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(54) Backlight module and liquid crystal display

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Rétroéclairage et affichage à cristaux liquides

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Description

FIELD OF THE INVENTION

[0001] The present invention belongs to a field of liquid crystal display technology, and relates to a backlight module and a liquid crystal display.

BACKGROUND OF THE INVENTION

[0002] A liquid crystal molecule cannot emit light by itself. Thus, a backlight module is employed in a liquid crystal display to provide a liquid crystal panel with a uniform and high-brightness light source. Generally, backlight modules may be categorized into side-edge backlight modules and direct-type backlight modules according to the distribution positions of light sources in the backlight modules. A light source in the side-edge backlight module is positioned at a side of a display panel, and the side-edge backlight module is usually used in a liquid crystal display of relatively small size. A light source in the direct-type backlight module is positioned at the bottom of a display panel, and the direct-type backlight module is usually used in a liquid crystal display of relatively large size.

[0003] US 2012/188479 A1 refers to a backlight lamp cover, a backlight backboard and a liquid crystal display module. According to the present disclosure, a lamp cover is improved by further providing a bending structure to support and limit a movement of a liquid crystal display panel as well as to support a bezel, in substitution of main functions of a mold frame in the related art. At the same time, the backboard structure is improved accordingly by adding a stepped structure so as to supplementally limit the liquid crystal display panel.

[0004] US 2004/207773 A1 refers to a liquid crystal display includes a liquid crystal panel, a housing, and an optical film. The liquid crystal panel is used for displaying images. The housing supports the liquid crystal panel and has a plurality of lamps and sliding grooves. The lamps are used for transmitting light to the liquid crystal panel. The optical film is disposed in the sliding grooves.

[0005] EP 2 538 268 A1 refers to a backlight unit and a display apparatus using the same. The backlight unit includes a bottom chassis, and a panel guide module coupled to a corner region of the bottom chassis so as to support a display panel. The panel guide module includes a support plate to support a corner region of the display panel, a reinforcing rib disposed on the support plate, and a fixing rib disposed under the support plate and configured to be coupled to the bottom chassis.

[0006] US 2012/081351 A1 refers to a display device that can be provided as a final product such as a television receiver simply by assembling a display panel and a backlight and can prevent or suppress scratches due to swing or the like of an optical member.

[0007] US 2011/141391 A1 refers to a liquid crystal display device adapting a guide panel having a reinforced

structure. The liquid crystal display panel comprises: a liquid crystal display panel; a light guide plate disposed under the liquid crystal display panel; an LED light source disposed one side of the light guide plate; a cover bottom housing the LED light source and the light guide plate; and a guide panel supporting the liquid crystal display panel, and wrapping the LED light source and the light guide plate at outside, wherein the guide panel has an outer vertical surface and a support rib apart from the outer vertical surface inward to form a space for holding a vertical surface of the cover bottom.

[0008] An existing direct-type backlight module generally includes a backplane, a reflector and a light source which are arranged on the backplane, a diffuser arranged on the reflector, and a plastic frame which is arranged at the peripheries of the above components and is used for fixing the above components and a liquid crystal panel together. As compared with a side-edge backlight module, a direct-type backlight module has advantages of high light efficiency, no need of light guide plate, simple structure, and the like.

[0009] In the prior art, a light source includes a cold cathode fluorescent lamp (CCFL) and a light emitting diode (LED), and a through hole which corresponds to the position of the light-emitting body in a light source and enables the light-emitting body to pass through is previously provided on a reflector. When a direct-type backlight module and a liquid crystal panel are assembled, usually a light source is arranged on a backplane first, and then a reflector is arranged on the reflector. A through hole is provided on the reflector, and the light-emitting body in the light source passes through the through hole. A diffuser is arranged above the reflector. Then, the above components are assembled in a plastic frame to make the above components have fixed positions. Next, the liquid crystal panel is arranged above the plastic frame, and the backlight module and the liquid crystal panel are assembled together through the plastic frame. Finally, all of the above components are arranged into a casing.

[0010] In a backlight module, a plastic frame is used for ensuring the overall strength and the integrity of the backlight module, and is used for supporting a liquid crystal panel. From the aspect of structure, a plastic frame includes a one-piece plastic frame and a four-piece plastic frame (each piece thereof corresponds to one side of the liquid crystal panel). In the prior art, a mold for plastic frame is previously prepared, and then a plastic frame is formed by using polycarbonate (PC) material and by using the mold for plastic frame. The cost for manufacturing the mold for plastic frame and the cost of plastic frame material account for a large part of the cost of the backlight module. Especially in a backlight module of large size, the cost of a plastic frame makes the cost of a backlight module high.

SUMMARY OF THE INVENTION

[0011] In view of the above defects existing in a backlight module in the prior art, the technical problem to be solved by the present invention is to provide a backlight module and a liquid crystal display. The backlight module is a direct-type backlight module, and is of lower cost and enables assembling of the backlight module to be easier than the backlight module in the prior art.

[0012] A solution employed to solve the technical problem of the present invention is to provide a backlight module according to claim 1.

[0013] Furthermore, an upper surface of each of the plurality of position-limiting blocks is higher than an upper surface of the liquid crystal panel on the first bulge.

[0014] Preferably, each of the plurality of position-limiting blocks is arranged at each side of the liquid crystal panel and is in contact with the side respectively; or every two of the plurality of position-limiting blocks are arranged at each side of the liquid crystal panel and are in contact with the side respectively.

[0015] Preferably, the backlight module further includes an isolation unit which is used for maintaining a set distance between the backlight module and the liquid crystal panel.

[0016] A preferred solution is that, the isolation unit includes a plurality of isolation blocks, the plurality of isolation blocks are arranged between the diffuser and the liquid crystal panel and are located at the periphery of the diffuser; a part of the diffuser which corresponds to each side of the liquid crystal panel is provided with one isolation block, a length of each isolation block of the plurality of isolation blocks is less than or equal to a length of a side of the liquid crystal panel which corresponds to the isolation block; or, a part of the diffuser which corresponds to each side of the liquid crystal panel is provided with two or more isolation blocks, for two or more isolation blocks which correspond to the same side of the liquid crystal panel, a sum of the lengths of the two or more isolation blocks is less than or equal to a length of a side of the liquid crystal panel which corresponds to the two or more isolation blocks.

[0017] Preferably, the diffuser is provided with a plurality of positioning notches at edges thereof, and the plurality of isolation blocks are arranged to locate within areas defined by the plurality of positioning notches, respectively.

[0018] A preferred solution is that, the isolation unit includes a plurality of isolation blocks, the plurality of isolation blocks are arranged between the first bulge of the backplane and the liquid crystal panel; a part of the first bulge which corresponds to each side of the liquid crystal panel is provided with one isolation block, a length of the one isolation block is less than or equal to a length of a side of the liquid crystal panel which corresponds to the one isolation block; or, a part of the first bulge which corresponds to each side of the liquid crystal panel is provided with two or more isolation blocks, a sum of the

lengths of the two or more isolation blocks is less than or equal to a length of a side of the liquid crystal panel which corresponds to the two or more isolation blocks.

[0019] Preferably, the second bulge of the reflector and edges of the diffuser are respectively provided with isolation notches at positions which correspond to the isolation blocks arranged on the first bulge, and the isolation blocks are arranged within the isolation notches so that the isolation blocks are capable of maintaining a set distance between the backlight module and the liquid crystal panel.

