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(54) **Organic light emitting diode (OLED) display apparatus having light sensing function**

Organische lichtemittierende Diodenanzeigevorrichtung mit Lichtmessfunktion

Appareil d'affichage à diode électroluminescente organique doté d'une fonction de détection de la lumière

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Description

BACKGROUND

1. Field

[0001] One or more example embodiments of the present disclosure relate to an organic light emitting diode (OLED) display apparatus that enables a sensor panel to sense an external object by simultaneously displaying an image using a light emitter, and by passing input light from the external object through a transparent window and thereby, may take a photograph.

2. Description of the Related Art

[0002] An OLED is a light-emitting diode (LED) in which the emissive electroluminescent layer is a film of organic compounds which emit light in response to an electric current. This layer of organic semiconductor material is situated between two electrodes.

[0003] OLEDs are used in television screens, computer monitors, small, portable system screens such as mobile phones and PDAs. OLEDs are also used in large-area light-emitting elements for general illumination.

[0004] Unlike an existing liquid crystal display (LCD) apparatus, an OLED display apparatus is self luminous and thus works without a backlight. Therefore, it can display deep black levels and can be thinner and lighter than an LCD. Accordingly, OLEDs have recently been the subject of much interest.

[0005] US 2008/106628 discloses an OLED display with a sensor behind it. Light reflected from an external object goes through transparent pixels to reach the sensor. US 2004/263670 discloses an OLED display and a sensor, wherein external light entering through holes in the black matrix is received by the sensor. US 6454414, US 2010/238263, JP 2010/250789 and EP 2177973 disclose (semi-)transparent OLED displays with a CCD camera behind it.

SUMMARY

[0006] The foregoing and/or other aspects are achieved by providing an organic light emitting diode (OLED) display apparatus as defined in the single appended independent claim.

[0007] The OLED display apparatus may further include an infrared ray light source to emit an infrared ray towards the external object; and a pass filter to extract an infrared component from the input light comprising the infrared ray returned from the external object. The sensor panel may sense the infrared component.

[0008] The foregoing and/or other aspects are achieved by providing an organic light emitting diode (OLED) display apparatus having a light sensing function. The apparatus includes a display panel comprising an imaging pattern formed with a plurality of OLED pixels, and a sensor panel disposed behind the display panel and comprising at least one sensor to sense light that has passed through the imaging pattern.

[0009] Additional aspects of embodiments will be set forth in part in the description which follows and, in part, will be apparent from the description, or may be learned by practice of the disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] These and/or other aspects will become apparent and more readily appreciated from the following description of embodiments, taken in conjunction with the accompanying drawings of which:

FIG. 1 illustrates a configuration of an organic light emitting diode (OLED) display apparatus having a light sensing function;

FIG. 2 illustrates OLED pixels according to example embodiments;

FIG. 3 illustrates an imaging pattern of a display panel included in an OLED display apparatus having a light sensing function according to examples falling both within and outside the claimed invention;

FIG. 4 illustrates an imaging pattern of a display panel included in an OLED display apparatus having a light sensing function according to an example embodiment of the invention and other embodiments not forming part of the claimed invention;

FIG. 5 illustrates a configuration of an OLED display apparatus having a light sensing function;

FIG. 6 illustrates an OLED pixel including an infrared ray (IR) light source according to example embodiments; and

FIG. 7 illustrates an OLED pixel including a pass filter according to example embodiments.

DETAILED DESCRIPTION

[0011] Reference will now be made in detail to embodiments, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to the like elements throughout. Embodiments are described below to explain the present disclosure by referring to the figures.

[0012] The term "organic light emitting diode (OLED)" used throughout the present specification denotes a self-luminous element that is different from a general liquid crystal display (LCD) emitting light by a backlight. In general, compared to the LCD, the OLED may have relatively excellent color definition, and optical viewing angle, a quick response speed, low power, slimness, and the like. Following the LCD, a plasma display panel (PDP), and the like, the OLED has been receiving attention as a next generation display. In particular, proposed herein is a display apparatus that may simultaneously realize displaying of an image and recognizing a space touch of a user, for example recognizing a movement within a 3-

dimensional (3D) space, by providing a pixel further including a window to pass input light from an external object while displaying the image using the OLED.

[0013] FIG. 1 illustrates a configuration of an OLED display apparatus 101 having a light sensing function according to an example not forming part of the claimed invention.

[0014] Referring to FIG. 1, the OLED display apparatus 101 having the light sensing function may include, for example, a display panel 103 and a sensor panel 105.

[0015] The display panel 103 may include an imaging pattern formed with a plurality of OLED pixels. For example, the display panel 103 may provide an environment for photographing an external object by including the imaging pattern formed with the plurality of OLED pixels, and by passing input light from the external object through the imaging pattern. Referring to FIG. 1, the display panel 103 may be located directly above or on top or in front of the sensor panel 105 such as in a stacked configuration.

[0016] The display panel 103 may display a general image using an OLED, and may also pass the light input from the external object through the imaging pattern without having to separately switch a mode of the display panel based on a time division that is formed and combined based on a transparency adjustment of a window included in at least some of the OLED pixels. These at least some of the OLED pixels, having a window, are the plurality of OLED pixels that combine to form the imaging pattern.

[0017] When forming the imaging pattern, the display panel 103 forms various shapes of imaging patterns by combining first OLED pixels including an opaque window with second OLED pixels including a transparent window. The windows of the first and second OLED pixels are invariably opaque and transparent, respectively.

[0018] In the present example, the display panel 103 may selectively form a pattern for passing the input light, for example an imaging pattern with a circular hole, by adjusting the window within the first OLED pixel to be opaque, and by adjusting the window within the second OLED pixel to be transparent, or vice versa.

[0019] In the invention, however, the display panel 103 forms the imaging pattern in a modified uniformly redundant array (MURA), by appropriately arranging first and second OLED pixels and/or by adjusting and combining a transparency level of the windows included in first OLED pixel and the second OLED pixel. More types of OLED pixels, each type having a window with a set or variable level of opaqueness and/or transparency, than two types of OLED pixels may also be provided in one display panel.

[0020] The display panel 103 may form various shapes of imaging patterns by changing a quantity of OLED pixels or positions of the OLED pixels and by arranging the plurality of OLED pixels based on a transparency of a window included in at least a selection of the OLED pixels of the display panel to form a desired imaging pattern. For example, the display panel 103 may form a plurality of imaging patterns based on an external environment where light enters, and may change a number of imaging patterns or positions of imaging patterns based on a predetermined period.

[0021] A function of the display panel 103 to display an image will be described with reference to FIG. 2.

[0022] FIG. 2 illustrates OLED pixels according to example embodiments.

