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Lee et al.

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(54) **OPTICAL MEMBER, METHOD OF FABRICATING THE SAME AND LIQUID CRYSTAL DISPLAY APPARATUS HAVING THE SAME**

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G02F 1/1335 (2006.01)

(52) **U.S. Cl.** **349/113**

(58) **Field of Classification Search** 349/64–65
See application file for complete search history.

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(57) **ABSTRACT**

In an LCD apparatus having an optical member, the optical member has a base body having a light incident surface and a light emitting surface faced the light incident surface. A first resin layer is formed on the light emitting surface and a light diffusing pattern is uniformly formed on the first resin layer so as to diffuse a first light and emit a second light. Accordingly, the LCD apparatus can improve display quality and can be fabricated in low-cost manufacture. Also, since the light diffusing pattern is formed with a curable material, the light diffusing pattern can have various shapes and superior reproducibility.

23 Claims, 12 Drawing Sheets

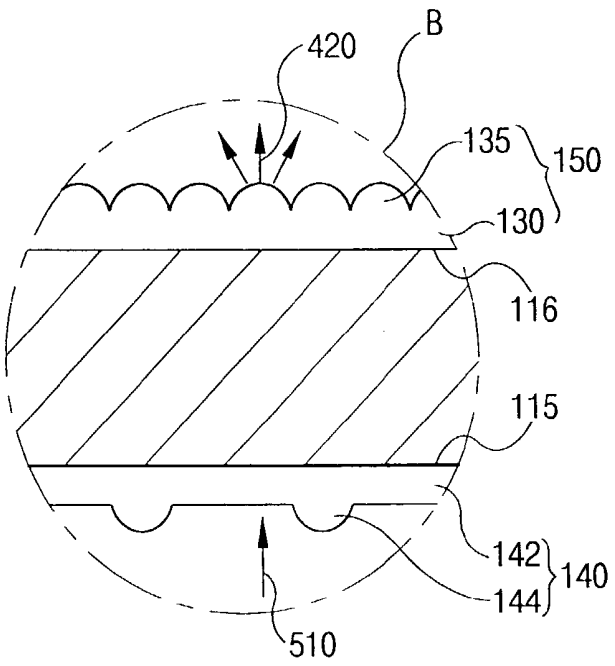


FIG. 1

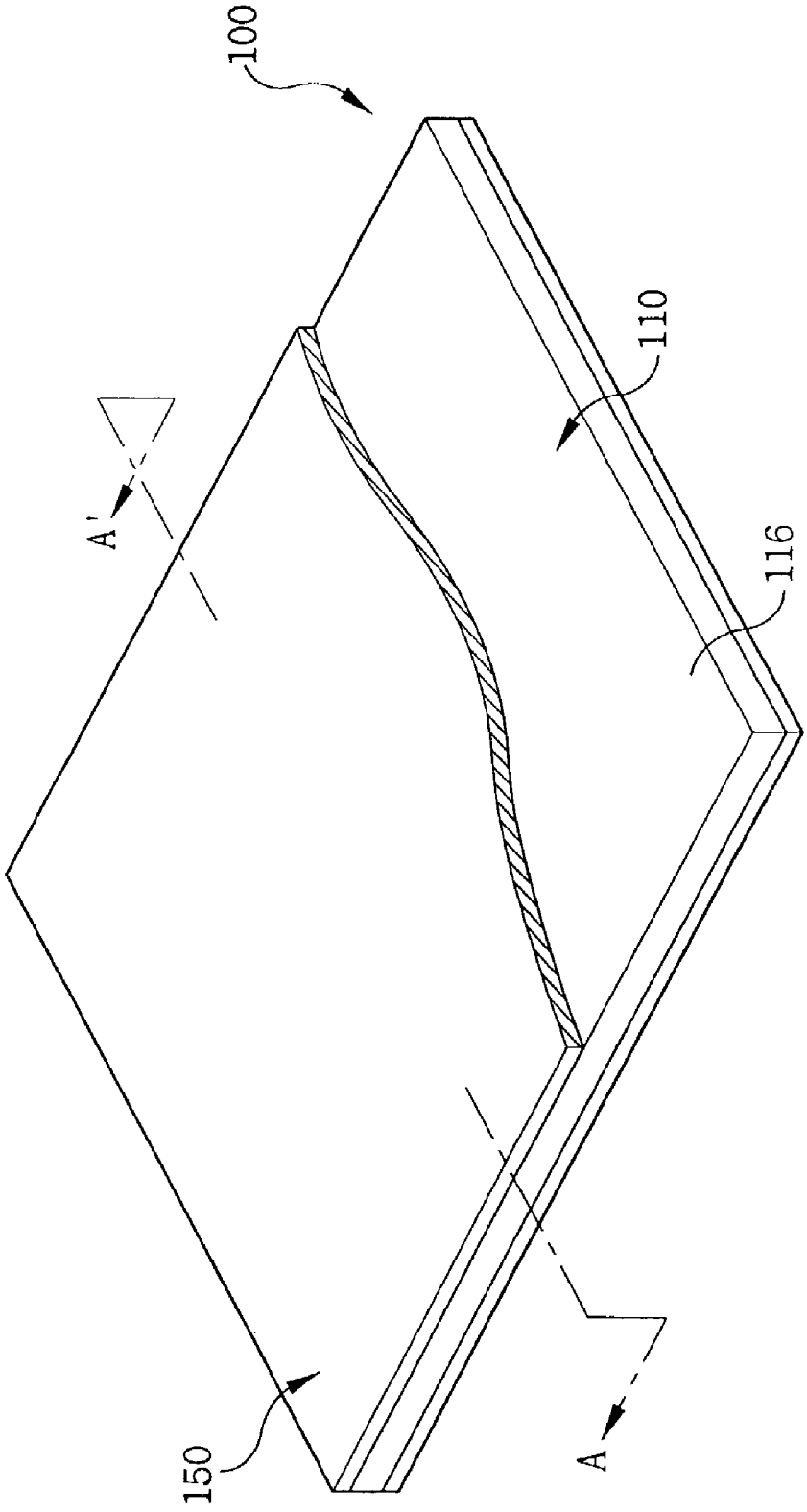


FIG. 2A

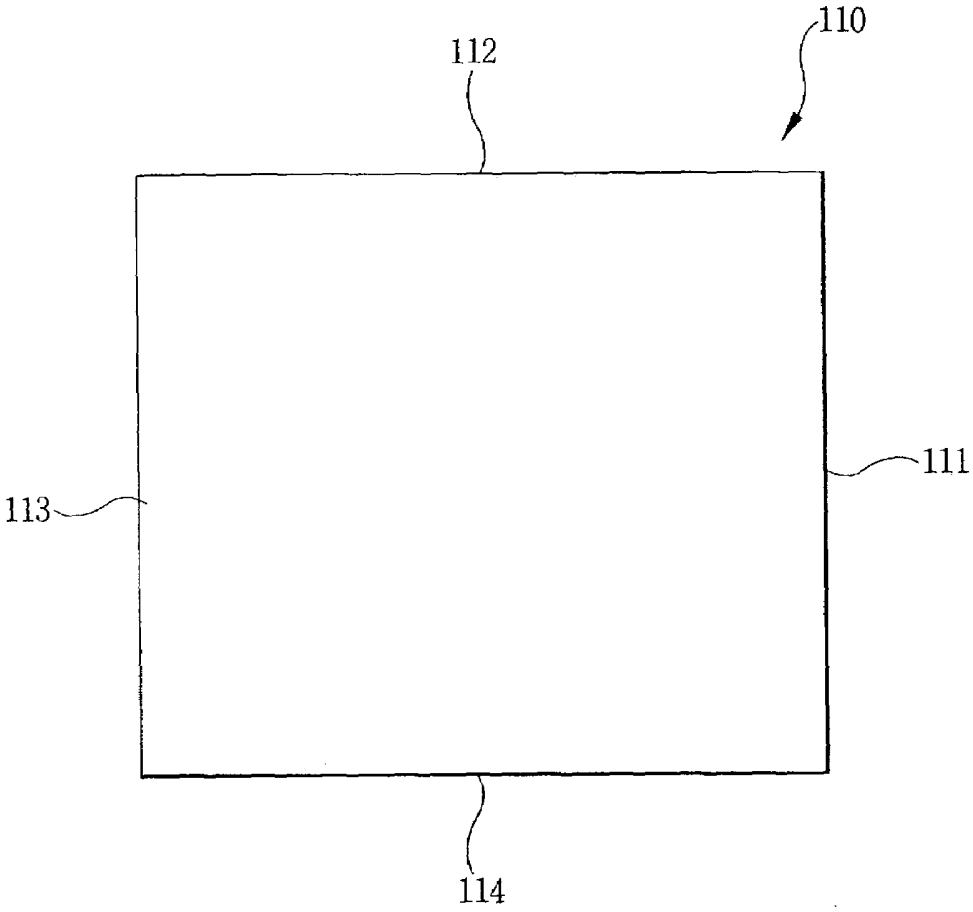


FIG. 2B

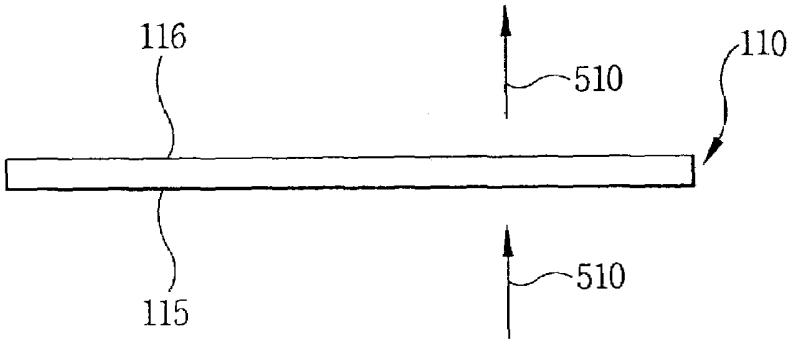


FIG.3A

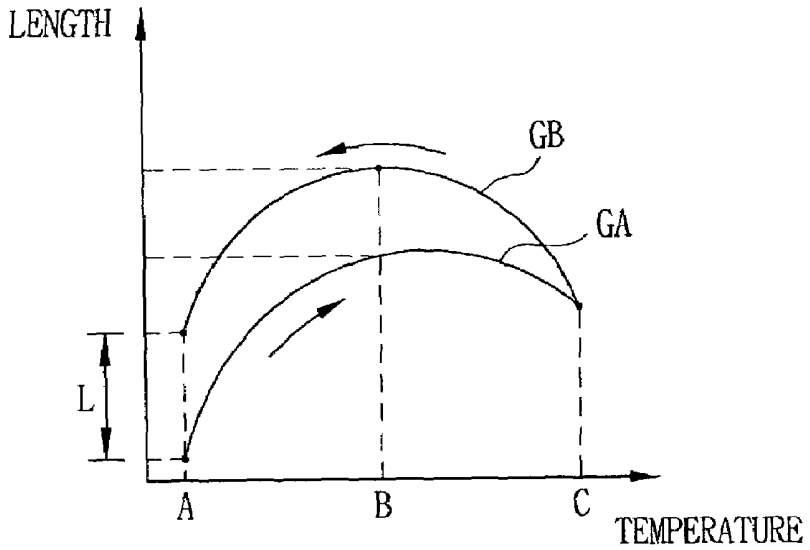


FIG.3B

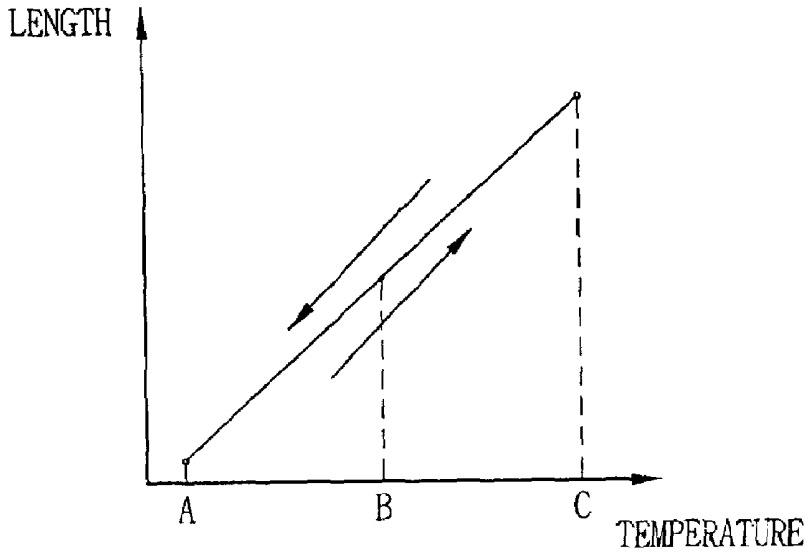


FIG. 4

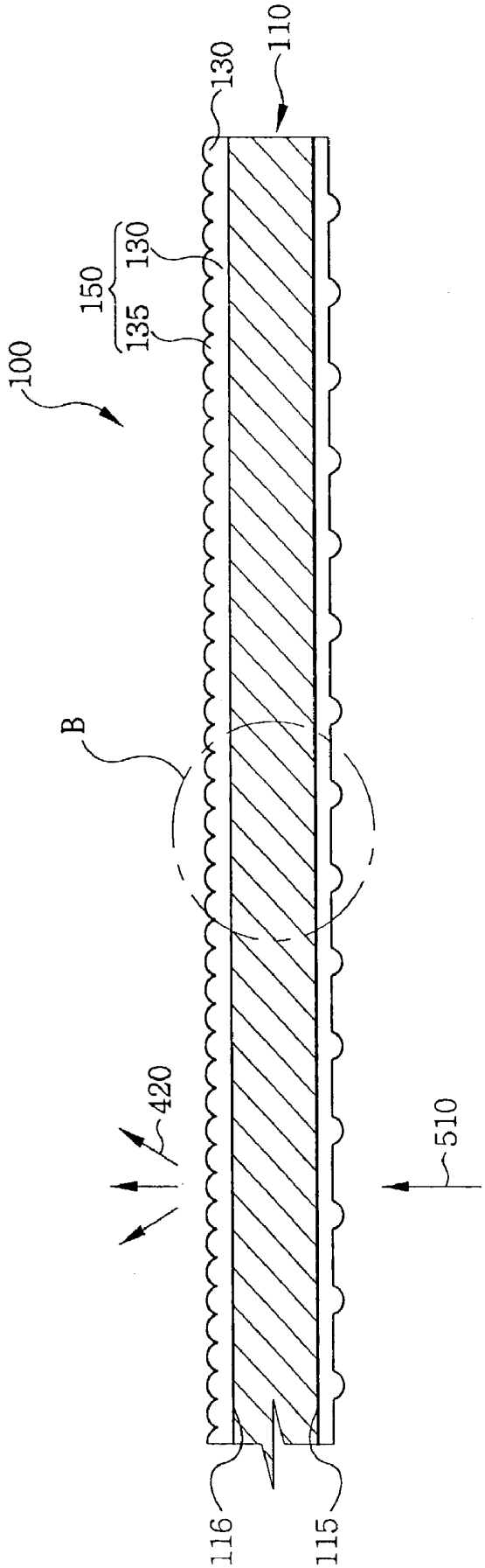


FIG.5

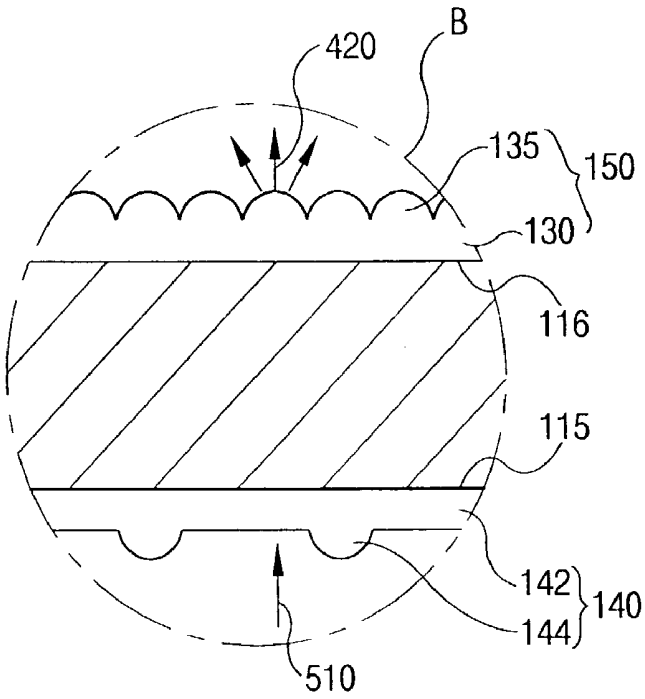


FIG.6