[0020] The isolation blocks are formed of polyethylene terephthalate, and the isolation blocks are bonded on the first bulge of the backplane (in the case that the isolation blocks are arranged between the first bulge of the backplane and the liquid crystal panel) or on the diffuser (in the case that the isolation blocks are arranged between the diffuser and the liquid crystal panel); the position-limiting blocks are formed of polyethylene terephthalate, and the position-limiting blocks are bonded on the first bulge of the backplane; the backplane is formed of electro-galvanized steel, and the first bulge of the backplane is provided with a stiffener.

[0021] A liquid crystal display including a liquid crystal panel, the liquid crystal display further includes the backlight module as described above, and the backlight module is arranged below the liquid crystal panel.

[0022] Preferably, the liquid crystal display further includes a casing used for fixing the backlight module and the liquid crystal panel, the casing is formed of electro-galvanized steel, a part of the casing which corresponds to the first bulge of the backplane is provided with a stiffener.

[0023] The backlight module according to the present invention is a direct-type backlight module. As compared with an assembling manner employed in a direct-type backlight module in the prior art in which a plastic frame is used to fix respective components, the backlight module according to the present invention does not need a plastic frame because the direct-type backlight module according to the present invention includes a position-limiting unit used for limiting the liquid crystal panel at a set position, an isolation unit used for maintaining a set distance between the backlight module and the liquid crystal panel, and a bonding material used for bonding respective components together. That is, the direct-type backlight module according to the present invention employs a configuration without a plastic frame, which reduces the cost of the backlight module effectively and enables assembling of the backlight module to be easier.

BRIEF DESCRIPTION OF THE DRAWINGS

[0024] In order to clearly illustrate the technical solutions of the embodiments of the invention, the drawings of the embodiments will be briefly described in the following. Apparently, the described drawings are only directed to some embodiments of the invention and thus

are not limitative to the present invention.

FIG. 1 is a longitudinal sectional view of a part of the assembly of a backlight module and a liquid crystal panel according to embodiment 1 of the present invention;

FIG. 2 is a top view of a diffuser according to embodiment 1 of the present invention;

FIG. 3 is a top view of a part of a backlight module according to embodiment 1 of the present invention;

FIG. 4 is a longitudinal sectional view of a part of the assembly of a backlight module and a liquid crystal panel according to embodiment 2 of the present invention; and

FIG. 5 is a top view of a diffuser according to embodiment 3 of the present invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0025] For better understanding the technical solutions of the present invention by a person skilled in the art, a backlight module and a liquid crystal display according to the present invention will be described in detail with reference to the drawings and the following embodiments.

[0026] A backlight module includes a backplane and a light source arranged on the backplane. The backlight module further includes a position-limiting unit, and the position-limiting unit is arranged on the backplane and used for limiting a liquid crystal panel arranged on the backlight module at a set position.

[0027] A liquid crystal display includes a liquid crystal panel. The liquid crystal display further includes the backlight module as described above, and the backlight module is arranged below the liquid crystal panel.

Embodiment 1:

[0028] As shown in Figs. 1 to 3, a backlight module includes a backplane 1 and a light source 2 arranged on the backplane 1. A position-limiting unit is provided on the backplane 1, and the position-limiting unit is capable of limiting a liquid crystal panel 5 at a set position. An isolation unit is further provided on the backplane 1, and the isolation unit is capable of maintaining a set distance between the backlight module and the liquid crystal panel 5.

[0029] The backplane includes a first base plate and a first bulge surrounding the periphery of the first base plate. The liquid crystal panel is supported on the first bulge. The position-limiting unit includes a plurality of position-limiting blocks distributed on the first bulge which are in contact with respective sides of the liquid crystal panel respectively to limit the liquid crystal panel within

an area surrounded by the plurality of position-limiting blocks. As shown in Fig. 1, the backplane 1 includes a first rectangular bottom (i.e., the first base plate), a first side extending vertically and upwards from each edge of the first bottom, and a first eave (i.e., the first bulge) extending horizontally and outwards from the upper edge of the first side.

[0030] In the present embodiment, the position-limiting unit includes two position-limiting blocks 7 which are arranged on the first eave corresponding to each edge of the first bottom of the backplane 1, respectively. That is, two position-limiting blocks 7 are arranged at each side of the liquid crystal panel, and the two position-limiting blocks are in contact with the corresponding side. The two position-limiting blocks are located at positions which are close to an edge of the corresponding side of the liquid crystal panel, respectively.

[0031] An upper surface of each of the plurality of position-limiting blocks is higher than an upper surface of the liquid crystal panel on the first bulge, and a height of each position-limiting block is preferably larger than or equal to a sum of a set distance between the backlight module and the liquid crystal panel and a thickness of the liquid crystal panel, such that it is ensured that the position-limiting blocks 7 are capable of limiting the position of the liquid crystal panel 5 and fixing the liquid crystal panel 5 effectively to prevent a fragmentation failure occurring when the liquid crystal panel is shocked by an external force.

[0032] Preferably, the position-limiting blocks 7 are formed of cushioning material commonly used in the art, and are usually formed of polyethylene terephthalate (PET). PET is crystalline thermoplastic plastic, has an obvious melting point of 245-260°C, and has advantages of good dimensional stability, heat resistance, electrical insulation, and low price. In the present embodiment, the position-limiting blocks 7 are bonded on the first eave of the backplane 1 through bonding material such as double-sided adhesive, respectively.

[0033] In the backlight module, the isolation unit includes a plurality of isolation blocks, and the plurality of isolation blocks may be arranged between the first bulge (i.e., the first eave) of the backplane and the liquid crystal panel. Specifically, a part of the first eave which corresponds to each side of the liquid crystal panel is provided with one isolation block 8, and a length of the isolation block 8 is less than or equal to a length of a side of the liquid crystal panel which corresponds to the isolation block 8.

[0034] Preferably, a height of each of the isolation blocks 8 is equal to a set distance between the backlight module and the liquid crystal panel. A length and a shape of the isolation block 8 may be set according to practical design requirements such as the size of a liquid crystal panel cooperating with the isolation block 8, strength of an external force the liquid crystal panel needs to withstand in an operating environment, and the like, and are not defined herein.

[0035] The isolation blocks 8 are formed of the same material as that of the position-limiting blocks 7, i.e., are formed of polyethylene terephthalate. The isolation blocks 8 are bonded on the first eave of the backplane 1 through bonding material such as double-sided adhesive, respectively.

[0036] In the present embodiment, a light source 2 in the backlight module may be a cold cathode fluorescent lamp (CCFL) or a light emitting diode (LED). In order to ensure that the utilization ratio of the light source 2 in the backlight module is high, the backlight module further includes a reflector 3. The reflector 3 includes a second base plate (i.e., a second bottom) and a second bulge (i.e., a second eave) surrounding the periphery of the second base plate, and the second bulge is arranged on the first bulge. Specifically, the reflector 3 includes a second rectangular bottom, a second side extending obliquely and upwards from each edge of the second bottom, and a second eave (i.e., the second bulge) extending horizontally and outwards from the upper edge of the second side. The second bottom is smaller than the first bottom, and the second eave and the first eave at least partially overlap each other. The second eave are provided with position-limiting notches at positions which correspond to the plurality of position-limiting blocks 7 respectively, and the second eave are provided with isolation notches at positions which correspond to the plurality of isolation blocks 8 respectively.

