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(71) Applicant: **Shenzhen TCL Digital Technology Ltd.**
Shenzhen, Guangdong 518054 (CN)

(72) Inventors:
- **LI, Bing**
  Hong Kong Cooperation Zone,No.1 Liyumen Street,
  Qianwan Road 1 Shenzhen, Guangdong 518054 (CN)
- **LIU, Liqiang**
  Hong Kong Cooperation Zone,No.1 Liyumen Street,
  Qianwan Road 1 Shenzhen, Guangdong 518054 (CN)
- **JIANG, Qijin**
  Hong Kong Cooperation Zone,No.1 Liyumen Street,
  Qianwan Road 1 Shenzhen, Guangdong 518054 (CN)

(74) Representative: **Petraz, Gilberto Luigi et al**
GLP S.r.l.
Viale Europa Unita, 171
33100 Udine (IT)

(54) **BACKPLATE PROCESSING METHOD AND BACKPLATE**

(57) A backplate (100) processing method and a backplate (100). The backplate (100) processing method comprises: forming at least one pressing groove on a first plate (10), and when bending the first plate (10) multiple times, bending the first plate (10) on the basis of the pressing groove, wherein a bending direction and the direction of the opening of the pressing groove are located at the same side of the first plate (10).

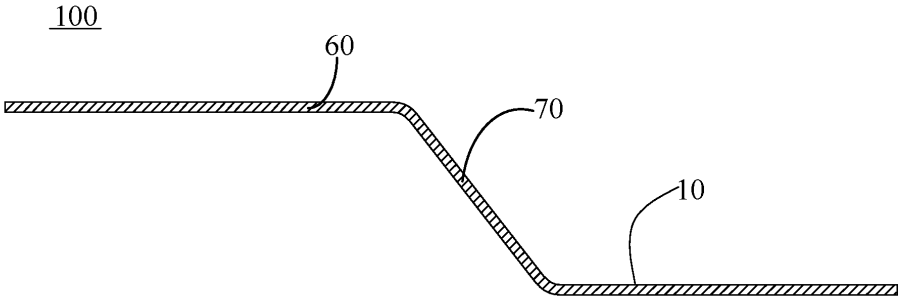

FIG. 1

EP 4 275 808 A1

Description

CROSS-REFERENCE TO RELATED APPLCATIONS

[0001] This application claims priority to Chinese Patent Application No. 202011594590.7, filed December 29, 2020, titled "METHOD FOR PROCESSING BACKPLANE AND BACKPLANE", which is incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present disclosure relates to a technical field of display technology, and more particularly, to a method for processing backplane and a backplane.

BACKGROUND

[0003] In recent years, TV sets have been developing towards a large size with an ultra-thin structure. Manufacturing cost of the structural components of TV sets is important for profit and price competition. A structural frame of a TV set is currently mostly made by a metal backplane and a metal middle frame. An integration of the metal backplane and the metal middle frame is subjected to a molding process technology, so that there are limitations in design. Difficulties on the molding process of the integration of the metal backplane and the metal middle frame lie in controlling the molding accuracy. As such, a large dimensional tolerance is generated.

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] The present disclosure is to provide a method for processing backplane and a backplane, in order to solve the technical problems that the molding accuracy of the backplane is difficult to control and the dimensional tolerance is large.

SOLUTIONS TO THE TECHNICAL PROBLEM

SUMMARY

[0005] In a first aspect, the present disclosure provides a method for processing a backplane comprising:

providing a sheet material including a first sheet, a second sheet, and a connecting sheet, wherein the connecting sheet is connected between the first sheet and the second sheet, and at least one groove is provided on the first sheet; and

bending the first sheet for a plurality of times, wherein the bending first sheet for a plurality of times at least includes bending the first sheet at the at least one groove, and the first sheet is bent toward a same side as an opening of the at least one groove on the first sheet.

