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Peng et al.

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(54) **LIQUID CRYSTAL DISPLAY AND
MANUFACTURING METHOD THEREOF**

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(51) **Int. Cl.**

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B32B 37/30 (2006.01)
G02B 5/30 (2006.01)
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B32B 38/00 (2006.01)
G02F 1/1333 (2006.01)

(52) **U.S. Cl.**

CPC **G02F 1/133528** (2013.01); **B32B 37/12**
(2013.01); **B32B 37/30** (2013.01); **G02B 5/30**

(2013.01); **B32B 37/18** (2013.01); **B32B**
38/004 (2013.01); **B32B 2305/55** (2013.01);
B32B 2307/42 (2013.01); **B32B 2309/02**
(2013.01); **B32B 2309/04** (2013.01); **B32B**
2309/12 (2013.01); **B32B 2457/202** (2013.01);
G02F 1/1303 (2013.01); **G02F 2001/133331**
(2013.01); **G02F 2001/133531** (2013.01);
G02F 2001/133538 (2013.01); **G02F 2202/28**
(2013.01); **Y10T 156/10** (2015.01)

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2001/133538; **G02F 1/133358**

See application file for complete search history.

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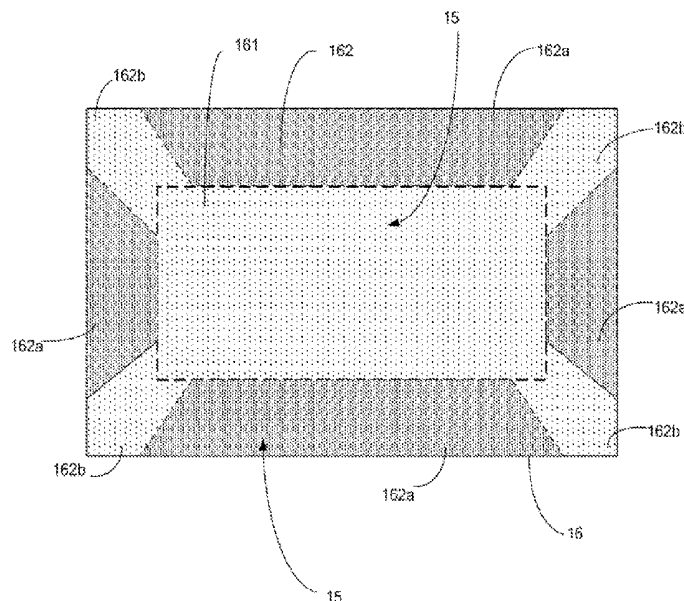
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(57) **ABSTRACT**

A liquid crystal display includes a first polarizer and a liquid
crystal display panel adhered to the first polarizer. The first
polarizer includes a first sub-areas and a first center area. An
adhesion intensity of the first polarizer and the liquid crystal
cell corresponding to the first sub-area is greater than an
adhesion intensity of the first polarizer and the liquid crystal
cell corresponding to the first center area.