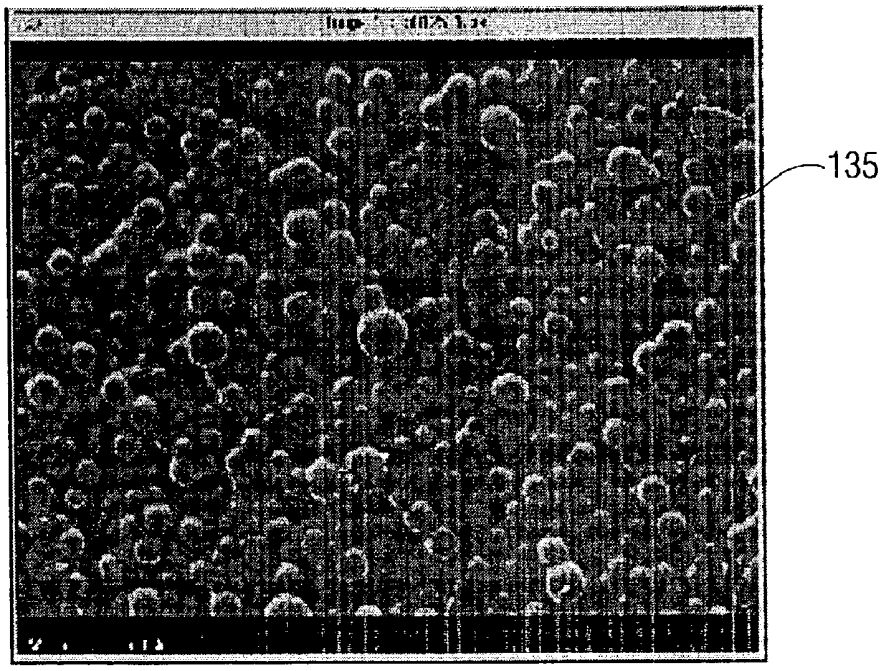


FIG. 7A

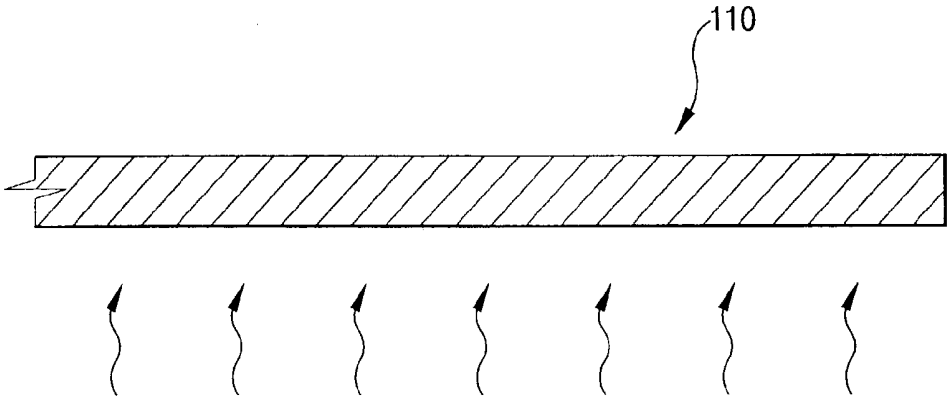


FIG. 7B

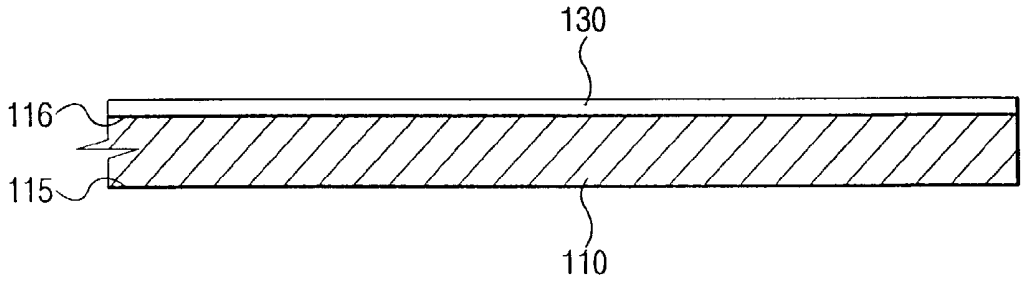


FIG. 7C

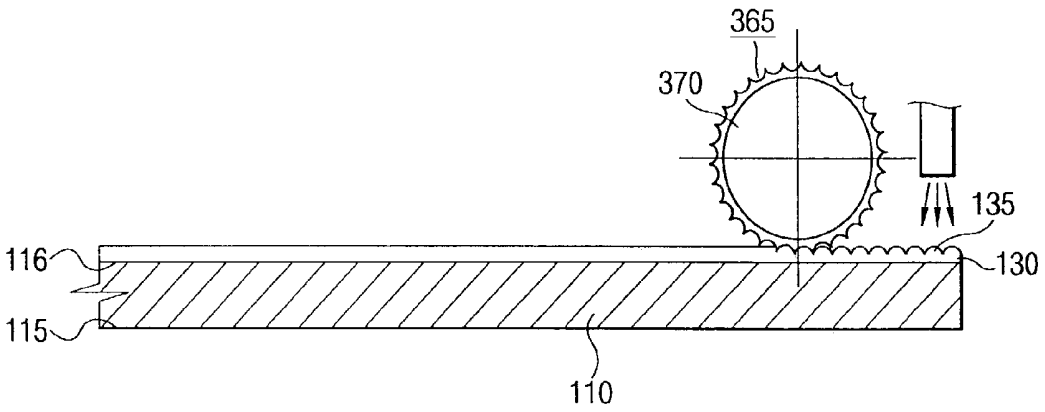


FIG. 7D

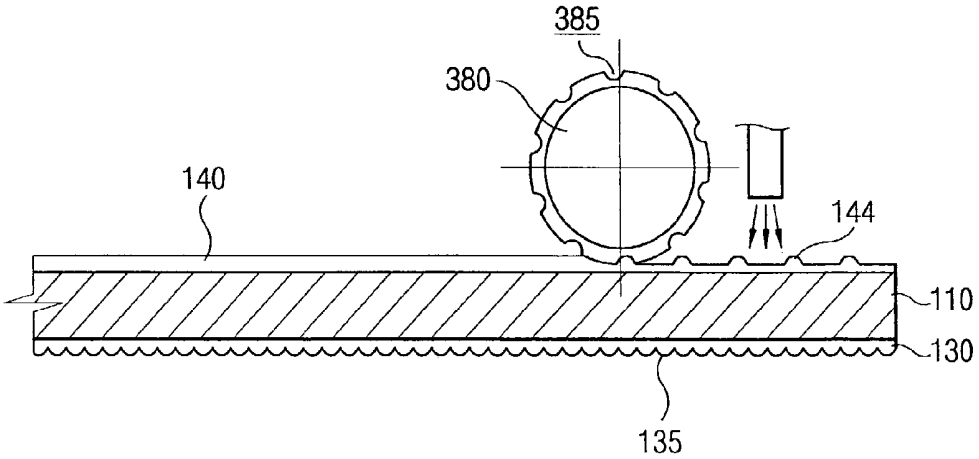


FIG. 8A

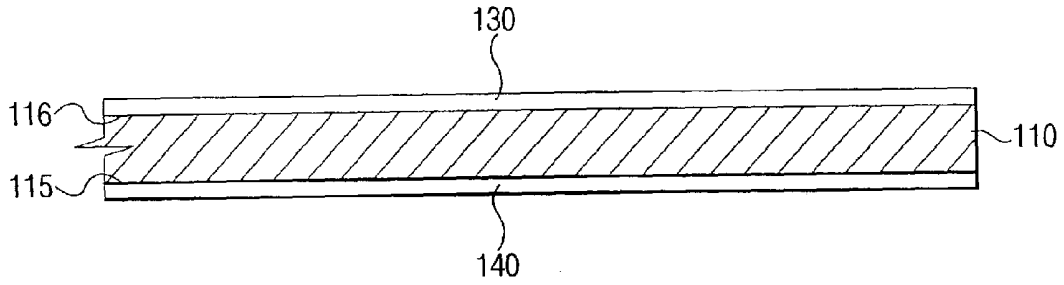


FIG. 8B

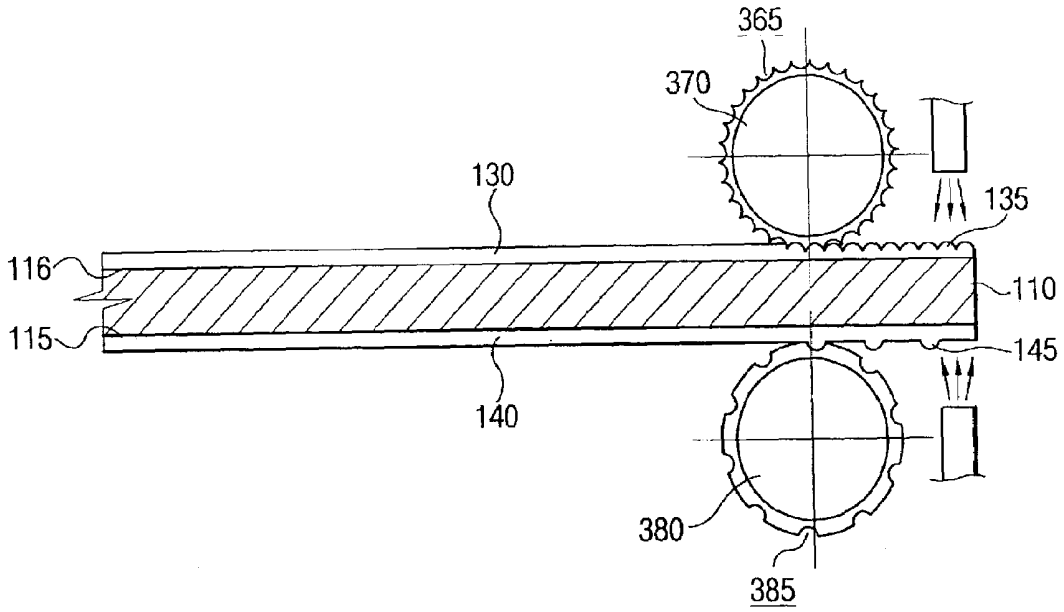


FIG. 8C

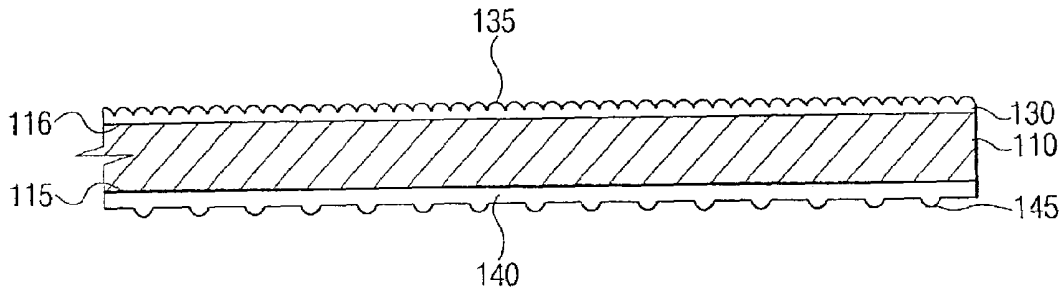


FIG.9A

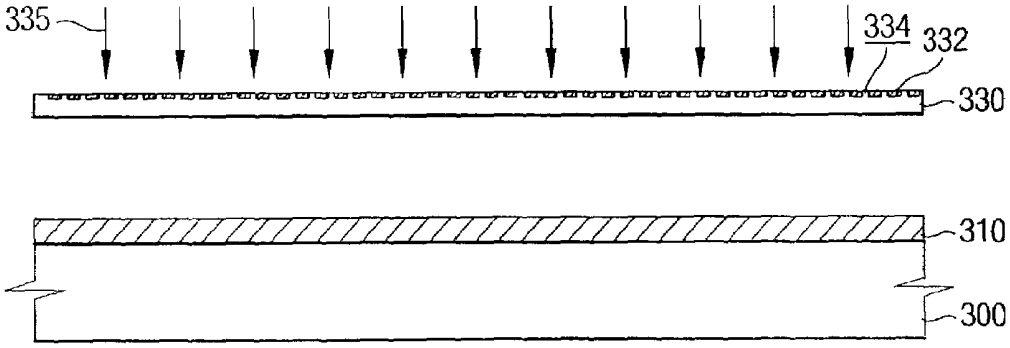


FIG.9B

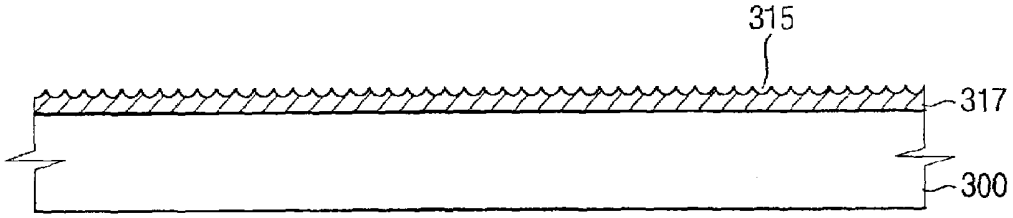


FIG.9C

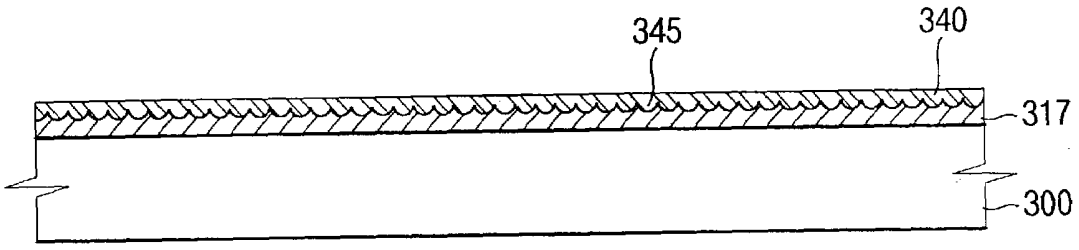


FIG.9D

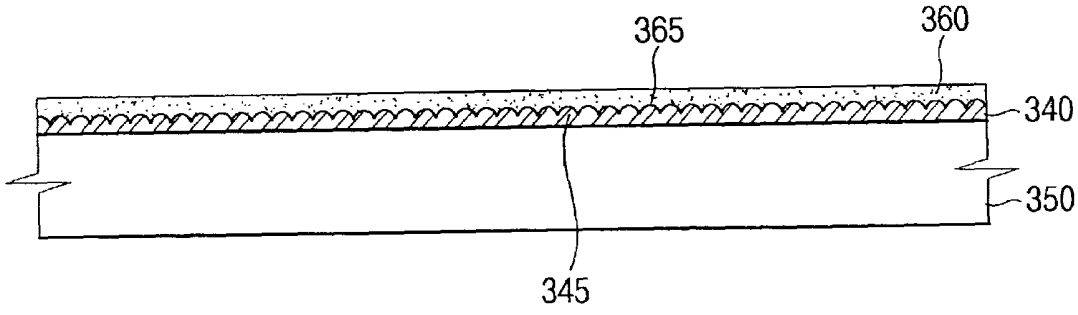


FIG. 9E

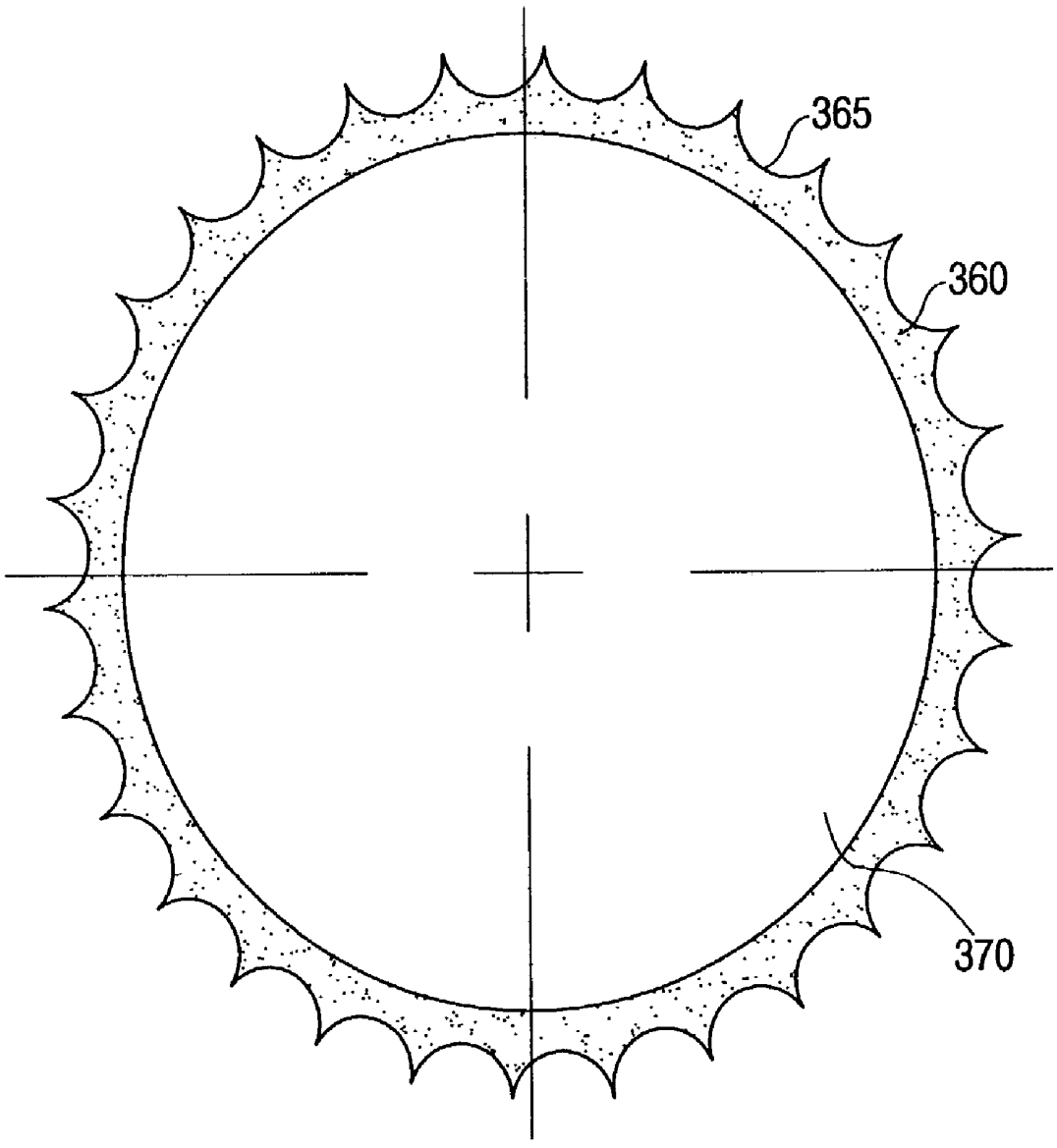
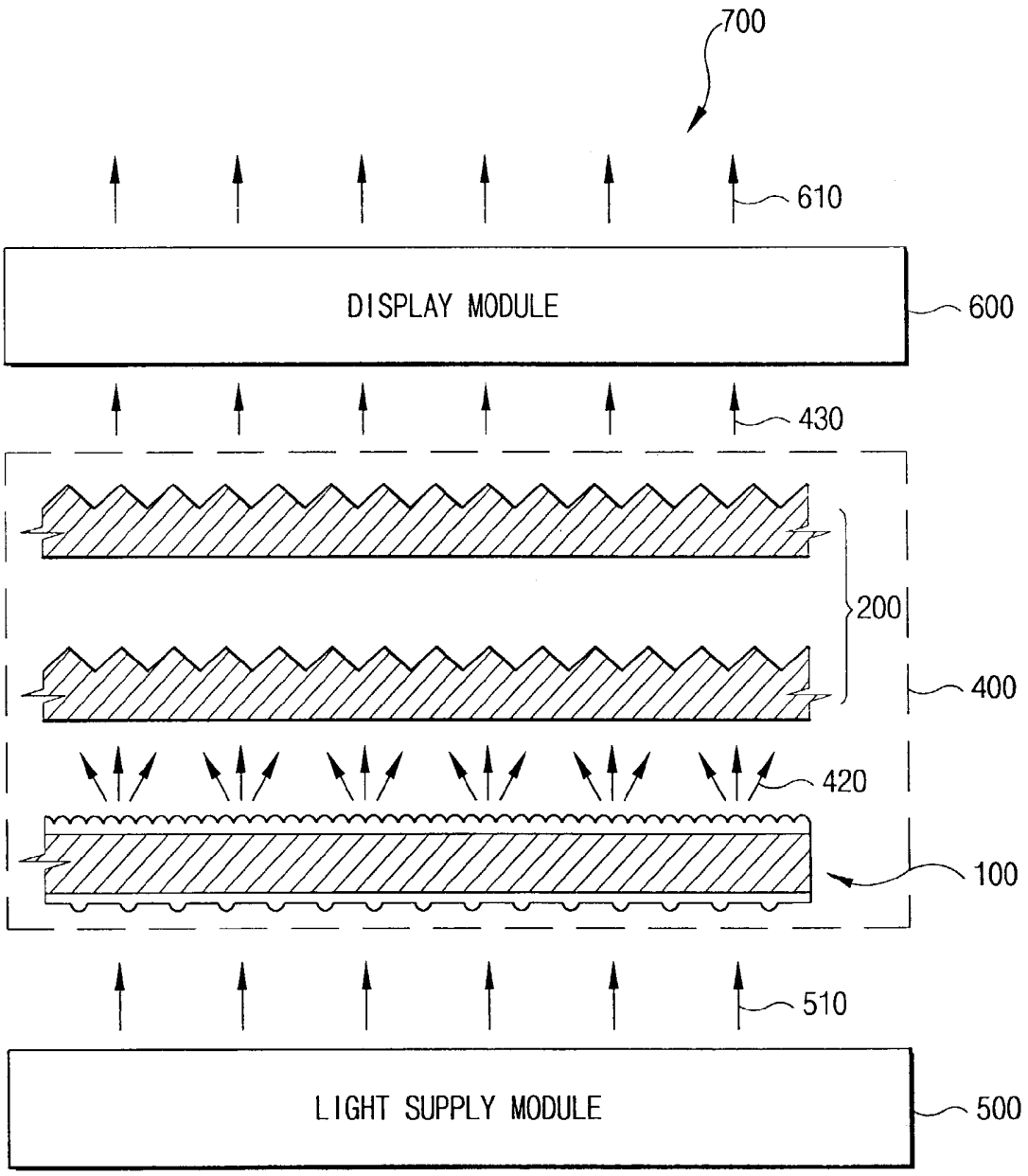


FIG. 10


700
610
DISPLAY MODULE
600
430
200
400
420
100
510
LIGHT SUPPLY MODULE
500

OPTICAL MEMBER, METHOD OF FABRICATING THE SAME AND LIQUID CRYSTAL DISPLAY APPARATUS HAVING THE SAME

CROSS-REFERENCE TO RELATED APPLICATION

This application relies for priority upon Korean Patent Application No. 2002-60804 filed on Oct. 5, 2002, the contents of which are herein incorporated by reference in its entirety.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an optical member, a method of fabricating the same and an LCD (Liquid Crystal Display) apparatus having the same, and more particularly to an optical member that has high display quality and may be manufactured at a low-cost, a method of fabricating the same and an LCD apparatus having the same.

2. Description of the Related Art

An LCD apparatus typically displays images using liquid crystals. Liquid crystals that are used in LCD apparatuses change their arrangement/orientation according to an electrical field that is applied to the liquid crystals, and the arrangement/orientation of the liquid crystals affects the light transmittance through a layer of liquid crystals.

In order to display an image using liquid crystals, an LCD apparatus includes a light supply module for generating light and a display module for changing the light emitted from the light supply module into image light having image information.

The LCD apparatus further includes a module for changing a light distribution of the light emitted from the light supply module or improving brightness of the light emitted from the light supply module. The module is disposed between the light supply module and the display module.