[0037] A through hole, which corresponds to the position of the light-emitting body in the light source 2 and enables the light-emitting body to pass through, is previously provided on the second bottom of the reflector 3. The through hole in the reflector 3 which enables the light-emitting body to pass through may be adaptively modified according to different forms of the light source 2 in the backlight module.

[0038] In order to ensure that light emitted from the backlight module has better uniformity, the backlight module further includes a diffuser 4. The diffuser 4 is supported on the second bulge of the reflector 3, and the liquid crystal panel is arranged on the diffuser 4. Specifically, the diffuser 4 is rectangular, and the edge of the diffuser 4 and the second eave of the reflector 3 at least partially overlap each other. As shown in Fig. 2, the diffuser 4 is provided with position-limiting notches 9 at positions which correspond to the plurality of position-limiting blocks 7 respectively, and the diffuser 4 is provided with isolation notches 10 at positions which correspond to the plurality of isolation blocks 8 respectively.

[0039] In order to simplify a process flow of the backlight module in a manufacturing procedure, the shapes and the sizes of the position-limiting notches and the shapes and the sizes of the isolation notches on the reflector 3 and on the diffuser 4 may be the same, and all of them may be set according to practical requirements. By arranging the position-limiting notches on the reflector 3 and on the diffuser 4, positions enabling the position-limiting blocks 7 to pass through are reserved for the

position-limiting blocks 7, such that the position-limiting blocks 7 can maintain the liquid crystal panel at a set position which is fixed after the backlight module and the liquid crystal panel being assembled. By arranging the isolation notches on the reflector 3 and on the diffuser 4, positions enabling the isolation blocks 8 to pass through are reserved for the isolation blocks 8, such that the isolation blocks 8 can isolate the backlight module from the liquid crystal panel completely and maintain a set distance between the backlight module and the liquid crystal panel after the backlight module and the liquid crystal panel being assembled. Thus, it is ensured that the backlight module can provide the liquid crystal panel with required light, and it facilitates ensuring that positions of respective components of the backlight module when assembled are correct.

[0040] A liquid crystal display includes a liquid crystal panel 5 and the backlight module as described above. The backlight module is arranged below the liquid crystal panel 5. That is, the above backlight module is a direct-type backlight module. As shown in Fig. 1, in the longitudinal sectional view of a part of the assembly of the backlight module and the liquid crystal panel, the liquid crystal display further includes a casing 6 which is used for fixing the backlight module and the liquid crystal panel 5. The backplane 1 and the casing 6 are fixed, which makes the backlight module and the liquid crystal panel 5 be packaged as a whole.

[0041] As compared with an existing backlight module, the backlight module according to the present embodiment does not need a plastic frame to fix positions of respective components of the backlight module and to support the liquid crystal panel 5. The backlight module according to the present embodiment only employs the position-limiting blocks and the isolation blocks which are designed to be located at local areas to maintain positions of respective components of the backlight module and a position of the liquid crystal panel and to maintain a certain distance between the backlight module and the liquid crystal panel.

[0042] Preferably, in order to further improve the strength of the liquid crystal display, the backplane 1 is formed of electro-galvanized steel (SECC), and the first bulge of the backplane 1 is provided with a plurality of stiffeners. Also, the casing 6 is formed of electro-galvanized steel, and an area of the casing 6 which corresponds to the first eave of the backplane is provided with a plurality of stiffeners.

[0043] In a procedure for manufacturing the liquid crystal display, before the backlight module is assembled, the second eave of the reflector 3 is provided with double-sided adhesive having viscosity at both the front side and the back side thereof, and both the position-limiting blocks 7 and the isolation blocks 8 are bonded at predetermined positions on the first eave of the backplane 1 previously. When the backlight module is assembled, the light source 2 is arranged at a predetermined position on the backplane 1 first. Next, the reflector 3 is arranged on

the backplane 1 such that the light-emitting body of the light source 2 passes through the through hole on the reflector 3 to be exposed from the front side of the reflector. The isolation notches and the position-limiting notches arranged on the second eave of the reflector 3 are aligned with the isolation blocks 8 and the position-limiting blocks 7 respectively. The reflector 3 is bonded onto the front side of the first eave of the backplane 1 through the double-sided adhesive provided on the back side of the second eave of the reflector 3. Then, the isolation notches 10 and the position-limiting notches 9 at the edge of the diffuser 4 are aligned with the isolation blocks 8 and the position-limiting blocks 7 respectively. The diffuser 4 is bonded onto a corresponding position on the reflector 3 through the double-sided adhesives provided on the front side of the second eave of the reflector, such that the backlight module is formed. Finally, the backlight module and the liquid crystal panel 5 are combined together, the casing 6 is assembled, and the backplane 1 and the casing 6 are fixed by using a bolt and a nut or other fasteners to maintain the overall strength of the liquid crystal panel 5 and the backlight module.

Embodiment 2:

[0044] The present embodiment differs from embodiment 1 in the number as well as arrangement positions of the isolation blocks included in the isolation unit.

[0045] As shown in Fig. 4, in the present embodiment, the first eave of the backplane 1 is provided with two or more isolation blocks at positions corresponding to each side of the liquid crystal panel, and a sum of the lengths of the two or more isolation blocks is less than or equal to a length of a side of the liquid crystal panel which corresponds to the two or more isolation blocks.

[0046] Correspondingly, the second bulge of the reflector and the edge of the diffuser are respectively provided with isolation notches at positions corresponding to the positions on the first bulge at which the isolation blocks are arranged. The isolation blocks are arranged in the isolation notches, such that the isolation blocks can maintain a set distance between the backlight module and the liquid crystal panel.

[0047] Other configurations of the backlight module according to the present embodiment are the same as those according to embodiment 1, thus description thereof is omitted.

Embodiment 3:

[0048] The present embodiment differs from embodiment 1 in arrangement positions of the isolation blocks included in the isolation unit.

[0049] In the present embodiment, the isolation unit includes a plurality of isolation blocks, the plurality of isolation blocks are arranged between the diffuser and the liquid crystal panel and are located at the periphery of the diffuser; the diffuser is provided with one isolation

block at a position corresponding to each side of the liquid crystal panel. The one isolation block is located between a pair of position-limiting blocks on the first eave which correspond to the one isolation block. A length of each isolation block of the plurality of isolation blocks is less than or equal to a length of a side of the liquid crystal panel which corresponds to the isolation block.

[0050] In order to ensure the accuracy of positions on the diffuser at which the isolation blocks are assembled, as shown in Fig. 5, the diffuser is provided with a plurality of positioning notches 11 at the edge thereof, and the isolation blocks are respectively arranged to locate within areas defined by the plurality of positioning notches 11. That is, one positioning notch is provided on the diffuser at a position corresponding to each of the two sides of each isolation block. The arrangement of the positioning notches is equivalent to providing a foolproof design on the diffuser 4, facilitating correct bonding between the isolation blocks and the diffuser. Thus, the correctness of assembling respective components of the backlight module is ensured.

[0051] Other configurations of the backlight module according to the present embodiment are the same as those according to embodiment 1, thus description thereof is omitted.

Embodiment 4:

[0052] The present embodiment differs from embodiment 3 in the number and arrangement positions of the isolation blocks included in the isolation unit.