19 Claims, 19 Drawing Sheets



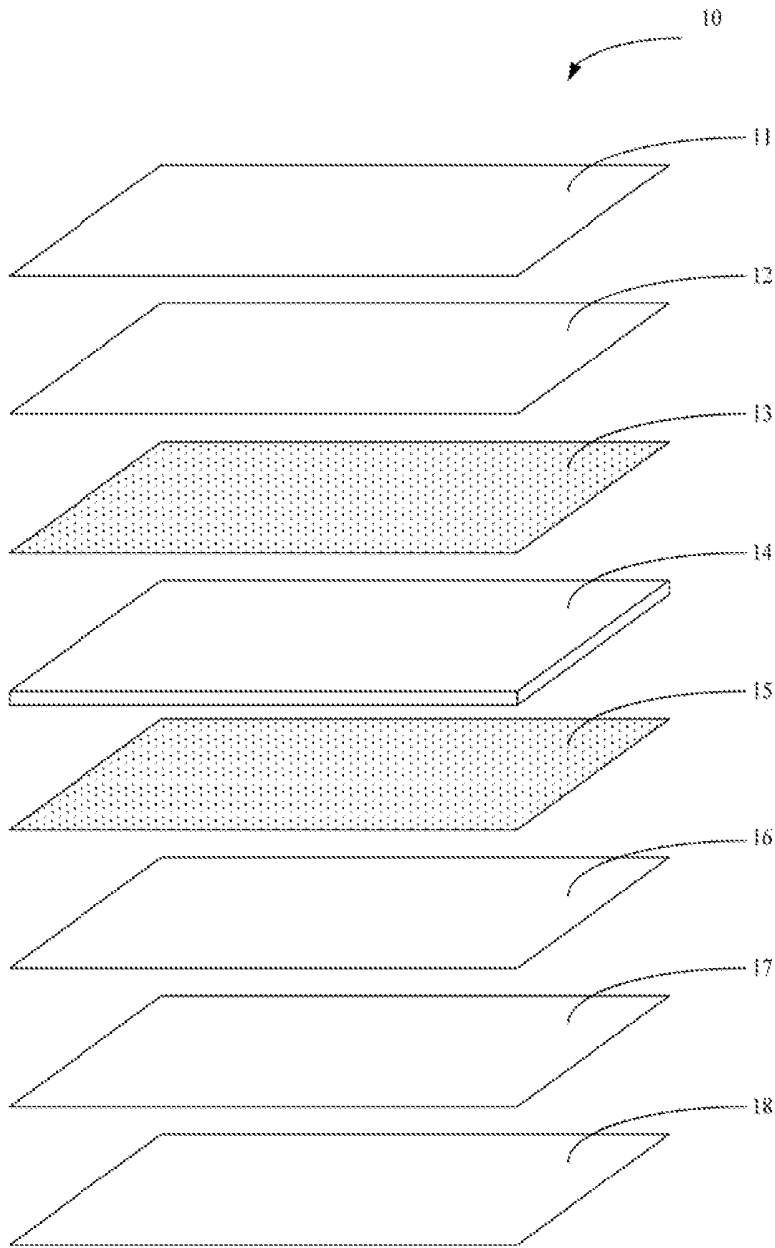


FIG. 1

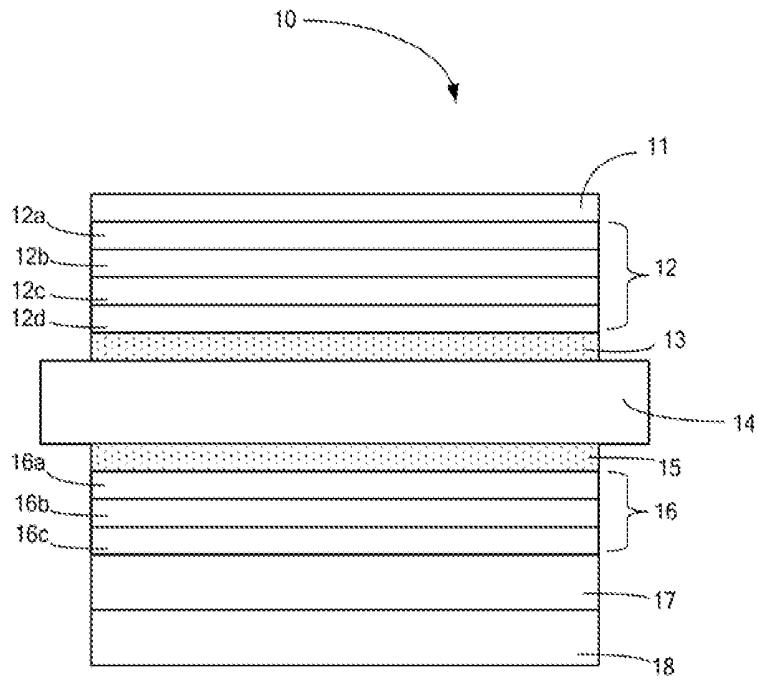


FIG. 2

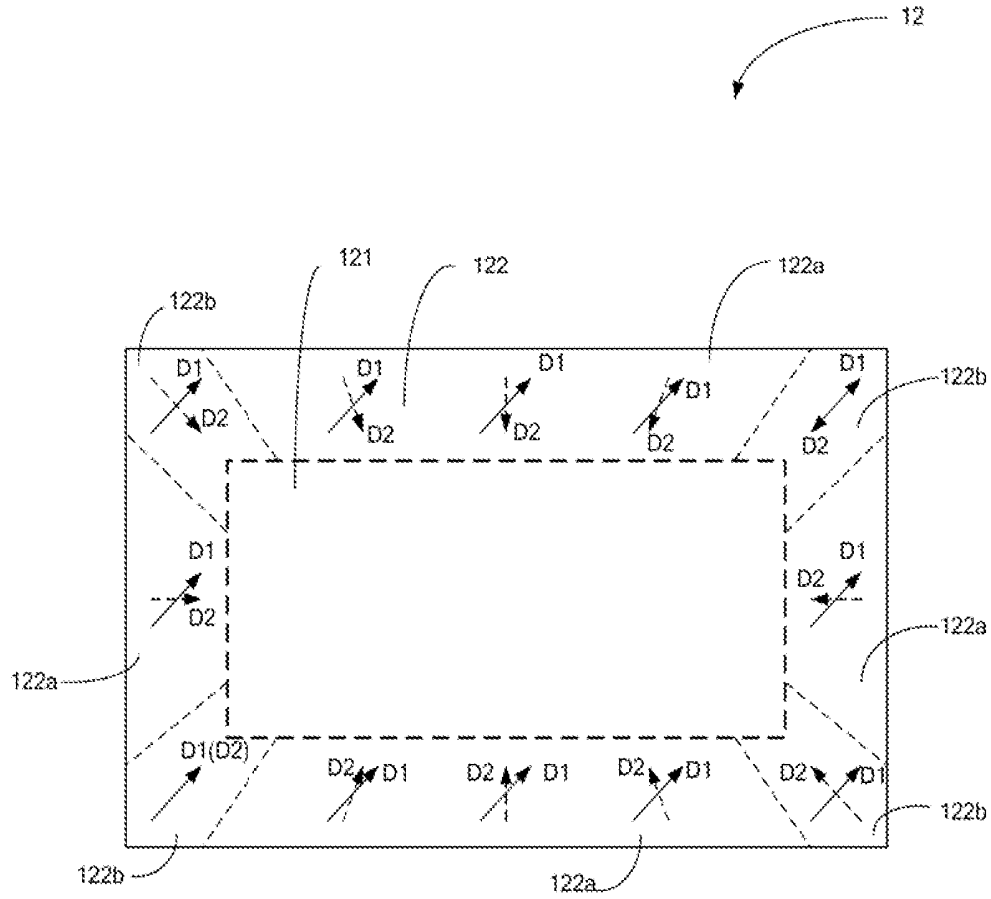


FIG. 3