[0023] Without using a separate backlight, the display panel 103 may include a plurality of OLED pixels and display an image through self-luminescence. In this example, displaying of the image on the display panel 103 may be simultaneously performed with the passing of input light using an imaging pattern and photographing, that is, with the sensing of an external object.

[0024] Referring to FIG. 2, each of the OLED pixels may include, for example, a light emitter to emit one of a red light, a green light, and a blue light using a luminous organic material, a circuit unit to drive the light emitter, and a window, for example, a glass substrate to pass or block the input light. When the window is formed to be transparent, the window may pass the light input from the outside, such as light reflected by an external object. When the window is formed to be opaque, the window may block the input light from the outside.

[0025] For example, a first OLED pixel 201 may include a light emitter 203 to emit light and to display an image such as a broadcast image, a circuit unit 205 to drive the light emitter 203, and an opaque window 207 to block the input light from the outside. A second OLED pixel 211 may be configured to be similar to the first OLED pixel 201, or may be configured to include a light emitter 213, a circuit unit 215, and a transparent window 217 to pass the input light from the outside as is. The transparency (or opaqueness) of the window of each OLED pixel 201, 211 may be fixed or adjustable.

[0026] Referring again to FIG. 1, the sensor panel 105 may photograph the external object by sensing the input light from the external object passing through the imaging pattern included in the display panel 103, and by obtaining image data associated with the external object. In this example, it is possible to stabilize the quality of image data obtained at the sensor panel 105 by maintaining the whole transparency level of the imaging patterns included in the display panel 103 to be a predetermined level.

[0027] The sensor panel 105 may be disposed at a rear end of the display panel 103 or below the display panel 103 to sense the light that is input from the external object and that passes through the display apparatus 103 at a predetermined transparency level, and to obtain image data associated with the external object.

[0028] In the example of fig. 1, that is not forming part of the invention, the sensor panel 105 may sense the input light passing through the window by configuring a sensor unit and an aperture to be in a form of a grid pattern or in a form of a repeating pattern. The sensor unit may sense the input light and the aperture may pass

the input light. The sensor panel 105 may further include a color filter to obtain image data corresponding to a color of the color filter.

[0029] According to an embodiment, an OLED display apparatus having a light sensing function may display an image and photograph an external object, for example at the same time or substantially the same time, by simultaneously processing displaying of the image using a light emitter and sensing of input light from an external object passing through an imaging pattern included in a display panel.

[0030] In addition, the OLED display apparatus having the light sensing function may be used in a variety of fields such as proximity sensing, gesture recognition, photography, by simultaneously providing an image display function and an external object photographing function.

[0031] For example, when displaying a three-dimensional (3D) image, the OLED display apparatus having the light sensing function may photograph the external object and obtain a distance between the OLED display apparatus and the external object, or position information of the OLED display apparatus and the external object. Accordingly, the OLED display apparatus may readily recognize a gesture and readily sense a manipulation on a 3D image appearing to be positioned outside the OLED display apparatus, for example, outside a screen.

[0032] When the OLED display apparatus having the light sensing function is applied to a terminal supporting a video call, an image displaying position and an external object photographing position may match and thus, a user may make a video call while viewing a face of a counter party, that is, the party being called.

[0033] When the OLED display apparatus having the light sensing function is applied to a relatively large screen, for example, a smart window, a user may recognize a minute motion of a counter party by obtaining a distance of the counter party from the screen or position information using an image of the counter party. Accordingly, the user may perceive the user as if the user were present in the same space as the counter party.

[0034] Referring again to FIG. 1, the OLED display apparatus 101 may recognize a movement of the external object within a predetermined space based on a change in a position where the input light is sensed. For example, when a user touches a space, the OLED display apparatus may verify a movement of the user within the space, for example, a drag and the like. For the above operation, virtual coordinates may be set at each imaging pattern or hole included in the display panel 103. The sensor panel 105 may identify coordinates of a hole passed by each of input lights sensed at predetermined time intervals with respect to the same external object, and may verify the movement of the external object within the space.

[0035] For example, with respect to 16 holes within the imaging pattern of FIG. 1, the display panel 103 may sequentially set coordinates of the holes from hole A with coordinates (1,1) to hole B with coordinates (4, 4). When a plurality of input lights with respect to the external object sequentially passes through the hole A and the hole B at predetermined time intervals, the sensor panel 105 may sense that the external object has moved from coordinates (1, 1) to coordinates (4, 4).

[0036] The OLED display apparatus 101 may verify a space touch of the external object by combining sensing results with respect to one or more holes within the imaging pattern.

[0037] For example, when 16 holes are arranged within the imaging pattern as shown in FIG. 1, a sensing result at the sensor panel 105 associated with each of 16 holes with respect to the external object may be different based on a position relationship between a corresponding hole and the external object, an incident angle of related input light, and the like. Accordingly, the sensor panel 105 may accurately recognize a position of the external object within the space, that is, a form of the space touch by combining sensing results of 16 holes.

[0038] The sensor panel 105 may sense the position of the external object within the space based on an aspect that a sensing result of input light with respect to the external object is slightly different based on an arrangement position of each hole.

[0039] A model of calculating a position of an external object within a space using a plurality of different sensing results is disclosed in "BiDi Screen: Depth and Lighting Aware Interaction and Display," by Matthew Hirsch, Douglas Lanman, Ramesh Raskar, and Henry Holtzman, in Proceedings of SIGGRAPH ASIA Dec. 2009. Detailed descriptions related thereto will be omitted here.

[0040] The OLED display apparatus 101 may more accurately verify a movement of a drag, such as a drag of an object across the display, and the like within the space after the space touch by combining sensing results from holes within the imaging pattern with respect to the external object at predetermined time intervals, and by using the combined sensing results.

[0041] For example, when 16 holes are arranged in the imaging pattern as shown in FIG. 1, the OLED display apparatus 101 may induce a movement start position of the external object within the space based on a combination of sensing results at the sensor panel 105 associated with the 16 holes at a point in time T1. Similarly, at a point in time T2, the OLED display apparatus 101 may induce a movement end position within the space based on the combination of sensing results at the sensor panel 105 associated with the 16 holes.

[0042] That is, the OLED display apparatus 101 may verify a position of the external object within the space, for example, coordinates (1, 1) at the point in time T1 and a position of the external object within the space, for example, coordinates (4, 4) at the point in time T2 that is a point in time after a predetermined amount of time is elapsed from the point in time T1, and may sense that the external object has moved from coordinates (1, 1) to coordinates (4, 4).

[0043] Accordingly, the OLED display apparatus 101 may accurately verify a movement of the external object within the space based on a change in the movement start position of the object and the movement end position of the object within the space.