[0053] In the present embodiment, the diffuser is provided with two or more isolation blocks at a position corresponding to each side of the liquid crystal panel, for two or more isolation blocks which correspond to the same side of the liquid crystal panel, a sum of the lengths of the two or more isolation blocks is less than or equal to a length of a side of the liquid crystal panel which corresponds to the two or more isolation blocks.

[0054] Correspondingly, the number and the arrangement positions of the positioning notches provided at the edge of the diffuser match to the number and the arrangement positions of the isolation blocks.

[0055] Other configurations of the backlight module according to the present embodiment are the same as those according to embodiment 1, thus description thereof is omitted.

Embodiment 5:

[0056] The present embodiment differs from embodiments 1 to 4 in the number of the position-limiting blocks included in the position-limiting unit.

[0057] In the present embodiment, the plurality of position-limiting blocks included in the position-limiting unit are arranged at sides of the liquid crystal panel and are in contact with the sides respectively, i.e., only one position-limiting block is arranged at each side of the liquid

crystal panel.

[0058] Other configurations of the backlight module according to the present embodiment are the same as those according to embodiment 1, thus description thereof is omitted.

[0059] In consideration of a subsequent reliability test, as compared with embodiments 1 to 4, the arrangement manner of the position-limiting unit according to the present embodiment is suitable for a liquid crystal panel of relatively small size.

[0060] As compared with an existing direct-type backlight module, the backlight modules according to embodiments 1 to 5 employ a configuration without a plastic frame, making respective components of the backlight module be supported on the first bulge (i.e., a weight bearing surface) of the backplane 1. The isolation blocks and the position-limiting blocks are arranged at the periphery of the backlight module to support the liquid crystal panel, to limit the position of the liquid crystal panel, and to fix the liquid crystal panel. This is realized merely by making minor changes to the structures of respective components of an existing direct-type backlight module. Furthermore, the respective components can be aligned with each other and bonded together merely by a pre-designed cooperative-position relationship, thus, assembling is easier. Meanwhile, the respective components can be assembled to form a whole merely by commonly used double-sided adhesive. The cost of the double-sided adhesive, the isolation blocks, and the position-limiting blocks is smaller than the cost of an existing mold for plastic frame and material of a plastic frame. Thus, the cost of the backlight module may be reduced effectively. The present invention is especially suitable for a structural design of a backlight module cooperating with a liquid crystal panel of large size.

[0061] It should be understood that, the above embodiments are only exemplary embodiments for the purpose of explaining the principle of the present invention, and the present invention is not limited thereto.

[0062] It should be also noted that the aforementioned term "backplane" is referred to in the claims as "back chassis", while the term "second cave" is referred to as "tab portion".

Claims

1. A backlight module including a backchassis (1), a liquid crystal panel (5) and a light source (2) arranged on the backchassis (1), wherein

the backlight module further includes a position-limiting unit,
the position-limiting unit is arranged on the backchassis (1) and used for fixing the liquid crystal panel (5) to a set position;
the backchassis (1) includes a first base plate and a bulge surrounding the periphery of the first

base plate,

the liquid crystal panel (5) is supported on the bulge,

the position-limiting unit includes a plurality of position-limiting blocks (7) which are distributed on the bulge, and

the plurality of position-limiting blocks (7) are in contact with respective sides of the liquid crystal panel (5) respectively to limit the liquid crystal panel (5) within an area surrounded by the plurality of position-limiting blocks (7); wherein the backlight module further includes a reflector (3) and a diffuser,

the reflector (3) includes a second base plate, side portions surrounding the periphery of the second base plate, the side portions extending obliquely and outwards from the edges of the second base plate, and tab portions extending horizontally and outwards from the upper edges of the side portions, wherein

the tab portions are arranged on the bulge,

the diffuser (4) is supported on the tab portions, the liquid crystal panel (5) is arranged on the diffuser (4), and

the tab portions of the reflector (3) and the diffuser are provided with position-limiting notches at positions corresponding to the plurality of position-limiting blocks (7).

2. The backlight module according to claim 1, wherein an upper surface of each of the plurality of position-limiting blocks (7) is higher than an upper surface of the liquid crystal panel (5) on the bulge.

3. The backlight module according to claim 2, wherein position-limiting block (7) is arranged at each side of the liquid crystal panel (5) and is in contact with the side respectively; or two position-limiting blocks (7) are arranged at each side of the liquid crystal panel (5) and are in contact with the side respectively.

4. The backlight module according to claim 1, wherein the backlight module further includes an isolation unit which is used for maintaining a set distance between the backlight module and the liquid crystal panel (5).

5. The backlight module according to claim 4, wherein the isolation unit includes a plurality of isolation blocks (8), the plurality of isolation blocks (8) are arranged between the diffuser (4) and the liquid crystal panel (5) and are located at the periphery of the diffuser (4); wherein, the parts of the diffuser (4) which correspond to a respective side of the liquid crystal panel (5) are provided with one isolation block, a length of each isolation block (8) of the plurality of isolation blocks (8) is less than or equal to a length of a side of the liquid crystal panel (5) which corresponds to the isolation block (8); or, the parts of the

diffuser (4) which correspond to a respective side of the liquid crystal panel (5) are provided with two or more isolation blocks (8), wherein for two or more isolation blocks (8) which correspond to the same side of the liquid crystal panel (5), a sum of the lengths of the two or more isolation blocks (8) is less than or equal to a length of a side of the liquid crystal panel (5) which corresponds to the two or more isolation blocks (8).

6. The backlight module according to claim 5, wherein the diffuser (4) is provided with a plurality of positioning notches at edges thereof, and the plurality of isolation blocks (8) are arranged to be located within areas defined by the plurality of positioning notches, respectively.
7. The backlight module according to claim 4, wherein the isolation unit includes a plurality of isolation blocks (8), the plurality of isolation blocks (8) are arranged between the bulge of the backchassis (1) and the liquid crystal panel (5); wherein, the parts of the bulge which correspond to a respective side of the liquid crystal panel (5) are provided with one isolation block (8), a length of the one isolation block (8) is less than or equal to a length of a side of the liquid crystal panel (5) which corresponds to the one isolation block (8); or, the parts of the bulge which correspond to a respective side of the liquid crystal panel (5) are provided with two or more isolation blocks (8), a sum of the lengths of the two or more isolation blocks (8) is less than or equal to a length of a side of the liquid crystal panel (5) which corresponds to the two or more isolation blocks (8).
8. The backlight module according to claim 7, wherein the tab portions of the reflector (3) and edges of the diffuser (4) are respectively provided with isolation notches (10) at positions which correspond to the isolation blocks (8) arranged on the bulge, and the isolation blocks (8) are arranged within the isolation notches (10) so that the isolation blocks (8) are capable of maintaining a set distance between the backlight module and the liquid crystal panel (5).
9. The backlight module according to claims 5 or 6, wherein the isolation blocks (8) are formed of polyethylene terephthalate, and the isolation blocks (8) are bonded on the diffuser (4); the position-limiting blocks (7) are formed of polyethylene terephthalate, and the position-limiting blocks (7) are bonded on the bulge of the backchassis (1); the backchassis (1) is formed of electro-galvanized steel, and the bulge of the backplane (1) is provided with a stiffener.
10. The backlight module according to claims 7 or 8, wherein the isolation blocks (8) are formed of polyethylene terephthalate, and the isolation blocks (8)

are bonded on the bulge of the backchassis (1); the position-limiting blocks (7) are formed of polyethylene terephthalate, and the position-limiting blocks (7) are bonded on the bulge of the backchassis (1); the backchassis (1) is formed of electro-galvanized steel, and the bulge of the backchassis (1) is provided with a stiffener.