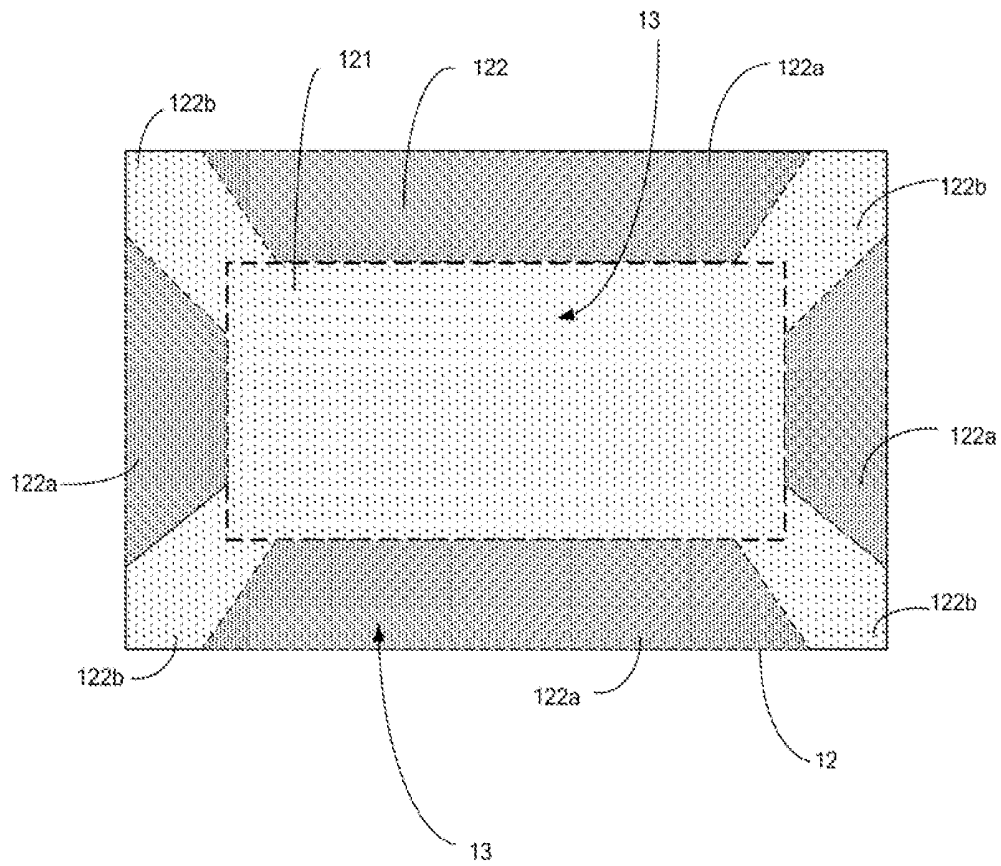


FIG. 4

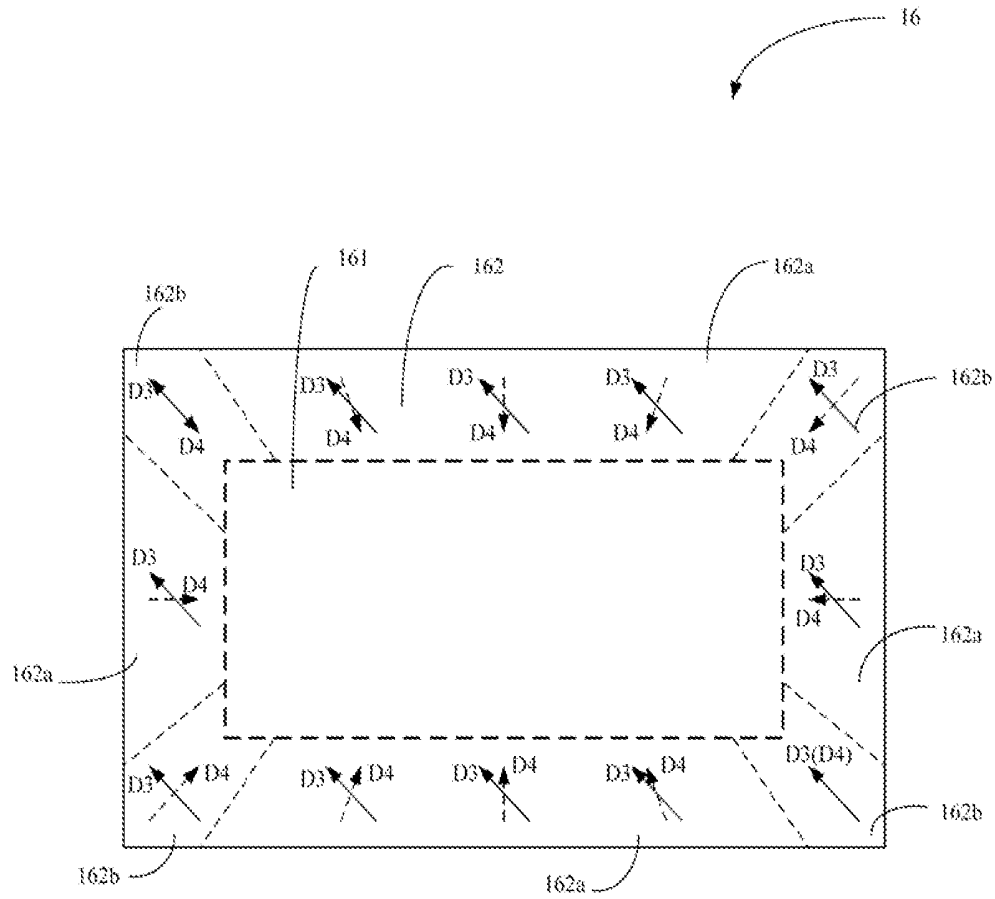


FIG. 5

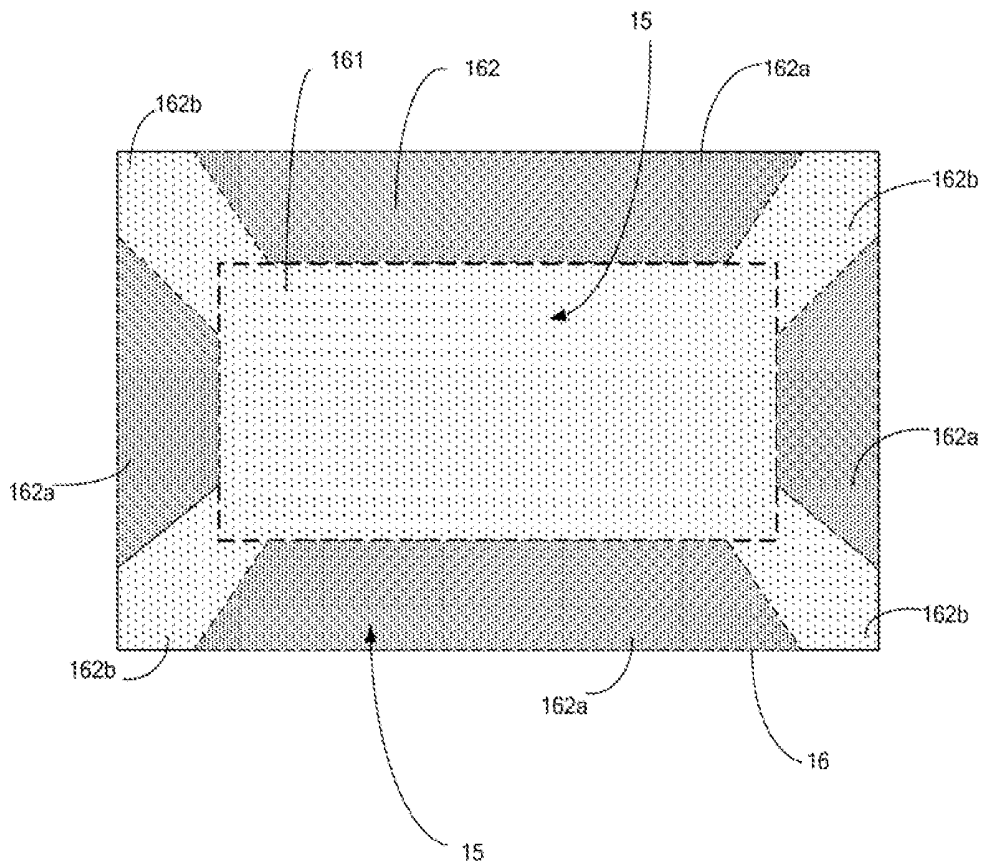
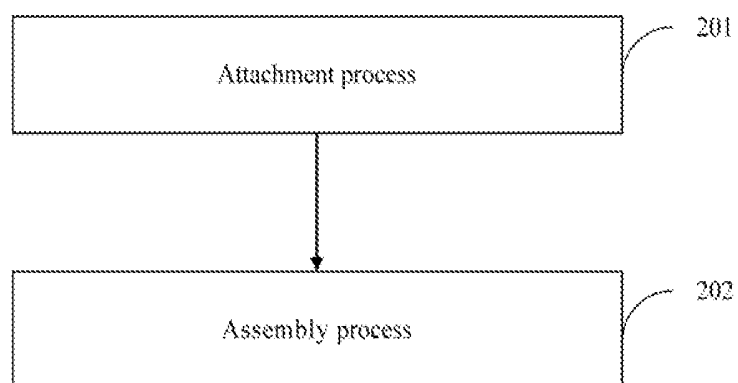
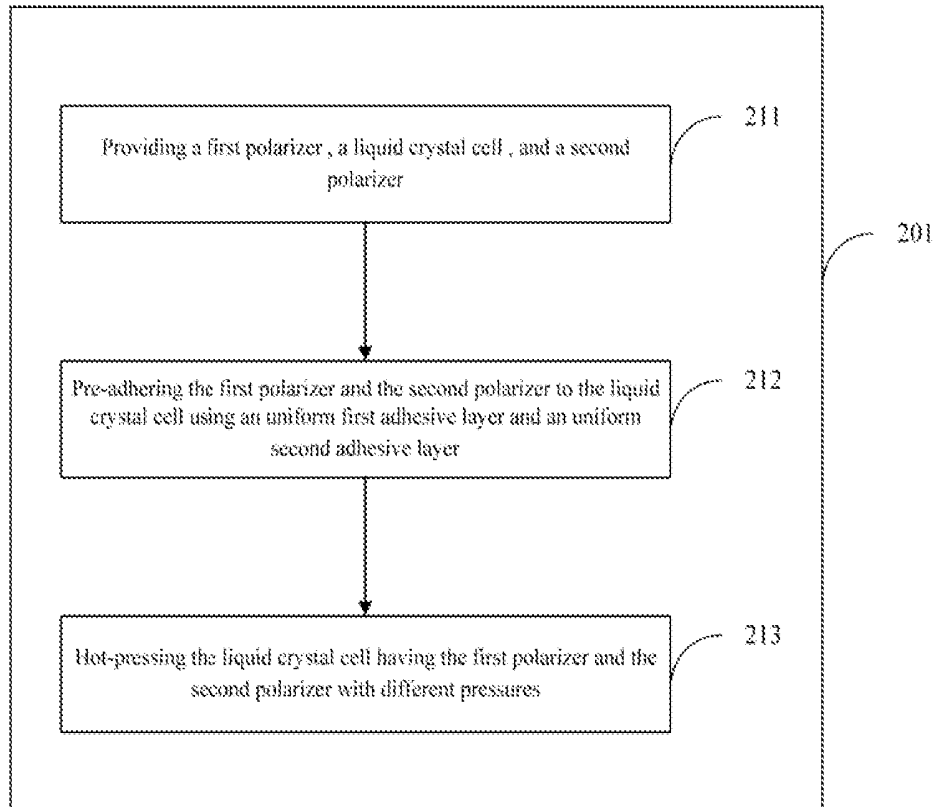