[0006] In an embodiment, the bending the first sheet for a plurality of times includes:

conducting a first bending to the first sheet to define a folding wall with an angle to the first sheet, wherein the at least one groove is disposed on the folding wall.

[0007] In an embodiment, the at least one groove includes a first groove and a second groove, after conducting the first bending to the first sheet to define the folding wall with the angle to the first sheet, the bending the first sheet for a plurality of times further comprises:

conducting a second bending to the folding wall, wherein the folding wall is bent at the first groove to define a first folding edge parallel to the first sheet, and the second bending is conducted toward a same side of an opening of the first groove.

[0008] In an embodiment, after conducting the second bending to the folding wall, the bending the first sheet for a plurality of times further comprises:

conducting a third bending to the first folding edge, wherein the first folding edge is bent at the first groove to define a second folding edge against the folding wall, the second groove is disposed on the second folding edge, and the third bending is conducted toward a same direction as the second bending.

[0009] In an embodiment, the first groove and the second groove are disposed on different surfaces of the folding wall and are staggered, after conducting the third bending to the first folding edge, the bending the first sheet for a plurality of times further comprises:

conducting a fourth bending to the second folding edge, wherein the second folding edge is bent at the second groove to define a third folding edge parallel to the first sheet, the fourth bending direction is conducted toward an opposite direction of the third bending, and the fourth bending is conducted toward a same side of an opening of the second groove.

[0010] In an embodiment, the folding wall is bent for 90 degrees at the second bending, and the second folding edge is bent for 90 degrees at the fourth bending.

[0011] In an embodiment, a distance between the second folding edge and the first sheet is greater than or equal to 1 mm.

[0012] In an embodiment, the first groove and the second groove are V-shaped; and/or
an angle between two walls of the first groove is greater than 90 degrees, and an angle between two walls of the second groove is greater than 90 degrees.

[0013] In an embodiment, a depth of the first groove ranges from 1/3 to 1/2 of a thickness of the first sheet, and a depth of the second groove ranges from 1/3 to 1/2 of the thickness of the first sheet.

[0014] In a second aspect, the present disclosure provides a method for processing a backplane comprising:

providing a sheet material including a first sheet, wherein at least one groove is provided on the first sheet; and
bending the first sheet for a plurality of times, wherein the bending first sheet for a plurality of times at least includes bending the first sheet at the at least one groove.

[0015] In an embodiment, the sheet material further comprises a second sheet and a connecting sheet, and the connecting sheet is connected between the first sheet and the second sheet;
the first sheet is bent toward a same side as an opening of the at least one groove on the first sheet.

[0016] In an embodiment, the bending the first sheet for a plurality of times comprises:

conducting a first bending to the first sheet to define a folding wall with an angle to the first sheet, wherein the at least one groove is disposed on the folding wall,
the at least one groove includes a first groove and a second groove;
conducting a second bending to the folding wall, wherein the folding wall is bent at the first groove to define a first folding edge parallel to the first sheet, and the second bending is conducted toward a same side of an opening of the first groove.

[0017] In an embodiment, after conducting the second bending to the folding wall, the bending the first sheet for a plurality of times further includes:

conducting a third bending to the first folding edge, wherein the first folding edge is bent at the first groove to define a second folding edge against the folding wall, the second groove is disposed on the second folding edge, and the third bending is conducted toward a same direction as the second bending;
the first groove and the second groove are disposed on different surfaces of the folding wall and are staggered;
conducting a fourth bending to the second folding edge, wherein the second folding edge is bent at the second groove to define a third folding edge parallel to the first sheet, the fourth bending direction is conducted toward an opposite direction of the third bending, and the fourth bending is conducted toward a same side of an opening of the second groove.

[0018] According to a third aspect, the present disclosure further provides a backplane, the backplane including a first sheet, wherein the first sheet includes a folding wall and a first folding edge, and the folding wall and the first folding edge are defined by bending the first sheet for a plurality of times.