11. A liquid crystal display, wherein the liquid crystal display further includes the backlight module according to any one of claims 1 to 10, the backlight module being arranged below the inner surface of the liquid crystal panel (5).
12. The liquid crystal display according to claim 11, wherein the liquid crystal display further includes a casing (6) used for fixing the backlight module and the liquid crystal panel (5), the casing (6) is formed of electro-galvanized steel, a part of the casing (6) which corresponds to the bulge of the backchassis (1) is provided with a stiffener.

Patentansprüche

1. Hintergrundbeleuchtungsmodul mit einem hinteren Rahmenteil (1), einem Flüssigkristall-Panel (5) und einer auf dem hinteren Rahmenteil (1) angeordneten Lichtquelle (2), wobei
 das Hintergrundbeleuchtungsmodul ferner eine Positionsbegrenzungseinheit aufweist, wobei die Positionsbegrenzungseinheit auf dem hinteren Rahmenteil (1) angeordnet ist und dazu verwendet wird, das Flüssigkristall-Panel (5) an einer vorgegebenen Position zu fixieren, wobei das hintere Rahmenteil (1) eine erste Basisplatte und einen aufgewölbten Randabschnitt aufweist, die den Umfang der ersten Basisplatte umgibt, das Flüssigkristall-Panel (5) auf dem aufgewölbten Randabschnitt gehalten wird, die Positionsbegrenzungseinheit mehrere auf dem aufgewölbten Randabschnitt verteilte Positionsbegrenzungsblöcke (7) aufweist, und die mehreren Positionsbegrenzungsblöcke (7) mit jeweiligen Seiten des Flüssigkristall-Panels in Kontakt stehen, um das Flüssigkristall-Panel (5) innerhalb eines Bereichs zu begrenzen, der durch die mehreren Positionsbegrenzungsblöcke (7) umgeben ist, wobei
 das Hintergrundbeleuchtungsmodul ferner einen Reflektor (3) und ein Streuelement aufweist, der Reflektor (3) eine zweite Basisplatte, Seitenabschnitte, die den Umfang der zweiten Basisplatte umgeben, wobei die Seitenabschnitte sich von den Rändern der zweiten Basisplatte schräg nach außen erstrecken, und Ansatzab-

- schnitte aufweist, die sich von den oberen Rändern der Seitenabschnitte horizontal nach außen erstrecken, wobei die Ansatzabschnitte auf dem aufgewölbten Randabschnitt angeordnet sind, das Streuelement (4) auf den Ansatzabschnitten gehalten wird, das Flüssigkristall-Panel (5) auf dem Streuelement (4) angeordnet ist, und die Ansatzabschnitte des Reflektors (3) und das Streuelement Positionsbegrenzungsnuten an den mehreren Positionsbegrenzungsböcken (7) entsprechenden Positionen aufweisen.
2. Hintergrundbeleuchtungsmodul nach Anspruch 1, wobei eine obere Fläche jedes der mehreren Positionsbegrenzungsböcken (7) höher angeordnet ist als eine obere Fläche des Flüssigkristall-Panels (5) auf dem aufgewölbten Randabschnitt.
 3. Hintergrundbeleuchtungsmodul nach Anspruch 2, wobei jeweils ein Positionsbegrenzungsblock (7) an jeder Seite des Flüssigkristall-Panels (5) angeordnet ist und mit der Seite in Kontakt steht, oder wobei jeweils zwei Positionsbegrenzungsböcke (7) an jeder Seite des Flüssigkristall-Panels (5) angeordnet sind und mit der Seite in Kontakt stehen.
 4. Hintergrundbeleuchtungsmodul nach Anspruch 1, wobei das Hintergrundbeleuchtungsmodul ferner eine Isoliereinheit aufweist, die zum Aufrechterhalten eines vorgegebenen Abstands zwischen dem Hintergrundbeleuchtungsmodul und dem Flüssigkristall-Panel (5) verwendet wird.
 5. Hintergrundbeleuchtungsmodul nach Anspruch 4, wobei die Isoliereinheit mehrere Isolierblöcke (8) aufweist, wobei die mehreren Isolierblöcke (8) zwischen dem Streuelement (4) und dem Flüssigkristall-Panel (5) und am Umfang des Streuelements (4) angeordnet sind, wobei die Teile des Streuelements (4), die einer jeweiligen Seite des Flüssigkristall-Panels (5) entsprechen, einen Isolierblock aufweisen, wobei eine Länge jedes Isolierblocks (8) der mehreren Isolierblöcke (8) kleiner oder gleich einer Länge einer Seite des Flüssigkristall-Panels (5) ist, die dem Isolierblock (8) entspricht, oder wobei die Teile des Streuelements (4), die einer jeweiligen Seite des Flüssigkristall-Panels (5) entsprechen, zwei oder mehr Isolierblöcke (8) aufweisen, wobei für zwei oder mehr Isolierblöcke (8), die der gleichen Seite des Flüssigkristall-Panels (5) entsprechen, eine Summe der Längen der zwei oder mehr Isolierblöcke (8) kleiner oder gleich einer Länge einer Seite des Flüssigkristall-Panels (5) ist, die den zwei oder mehr Isolierblöcken (8) entspricht.
 6. Hintergrundbeleuchtungsmodul nach Anspruch 5, wobei das Streuelement (4) mehrere Positionierungsnuten an Rändern davon aufweist, wobei die mehreren Isolierblöcke (8) derart angeordnet sind, dass sie jeweils innerhalb von Bereichen angeordnet werden können, die durch die mehreren Positionierungsnuten definiert sind.
 7. Hintergrundbeleuchtungsmodul nach Anspruch 4, wobei die Isoliereinheit mehrere Isolierblöcke (8) aufweist, wobei die mehreren Isolierblöcke (8) zwischen dem aufgewölbten Randabschnitt des hinteren Rahmentails (1) und dem Flüssigkristall-Panel (5) angeordnet sind, wobei die Teile des aufgewölbten Randabschnitts, die einer jeweiligen Seite des Flüssigkristall-Panels (5) entsprechen, einen Isolierblock (8) aufweisen, wobei eine Länge eines Isolierblocks (8) kleiner oder gleich einer Länge einer Seite des Flüssigkristall-Panels (5) ist, die dem einen Isolierblock (8) entspricht, oder wobei die Teile des aufgewölbten Randabschnitts, die einer jeweiligen Seite des Flüssigkristall-Panels (5) entsprechen, zwei oder mehr Isolierblöcke (8) aufweisen, wobei eine Summe der Längen der zwei oder mehr Isolierblöcke (8) kleiner oder gleich einer Länge einer Seite des Flüssigkristall-Panels (5) ist, die den zwei oder mehr Isolierblöcken (8) entspricht.
 8. Hintergrundbeleuchtungsmodul nach Anspruch 7, wobei die Ansatzabschnitte des Reflektors (3) und die Ränder des Streuelements (4) jeweils Isoliernuten (10) an Abschnitten aufweisen, die den auf dem aufgewölbten Randabschnitt angeordneten Isolierblöcken (8) entsprechen, und wobei die Isolierblöcke (8) innerhalb der Isoliernuten (10) derart angeordnet sind, dass die Isolierblöcke (8) in der Lage sind, einen vorgegebenen Abstand zwischen dem Hintergrundbeleuchtungsmodul und dem Flüssigkristall-Panel (5) aufrechtzuerhalten.
 9. Hintergrundbeleuchtungsmodul nach Anspruch 5 oder 6, wobei die Isolierblöcke (8) aus Polyethylenterephthalat ausgebildet sind und die Isolierblöcke (8) mit dem Streuelement (4) verbunden sind, wobei die Positionsbegrenzungsböcke (7) aus Polyethylenterephthalat ausgebildet sind, und wobei die Positionsbegrenzungsböcke (7) mit dem aufgewölbten Randabschnitt des hinteren Rahmentails (1) verbunden sind, wobei das hintere Rahmentail (1) aus galvanisiertem Stahl hergestellt ist, und wobei der aufgewölbte Randabschnitt des hinteren Rahmentails (1) eine Versteifung aufweist.
 10. Hintergrundbeleuchtungsmodul nach Anspruch 7 oder 8, wobei die Isolierblöcke (8) aus Polyethylenterephthalat ausgebildet sind und die Isolierblöcke (8) mit dem hinteren Rahmentail (1) verbunden sind, wobei die Positionsbegrenzungsböcke (7) aus Polyethylenterephthalat ausgebildet sind, und wobei