FIG. 6

**FIG. 7**

**FIG. 8**

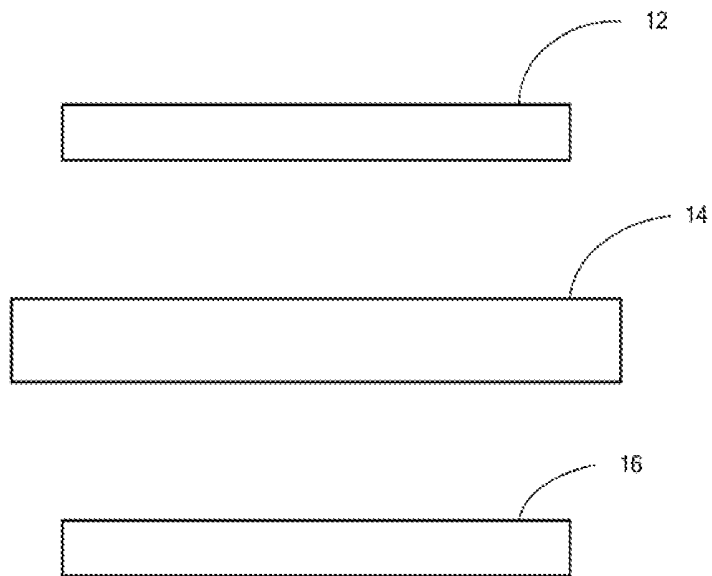


FIG. 9

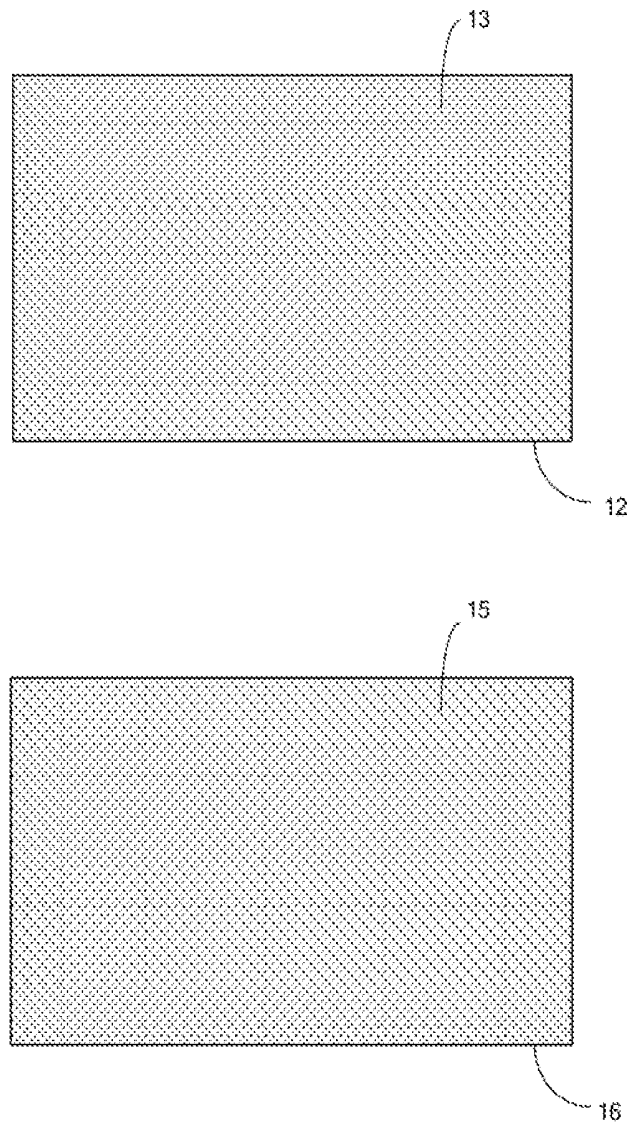


FIG. 10

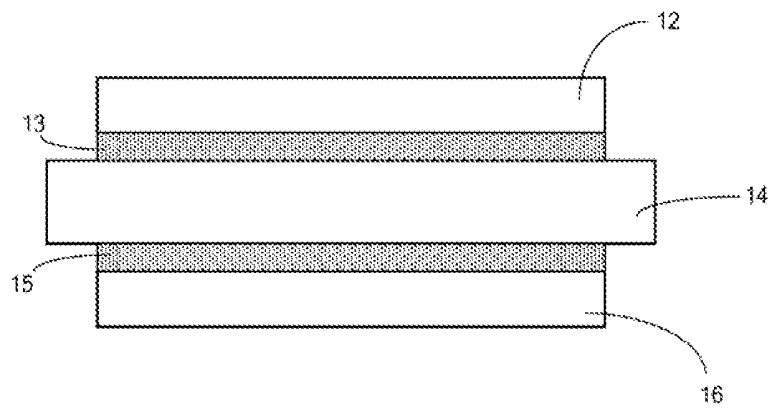


FIG. 11

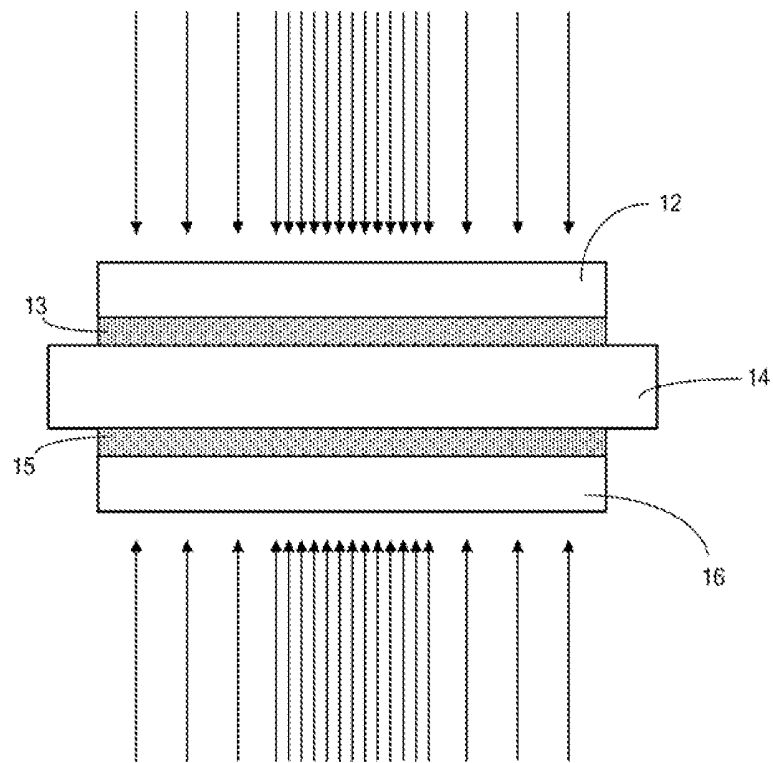


FIG. 12

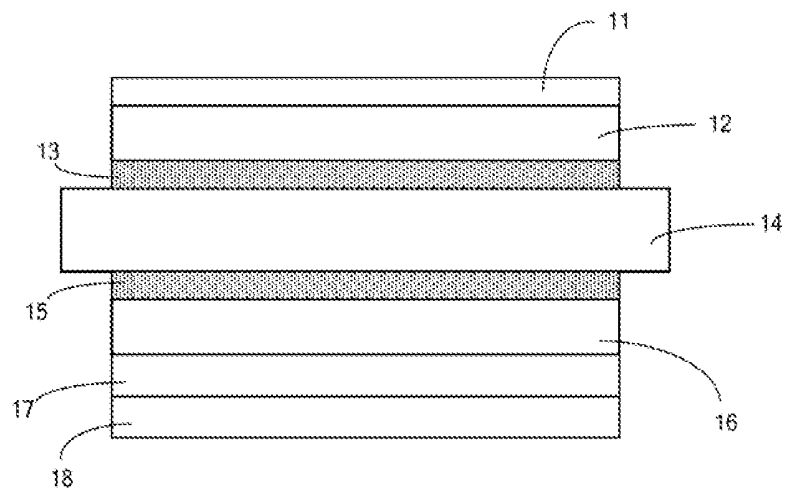
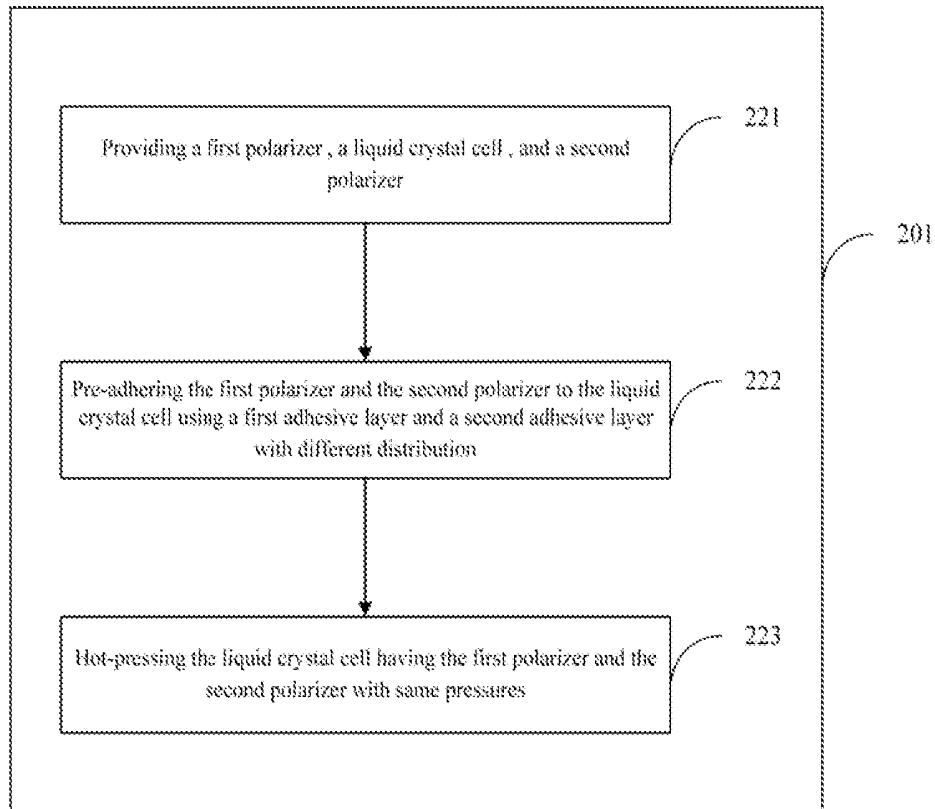