[0044] FIG. 3 illustrates an imaging pattern of a display panel 301 included in an OLED display apparatus having a light sensing function according to examples both within and outside the scope of the present invention.

[0045] In the invention, the display panel 301 forms the imaging pattern to be a MURA hole, by arranging and combining a plurality of OLED pixels based on a transparency level of a window included in each OLED pixel.

[0046] Referring to FIG. 3, the display panel 301 may include the imaging pattern formed with the plurality of OLED pixels, and may pass input light from an external object through the imaging pattern.

[0047] In an example, not forming part of the claimed invention, the display panel 301 may form, as the imaging pattern for passing the light, a pattern 303 including a circular hole or a polygonal hole. In the invention, the imaging pattern is formed as a MURA pattern.

[0048] FIG. 4 illustrates an imaging pattern of a display panel included in an OLED display apparatus having a light sensing function according to an inventive embodiment and other examples that do not form part of the claimed invention.

[0049] Accordingly, the OLED display apparatus may pass a plurality of input lights from the external object using the display panel formed with a plurality of imaging patterns, and may sense the plurality of input lights using a sensor panel. Thus, it is possible to obtain the effect of photographing the external object using a plurality of cameras.

[0050] FIG. 5 illustrates a configuration of an OLED display apparatus 501 having a light sensing function according to an example not foming part of the claimed invention.

[0051] Referring to FIG. 5, the OLED display apparatus 501 may further include a pass filter 505 in addition to a display panel 503 and a sensor panel 507.

[0052] As described above, the display panel 503 may include an imaging pattern formed with a plurality of OLED pixels, and may pass input light, for example, sunlight from an external object through the imaging pattern.

[0053] The input light may include an infrared ray (IR) reflected from the external object. For the above operation, the OLED display apparatus 501 may further include an IR light source being disposed in at least one portion of the display panel 503 to emit the IR towards the external object. Accordingly, the OLED display apparatus 501 may sense a relatively large amount of infrared components from the input light and thus, may obtain cleaner image data with respect to the external object.

[0054] The IR emitted from the IR light source may be returned from the external object and be input into the display panel 503 as the input light. The display panel 503 may transfer the input light to the pass filter 505 disposed at a rear end such as a rear face or back surface of the display panel 503, through the imaging pattern.

[0055] The pass filter 505 (hereinafter, a first pass filter) may be disposed between the display panel 503 and the sensor panel 507, for example in a sandwich-like configuration, to extract an infrared component from the input light passing through the imaging pattern of the display panel 503.

[0056] The sensor panel 507 disposed at the rear end of the first pass filter may generate image data by sensing the extracted infrared component and photographing the external object, for example, a space touch.

[0057] The IR light source may be included in at least one of the OLED pixels as an internal configuration. In this example, an infrared component may be extracted from the input light including an IR returned from the external object by the pass filter 505 (hereinafter, a second pass filter) included in the OLED pixel as the internal configuration.

[0058] The pass filter 505 functioning as the second pass filter may extract the infrared component from the input light from the external object, and transfer the extracted infrared component to the imaging pattern of the display panel 503.

[0059] The sensor panel 507 positioned at the rear end of the display panel 503 may sense the infrared component passing through the imaging pattern of the display panel 503. A ray, for example, a visible ray excluding the infrared ray included in the input light may be blocked by the pass filter 505 and thus, the sensor panel 507 may obtain image data with respect to the external object using only the sensed infrared component. Accordingly, it is possible to decrease noise in the image.

[0060] The first pass filter and the second pass filter are differentiated based on the respective positions thereof within a display apparatus.

[0061] That is, the first pass filter indicates a pass filter that is positioned in a structure sandwiched between the display panel 503 and the sensor panel 507, and the second pass filter indicates a pass filter included within each organic light emitting diode (OLED) pixel (for example, window) of the display panel 503.

[0062] Accordingly, the first pass filter and the second pass filter have the same functionality and may be selectively included in the display apparatus to extract an infrared component.

[0063] Consequently, when the display apparatus includes the first pass filter, the display apparatus is configured to include the display panel 503, the pass filter 505, and the sensor panel 507. When the display apparatus includes the second pass filter, the display apparatus is configured to include the display panel 503, including the second pass filter, and the sensor panel 507. Accordingly, when the display apparatus includes the second pass filter, the display apparatus may be formed in a thinner structure compared to a case where the display apparatus includes the first pass filter.

[0064] FIG. 6 illustrates an OLED pixel 601 including

an IR light source according to example embodiments.

[0065] Referring to FIG. 6, the OLED pixel 601 may include a light emitter 603, a circuit unit 605 to drive the light emitter 603, and a window 607, for example, a glass substrate, to alternatively pass or block light from an outside. The light emitter 603 may include red light R, green light G, blue light B, and an IR light source IR to emit an IR towards an external object.

[0066] Accordingly, the OLED pixel 601 may display an image by one of or a combination of the red light R, the green light G, and the blue light B. Also, the OLED pixel 601 may pass the input light including the IR through an imaging pattern configured as a transparency adjustable window, thereby enabling a pass filter and a sensor panel to sense the external object using an infrared component.

[0067] The IR light source IR may be included in the OLED pixel 601. However, it is only an example and thus, may also be included in a case, for example, a bezel of the OLED display apparatus 601.

[0068] FIG. 7 illustrates an OLED pixel 701 including a pass filter according to example embodiments.

[0069] Referring to FIG. 7, the OLED pixel 701 may include a light emitter 703 to emit one of red light R, green light G, and blue light B using a luminous organic material, a circuit unit 705 to drive the light emitter 703, and a window 707, for example, a glass substrate to alteratively pass or block input light from an outside. The OLED pixel 701 may further include, in an upper portion or a lower portion of the window 707, a second pass filter to extract an infrared component.

[0070] According to an embodiment, an OLED display apparatus having a light sensing function may photograph an external object using IR by sensing an infrared component from the external object passing through an imaging pattern included in a display panel, using an IR light source to emit the IR towards the external object and a pass filter to extract the infrared component.

[0071] According to an embodiment, an OLED display apparatus having a light sensing apparatus may display an image by transferring input light from an external object to a sensor panel through adjustment of a transparency with respect to a window included in an OLED pixel. Also, the OLED display apparatus may photograph the external object without switching an apparatus mode. That is, the OLED display apparatus may also sense a space touch.

[0072] According to an embodiment, an OLED display apparatus having a light sensing function may photograph an external object in conjunction with the displaying of an image by simultaneously processing displaying of the image using a light emitter and sensing of input light from the external object passing through an imaging pattern included in a display panel.

