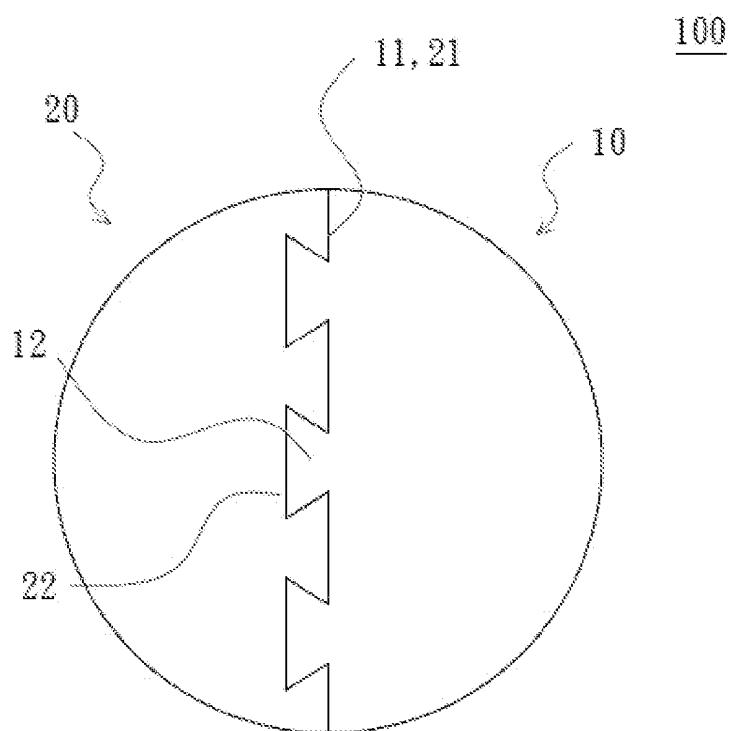


Fig. 5

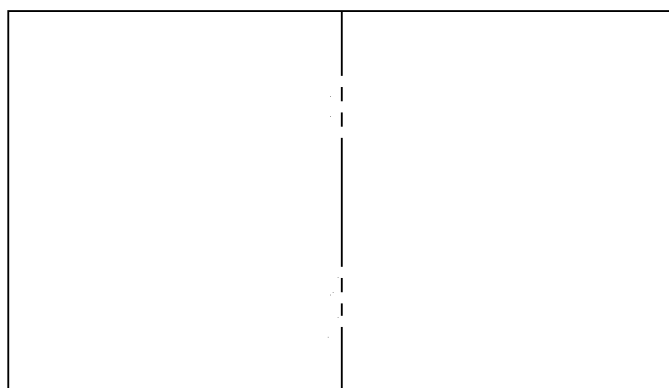


Fig. 6A



Fig. 6B

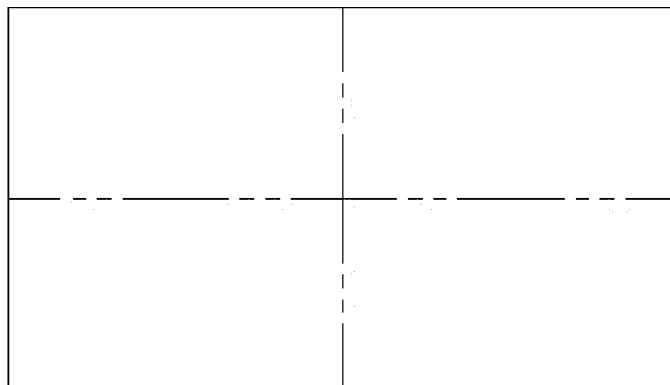


Fig. 6C

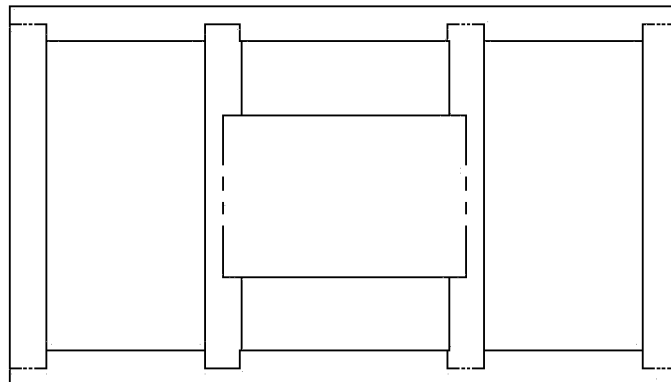


Fig. 6D

SPLICING BACK PLATE OF LIQUID CRYSTAL DISPLAY MODULE AND SPLICE STRUCTURE THEREOF

FIELD OF THE INVENTION

[0001] The present invention relates to a splicing back plate of a liquid crystal display (LCD) module, and more particularly to a splice structure of a splicing back plate of an LCD module.

BACKGROUND OF THE INVENTION

[0002] A liquid crystal display (LCD) is a kind of flat panel display (FPD) which displays images by the property of the liquid crystal material. In comparison with other display devices, the LCD has the advantages in lightweight, compactness, low driving voltage and low power consumption, and thus has already become the mainstream product in the whole consumer market. However, the liquid crystal material of the LCD cannot emit light by itself, and must depend upon an external light source. Thus, the LCD further has a backlight module to provide the needed light source.

[0003] An assembly of a traditional LCD module is mainly to load a light guide plate into a back plate, wherein the light guide plate is provided with an optical film assembly, and then a plastic frame covers on outer edges of the back plate to fix the optical film set and the light guide plate, from top to bottom, so as to assemble a back light module. Moreover, an LCD panel is stacked on the back light module, and then an housing covers and fixes the LCD panel and the back light module to assemble an LCD module.