FIG. 13

**FIG. 14**

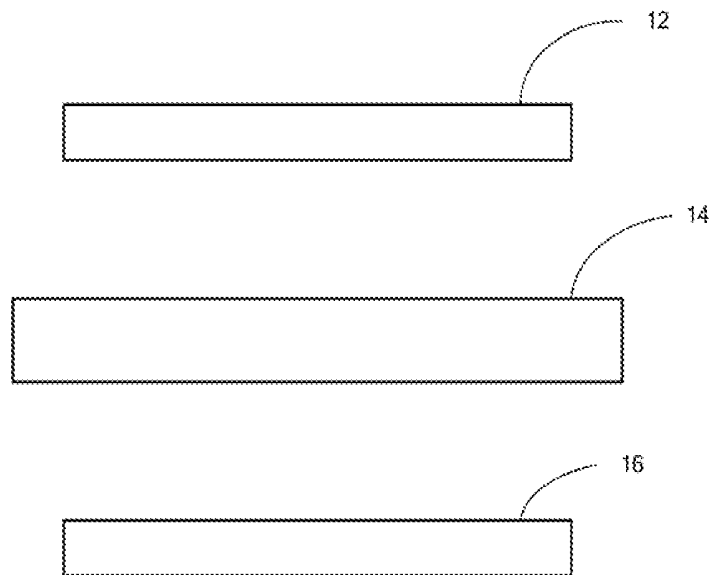


FIG. 15

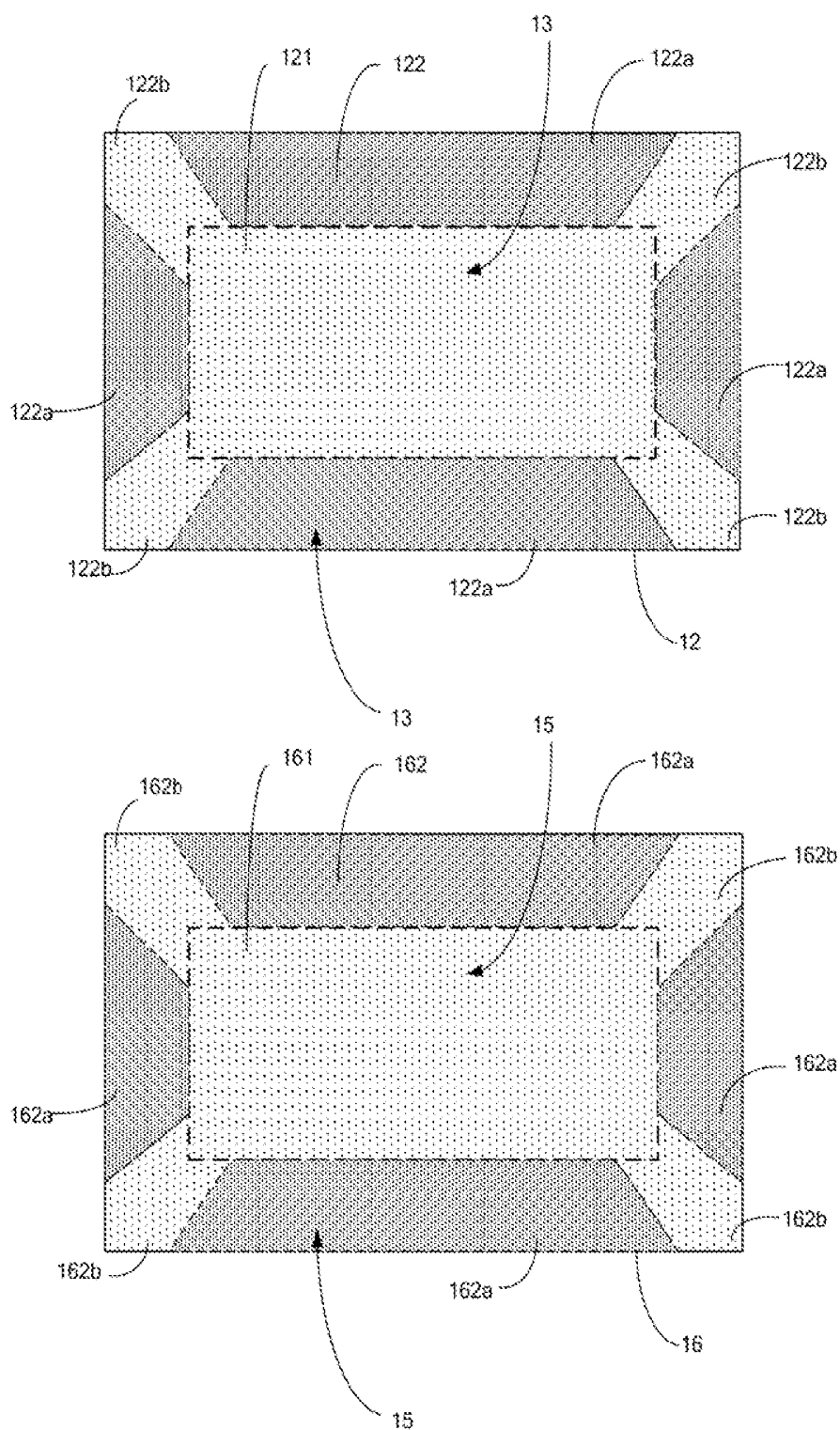


FIG. 16

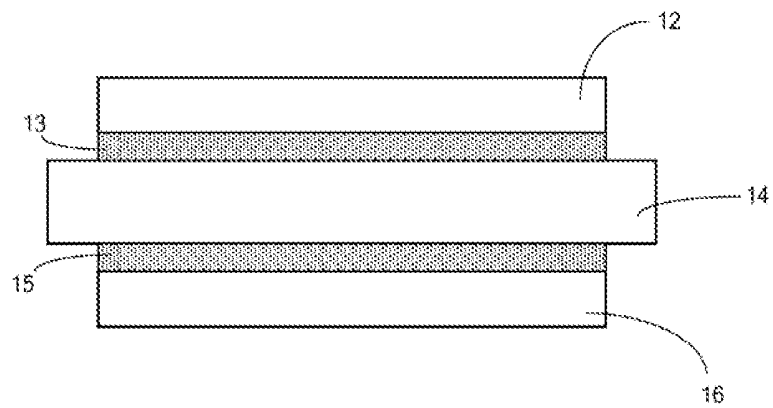


FIG. 17

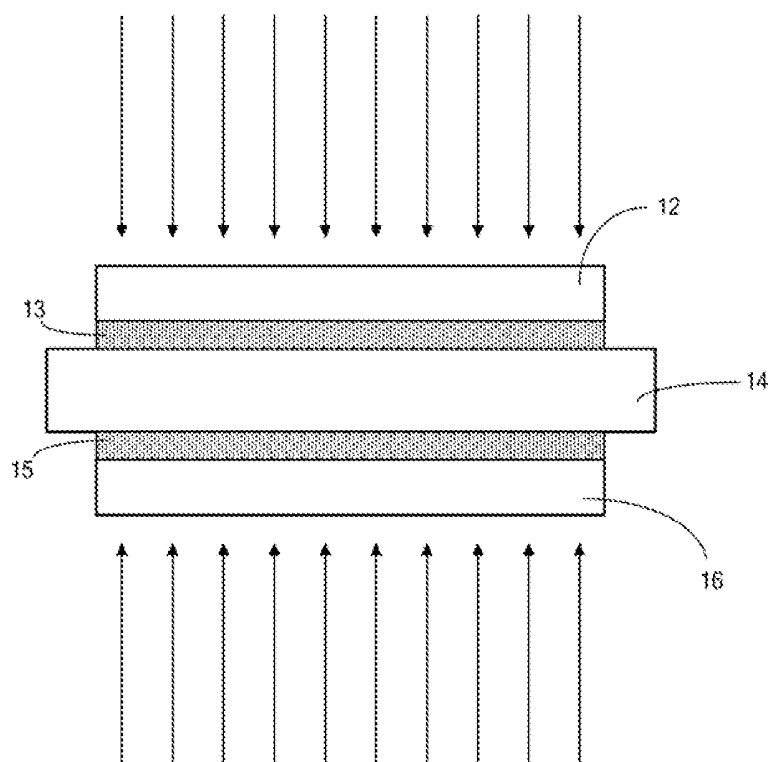


FIG. 18

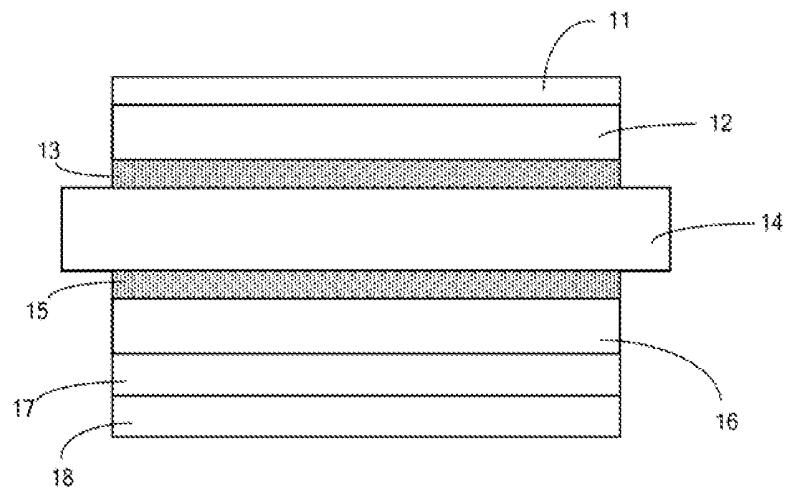


FIG. 19

1

LIQUID CRYSTAL DISPLAY AND MANUFACTURING METHOD THEREOF

FIELD

The subject matter herein generally relates to a liquid crystal display and a method of manufacturing the liquid crystal display.

BACKGROUND

A basic liquid crystal display usually includes a liquid crystal cell with two crossed linear polarizer films. An attachment element is generally used to bind the polarizer film to the liquid crystal cell. Upon the completion of a confidence test, such as a high temperature process or/and a high humidity process, which is often applied to the liquid crystal display, the shrinkage of the polarizer due to the mismatch of thermo-mechanical properties results in light-leakage phenomena or shrink mura.

BRIEF DESCRIPTION OF THE DRAWINGS

Implementations of the present technology will now be described, by way of example only, with reference to the attached figures.

FIG. 1 is an exploded, isometric view of a liquid crystal display, the liquid crystal display including a first polarizer, first adhesive layer, a second polarizer, and a second adhesive layer.

FIG. 2 is a cross-sectional view of the liquid crystal display of FIG. 1.

FIG. 3 is a top view of the first polarizer of FIG. 1, each area of the first polarizer including a first direction and a second direction.

FIG. 4 is a top view of the first adhesive layer of FIG. 1.

FIG. 5 is a top view of the second polarizer of FIG. 1, each area of the second polarizer including a third direction and a fourth direction.

FIG. 6 is a top view of the second adhesive layer of FIG. 1.

FIG. 7 is a flowchart of a method of manufacturing the liquid crystal display of FIG. 1.

FIG. 8 is a sub-flowchart of a first embodiment of an attachment process of the method of FIG. 7.

FIGS. 9-13 are diagrammatic views of successive steps of the manufacturing method of FIGS. 7-8.