BENEFICIAL EFFECT OF INVENTION

BENEFICIAL EFFECT

[0019] A production error is generated as stamping a sheet material, and the production error is accumulated with the increase of stamping times. According to the present disclosure, at least one groove can be provided on the first sheet. When the first sheet is subjected to multiple bending treatments, the first sheet can be bent at the groove, so that the accuracy bending is provided. The bending deformation resistance is greatly reduced by adopting the groove, the loss of the punch is reduced, and the service life of the punch can be prolonged. The first sheet is bent toward a same side as an opening of the groove on the first sheet, so as to prevent movement interference of the opening of the groove.

BRIEF DESCRIPTION TO DRAWINGS

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] In order to make the embodiments of the present disclosure or the technical solutions in the prior art more clearly, reference will now be made to the accompanying drawings used in the description of the embodiments or the prior art, and it will be apparent that the accompanying drawings in the description below are merely some of the embodiments of the present disclosure, and other drawings may be made to those skilled in the art without any inventive effort.

FIG. 1 is a schematic structural diagram of a backplane in an extended state according to an embodiment of a method for processing backplane of the present disclosure.
FIG. 2 is a schematic structural diagram of a second groove according to an embodiment of a method for processing backplane of the present disclosure.
FIG. 3 is a schematic structural diagram of a first groove according to an embodiment of a method for processing backplane of the present disclosure.
FIG. 4 is a schematic structural diagram of a folding wall according to an embodiment of a method for processing backplane of the present disclosure.
FIG. 5 is a schematic structural diagram of a first folding edge according to an embodiment of a method for processing backplane of the present disclosure.
FIG. 6 is a schematic structural diagram of a second folding edge and a third folding edge according to an embodiment of a method for processing backplane of the present disclosure.
FIG. 7 is a schematic structural diagram of a folding wall according to another embodiment of a method for processing backplane of the present disclosure.
FIG. 8 is a schematic structural diagram of a first folding edge according to another embodiment of a method for processing backplane of the present disclosure.
FIG. 9 is a schematic structural diagram of a second folding edge and a third folding edge according to another embodiment of a method for processing backplane of the present disclosure.

Numeral reference:

[0021]

Numeral	Reference Name	Numeral	Reference Name
100	Backplane	10	First sheet
11	Folding wall	12	First folding edge
13	Second folding edge	14	Third folding edge
20	Insert core	30	Upper punch
40	Right punch	50	Lower punch
60	Second sheet	70	Connecting sheet
A	First groove	B	Second groove
C	Mounting cavity		

[0022] The enablement, function and advantage of the present disclosure will be detailed with the embodiments and the drawings.

EMBODIMENTS OF INVENTION

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0023] In the following, the technical solution in the embodiments of the present disclosure will be clearly and completely described with the accompanying drawings, and it will be apparent that the described embodiments are only a part of the embodiments of the present disclosure and not all of the embodiments. Based on the embodiments in the present

disclosure, all other embodiments obtained by a person of ordinary skill in the art without involving any inventive effort are within the scope of the present disclosure.

[0024] It should be noted that all directional indications (for example up, down, left, right, front, rear, etc.) in the embodiments of the present disclosure are only intended to explain the relative positional relationship between the components in a particular position (as shown in the drawings), a motion situation, and the like, and if the particular position changes, the directional indication changes accordingly.

[0025] In addition, the description in this disclosure referring to "first", "second", "up", "down", "left", "right", etc., is for descriptive purposes only, and is not to be construed as indicating or implying a relative importance thereof or implying the number of indicated technical features. As such, the feature defined with "first" and "second" expressly and imply includes at least one this feature. In addition, the technical solutions of the embodiments may be combined with each other, but the combination of the technical solutions should be realized by a person of ordinary skill in the art. When the combination of the technical solutions is contradictory to each other or cannot be realized, the combination of the technical solutions should be considered not to exist or fall within the protection scope of the present disclosure.