[0073] According to an embodiment, an OLED display apparatus having a light sensing function may accurately sense an external object without noise by employing an IR light source to emit IR towards the external object and a pass filter to extract, from the input light, an infrared component associated with the IR.

[0074] Although embodiments have been shown and described, it would be appreciated by those skilled in the art that changes may be made in these embodiments without departing from the principles of the present invention, for which the scope of protection is defined in and by the appended claims.

Claims

1. An organic light emitting diode (OLED) display apparatus (101) having a light sensing function, comprising:

   a display panel (103) comprising an imaging pattern formed with a plurality of OLED pixels (201), wherein the display panel (103) forms the imaging pattern by arranging each of the plurality of OLED pixels (201) based on transparency level of a window included in a corresponding OLED pixel (201); and
   a sensor panel (105) comprising at least one sensor to sense input light from an external object, the light passing through the imaging pattern,
   CHARACTERIZED IN THAT
   the display panel (103) forms the imaging pattern to be in a modified uniformly redundant array "MURA" by combining first OLED pixels comprising an opaque window with second OLED pixels comprising a transparent window.

2. The OLED display apparatus of claim 1, wherein:

   OLED pixels (201) comprise a light emitter (203) to emit at least one of a red light, a green light, and a blue light, and
   the display panel (103) enables the sensor panel (105) to sense the external object by simultaneously displaying an image using the light emitter (203), and by passing the input light through the imaging pattern.

3. The OLED display apparatus of any preceding claim, further comprising:

   an infrared ray light source (IR) to emit an infrared ray towards the external object; and
   a pass filter (505) to extract an infrared component from the input light comprising the infrared ray returned from the external object,
   wherein the sensor panel (105) senses the infrared component.

4. The OLED display apparatus of any of claims 1 and 2, further comprising:

an infrared ray light source (IR) included in at least some of the OLED pixels (601) to emit an infrared ray towards the external object; and
a pass filter included in at least some of the OLED pixels to extract an infrared component from the input light comprising the infrared ray returned from the external object, and to transfer the extracted infrared component to the imaging pattern,
wherein the sensor panel (105) senses the infrared component passing through the imaging pattern.

5. The OLED display apparatus of any of claims 1 and 2, further comprising:

an infrared ray light source (IR) included in at least some of the OLED pixels to emit an infrared ray towards the external object; and
a pass filter to extract an infrared component from the input light comprising the infrared ray returned from the external object,
wherein the sensor panel (105) senses the infrared component.

6. The OLED display apparatus of any preceding claim, wherein the imaging pattern is formed by adjusting a transparency of at least one window included in at least some of the OLED pixels.

7. The OLED display apparatus of any preceding claim, wherein:
the sensor panel (105) is disposed behind the display panel (103) in relation to the direction of light emitted by the display panel (103).

8. The OLED display apparatus of any preceding claim, wherein the imaging pattern is formed by adjusting a transparency of at least one window included in at least some of the OLED pixels.

9. The OLED display apparatus of any preceding claim, wherein a pass filter panel is disposed between the display panel and the sensor panel.

10. The OLED display apparatus of claim 9, wherein an additional, second pass filter is provided.

11. The OLED display apparatus of any preceding claim, wherein a pass filter is disposed in at least some of the OLED pixels.

12. The OLED display apparatus of claim 8 and claim 11, wherein the pass filter is a unit with the window in at least some of the OLED pixels forming the imaging pattern.

Patentansprüche

1. Organische lichtemittierende Diodenanzeigevorrichtung (OLED-Anzeigevorrichtung) (101) mit Lichtmessfunktion, wobei die Vorrichtung umfasst:

eine Anzeigetafel (103), die ein mit einer Mehrzahl von OLED-Pixeln (201) gebildetes Abbildungsmuster umfasst;
wobei die Anzeigetafel (103) das Abbildungsmuster durch Anordnen jedes aus der Mehrzahl von OLED-Pixeln (201) basierend auf dem Transparenzgrad eines in einem entsprechenden OLED-Pixel (201) enthaltenen Fensters bildet, und
eine Sensortafel (105), die wenigstens einen Sensor zum Erfassen von von einem externen Objekt eingegebenem Licht umfasst, wobei das Licht durch das Abbildungsmuster hindurch geht,
DADURCH GEKENNZEICHNET, DASS
die Anzeigetafel (103) das Abbildungsmuster so bildet, dass es sich in einer MURA-Form (Modified Uniformly Redundant Array) befindet, indem erste OLED-Pixel, die ein undurchsichtiges Fenster umfassen, mit zweiten OLED-Pixeln, die ein transparentes Fenster umfassen, kombiniert werden.

2. OLED-Anzeigevorrichtung nach Anspruch 1, wobei:

OLED-Pixel (201) einen Lichtemitter (203) zum Emittieren eines roten Lichts, eines grünen Lichts und/oder eines blauen Lichts umfassen, und
die Anzeigetafel (103) es der Sensortafel (105) ermöglicht, das externe Objekt durch gleichzeitiges Anzeigen eines Bildes unter Verwendung des Lichtsenders (203) und durch Hindurchleiten des eingegebenen Lichts durch das Abbildungsmuster zu erfassen.

3. OLED-Anzeigevorrichtung nach einem der vorangegangenen Ansprüche, die weiterhin Folgendes umfasst:

eine Infrarotstrahl-Lichtquelle (IR), um einen Infrarotstrahl auf das externe Objekt zu emittieren; und
ein Durchlassfilter (505) zum Extrahieren einer Infrarotkomponente aus dem eingegebenen Licht, das den von dem externen Objekt zurückkommenden Infrarotstrahl umfasst,
wobei die Sensortafel (105) die Infrarotkomponente erfasst.

4. OLED-Anzeigevorrichtung nach einem der Ansprüche 1 und 2, die weiterhin Folgendes umfasst:

eine Infrarotstrahl-Lichtquelle (IR), die in wenigstens einigen der OLED-Pixel (601) enthalten ist, um einen Infrarotstrahl auf das externe Objekt zu emittieren; und
einen Durchlassfilter, der in wenigstens einigen der OLED-Pixel enthalten ist, um eine Infrarotkomponente aus dem eingegebenen Licht zu extrahieren, das den von dem externen Objekt zurückgestrahlten Infrarotstrahl umfasst, und um die extrahierte Infrarotkomponente auf das Abbildungsmuster zu übertragen,
wobei die Sensortafel (105) die durch das Abbildungsmuster hindurch gehende Infrarotkomponente erfasst.