FIG. 14 is a sub-flowchart of a second embodiment of an attachment process of the method of FIG. 7.

FIGS. 15-19 are diagrammatic views of successive steps of the manufacturing method of FIG. 7 and FIG. 13.

DETAILED DESCRIPTION

It will be appreciated that for simplicity and clarity of illustration, where appropriate, reference numerals have been repeated among the different figures to indicate corresponding or analogous elements. In addition, numerous specific details are set forth in order to provide a thorough understanding of the embodiments described herein. However, it will be understood by those of ordinary skill in the art that the embodiments described herein can be practiced without these specific details. In other instances, methods, procedures and components have not been described in detail so as not to obscure the related relevant feature being described. Also, the description is not to be considered as limiting the scope of the embodiments described herein. The

2

drawings are not necessarily to scale and the proportions of certain parts have been exaggerated to better illustrate details and features of the present disclosure.

Several definitions that apply throughout this disclosure will now be presented.

The term "substantially" is defined to be essentially conforming to the particular dimension, shape or other word that substantially modifies, such that the component need not be exact. For example, substantially cylindrical means that the object resembles a cylinder, but can have one or more deviations from a true cylinder. The term "comprising," when utilized, means "including, but not necessarily limited to"; it specifically indicates open-ended inclusion or membership in the so-described combination, group, series and the like.

An emitting direction of light beams and an absorption axis of the polarizer films are determined whether the light is able to emit out. In detail, a light paralleled to the absorption axis is absorbed by the polarizer, and a light perpendicular to the absorption axis passes through the polarizer. Upon the completion of the confidence test, a shrinkage stress is generated and applied to the polarizer along directions from edges of the polarizer towards a geometric center of the polarizer.

It is understood that, in some areas of the polarizer, a direction of the absorption axis is paralleled to the direction of the shrinkage stress. In some areas of the polarizer, the direction of the absorption axis is perpendicular to the direction of the shrinkage stress. In some other areas of the polarizer, the direction of the absorption axis is skewed to the direction of the shrinkage stress. A main cause of the light leakage situation is that the absorption axis occur an offset due to the change of shrinkage force after a confidence test. At the center area of the polarizer, the absorption axis of the polarizer has a little, even no offset, but in a peripheral area adjacent to the edges of the polarizer has a greater offset than the center area. Furthermore, at the peripheral area, the polarizer is also applied with different shrinkage stresses, and therefore results in different offsets. As a specific performance, the absorption axis has a great offset when the direction of the absorption axis is skewed to the direction of the shrinkage stress, and the absorption axis has a little offset when the direction of the absorption axis is parallel or perpendicular to the direction of the shrinkage stress. That is, the direction of the absorption axis is skewed to the direction of the shrinkage stress in the peripheral area is defined a great offset area. In the embodiments of the disclosure, the attachment strength between the polarizer and the liquid crystal cell opposite to the great offset area is increased to improve the light leakage situation.

FIG. 1 is an exploded, isometric view of a liquid crystal display. Referring to FIG. 1, the liquid crystal display 10 includes a cover glass 11, a first polarizer 12, a first adhesive layer 13, a liquid crystal cell 14, a second adhesive layer 15, a second polarizer 16, an optical adjustment element 17, and a backlight module 18.

The cover glass 11 covers and protects the first polarizer 12. The first polarizer 12 allows light to pass through in a direction. The second polarizer 16 allows light to pass through in another direction which is perpendicular to the above direction. The backlight module 18 provides light to the liquid crystal display panel 14. The optical adjustment element 17 adjusts the light emitted from the backlight module 18.

Referring to FIG. 2, the first polarizer 12 is adhered with one side of the liquid crystal cell 14 via the first adhesive layer 13. The second polarizer 16 is adhered with another

side of the liquid crystal cell **14** via the second adhesive layer **15**. The cover glass **11** is disposed on one side of the first polarizer **12** away from the liquid crystal display panel **14**. The backlight module **18** is disposed on one side of the second polarizer **16** away from the liquid crystal display panel **14**. The optical adjustment element **17** is disposed between the second polarizer **16** and the backlight module **18**.

In this embodiment, the cover glass **11** is made of polymethylmethacrylate (PMMA). The first polarizer **12** includes a top protection layer **12a**, a polarizer layer **12b**, a bottom protection layer **12c**, and an optical compensation film **12d**. The top protection layer **12a** and the bottom protection layer **12c** are made of triacetyl cellulose (TAC). The polarizer layer **12b** is made of polyvinyl alcohol (PVA). The optical compensation film **12d** is a wide-viewing film. The second polarizer **16** includes a top protection layer **16a**, a polarizer layer **16b**, a bottom protection layer **16c**, and an optical compensation film **16d**. The top protection layer **16a** and the bottom protection layer **16c** are made of triacetyl cellulose (TAC). The polarizer layer **16b** is made of polyvinyl alcohol (PVA). The optical compensation film **16d** is a wide-viewing film. The first adhesive layer **13** and the second adhesive layer **15** include a number of colloidal particles. In this embodiment, the colloidal particles are pressure sensitive particles.

Referring to FIG. 3, in this embodiment, the first polarizer **12** defines a first direction **D1** and a second direction **D2**. The first direction **D1** is a direction of the absorption axis of the first polarizer **12**. The second direction **D2** is a direction towards to the geometric center of the first polarizer **12**. The first polarizer **12** includes a first center area **121** and a first peripheral area **122** adjacent to the edges of the first polarizer **12** and surrounding the first center area **121**. The first peripheral area **122** includes several first sub-areas **122a** and several second sub-areas **122b**. Areas of the first peripheral area **122** where the first direction **D1** is titled with the second direction **D2** are defined as the first sub-areas **122a**. Areas of the first peripheral area **122** where the first direction **D1** is parallel or substantially perpendicular to the second direction **D2** are defined as the second sub-area **122b**. In this embodiment, the acreage of the first center area **121** is equal to the acreage of the first peripheral area **122**. In the embodiment, the first peripheral area **122** is a rectangular ring shape. Each of the second sub-areas **122b** is shaped as a wide-tape, with two ends of the tape connecting between a vertical angle of inner ring and a corresponding vertical angle of outer ring. The first sub-areas **122a** are defined between the two adjacent second sub-areas **122b**.

Referring to FIG. 4, the first adhesive layer **13** is coated on a whole contact surface between the first polarizer **12** and the liquid crystal cell **14**, and a distribution of the colloidal particles of the first adhesive layer **13** corresponding to the first sub-areas **122a** is greater than a distribution of the colloidal particles of the first adhesive layer **13** corresponding to the second sub-areas **122b** and the first center area **121**. Thus, an adhesion intensity of the first polarizer **12** and the liquid crystal cell **14** corresponding to the first sub-areas **122a** is greater than an adhesion intensity of the first polarizer **12** and the liquid crystal cell **14** corresponding to the second sub-areas **122b** and the first center area **121**.

Referring to FIG. 5, in the same way, the second polarizer **16** defines a third direction **D3** and a fourth direction **D4**. The third direction **D3** is a direction of the absorption axis of the second polarizer **16**, the fourth direction **D4** is a direction towards to the geometric center of the second polarizer **16**. The second polarizer **16** includes a second

center area **161** and a second peripheral area **162** adjacent to the edges of the second polarizer **16** and surrounding the second center area **161**. The second peripheral area **162** includes several third sub-areas **162a** and several fourth sub-areas **162b**. Areas of the second peripheral area **162** where the third direction **D3** is titled with the fourth direction **D4** are defined as the third sub-areas **162a**. Areas of the second peripheral area **162** where the third direction **D3** is parallel or substantially perpendicular to the fourth direction **D4** are defined as the fourth sub-area **162b**. In this embodiment, the acreage of the second center area **161** is equal to the acreage of the second peripheral area **162**. In the embodiment, the second peripheral area **162** is a rectangular ring shape. Each of the fourth sub-areas **162b** is shaped as a wide-tape, with two ends of the tape connecting between a vertical angle of inner ring and a corresponding vertical angle of outer ring. The third sub-areas **162a** are defined between the two adjacent fourth sub-areas **162b**.

Referring to FIG. 6, the second adhesive layer **15** is coated on a whole contact surface between the second polarizer **16** and the liquid crystal cell **14**, and a distribution of the colloidal particles of the second adhesive layer **15** corresponding to the third sub-areas **162a** is greater than a distribution of the colloidal particles of the second adhesive layer **15** corresponding to the fourth sub-areas **162b** and the second center area **161**. Thus, an adhesion intensity of the second polarizer **16** and the liquid crystal cell **14** corresponding to the third sub-areas **162a** is greater than an adhesion intensity of the second polarizer **16** and the liquid crystal cell **14** corresponding to the fourth sub-areas **162b** and the second center area **161**.

FIG. 7 is a total flowchart of manufacturing the liquid crystal display **10**. FIG. 8 is a sub-flowchart of a first embodiment of an attachment process of the method of FIG. 7. Depending on the embodiment, additional steps may be added, others deleted, and the ordering of the steps may be changed.