In detail, the module includes a light guide plate, a diffusion sheet and a prism sheet. The light guide plate changes the light distribution of a line light source emitted from the light supply module into a light distribution of a surface light source. The diffusion sheet is disposed on the light guide plate and allows the light emitted from the light guide plate to have a uniform brightness distribution. The diffusion sheet includes beads distributed on a transparent substrate so as to scatter or diffuse the light emitted from the light guide plate.

However, beads may be nonuniformly distributed on the diffusion sheet since beads are very minute. In case that beads are nonuniformly distributed, the brightness distribution of the light emitted from the diffusion sheet is not uniform, thereby deteriorating display quality of LCD apparatus.

BRIEF SUMMARY OF THE INVENTION

The present invention provides an optical member for generating light having a uniform brightness distribution.

Also, the present invention provides a method of fabricating the above optical member.

Also, the present invention provides an LCD apparatus having the above optical member.

In one aspect of the invention, an optical member includes a base body and a light diffusing layer formed on the base body.

The base body has a light incident surface for receiving a first light and a light emitting surface for emitting the first light, which faces the light incident surface. The light diffusing layer has a first resin layer disposed on the light emitting surface and a light diffusing pattern disposed on the first resin layer so as to diffuse the first light emitted from the light emitting surface and to emit a second light.

In another aspect of the invention, in a method of fabricating an optical member, a first resin layer is formed on a light emitting surface of a base body having a light incident surface for receiving a first light and the light emitting surface for emitting the first light, which faces the light incident surface. A light diffusing pattern having a hemispherical shape is formed on the first resin layer so as to diffuse the first light emitted from the light emitting surface and to emit a second light, the light diffusing pattern having a hemispherical shape. The first resin layer is cured through a curing process.

In further aspect of the invention, an LCD apparatus includes a light supply module for generating a first light, an optical member for diffusing the first light and emitting a second light and an LCD panel assembly for displaying an image using the second light.

The optical member includes a base body having a light incident surface for receiving the first light and a light emitting surface facing the light incident surface, a first resin layer formed on the light emitting surface, and a light diffusing layer having a light diffusing pattern formed on the first resin layer, for diffusing the first light emitted from the light emitting surface and emitting a second light.

According to the present invention, the light diffusing pattern formed on the optical member changes a light having a nonuniform brightness distribution into a light having a uniform brightness distribution. Thus, the LCD apparatus having the optical member can improve display quality and can be fabricated at a low-cost since the optical member does not need beads.

Also, since the light diffusing pattern is formed with a curable material, the light diffusing pattern can have various shapes and superior reproducibility.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other advantages of the present invention will become readily apparent by reference to the following detailed description when considered in conjunction with the accompanying drawings wherein:

FIG. **1** is a perspective view showing an optical member according to an exemplary embodiment of the present invention;

FIGS. **2**A and **2**B are views showing a base body shown in FIG. **1**;

FIGS. **3**A and **3**B are graphs showing heat properties of a base body shown in FIG. **1**;

FIG. **4** is a cross-sectional view taken along the lines A-A' for showing an optical member shown in FIG. **1**;

FIG. **5** is a partially enlarged view showing a portion "B" in FIG. **4**;

FIG. **6** is a scanning-electron-microscopy (SEM) specimen showing a light diffusing pattern according to an exemplary embodiment of the present invention;

FIGS. **7**A to **7**D are views for illustrating a method of fabricating an optical member according to an exemplary embodiment of the present invention;

FIGS. **8**A to **8**C are views for illustrating a method of fabricating an optical member according to another exemplary embodiment of the present invention;

FIGS. **9**A to **9**E are views for illustrating a method of manufacturing a roller according to an exemplary embodiment of the present invention; and

FIG. **10** is a schematic view showing an LCD apparatus according to an exemplary embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** is a perspective view showing an optical member according to an exemplary embodiment of the present invention.

Referring to FIG. **1**, an optical member **100** includes an optical sheet that changes light having a nonuniform brightness distribution into light having a uniform brightness distribution. For this purpose, the optical member **100** includes a base body **110** and a light diffusing layer **150**.

The base body **110** has a shape of a rectangular plate or a rectangular sheet having a length longer than a width thereof and comprises polyester having a high light transmittance.

FIG. **2**A is a plan view showing the base body **110** shown in FIG. **1**, and FIG. **2**B is a sectional view showing the base body **110** shown in FIG. **1**.

Referring to FIGS. **2**A and **2**B, the base body **110** includes a first surface **111**, a second surface **112**, a third surface **113**, a fourth surface **114**, a light incident surface **115** and a light emitting surface **116**.

Particularly, the first and second surfaces **111** and **112** face the third and fourth surfaces **113** and **114**, respectively, and the light incident surface **115** faces the light emitting surface **116**. The first to fourth surfaces **111**, **112**, **113** and **114** are connected between the light incident surface **115** and the light emitting surface **116**. The base body **110** has high light transmittance so as to emit a first light **510** that is incident through the light incident surface **115** without changing optical properties of the first light **510**.

The base body **110** may have various shapes in association with an installation position of a light source (not shown) that emits the first light **510**. The base body **110** may be deformed by heat generated from the light source (not shown) and the heat generated from the light source (not shown) may cause wrinkle on the base body **110**. As a result, the base body **110** wrinkled by the heat deteriorates display quality of the LCD apparatus.

FIGS. **3**A and **3**B are graphs showing heat properties of the base body **110** shown in FIG. **1**.

In FIG. **3**A, a graph GA represents a length variation of the base body **110** while the base body **110** is heated and a graph GB represents a length variation of the base body **110** while the base body **110** is cooled.

As shown in FIG. **3**A, when the base body **110** is successively heated from temperature "A" to temperature "B", the base body **110** is expanded along the graph GA as represented in quadratic curve. The base body **110** is successively expanded while the temperature "A" reaches the temperature "B" and contracted while the temperature "B" reaches temperature "C" even though the temperature "B" rises to the temperature "C", so the expanded length of the base body **110** is longest at the temperature "B".

When the base body **110** is successively cooled from the temperature "C" to the temperature "A", the base body **110** has a length different from a length before the base body **110** is heated. The difference between the expanded length and the contracted length of the base body **110** is as shown in reference numeral "L" of FIG. **3**A. This means that the base body **110** is permanently deformed when the temperature applied to the base body **110** exceeds a specified temperature.

As the size of LCD apparatuses become larger, the lamp(s) used for the LCD apparatuses have become longer. The longer lamps generate more heat, and sometimes this increased heat is sufficient to cause wrinkles to form in the base body **110** in the LCD apparatus.

Referring to FIG. **3**B, when the heat-treated base body **110** is successively heated from the temperature "A" to the temperature "C", the base body **110** is expanded in proportion to the temperature raised from the temperature "A" to the temperature "C". On the contrary, when the heat-treated base body **110** is cooled from the temperature "C" to the temperature "A", the length of the base body **110** returns to an initial state before the base body **110** is heated. That is, the expanded length of the base body **110** is identical to the contracted length of the base body **110**.

The heat-treated base body **110** that comprises polyester does not wrinkle by the heat generated from the lamp, thereby preventing the deterioration of display quality of the LCD apparatus. As shown in FIG. **1**, the light diffusing layer **150** is disposed on the heat-treated base body **110**.

FIG. **4** is a cross-sectional view taken along the lines A-A' for showing an optical member shown in FIG. **1**, and FIG. **5** is a partially enlarged view showing a portion "B" shown in FIG. **4**.

Referring to FIGS. **4** and **5**, the light diffusing layer **150** is disposed on the light emitting surface **116** of the base body **110**. The light diffusing layer **150** includes a first resin layer **130** and a light diffusing pattern **135**.

The first resin layer **130** may be comprised of a curable material that is gradually cured in accordance with the passage of time or rapidly cured under a specified condition.

In this exemplary embodiment, the first resin layer **130** is rapidly cured under the specified condition. That is, the first resin layer **130** is cured by exposure to ultraviolet rays, so the first resin layer **130** includes an ultraviolet-curable material.

Also, an expansion ratio and a contraction ratio of the first resin layer **130** are identical to those of the heat-treated base body **110** as described above. If the expansion ratio and contraction ratio of the first resin layer **130** are not identical to those of the heat-treated base body **110**, the first resin layer **130** attached on the heat-treated base body **110** may be cracked or torn while the heat-treated base body **110** is expanded or contracted by the heat generated from the lamp.

FIG. **6** is a scanning-electron-microscopy (SEM) specimen showing a light diffusing pattern according to an exemplary embodiment of the present invention.