[0026] The disclosure provides a method for processing a backplane 100. It should be understood that in embodiments of the present disclosure, the backplane 100 may be applied to a display module, such as a liquid crystal television, or the like.

[0027] As shown in FIGS. 1 to 6, in an embodiment of the present disclosure, a method for processing a backplane 100 includes:

[0028] Providing a sheet material including a first sheet 10, a second sheet 60, and a connecting sheet 70, wherein the connecting sheet 70 is connected between the first sheet 10 and the second sheet 60, and at least one groove is provided on a side of the first sheet 10; and

[0029] Bending the first sheet 10 for a plurality of times, wherein the bending first sheet 10 for a plurality of times at least includes bending the first sheet 10 from the groove, and the first sheet 10 is bent toward a same side as an opening of the groove on the first sheet.

[0030] It should be understood that the sheet material for processing the backplane 100 may be placed on a mold. The sheet material is a metallic material, such as steel, iron, alloy, metal plate or precoated sheet, and the like, which is selected in accordance with the actual application and is not limited herein. Alternatively, the sheet material is rectangular in shape.

[0031] In the present embodiment, the sheet material is provided on the mold, and is stretched (for example, to form a convex hull, a rear housing, a reinforcing rib, and the like). The backplane 100 is made by processing the sheet material by the mold. Therefore, as shown in FIG. 1, the backplane 100 of the present disclosure mainly includes a first sheet 10, a second sheet 60, and a connecting sheet 70 for connecting the first sheet 10 and the second sheet 60. The first sheet 10 is used for stamping to form a middle frame structure. A production error is generated every time the sheet material is stamped. As the stamping times increase, the error is accumulated. As shown in FIGS. 2 to 3, in order to reduce a dimensional error of bending the sheet material, at least one groove can be provided on the first sheet 10. When the first sheet 10 is subjected to bending, the first sheet 10 can be bent from the groove to improve the bending accuracy. The first sheet 10 is bent toward a same side as an opening of the groove on the first sheet 10, so as to prevent movement interference of the opening of the groove. The bending treatment according to the present disclosure may be performed by a stamping process, or may be performed by another process capable of realizing bending. The groove is adopted to reduce the bending deformation resistance substantially, and reduce the loss of the punch. In the bending process, an upper pressing punch 30 can bear an upward forced, so that the upper pressing punch 30 can effectively bear the upward force from a lower pressing punch 50, and the service life of the punch can be prolonged.

[0032] It should be understood that depending on the number of the bending required for the first sheet 10, the groove may be provided at each location where the first sheet 10 is bent to reduce the error caused by each bending.

[0033] It should be understood that the sheet material may be conducted with all the processes on one mold or different processes on different molds.

[0034] As shown in FIG. 4, the bending the first sheet 10 for a plurality of times includes:

[0035] Conducting a first bending to define a folding wall 11, wherein the folding wall 11 is with an angle to the first sheet 10, and the groove is disposed on the folding wall 11.

[0036] In the present embodiment, in order to form the middle frame structure of the backplane 100, it is necessary to stamp a first bending to the first sheet 10 to define the folding wall 11. The folding wall 11 is provided with at least one groove. Specifically, before stamping a first bending to the first sheet 10, a thinning process can be performed on the first sheet 10 to form the groove. The first groove A can be formed by thinning an upper surface of the first sheet 10. The first groove A has a same length side as the first sheet 10. The first groove A is used to define an upper pre-bending line for a subsequent bending. An accurate bending can be performed along the first groove A to reduce errors. The depth of the first groove A and the size of the opening of the first groove A can be set according to a specific thickness of the sheet material, a stamping process parameter, and the like. The folding wall 11 is defined at a right angle to the first sheet 10, and may be provided at other angles as required.