In block **201**, an attachment process is provided. In detail, referring to FIG. 9, in sub-block **211**, a first polarizer **12**, a liquid crystal cell **14**, and a second polarizer **16** are provided.

In sub-block **212**, the first polarizer **12** and the second polarizer **16** are pre-adhered to the liquid crystal cell **14**. In detail, referring to FIG. 10, a first adhesive layer **13** is formed on the first polarizer **12**, and a second adhesive layer **15** is formed on the second polarizer **16**. The first polarizer **12** is pre-adhered to the liquid crystal cell **14** using the first adhesive layer **13**. The second polarizer **16** is pre-adhered to the liquid crystal cell **14** using the second adhesive layer **15**. Referring to FIG. 11, the first adhesive layer **13** is distributed between the first polarizer **12** and the liquid crystal cell **14** uniformly. The second adhesive layer **15** is distributed between the second polarizer **16** and the liquid crystal cell **14** uniformly.

The first polarizer **12** defines a first direction **D1** and a second direction **D2**. The second polarizer **16** defines a third direction **D3** and a fourth direction **D4**. The first polarizer **12** includes a first center area **121** and a first peripheral area **122** adjacent to the edges of the first polarizer **12** and surrounding the first center area **121**. The first peripheral area **122** includes several first sub-areas **122a** and several second sub-areas **122b**. Areas of the first peripheral area **122** where the first direction **D1** is titled with the second direction **D2** are defined as the first sub-areas **122a**. Areas of the first peripheral area **122** where the first direction **D1** is parallel or substantially perpendicular to the second direction **D2** are defined as the second sub-area **122b**. The second polarizer **16** includes a second center area **161** and a second peripheral

area **162** adjacent to the edges of the second polarizer **16** and surrounding the second center area **161**. The second peripheral area **162** includes several third sub-areas **162a** and several fourth sub-areas **162b**. Areas of the second peripheral area **162** where the third direction **D3** is titled with the fourth direction **D4** are defined as the third sub-areas **162a**. Areas of the second peripheral area **162** where the third direction **D3** is parallel or substantially perpendicular to the fourth direction **D4** are defined as the fourth sub-area **162b**.

In sub-block **213**, referring to FIG. **12**, the liquid crystal cell **14** is hot-pressed having the first polarizer **12** and the second polarizer **16**.

In detail, a pressure applied to the first sub-area **122a** is less than a pressure applied to both the second sub-area **122b** and the first center area **121**. A pressure applied to the third sub-area **162a** is less than a pressure applied to both the fourth sub-area **162b** and the second center area **161**.

During the hot pressing process, the first adhesive layer **13** and the second adhesive layer **15** are in a fluid state, so the first adhesive layer **13** and the second adhesive layer **15** are capable of flowing from an area applied with a higher pressure to an area applied with a lower pressure. Therefore, a distribution of the colloidal particles of the first adhesive layer **13** corresponding to the first sub-areas **122a** is greater than a distribution of the colloidal particles of the first adhesive layer **13** corresponding to the second sub-areas **122b** and the first center area **121**. Thus, an adhesion intensity of the first polarizer **12** and the liquid crystal cell **14** corresponding to the first sub-areas **122a** is greater than an adhesion intensity of the first polarizer **12** and the liquid crystal cell **14** corresponding to the second sub-areas **122b** and the first center area **121**. In the same way, a distribution of the colloidal particles of the second adhesive layer **15** corresponding to the third sub-areas **162a** is greater than a distribution of the colloidal particles of the second adhesive layer **15** corresponding to the fourth sub-areas **162b** and the second center area **161**. Thus, an adhesion intensity of the second polarizer **16** and the liquid crystal cell **14** corresponding to the third sub-areas **162a** is greater than an adhesion intensity of the second polarizer **16** and the liquid crystal cell **14** corresponding to the fourth sub-areas **162b** and the second center area **161**.

In this embodiment, the operation temperature of the hot-pressing process maintains 50 degree centigrade, and the duration of the autoclave process is about 30 minutes. The pressure applied to the first sub-area **122a** and the third sub-area **162a** is less than two atmospheres. The pressures applied to the second sub-area **122b**, the first center area **121**, the fourth sub-area **162b**, and the second center area **161** are greater than two atmospheres.

In block **202**, referring to FIG. **13**, a cover glass **11**, an optical adjustment element **17**, and a backlight module **18** are provided. The cover glass **11**, the first polarizer **12**, the adhesive layer **13**, the liquid crystal display panel **14**, the second adhesive layer **15**, the second polarizer **16**, the optical adjustment element **17** and the backlight module **18** are assembled to form a liquid crystal display **10**. The present liquid crystal display **10** is thus obtained.

FIG. **14** is a sub-flowchart of a second embodiment of an attachment process of the method of FIG. **7**. Depending on the embodiment, additional steps may be added, others deleted, and the ordering of the steps may be changed.

In block **201**, an attachment process is provided. In detail, referring to FIG. **15**, in sub-block **221**, a first polarizer **12**, a liquid crystal cell **14**, and a second polarizer **16** are provided.

In sub-block **222**, the first polarizer **12** and the second polarizer **16** are pre-adhered to the liquid crystal cell **14**. In

detail, referring to FIG. **16**, a first adhesive layer **13** is formed on the first polarizer **12**, and a second adhesive layer **15** is formed on the second polarizer **16**. The first polarizer **12** is pre-adhered to the liquid crystal cell **14** using the first adhesive layer **13**. The second polarizer **16** is pre-adhered to the liquid crystal cell **14** using the second adhesive layer **15**. The first polarizer **12** defines a first direction **D1** and a second direction **D2**. The second polarizer **16** defines a third direction **D3** and a fourth direction **D4**. The first polarizer **12** includes a first center area **121** and a first peripheral area **122** adjacent to the edges of the first polarizer **12** and surrounding the first center area **121**. The first peripheral area **122** includes several first sub-areas **122a** and several second sub-areas **122b**. Areas of the first peripheral area **122** where the first direction **D1** is titled with the second direction **D2** are defined as the first sub-areas **122a**. Areas of the first peripheral area **122** where the first direction **D1** is parallel or substantially perpendicular to the second direction **D2** are defined as the second sub-area **122b**. The second polarizer **16** includes a second center area **161** and a second peripheral area **162** adjacent to the edges of the second polarizer **16** and surrounding the second center area **161**. The second peripheral area **162** includes several third sub-areas **162a** and several fourth sub-areas **162b**. Areas of the second peripheral area **162** where the third direction **D3** is titled with the fourth direction **D4** are defined as the third sub-areas **162a**. Areas of the second peripheral area **162** where the third direction **D3** is parallel or substantially perpendicular to the fourth direction **D4** are defined as the fourth sub-area **162b**. A distribution of the colloidal particles of the first adhesive layer **13** corresponding to the first sub-areas **122a** is greater than a distribution of the colloidal particles of the first adhesive layer **13** corresponding to the second sub-areas **122b** and the first center area **121**. A distribution of the colloidal particles of the second adhesive layer **15** corresponding to the third sub-areas **162a** is greater than a distribution of the colloidal particles of the second adhesive layer **15** corresponding to the fourth sub-areas **162b** and the second center area **161**. Referring to FIG. **17**, the first adhesive layer **13** is distributed between the first polarizer **12** and the liquid crystal cell **14**. The second adhesive layer **15** is distributed between the second polarizer **16** and the liquid crystal cell **14**.

In sub-block **223**, referring to FIG. **18**, the liquid crystal cell **14** is hot-pressed having the first polarizer **12** and the second polarizer **16**. In detail, a pressure applied to the first sub-area **122a**, the second sub-area **122b** and the first center area **121** are the same. A pressure applied to the third sub-area **162a**, the fourth sub-area **162b** and the second center area **161** are the same. Thus, an adhesion intensity of the first polarizer **12** and the liquid crystal cell **14** corresponding to the first sub-areas **122a** is greater than an adhesion intensity of the first polarizer **12** and the liquid crystal cell **14** corresponding to the second sub-areas **122b** and the first center area **121**. An adhesion intensity of the second polarizer **16** and the liquid crystal cell **14** corresponding to the third sub-areas **162a** is greater than an adhesion intensity of the second polarizer **16** and the liquid crystal cell **14** corresponding to the fourth sub-areas **162b** and the second center area **161**.

In this embodiment, the operation temperature of the hot-pressing process maintains 50 degree centigrade, and the duration of the autoclave process is about 30 minutes. The pressure applied to the first sub-area **122a**, the second sub-area **122b**, the third sub-area **162a**, the fourth sub-area **162b**, the first center area **121**, and the second center area **161** are two atmospheres.

In block 202, referring to FIG. 19, a cover glass 11, an optical adjustment element 17, and a backlight module 18 are provided. The cover glass 11, the first polarizer 12, the adhesive layer 13, the liquid crystal display panel 14, the second adhesive layer 15, the second polarizer 16, the optical adjustment element 17 and the backlight module 18 are assembled to form a liquid crystal display 10. The present liquid crystal display 10 is thus obtained.