5. OLED-Anzeigevorrichtung nach einem der Ansprüche 1 und 2, die weiterhin Folgendes umfasst:

eine Infrarotstrahl-Lichtquelle (IR), die in wenigstens einigen der OLED-Pixel enthalten ist, um einen Infrarotstrahl auf das externe Objekt zu emittieren; und
einen Durchlassfilter zum Extrahieren einer Infrarotkomponente aus dem eingegebenen Licht, das den von dem externen Objekt zurückkommenden Infrarotstrahl umfasst,
wobei die Sensortafel (105) die Infrarotkomponente erfasst.

6. OLED-Anzeigevorrichtung nach einem der vorhergehenden Ansprüche, wobei das Abbildungsmuster durch Anpassen der Transparenz wenigstens eines in wenigstens einigen der OLED-Pixel enthaltenen Fensters gebildet wird.

7. OLED-Anzeigevorrichtung nach einem der vorhergehenden Ansprüche, wobei:
die Sensortafel (105) in Bezug auf die Richtung des von der Anzeigetafel (103) emittierten Lichts hinter der Anzeigetafel (103) angeordnet ist.

8. OLED-Anzeigevorrichtung nach einem der vorhergehenden Ansprüche, wobei das Abbildungsmuster durch Anpassen der Transparenz wenigstens eines in wenigstens einigen der OLED-Pixel enthaltenen Fensters gebildet wird.

9. OLED-Anzeigevorrichtung nach einem der vorhergehenden Ansprüche, wobei eine Duchlassfiltertafel zwischen der Anzeigetafel und der Sensortafel angeordnet ist.

10. OLED-Anzeigevorrichtung nach Anspruch 9, wobei ein zusätzlicher zweiter Durchlassfilter vorgesehen ist.

11. OLED-Anzeigevorrichtung nach einem der vorhergehenden Ansprüche, wobei in wenigstens einigen der OLED-Pixel ein Durchlassfilter angeordnet ist.

12. OLED-Anzeigevorrichtung nach Anspruch 8 und Anspruch 11, wobei der Durchlassfilter bei wenigstens einigen der OLED-Pixel, die das Abbildungsmuster bilden, eine Einheit mit dem Fenster bildet.

Revendications

1. Dispositif d'affichage (101) à diodes électroluminescentes organiques (OLED) possédant une fonction de détection de lumière, comprenant :

une surface d'affichage (103) comprenant un motif de représentation constitué d'une pluralité de pixels d'OLED (201) ;
ledit panneau d'affichage (103) formant le motif de représentation en agençant chacun des pixels de la pluralité de pixels d'OLED (201) en fonction du niveau de transparence d'une fenêtre comprise dans un pixel d'OLED (201) correspondant ; et
un panneau détecteur (105) comprenant au moins un capteur permettant de détecter la lumière entrante en provenance d'un objet externe, la lumière traversant le motif de représentation,
CARACTÉRISÉ EN CE QUE
la surface d'affichage (103) forme le motif de représentation de manière qu'il se trouve sous la forme MURA (Modified Uniformly Redundant Array) en combinant des premiers pixels d'OLED comprenant une fenêtre opaque avec des seconds pixels d'OLED comprenant une fenêtre transparente.

2. Dispositif d'affichage OLED selon la revendication 1, dans lequel :

les pixels d'OLED (201) comprennent un émetteur de lumière (203) destiné à émettre une lumière rouge, une lumière verte et/ou une lumière bleue, et
la surface d'affichage (103) permet au panneau détecteur (105) de détecter l'objet externe en affichant une image au moyen de l'émetteur de lumière (203) et en faisant passer la lumière entrante à travers le motif de représentation simultanément.

3. Dispositif d'affichage OLED selon l'une quelconque des revendications précédentes, comprenant en outre :

une source de lumière infrarouge (IR) destinée à émettre un rayon infrarouge à destination de l'objet externe, et

un filtre de passage (505) destiné à extraire une composante infrarouge hors de la lumière entrante comprenant le rayon infrarouge renvoyé par l'objet externe ;
ledit panneau détecteur (105) détectant la composante infrarouge.

4. Dispositif d'affichage OLED selon l'une quelconque des revendications 1 et 2, comprenant en outre :

une source de lumière infrarouge (IR) comprise dans au moins certains des pixels d'OLED (601) et destinée à émettre un rayon infrarouge en direction de l'objet externe, et
un filtre de passage compris dans au moins certains des pixels d'OLED et destiné à extraire une composante infrarouge de la lumière entrante comprenant le rayon infrarouge renvoyé par l'objet externe, et destiné à transférer la composante infrarouge extraite vers le motif de représentation ;
le panneau détecteur (105) détectant la composante infrarouge traversant le motif de représentation.

5. Dispositif d'affichage OLED selon l'une quelconque des revendications 1 et 2, comprenant en outre :

une source de lumière infrarouge (IR) comprise dans au moins certains des pixels d'OLED et destinée à émettre un rayon infrarouge vers l'objet externe, et
un filtre de passage destiné à extraire une composante infrarouge de la lumière entrante comprenant le rayon infrarouge renvoyé par l'objet externe ;
le panneau détecteur (105) détectant la composante infrarouge.

6. Dispositif d'affichage OLED selon l'une quelconque des revendications précédentes, dans lequel le motif de représentation est formé en réglant la transparence d'au moins une fenêtre comprise dans au moins certains des pixels d'OLED.

7. Dispositif d'affichage OLED selon l'une quelconque des revendications précédentes, dans lequel :
le panneau détecteur (105) est disposé derrière la surface d'affichage (103) eu égard à la direction de la lumière émise par la surface d'affichage (103).

8. Dispositif d'affichage OLED selon l'une quelconque des revendications précédentes, dans lequel le motif de représentation est formé en réglant la transparence d'au moins une fenêtre comprise dans au moins certains des pixels d'OLED.

9. Dispositif d'affichage OLED selon l'une quelconque des revendications précédentes, dans lequel un panneau filtre de passage est disposé entre la surface d'affichage et le panneau détecteur.

10. Dispositif d'affichage OLED selon la revendication 9, dans lequel il est prévu un second filtre de passage supplémentaire, dit second filtre de passage.

11. Dispositif d'affichage OLED selon l'une quelconque des revendications précédentes, dans lequel un filtre de passage est disposé dans au moins certains des pixels d'OLED.

12. Dispositif d'affichage OLED selon la revendication 8 et la revendication 11, dans lequel le filtre de passage forme une unité avec la fenêtre d'au moins certains des pixels d'OLED constituant le motif de représentation.