die Positionsbegrenzungsblöcke (7) mit dem aufgewölbten Randabschnitt des hinteren Rahmenteils (1) verbunden sind, wobei das hintere Rahmenteil (1) aus galvanisiertem Stahl hergestellt ist, und wobei der aufgewölbte Randabschnitt des hinteren Rahmenteils (1) eine Versteifung aufweist.

11. Flüssigkristallanzeige, wobei die Flüssigkristallanzeige ferner das Hintergrundbeleuchtungsmodul nach einem der Ansprüche 1 bis 10 aufweist, wobei das Hintergrundbeleuchtungsmodul unter der Innenfläche des Flüssigkristall-Panels (5) angeordnet ist.
12. Flüssigkristallanzeige nach Anspruch 11, wobei die Flüssigkristallanzeige ferner ein Gehäuse (6) aufweist, das zum Befestigen des Hintergrundbeleuchtungsmoduls und des Flüssigkristall-Panels (5) verwendet wird, wobei das Gehäuse (6) aus galvanisiertem Stahl hergestellt ist, und wobei ein Teil des Gehäuses (6) das dem aufgewölbten Randabschnitt des hinteren Rahmenteils (1) entspricht, eine Versteifung aufweist.

Revendications

1. Module de rétro-éclairage comprenant un châssis arrière (1), un panneau à cristaux liquides (5) et une source de lumière (2) agencée sur le châssis arrière (1), où

le module de rétro-éclairage comprend en outre une unité de limitation de la position, l'unité de limitation de la position est agencée sur le châssis arrière (1) et est utilisée pour fixer le panneau à cristaux liquides (5) à une position définie ;

le châssis arrière (1) comprend une première plaque de base et un renflement entourant la périphérie de la première plaque de base, le panneau à cristaux liquides (5) est porté par le renflement,

l'unité de limitation de la position comprend une pluralité de blocs de limitation de la position (7) qui sont distribués sur le renflement, et

la pluralité des blocs de limitation de la position (7) est en contact avec les côtés respectifs du panneau à cristaux liquides (5) respectivement pour limiter le panneau à cristaux liquides (5) à l'intérieur d'une aire entourée par la pluralité des blocs de limitation de la position (7) ; où

le module de rétro-éclairage comprend en outre un réflecteur (3) et un diffuseur,

le réflecteur (3) comprend une deuxième plaque de base, des parties latérales entourant la périphérie de la deuxième plaque de base, les parties latérales s'étendant de manière oblique et

vers l'extérieur en partant des bords de la deuxième plaque de base, et des parties en languettes s'étendant horizontalement et vers l'extérieur à partir des bords supérieurs des parties latérales, où

les parties en languettes sont agencées sur le renflement,

le diffuseur (4) est porté sur les parties en languettes,

le panneau à cristaux liquides (5) est agencé sur le diffuseur (4), et

les parties en languettes du réflecteur (3) et du diffuseur sont munies d'entailles de limitation de position au niveau des positions correspondant à la pluralité des blocs de limitation de la position (7).

2. Module de rétro-éclairage selon la revendication 1, dans lequel une surface supérieure de chacun parmi la pluralité des blocs de limitation de la position (7) est plus élevée qu'une surface supérieure du panneau à cristaux liquides (5) sur le renflement.

3. Module de rétro-éclairage selon la revendication 1, dans lequel un bloc de limitation de la position (7) est agencé au niveau de chaque côté du panneau à cristaux liquides (5) et est respectivement en contact avec le côté ; ou deux blocs de limitation de la position (7) sont agencés au niveau de chaque côté du panneau à cristaux liquides (5) et sont respectivement en contact avec le côté.

4. Module de rétro-éclairage selon la revendication 1, où le module de rétro-éclairage comprend en outre une unité d'isolation qui est utilisée pour maintenir une distance définie entre le module de rétro-éclairage et le panneau à cristaux liquides (5).

5. Module de rétro-éclairage selon la revendication 4, dans lequel l'unité d'isolation comprend une pluralité de blocs d'isolation (8), la pluralité des blocs d'isolation (8) est agencée entre le diffuseur (4) et le panneau à cristaux liquides (5) et est située à la périphérie du diffuseur (4) ; où, les parties du diffuseur (4) qui correspondent à un côté respectif du panneau à cristaux liquides (5) sont munies d'un bloc d'isolation, une longueur de chaque bloc d'isolation (8) parmi la pluralité des blocs d'isolation (8) est inférieure ou égale à une longueur d'un côté du panneau à cristaux liquides (5) qui correspond au bloc d'isolation (8) ; ou, les parties du diffuseur (4) qui correspondent à un côté respectif du panneau à cristaux liquides (5) sont munies de deux ou de plusieurs blocs d'isolation (8), où, pour deux ou plusieurs blocs d'isolation (8) qui correspondent au même côté du panneau à cristaux liquides (5), une somme des longueurs des deux ou plusieurs blocs d'isolation (8) est inférieure ou égale à une longueur d'un côté du

panneau à cristaux liquides (5) qui correspond aux deux ou plusieurs blocs d'isolation (8).