Referring to FIG. **6**, the light diffusing pattern **135** is formed on a surface of the first resin layer **130** by using a stamp method.

The light diffusing pattern **135** has a hemispherical shape uniformly formed on the surface of the first resin layer **130**. The first light **510** passing through the base body **110** reaches the light diffusing pattern **135** and is diffused while passing through a spherical surface of the light diffusing pattern **135**. Hereinafter, the first light **510** diffused by the light diffusing pattern **135** is defined as a second light **420**.

In this exemplary embodiment, with consideration for using the stamp method so as to form the light diffusing pattern **135**, the light diffusing pattern **135** may have various shapes, for example, such as a convex pyramid, a concave hemisphere or a concave pyramid.

As shown in FIG. **5**, the optical member **100** further includes a layer **140** having a second resin layer **142**

disposed on the light incident surface **115** and a protrusion **144** disposed on the second resin layer **142** so as to prevent the second resin layer **142** from making contact with a member adjacent to the optical member **100**.

The second resin layer **142** is comprised of the curable material that is gradually cured in accordance with the passage of time or rapidly cured under the specified condition. In this exemplary embodiment, the second resin layer **142** includes the ultraviolet-curable material so as to be cured by exposure to ultraviolet rays.

Also, an expansion ratio and a contraction ratio of the second resin layer **142** are identical to those of the heat-treated base body **110**. If the expansion ratio and contraction ratio of the second resin layer **142** are not identical to those of the heat-treated base body **110**, the second resin layer **142** attached on the heat-treated base body **110** may be cracked or torn while the heat-treated base body **110** is expanded or contracted by the heat generated from the lamp.

Furthermore, an expansion ratio and a contraction ratio of the second resin layer **142** are identical to those of the first resin layer **130**. If the expansion ratio and contraction ratio of the second resin layer **142** are not identical to those of the first resin layer **130**, the base body **110** may be bent due to differences of the expansion and contraction ratios between the first and second resin layers **130** and **142** while the base body **110** is expanded or contracted.

The protrusion **144** is formed on a surface of the second resin layer **142** in a matrix configuration and protruded from the surface of the second resin layer **142**. The protrusion **144** may have various shapes, for example, such as a hemispherical shape and a polygonal shape since the protrusion **144** is formed using the stamp method.

Hereinafter, a method of fabricating the optical member according to an exemplary embodiment of the present invention will be illustrated with reference to the accompanying drawings.

FIGS. **7**A to **7**D are views for illustrating a method of fabricating an optical member according to an exemplary embodiment of the present invention.

Referring to FIG. **7**A, the base body **110** is selectively heat-treated according to a material contained into the base body **110** before forming the first resin layer **130** (see FIG. **7**B) thereon. That is, the heat treatment with respect to the base body **110** is selectively performed when the expansion ratio and the contraction ratio are not identical to each other.

Referring to FIG. **7**B, the first resin layer **130** is formed on the light emitting surface **116** of the base body **110** in a thin film. In this exemplary embodiment, the first resin layer **130** includes the curable material cured by exposure to the ultraviolet rays.

Referring to FIG. **7**C, a first roller **370**, on which a first transfer pattern **130** having a hemispherical shape that is reversed with respect to the light diffusing pattern **135** (see FIG. **4**) is formed, is disposed on the first resin layer **130**. The first roller **370** is rolled along the surface of the first resin layer **130** so as to form the light diffusing pattern **135** on the first resin layer **130**. After the light diffusing pattern **135** is formed on the first resin layer **130** by rolling the first roller **370**, the first resin layer **130** and the light diffusing pattern **135** formed on the first resin layer are exposed to the ultraviolet rays, thereby curing the first resin layer **130** and the light diffusing pattern **135**.

Referring to FIG. **7**D, after curing the first resin layer **130** and the light diffusing pattern **135**, the second resin layer **140** having the curable material cured by exposure to the ultraviolet rays is formed on the light incident surface **115** of the base body **110**. A second roller **380**, on which a second transfer pattern **385** having a reversed shape with respect to the protrusion **144** is formed, is disposed on the second resin layer **140**. The second roller **380** is rolled along the surface of the second resin layer **140** so as to form the protrusion **144** on the surface of the second resin layer **140**, thereby preventing the base body **110** from making contact with a member adjacent to the base body **110**, for example, such as a light guide plate (not shown). The second resin layer **140** and the protrusion **144** are cured by exposure to the ultraviolet rays.

FIGS. **8**A to **8**C are views for illustrating a method of fabricating an optical member according to another exemplary embodiment of the present invention.

Referring to FIG. **8**A, a first resin layer **130** is formed on a light emitting surface **116** of a base body **110** and a second resin layer **140** is formed on a light incident surface **115**. In this exemplary embodiment, the first and second resin layers **130** and **140** include a curable material cured by exposure to an ultraviolet rays.

Referring to FIGS. **8**B and **8**C, a first roller **370** is disposed on the first resin layer **130** and a second roller **380** is disposed on the second resin layer **140**.

The first roller **370** includes a first transfer pattern **375** which is closely formed on the first rolled **370** and the second roller **380** includes a second transfer pattern **385** which is separated from each other in a predetermined distance. The first and second transfer patterns **375** and **385** has a hemispherical shape that is reversed with respect to a light diffusing pattern **135** and a protrusion **145**, respectively (see FIG. **8**C).

The first roller **370** is rolled along a surface of the first resin layer **130** so as to form the light diffusing pattern **135** on the first resin layer **130** and the second roller **380** is rolled along a surface of the second resin layer **140** so as to form the protrusion **145** on the second resin layer **140**, respectively. The light diffusing pattern **135** and the protrusion **145** may be formed by transferring the base body **110** to be passed between the first and second rollers **370** and **380**.

After the light diffusing pattern **135** and the protrusion **145** are formed on the first and second resin layers **130** and **140**, respectively, the first resin layer **130** and the second resin layer **140** are exposed to the ultraviolet rays, so the first resin layer **130** on which the light diffusing pattern **135** is formed and the second resin layer **140** on which the protrusion **145** is formed are cured.

Hereinafter, a method of fabricating a roller according to an exemplary embodiment of the present invention will be described with reference to the accompanying drawings.

FIGS. **9**A to **9**E are views for illustrating a method of manufacturing a roller according to an exemplary embodiment of the present invention.

Referring to FIG. **9**A, a first photoresist layer **310** is coated on a first substrate **300** by using a spin coating method.

Then, a pattern mask **330** is aligned with the first photoresist layer **310**. The pattern mask **330** includes a chrome layer **332** that is partially opened corresponding to positions on which a light diffusing pattern (not shown) is formed. A light **335** is provided to the pattern mask **330** aligned with the first photoresist layer **310**.

The light **335** provided to the pattern mask **330** is supplied to the first photoresist layer **310** passing through the opening portion **334** of the chrome layer **332** so as to partially expose the first photoresist layer **310**.

Referring to FIG. **9**B, partially exposed portions of the first photoresist layer **310** by the light **335** supplied through the pattern mask **330** is removed through a developing

process, thereby forming a second photoresist layer **317** on which a first pattern **315** having size identical to and shape that is reversed with respect to that of the light diffusing pattern **135** is formed.

Referring to FIG. **9**C, a metal layer **340** is formed on the second photoresist layer **317** by using a sputtering method, on which the first pattern **315** is formed. The metal layer **340** has a second pattern **345** having size and shape identical to those of the light diffusing pattern **135** by means of the first pattern **315** of the second photoresist layer **317**.

The second photoresist layer **317** formed under the metal layer **340** is removed through an ashing process and the metal layer **340** is separated from the second photoresist layer **317**.

The separated metal layer **340** is attached on a second substrate **350** as shown in FIG. **9**D and a synthetic resin layer **360** is coated over the second pattern **345** of the metal layer **340**. In this exemplary embodiment, the synthetic resin layer **360** is preferably coated over the second pattern **345** without a void space between the synthetic resin layer **360** and the second pattern **345** of the metal layer **340**.

By coating the synthetic resin layer **360** over the second pattern **345** of the metal layer **340**, a third pattern **365** is formed on the synthetic resin layer **360**. The third pattern **365** has a reversed shape with respect to the light diffusing pattern **135** and is named as a transfer pattern hereinafter.