FIG. 1

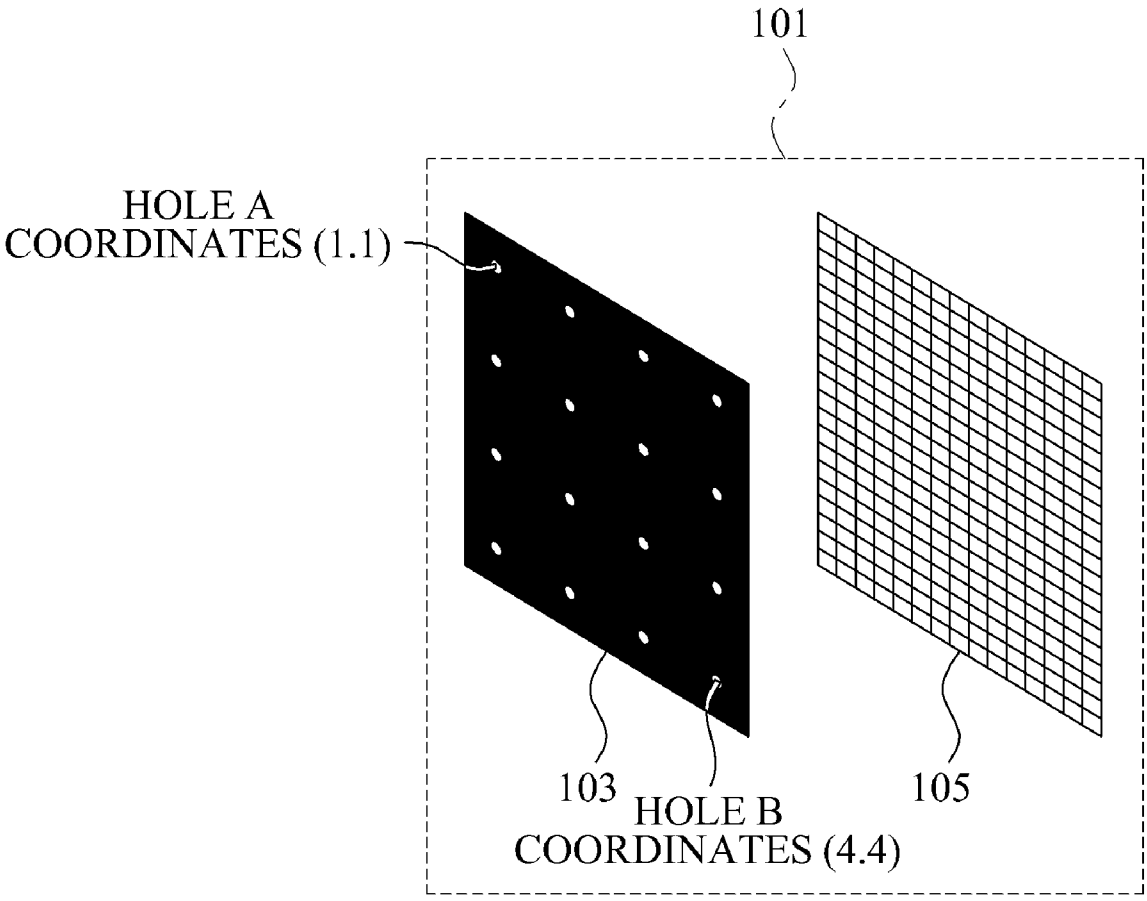


FIG. 2

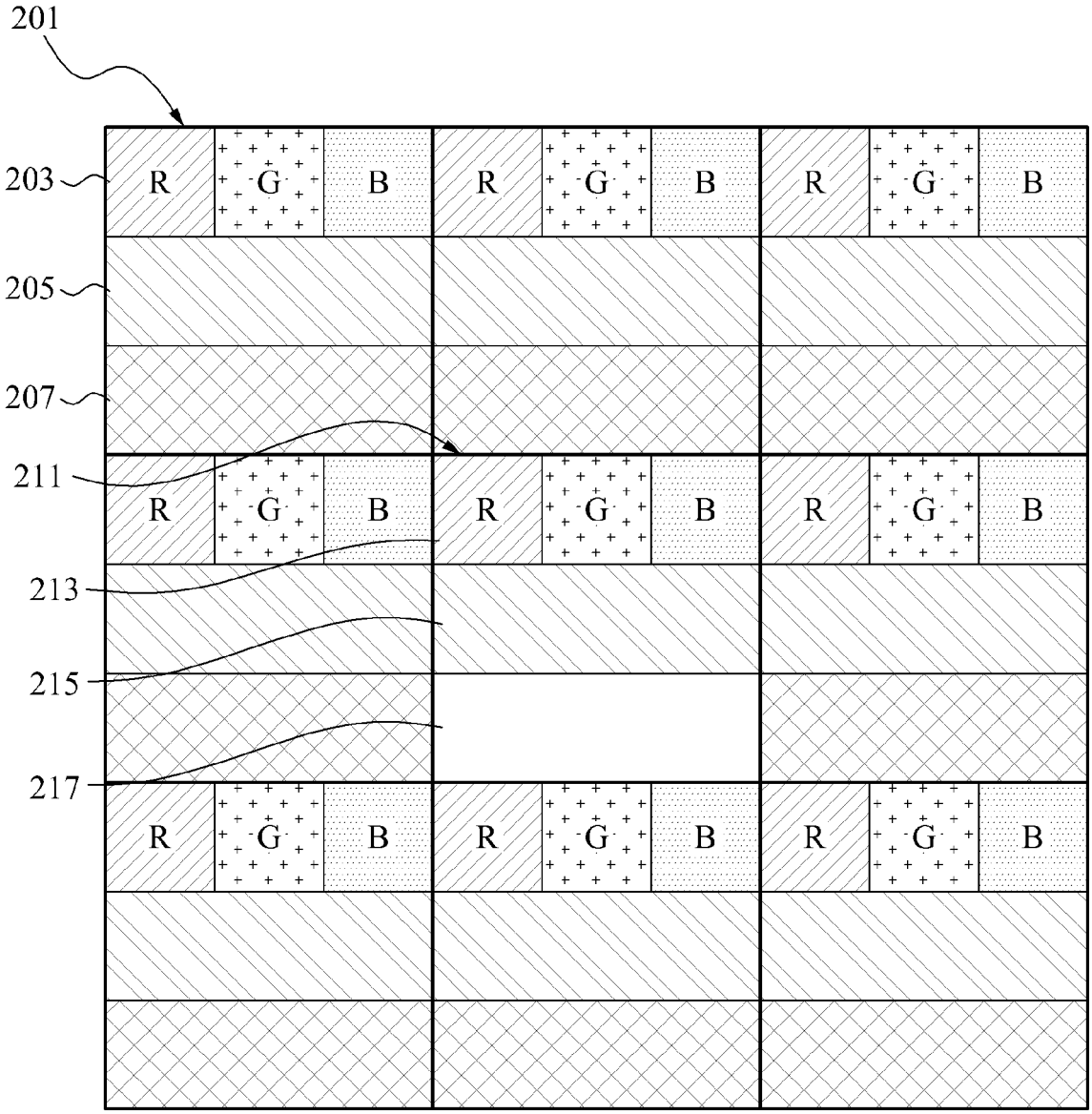


FIG. 3

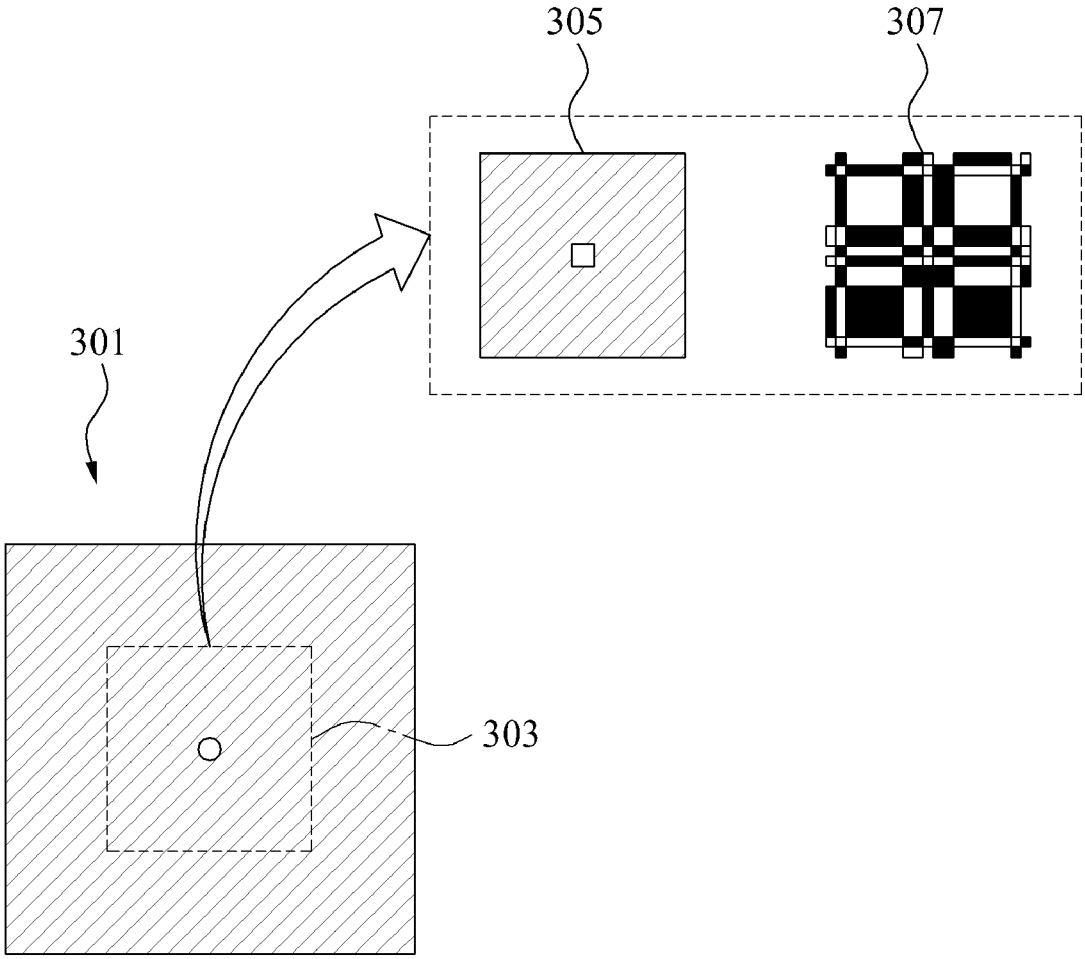


FIG. 4

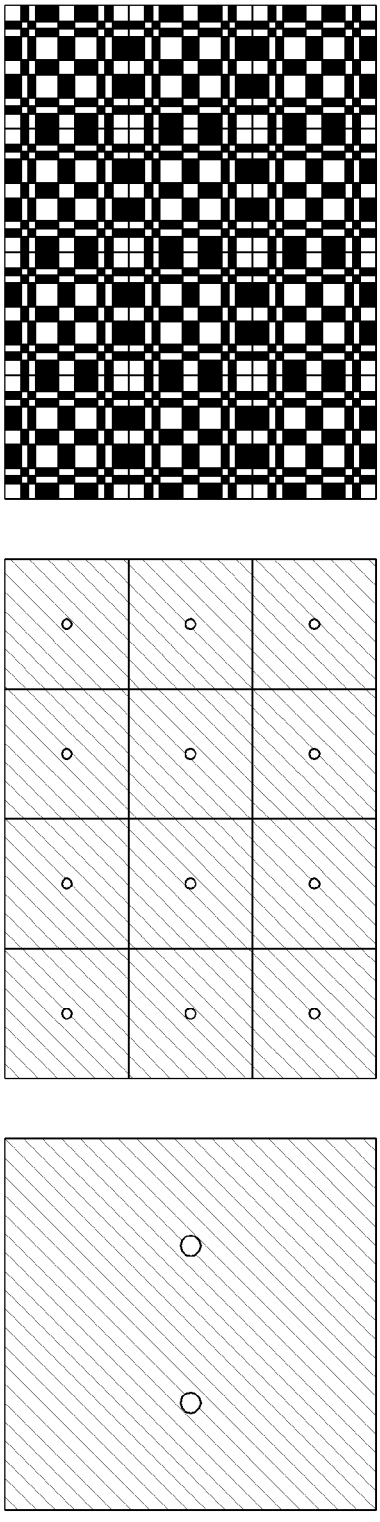


FIG. 5