[0037] On the basis of the above embodiment, as shown in FIG. 5, the groove includes a first groove A. After conducting a first bending to the first sheet 10 to define a folding wall 11 with an angle to the first sheet 10, the bending the first sheet 10 for a plurality of times further includes:

[0038] Conducting a second bending to the folding wall 11, wherein the folding wall 11 is bent at the first groove A to define a first folding edge 12 parallel to the first sheet 10, wherein the second bending is conducted toward a same side of an opening of the first groove A.

[0039] In the present embodiment, after the first sheet 10 is bent and stamped to define the folding wall 11, a subsequent bending and stamping is configured to form a structure for supporting the display screen. Therefore, in order to improve the bending and stamping accuracy, when conducting a second bending to the folding wall 11, the folding wall 11 is bent at the first groove A to define the first folding edge 12, and the folding wall 11 is bent toward the same side as the opening of the first groove A. Optionally, the first folding edge 12 is arranged in parallel with the first sheet 10. Specifically, the position where the folding wall 11 is bent is the position where the first groove A is disposed, so that the bending accuracy is improved.

[0040] On the basis of the above embodiment, as shown in FIG. 6, after conducting the second bending to the folding wall 11, the bending the first sheet 10 for a plurality of times further includes:

[0041] Conducting a third bending to the first folding edge 12, wherein the first folding edge 12 is bent at the first groove A to define a second folding edge 13 against the folding wall 11, the second groove B is disposed on the second folding edge 13, and he third bending is conducted toward a same direction as the second bending. Specifically, the third bending is conducted at the first groove A, so that the bending accuracy is improved.

[0042] In this embodiment, in order to improve the stability of the middle frame structure formed by the first sheet 10, it is necessary to bend the first folding edge 12 at the first groove A. The third bending is conducted toward a same direction as the second bending, so that the second folding edge 13 is against the first folding edge 12, thereby improving the strength of the folding wall 11to support the display screen.

[0043] On the basis of the above embodiment, as shown in FIG. 6, the groove further includes a second groove B, wherein the first groove A and the second groove B are disposed on different surfaces of the folding wall 11 and arranged in a staggered manner. After conducting the third bending to the first folding edge 12, the bending the first sheet 10 for a plurality of times further includes:

[0044] Conducting a fourth bending to the second folding edge 13, wherein the second folding edge 13 is bent at the second groove B to define a third folding edge 14. Optionally, the third folding edge 14 is arranged parallel to the first sheet 10, wherein the fourth bending direction is conducted toward an opposite direction of the third bending, and the second folding edge 13 is bent toward a same side as an opening of the second groove B.

[0045] In the present embodiment, in order to form a middle frame structure to accommodate a display screen and prevent the display screen from projecting out of the folding wall 11 after being mounted on the first folding edge 12, the second folding edge 13 needs to be bent, and the second folding edge 13 is bent at the second groove B to define the third folding edge 14. The fourth bending direction is conducted toward an opposite direction of the third bending, and the second folding edge 13 is bent toward a same side as the opening of the second groove B. As such, the third folding edge 14 is arranged parallel to the first sheet 10 after being bent, and the third folding edge 14 is depressed toward the first sheet 10 to form a space sufficient to accommodate the display screen.

[0046] In order to improve the dimensional accuracy after bending, a lower surface of the first sheet 10 may be thinned to form the second groove B. A lower pre-bending line is defined by the second groove B, so that an accurate bending may be performed along the second groove B in a subsequent bending, thereby reducing errors.

[0047] It should be understood that the second groove B is spaced from the first groove A, and the first groove A and the second groove B both are disposed on the folding wall 11.

[0048] By arranging the first groove A and the second groove B on the upper and lower surfaces of the first sheet 10 respectively, the bending deformation resistance can be greatly reduced, the loss of the punch can be reduced, the error caused by each stamping can be effectively reduced, and the qualified rate of the product can be improved. Moreover, the second folding edge 13 and the third folding edge 14 can be formed by a same stamping.