[0004] Referring now to FIG. 1, a front view of a back face of a back plate of a traditional LCD module is illustrated in FIG. 1. As shown in FIG. 1, aluminum or zinc-plated steel plate is generally used to be material of an LCD module, and is processed to be an integral back plate by punching. The aluminum has a better effect of heat-dissipation, so that it is advantageous to increase the life time of a product; and heat-dissipation effect of the zinc-plated steel plate is worse, but the price is relatively low. In a cost of the back plate, the cost of the back plate material occupies the greatest ratio, especially for a large size LCD module (such as 46 inches or larger). If the entire back plate uses the aluminum material, the cost is too high, and the structure strength is worse; but if the entire back plate uses the zinc-plated steel plate, the heat-dissipation is worse and the performance of product will be lowered. Hence, how to ensure the product quality and save the material cost to lower the whole product cost has become an important subject matter of research.

[0005] As a result, it is necessary to provide a splicing back plate of an LCD module and a splice structure thereof to solve the problems existing in the conventional technologies.

SUMMARY OF THE INVENTION

[0006] A primary object of the present invention is to provide a splice structure of a splicing back plate of a liquid crystal display (LCD) module, wherein through at least one splice structure defined between a first back plate portion and a second back plate portion, the shapes of two side edges are correspondingly engaged with each other. By the splice structure, the present invention can use different type of material to assemble into the splicing back plate of the LCD module.

[0007] A secondary object of the present invention is to provide a splicing back plate of an LCD module, wherein

different type of material and separation modes are used to assemble into the splicing back plate of an LCD module.

[0008] To achieve the above object, the present invention provides a splice structure of a splicing back plate of a liquid LCD module, characterized in that: the splicing back plate of the LCD module is assembled at least by a first back plate portion and a second back plate portion, wherein at least one splice structure is defined between the first back plate portion and the second back plate portion, and the splice structure comprises a first side edge formed on the first back plate portion, and a second side edge formed on the second back plate portion; and

[0009] the first side edge is provided with at least one convex portion, and the second side edge is provided with at least one concave portion, and shapes of the first side edge and the second side edge are correspondingly engaged with each other;

[0010] wherein a maximum width at an outer end of the convex portion is larger than a minimum width at an inner end of the convex portion.

[0011] In one embodiment of the present invention, the shape of the convex portion and the concave portion is an arc shape or a trapezoid shape, and the length of the convex portion is substantially equal to the width thereof.

[0012] In one embodiment of the present invention, the ratio of the thickness to the width of the convex portion is smaller than 1:10.

[0013] In one embodiment of the present invention, the splice structure comprises a plurality of the convex portions and the concave portions, wherein an arrangement mode of the convex portions is symmetrical or unsymmetrical type.

[0014] In one embodiment of the present invention, the splice structure comprises a plurality of the convex portions and the concave portions, wherein an arrangement mode of the convex portions is equidistant or non-equidistant type.

[0015] To achieve the above object, the present invention provides a splicing back plate of an LCD module, characterized in that: the splicing back plate of the LCD module is assembled at least by a first back plate portion and a second back plate portion, wherein at least one splice structure is defined between the first back plate portion and the second back plate portion, and the splice structure comprises a first side edge formed on the first back plate portion, and a second side edge formed on the second back plate portion; and

[0016] the first side edge is provided with at least one convex portion, and the second side edge is provided with at least one concave portion, and shapes of the first side edge and the second side edge are correspondingly engaged with each other;

[0017] wherein a maximum width at an outer end of the convex portion is larger than a minimum width at an inner end of the convex portion.

[0018] In one embodiment of the present invention, material of the first back plate portion and the second back plate portion are the same or different.

[0019] In one embodiment of the present invention, a heat-dissipation property of the material of the first back plate portion is better than the second back plate portion, and the first back plate portion is disposed relatively close to an installation location of a backlight source.

[0020] In one embodiment of the present invention, a splice mode of the splicing back plate of the LCD module is symmetrical or unsymmetrical type.

专利名称(译)	拼接液晶显示模块的背板及其拼接结构		
公开(公告)号	US20130149482A1	公开(公告)日	2013-06-13
申请号	US13/381325	申请日	2011-11-24
[标]申请(专利权)人(译)	KUO翼城 小宇春 黄崇 程嘉禾 QUE李成文 李泉 杨丽		
申请(专利权)人(译)	KUO, 翼城 萧YU-CHUN 黄创 程, 嘉禾 QUE, 李成文 李铨 杨, 李, 杨		
当前申请(专利权)人(译)	深圳市中国星光电科技有限公司.		
[标]发明人	KUO YICHENG HSIAO YU CHUN HUANG CHONG CHENG JIAHE QUE CHENGWEN LI QUAN YANG LI YANG		
发明人	KUO, YICHENG HSIAO, YU-CHUN HUANG, CHONG CHENG, JIAHE QUE, CHENGWEN LI, QUAN YANG, LI-YANG		
IPC分类号	G02F1/1333		
CPC分类号	G02F1/1333 G02F2001/133314 Y10T428/24777 G02F2001/133325 Y10T428/192 G02F1/133308		
优先权	201110367584.2 2011-11-18 CN		
外部链接	Espacenet USPTO		

摘要(译)

本发明公开了一种液晶显示 (LCD) 模块的拼接背板及其拼接结构。根据本发明的LCD模块的拼接背板至少由第一背板部分和第二背板部分组装, 其中至少一个拼接结构限定在第一背板部分和第二背板部分之间并且, 拼接结构的两侧的形状相应地相互接合。通过拼接结构, 本发明可以使用不同类型的材料组装到LCD模块的拼接背板中, 从而最小化厚度并最大化强度, 除了降低材料成本。