6. Module de rétro-éclairage selon la revendication 5, dans lequel le diffuseur (4) est muni d'une pluralité d'entailles de positionnement au niveau de ses bords, et la pluralité des blocs d'isolation (8) est agencée afin d'être située dans des aires définies par la pluralité des entailles de positionnement, respectivement. 5
7. Module de rétro-éclairage selon la revendication 4, dans lequel l'unité d'isolation comprend une pluralité de blocs d'isolation (8), la pluralité des blocs d'isolation (8) est agencée entre le renflement du châssis arrière (1) et le panneau à cristaux liquides (5) ; où, les parties du renflement qui correspondent à un côté respectif du panneau à cristaux liquides (5) sont munies d'un bloc d'isolation (8), une longueur d'un bloc d'isolation (8) est inférieure ou égale à une longueur d'un côté du panneau à cristaux liquides (5) qui correspond à un bloc d'isolation (8) ; ou les parties du renflement qui correspondent à un côté respectif du panneau à cristaux liquides (5) sont munies de deux ou plusieurs blocs d'isolation (8), une somme des longueurs des deux ou plusieurs blocs d'isolation (8) est inférieure ou égale à une longueur d'un côté du panneau à cristaux liquides (5) qui correspond aux deux ou plusieurs blocs d'isolation (8). 10 15 20 25 30
8. Module de rétro-éclairage selon la revendication 7, dans lequel les parties en languettes du réflecteur (3) et les bords du diffuseur (4) sont respectivement munis d'entailles d'isolation (10) au niveau de positions qui correspondent aux blocs d'isolation (8) agencés sur le renflement, et les blocs d'isolation (8) sont agencés dans les entailles d'isolation (10) de sorte que les blocs d'isolation (8) sont capables de maintenir une distance définie entre le module de rétro-éclairage et la panneau à cristaux liquides (5). 35 40
9. Module de rétro-éclairage selon les revendications 5 ou 6, dans lequel les blocs d'isolation (8) sont formés de polyéthylène téréphtalate, et les blocs d'isolation (8) sont reliés au diffuseur (4) ; les blocs de limitation de la position (7) sont formés de polyéthylène téréphtalate, et les blocs de limitation de la position (7) sont reliés sur le renflement du châssis arrière (1) ; le châssis arrière (1) est formé d'acier électro-galvanisé et le renflement de la plaque arrière (1) est muni d'un rigidifiant. 45 50
10. Module de rétro-éclairage selon les revendications 7 ou 8, dans lequel les blocs d'isolation (8) sont formés de polyéthylène téréphtalate, et les blocs d'isolation (8) sont reliés sur le renflement du châssis arrière (1) ; les blocs de limitation de la position (7) sont formés de polyéthylène téréphtalate et les blocs 55

de limitation de la position (7) sont reliés sur le renflement du châssis arrière (1) ; le châssis arrière (1) est formé d'acier électro-galvanisé et le renflement du châssis arrière (1) est muni d'un rigidifiant.

11. Affichage à cristaux liquides, où l'affichage à cristaux liquides comprend en outre le module de rétro-éclairage selon l'une quelconque des revendications 1 à 10, le module de rétro-éclairage étant agencé en dessous de la surface interne du panneau à cristaux liquides (5).
12. Affichage à cristaux liquides selon la revendication 11, où l'affichage à cristaux liquides comprend en outre un boîtier (6) utilisé pour fixer le module de rétro-éclairage et le panneau à cristaux liquides (5), le boîtier (6) est formé d'acier électro-galvanisé, une partie du boîtier (6) qui correspond au renflement du châssis arrière (1) est munie d'un rigidifiant.