Referring to FIG. **9**E, the synthetic resin layer **360**, on which the transfer pattern **365** is formed, is attached along an outer surface of the first roller **370**. The light diffusing pattern **135** of the first resin layer **130** according to the exemplary embodiment of the present invention is formed by using the first roller **370** having the transfer pattern **365**.

FIG. **10** is a schematic view showing an LCD apparatus according to an exemplary embodiment of the present invention.

Referring to FIG. **10**, an LCD apparatus **700** includes a light supply module **500**, a light adjusting module **400** and a display module **600**.

The light supply module **500** includes at least one CCFL (Cold Cathode Fluorescent Lamp) so as to emit the first light **510** needed to display the image. The first light **510** emitted from the light supply module **500** is supplied to the light adjusting module **400**.

The light adjusting module **400** includes at least two optical members **100** and **200**.

In this exemplary embodiment, the light adjusting module **400** includes a diffusing sheet **100** and a prism sheet **200**. The diffusing sheet **100** changes a brightness distribution of the first light **510** so as to emit the second light **420** having a uniform brightness distribution. The prism sheet **200** receives the second light **420** provided from the diffusing sheet **100** and changes directions of the second light **420** so as to emit a third light **430**. The diffusing sheet **100** has a same structure as the optical sheet (see FIG. **4**) and is fabricated through a same process as the optical sheet (see FIGS. **7**A to **7**D), so a method of fabricating the diffusing sheet **100** will be omitted in detail.

The display module **600** receives the third light **430** provided from the prism sheet **200** and emits an image light **610** having image information.

In this exemplary embodiment, the display module **600** is an LCD panel that displays the image information using a liquid crystal. The LCD panel may have various shapes so as to display the image information using the liquid crystal.

Although the exemplary embodiments of the present invention have been described, it is understood that the present invention should not be limited to these exemplary embodiments but various changes and modifications can be made by one ordinary skilled in the art within the spirit and scope of the present invention as hereinafter claimed.

What is claimed is:

1. An optical member comprising:

a base body having a light incident surface for receiving a first light and a light emitting surface for emitting the first light, the base body being substantially free of particles; and

a light diffusing layer having a first resin layer disposed on the light emitting surface and a light diffusing pattern disposed on the first resin layer so as to diffuse the first light emitted from the light emitting surface and to emit a second light, wherein the light diffusing layer is substantially free of particles and makes direct contact with the base body;

wherein the light diffusing pattern disposed on the first resin layer includes a substantially hemispherical shape.

2. The optical member of claim **1**, wherein the base body is heat-treated so as to prevent wrinkling of the base body.

3. The optical member of claim **2**, wherein an expansion ratio of the base body while the base body is heat-treated is identical to a contraction ratio of the base body while the base body is cooled.

4. The optical member of claim **1**, wherein the first resin layer comprises an ultraviolet-curable material.

5. The optical member of claim **1**, wherein the base body comprises an expansion ratio and a contraction ratio identical to those of the first resin layer.

6. The optical member of claim **1**, further comprising a second resin layer disposed on the light incident surface and a layer having a protrusion disposed on the second resin layer so as to prevent the second resin layer from making contact with an adjacent member.

7. The optical member of claim **6**, wherein the second resin layer comprises an ultraviolet-curable material.

8. The optical member of claim **6**, wherein the base body comprises an expansion ratio and a contraction ratio identical to those of the second resin layer.

9. The optical member of claim **6**, wherein the second resin layer has a plurality of protrusions spaced apart from each other.

10. The optical member of claim **6**, wherein the protrusion is part of a protrusion pattern formed on the second resin layer.

11. The optical member of claim **1**, wherein the first resin layer is a thin film.

12. A method of fabricating an optical member, comprising:

heat-treating a base body to prevent the base body from wrinkling, wherein the base body is substantially free of particles;

forming a substantially flat first resin layer directly on a light emitting surface of the base body, the base body having a light incident surface for receiving a first light and the light emitting surface for emitting the first light;

forming a light diffusing pattern on the first resin layer so as to diffuse the first light emitted from the light emitting surface and to emit a second light, the light diffusing pattern having a substantially hemispherical shape; and

curing the first resin layer.

13. The method of claim **12**, wherein forming the light diffusing pattern comprises rolling a roller on which a transfer pattern having a reversed shape with respect to the

light diffusing pattern is formed along the first resin layer so as to form the light diffusing pattern on the first resin layer.

14. The method of claim **12**, wherein curing the first resin layer comprises irradiating an ultraviolet-ray onto the first resin layer formed on the light emitting surface so as to cure the first resin layer.

15. The method of claim **12**, further comprising:

forming a second resin layer on the light incident surface;

forming a protrusion pattern on the second resin layer; and

curing the second resin layer.

16. The method of claim **15**, wherein curing the second resin layer comprises irradiating an ultraviolet-ray onto the second resin layer.

17. The method of claim **15**, wherein the forming of the protrusion comprises forming a plurality of protrusions spaced apart from each other.

18. The method of claim **12**, wherein the first resin layer is a thin film.

19. A method of fabricating an optical member having a base body that diffuses a first light incident Through a light incident surface thereof and emits a second light through a light emitting surface thereof, comprising:

heat-treating the base body to prevent the wrinkling of the base body, wherein the base body is substantially free of particles;

forming a first substantially flat curable resin layer directly on the light emitting surface;

forming a second substantially flat curable resin layer on the light incident surface;

forming a light diffusing pattern on the first curable resin layer so as to diffuse the first light emitted form the light emitting surface and to emit the second light, the light diffusing pattern having a substantially hemispherical shape;

forming a protrusion pattern on the second curable resin layer so as to prevent the second curable resin layer from making contact with an adjacent member; and

curing the first and second curable resin layers.

20. The method of claim **19**, wherein the first curable resin layer is a thin film.

21. The method of claim **19**, wherein the forming of the protrusion comprises forming a plurality of protrusions spaced apart from each other.

22. An LCD apparatus comprising:

a light supply module for generating a first light;

an optical member including a base that is substantially free of particles having a light incident surface for receiving the first light and a light emitting surface, a first resin layer formed on the light emitting surface as a thin film having a substantially flat surface, and a light diffusing layer having a light diffusing pattern formed on the first resin layer, wherein the light diffusing layer Is substantially free of particles for diffusing the first light emitted from the light emitting surface and emitting a second light, and wherein the light diffusing layer makes direct contact with the base, and wherein the light diffusing pattern has a substantially hemispherical shape;

a second resin layer formed on the light incident surface;

a protrusion pattern formed on the second resin layer to prevent the second resin layer from making contact with an adjacent member; and

an LCD panel assembly disposed at a pathway of the second light for changing the second light into an image light having image information.

23. The LCD apparatus of claim **22**, wherein protrusions of the protrusion pattern are spaced apart from each other.

* * * * *

专利名称(译)	光学构件，其制造方法和具有该光学构件的液晶显示装置		
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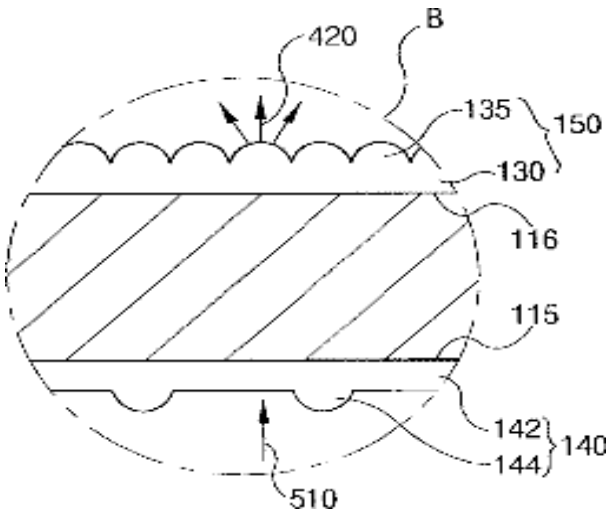
摘要(译)

在具有光学构件的LCD装置中，光学构件具有基体，该基体具有光入射表面和面向光入射表面的发光表面。在发光表面上形成第一树脂层，并且在第一树脂层上均匀地形成光漫射图案，以漫射第一光并发射第二光。因此，LCD装置可以改善显示质量并且可以以低成本制造来制造。而且，由于光漫射图案由可固化材料形成，所以光漫射图案可以具有各种形状和优异的再现性。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