The embodiments shown and described above are only examples. Many details are often found in the art such as the other features of a touch device. Therefore, many such details are neither shown nor described. Even though numerous characteristics and advantages of the present technology have been set forth in the foregoing description, together with details of the structure and function of the present disclosure, the disclosure is illustrative only, and changes may be made in the detail, especially in matters of shape, size and arrangement of the parts within the principles of the present disclosure up to, and including the full extent established by the broad general meaning of the terms used in the claims. It will therefore be appreciated that the embodiments described above may be modified within the scope of the claims.

What is claimed is:

1. A liquid crystal display comprising:

a first polarizer defining a first direction and a second direction, the first direction being a direction of an absorption axis of the first polarizer, and the second direction is a direction towards to the geometric center of the first polarizer;

the first polarizer further defining a first center area and a first peripheral area adjacent to the edges of the first polarizer and surrounding the first center area;

the first peripheral area comprising a first sub-area, areas of the first peripheral area where the first direction is titled with the second direction are defined as the first sub-area;

a second polarizer; and

a liquid crystal cell disposed between the first polarizer and the second polarizer, the first polarizer being adhered to the liquid crystal cell;

an adhesion intensity of the first polarizer and the liquid crystal cell corresponding to the first sub-area is greater than an adhesion intensity of the first polarizer and the liquid crystal cell corresponding to the first center area;

wherein the liquid crystal display further comprises a first adhesive layer, the first polarizer is adhered with one side of the liquid crystal cell via the first adhesive layer, a distribution of colloidal particles of the first adhesive layer corresponding to the first sub-area is greater than a distribution of colloidal particles of the first adhesive layer corresponding to the first center area.

2. The liquid crystal display of claim 1, wherein the first peripheral area further comprises a second sub-area, areas of the first peripheral area where the first direction is parallel or substantially perpendicular to the second direction are defined as the second sub-area, an adhesion intensity of the first polarizer and the liquid crystal cell corresponding to the first sub-area is greater than an adhesion intensity of the first polarizer and the liquid crystal cell corresponding to the second sub-area.

3. The liquid crystal display of claim 2, wherein a distribution of colloidal particles of the first adhesive layer corresponding to the first sub-area is greater than a distribution of colloidal particles of the first adhesive layer corresponding to the second sub-area.

4. The liquid crystal display of claim 1, wherein the acreage of the first center area is equal to the acreage of the first peripheral area.

5. The liquid crystal display of claim 1, wherein the first adhesive layer comprises a number of pressure sensitive particles.

6. The liquid crystal display of claim 1, wherein the second polarizer defines a third direction and a fourth direction, the third direction is a direction of the absorption axis of the second polarizer, the fourth direction is a direction towards to the geometric center of the second polarizer, the second polarizer further defines a second center area and a second peripheral area adjacent to the edges of the second polarizer and surrounding the second center area, the second around area comprises a third sub-area, areas of the second peripheral area where the third direction is titled with the fourth direction are defined as the third sub-area, the second polarizer is adhered to the liquid crystal display panel, an adhesion intensity between the second polarizer and the liquid crystal cell corresponding to the third sub-area is greater than an adhesion intensity between the second polarizer and the liquid crystal cell corresponding to the second center area.

7. The liquid crystal display of claim 6, wherein the liquid crystal display further comprises a second adhesive layer, the second polarizer is adhered with another side of the liquid crystal cell via the second adhesive layer, a distribution of colloidal particles of the second adhesive layer corresponding to the third sub-area is greater than a distribution of colloidal particles of the second adhesive layer corresponding to the second center area.

8. The liquid crystal display of claim 7, wherein the second around area further comprises a fourth sub-area, areas of the second peripheral area where the third direction is parallel or substantially perpendicular to the fourth direction are defined as the fourth sub-area, an adhesion intensity of the second polarizer and the liquid crystal cell corresponding to the third sub-area is greater than an adhesion intensity of the second polarizer and the liquid crystal cell corresponding to the fourth sub-area.

9. The liquid crystal display of claim 8, wherein a distribution of colloidal particles of the second adhesive layer corresponding to the third sub-area is greater than a distribution of colloidal particles of the second adhesive layer corresponding to the fourth sub-area.

10. The liquid crystal display of claim 6, wherein the acreage of the second center area is equal to the acreage of the second peripheral area.

11. The liquid crystal display of claim 7, wherein the second adhesive layer comprises a number of pressure sensitive particles.

12. A method of manufacturing a liquid crystal display, comprising:

an attachment processing of a polarizer to a liquid crystal cell, the polarizer defining a first direction and a second direction, the first direction is a direction of the absorption axis of the polarizer, the second direction is a direction towards to the geometric center of the polarizer, the first polarizer further defining a center area and a peripheral area adjacent to the edges of the polarizer and surrounding the center area, the peripheral area comprising a first sub-area, areas of the peripheral area where the first direction is titled with the second direction are defined as the first sub-area, comprising: pre-adhering the polarizer to the liquid crystal cell using an adhesive layer;

hot-pressing the liquid crystal cell having the polarizer, wherein an adhesion intensity of colloidal particles of the adhesive layer corresponding to the first sub-area is greater than an adhesion intensity of colloidal particles of the adhesive layer corresponding to the center area,

wherein the adhesive layer is distributed between the polarizer and the liquid crystal cell, a distribution of colloidal particles of the adhesive layer corresponding to the first sub-area is greater than a distribution of colloidal particles of the adhesive layer corresponding to the center area.

13. The method of claim 12, wherein the adhesive layer is distributed between the polarizer and the liquid crystal cell uniformly, a pressure applied to the first sub-area is less than a pressure applied to the center area during the hot-pressing.

14. The method of claim 13, wherein the peripheral area further comprises a second sub-area, areas of the peripheral area where the first direction is parallel or substantially perpendicular to the second direction are defined as the second sub-area, an adhesion intensity of colloidal particles of the adhesive layer corresponding to the first sub-area is greater than an adhesion intensity of colloidal particles of the adhesive layer corresponding to the second sub-area.

15. The method of claim 14, wherein a pressure applied to the first sub-area is less than a pressure applied to the second sub-area during the hot-pressing.

16. The method of claim 15, wherein the operation temperature of the hot-pressing process maintains 50 degree centigrade, the duration of the autoclave process is about 30 minutes, the pressure applied to the first sub-area is less than two atmospheres, and the pressures applied to the second sub-area and the center area are greater than two atmospheres.

17. The method of claim 12, wherein the peripheral area further comprises a second sub-area, areas of the peripheral

area where the first direction is parallel or substantially perpendicular to the second direction are defined as the second sub-area, a distribution of colloidal particles of the adhesive layer corresponding to the first sub-area is greater than a distribution of colloidal particles of the adhesive layer corresponding to the second sub-area.

18. The method of claim 17, wherein the operation temperature of the hot-pressing process maintains 50 degree centigrade, the duration of the autoclave process is about 30 minutes, the pressures applied to the first sub-area, the second sub-area and the center area are two atmospheres.

19. A liquid crystal display comprising:

a first polarizer defining a first direction and a second direction, the first direction being a direction of an absorption axis of the first polarizer, and the second direction is a direction towards to the geometric center of the first polarizer;

the first polarizer further defining a first center area and a first peripheral area adjacent to the edges of the first polarizer and surrounding the first center area;

the first peripheral area comprising a first sub-area, areas of the first peripheral area where the first direction is titled with the second direction are defined as the first sub-area;

a second polarizer; and

a liquid crystal cell disposed between the first polarizer and the second polarizer, the first polarizer being adhered to the liquid crystal cell;

an adhesion intensity of the first polarizer and the liquid crystal cell corresponding to the first sub-area is greater than an adhesion intensity of the first polarizer and the liquid crystal cell corresponding to the first center area; wherein the acreage of the first center area is equal to the acreage of the first peripheral area.

* * * * *

专利名称(译)	液晶显示器及其制造方法		
公开(公告)号	US9500901	公开(公告)日	2016-11-22
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[标]申请(专利权)人(译)	深超光电(深圳)有限公司		
申请(专利权)人(译)	世纪科技(深圳)股份有限公司		
当前申请(专利权)人(译)	世纪科技(深圳)股份有限公司		
[标]发明人	PENG HAI BO MAI CHEN FU		
发明人	PENG, HAI-BO MAI, CHEN-FU		
IPC分类号	G02F1/13 B32B37/12 G02F1/1335 B32B37/30 G02B5/30 B32B37/18 B32B38/00 G02F1/1333		
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外部链接	Espacenet USPTO		

摘要(译)

液晶显示器包括第一偏振器和粘附到第一偏振器的液晶显示面板。第一偏振器包括第一子区域和第一中心区域。对应于第一子区域的第一偏振器和液晶单元的粘附强度大于对应于第一中心区域的第一偏振器和液晶单元的粘附强度。