FIG. 1

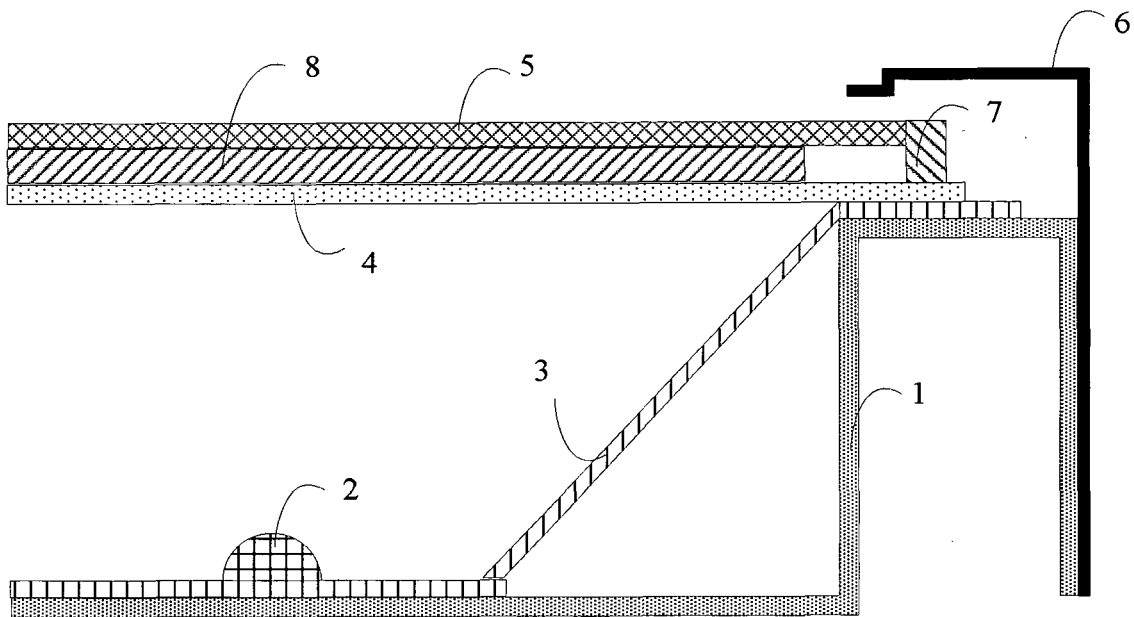


FIG. 2

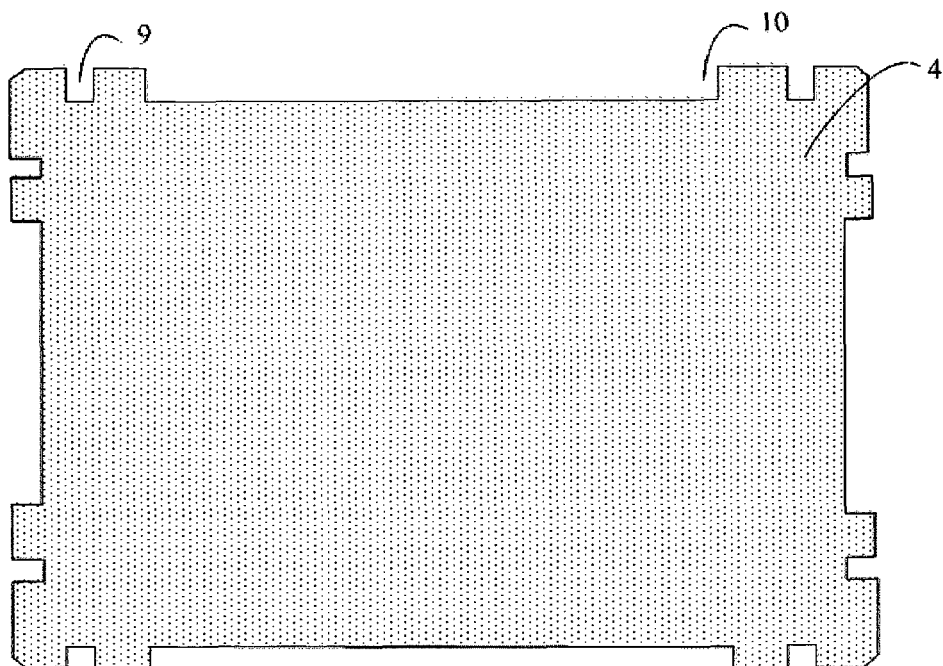


FIG. 3

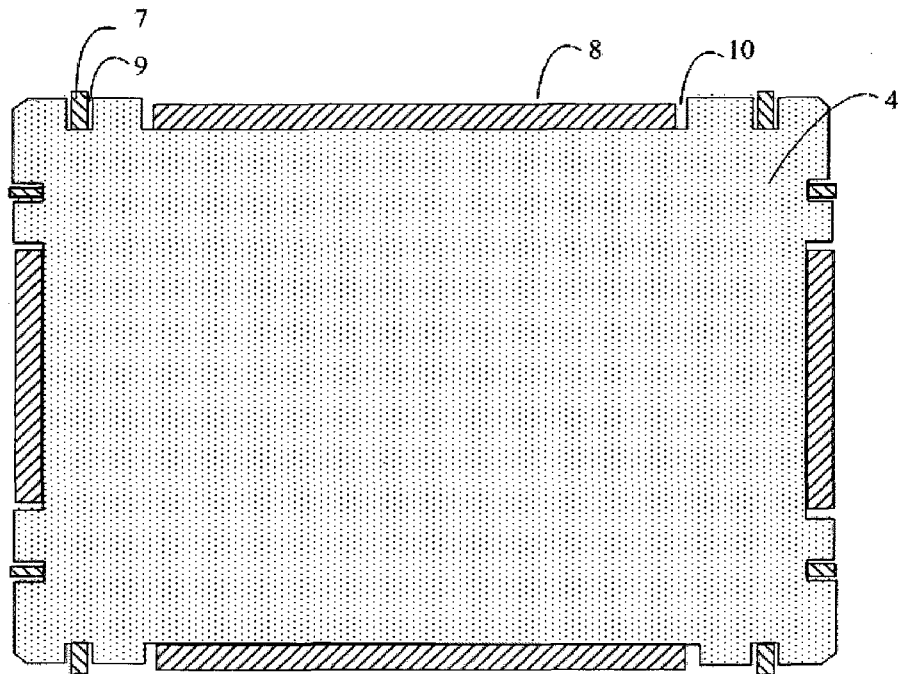


FIG. 4

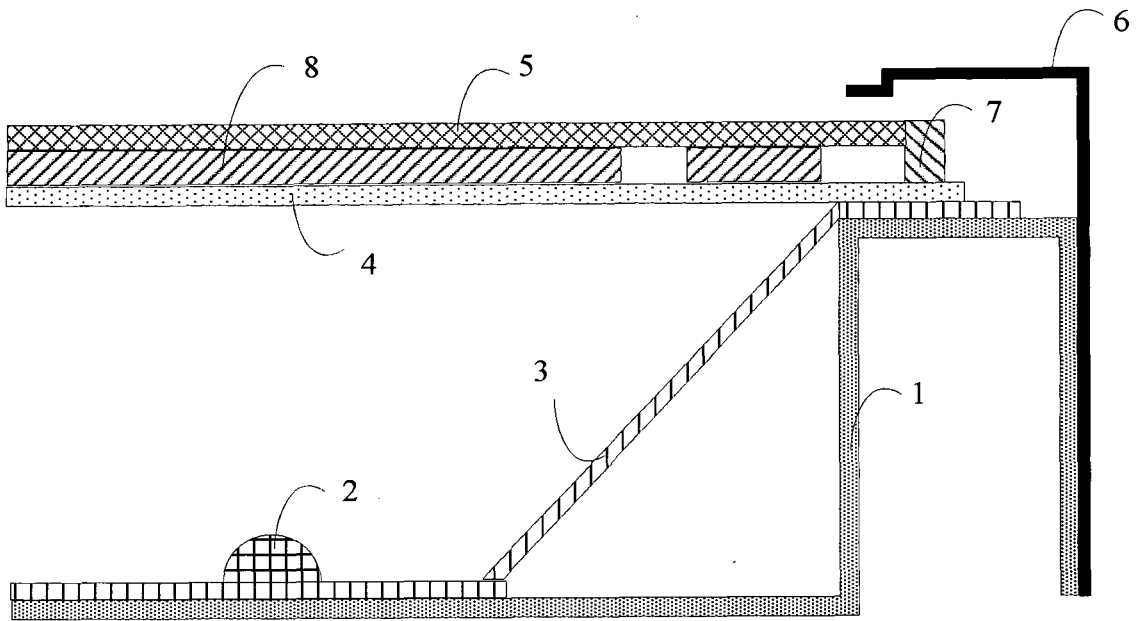
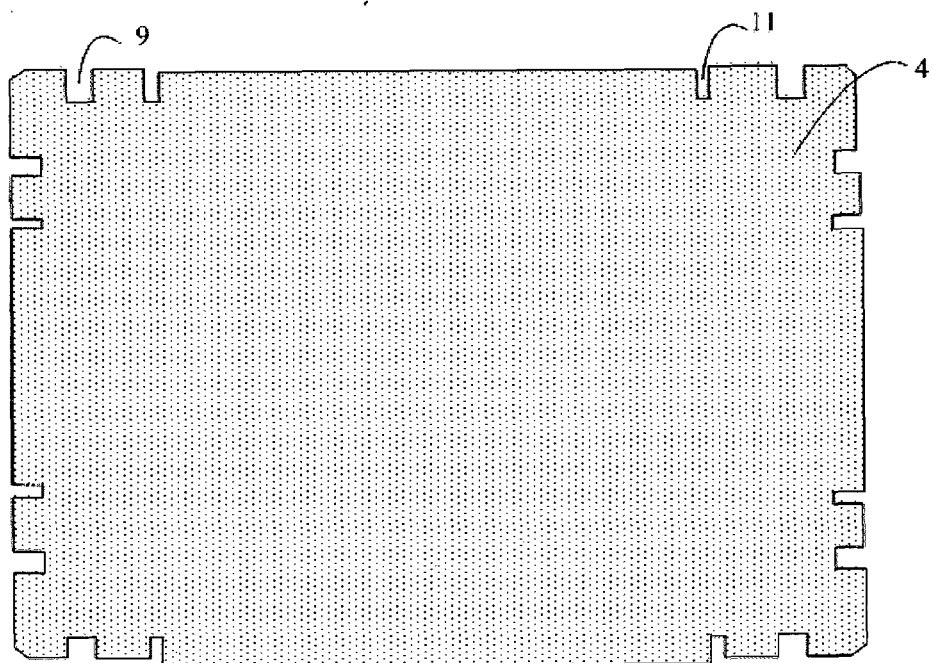


FIG. 5



REFERENCES CITED IN THE DESCRIPTION

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专利名称(译)	背光模块和液晶显示器		
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申请(专利权)人(译)	京东方科技集团有限公司.		
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其他公开文献	EP2749936A3 EP2749936A2		
外部链接	Espacenet		

摘要(译)

本发明属于液晶显示技术领域，涉及一种背光模组和液晶显示器。背光模块包括背板和设置在背板上的光源，还包括位置限制单元。位置限制单元布置在背板上，并且能够将液晶面板限制在设定位置。根据本发明的背光模块是直下式背光模块。本发明的有益效果如下：与现有技术中直接型背光模组相比，采用塑料框架固定各个元件的位置，本发明的背光模组降低了成本。由于采用不带塑料框架的结构，有效地使背光模块能够组装背光模块。