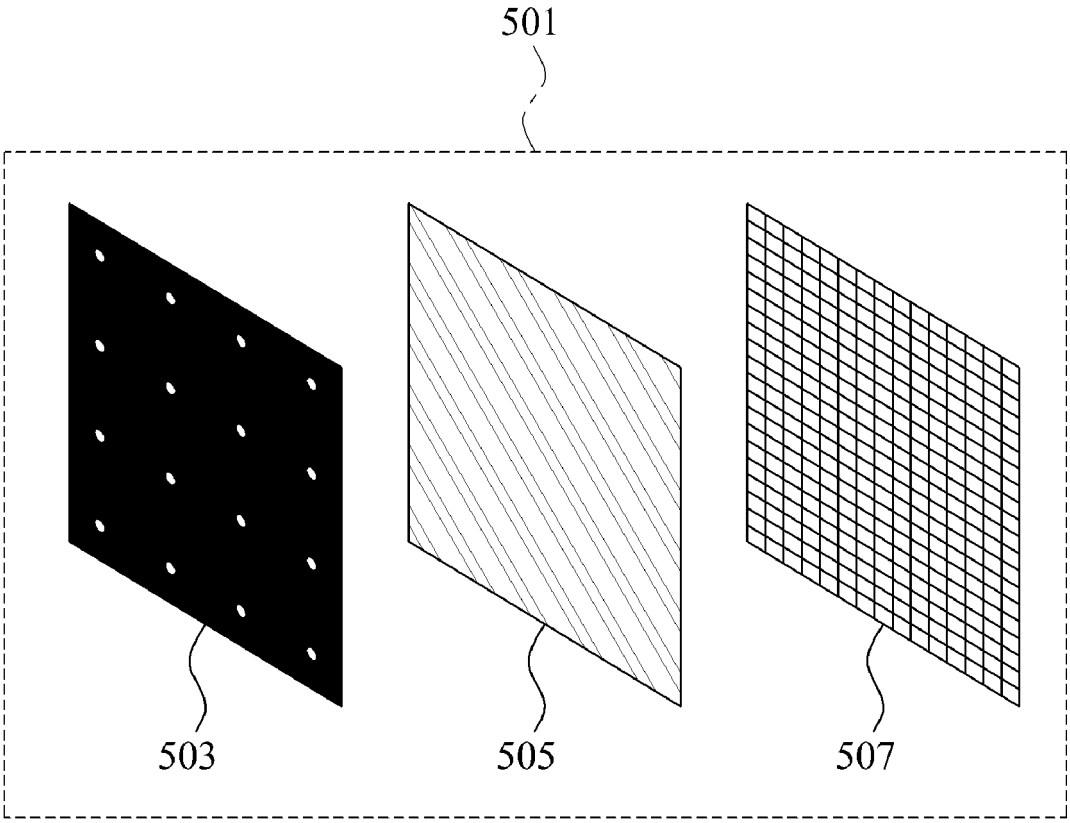


FIG. 6

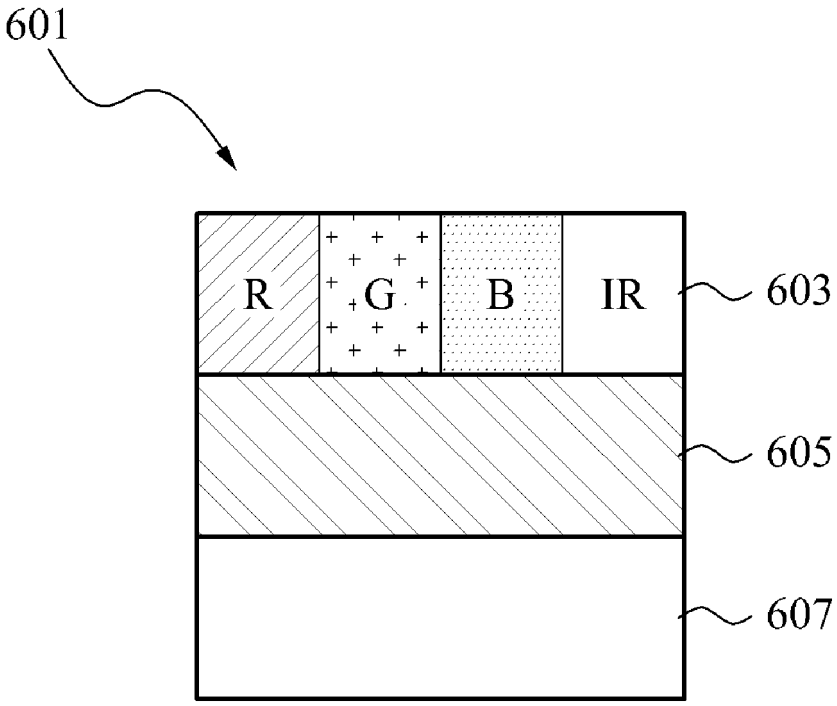
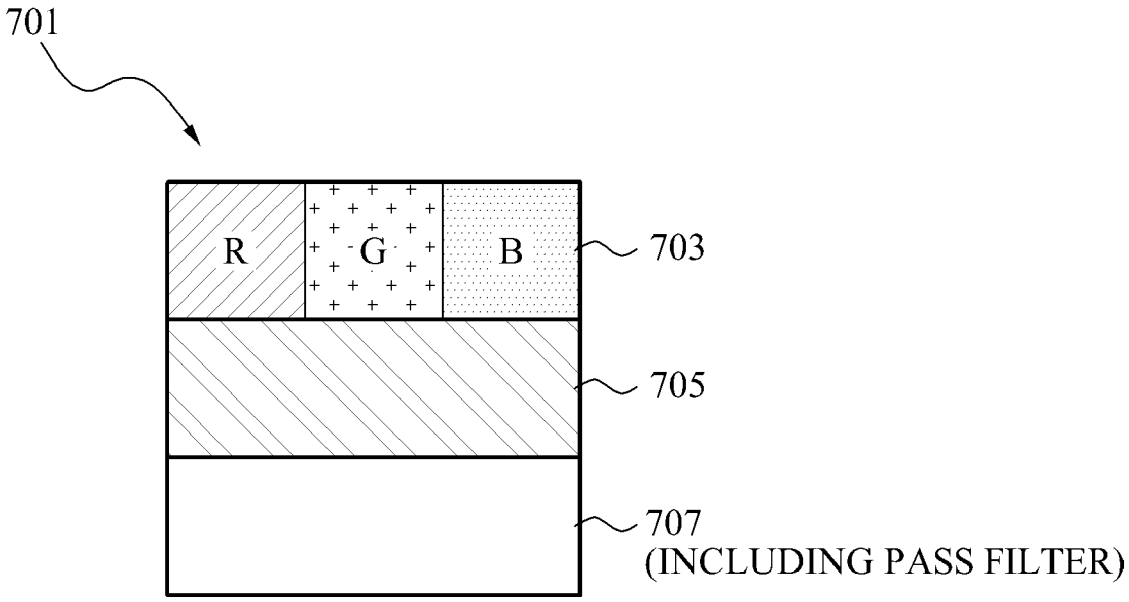


FIG. 7



REFERENCES CITED IN THE DESCRIPTION

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专利名称(译)	具有光感测功能的有机发光二极管（OLED）显示装置		
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其他公开文献	EP2475010A1		
外部链接	Espacenet		

摘要(译)

提供了一种具有光学传感功能的有机发光二极管（OLED）显示装置。OLED显示设备可以通过感测来自外部物体的输入光来拍摄外部物体，该外部物体穿过包括在显示面板中的成像图案。

FIG. 1