[0049] After forming the groove, a flash burr is generated on the first sheet 10. Thus, the flash burr is need to be removed after the last step or after each step above.

[0050] On the basis of the above embodiment, the folding wall 11 is bent for 90 degrees at the second bending, and the second folding edge 13 is bent for 90 degrees at the fourth bending.

[0051] In the present embodiment, since the die such as the insert core 20 and the punch need to be used in the stamping process, the folding wall 11 is bent for 90 degrees at the second bending, and the second folding edge 13 is bent for 90 degrees at the fourth bending, so that the second folding edge 13 and the third folding edge 14 are formed by a same stamping subsequently.

[0052] Referring to FIG. 7, FIG. 8, and FIG. 9, another embodiment of the present disclosure is provided as follows.

[0053] Stamping at a right side edge of the first sheet 10 is taken as an example. The first sheet 10 is connected closely between the insert core 20 and the upper punch 30 to prevent the first sheet 10 from offsetting. At the same

time, the folding wall 11 is stamped by the right punch 40 so that a portion of the folding wall 11 located outside the insert core 20 is bent by 90 degrees in the first direction (herein the clockwise direction). Since the upper pre-bending line defined by the first groove A can improve the accuracy of the bending, the first groove A is located on the edge of the insert core 20 on the side away from the first sheet 10. As such, the portion of the folding wall 11 outside of the insert core 20 is bent 90 degrees along the first groove A to define the first folding edge 12 parallel to the first sheet 10.

[0054] It should be understood that when the first folding edge 12 is defined, the bending corner may be trimmed.

[0055] The lower punch 50 upwardly stamps the first folding edge 12 so that a portion of the first folding edge 12 between the first groove A and the second groove B is bent by 90 degrees in a first direction along the first groove A. As such, a second folding edge 13 is defined and against the folding wall 11. A remaining portion of the second folding edge 13 is bent by 90 degrees in a second direction along the second groove B to define a third folding edge 14 parallel to the first sheet 10. The third folding edge 14 cooperates with the second folding edge 13 to define a mounting cavity C for placing an optical component such as a display screen.

[0056] Further, the first direction is opposite to the second direction.

[0057] In the stamping process of the present disclosure, after the folding wall 11 is fixed by the insert core 20, the folding wall 11 is stamped upwardly by the lower punch, so that the second folding edge 13 between the first groove A and the second groove B is bent 90 degrees along the first groove A in the first direction and is against the folding wall 11. The third folding edge 14 is bent 90 degrees along the second groove B in the second direction (herein the counterclockwise direction) and is arranged in parallel with the first sheet 10. As such, the third folding edge 14 is bent along the second groove B, and therefore, in a same process of forming the second folding edge 13 and the third folding edge 14, the second folding edge 13 and the third folding edge 14 are bent accurately along the first groove A and the second groove B, respectively, thereby effectively improving the stamping accuracy.

[0058] If the insert core 20 is in form of a cantilever, it is liable to be broken due to insufficient strength when subjected to the upward force of the lower punch. However, in the present embodiment, the pressure required by the lower punch is relatively small because of the groove, and since the insert core 20 can bear an upward force, it is possible to effectively bear the upward force of the lower punch, thereby improving the service life of the punch and the insert core 20.

[0059] It should be understood that the third folding edge 14 and the second folding edge 13 are stamped from the first folding edge 12.

[0060] On the basis of the above embodiment, a distance between the second folding edge 13 and the first sheet 10 is greater than or equal to 1 mm. According to the present embodiment, the groove is provided on the folding wall 11, and the first sheet 10 is fixed by insert core 20 from lower to upper, so that the between the third folding edge 14 and the first sheet 10 is easily adjusted, and the thin structure is easily formed without being limited by the height of the folding wall 11. Thus, the distance between the third folding edge 14 and the first sheet 10 can be as low as 1 mm.

[0061] On the basis of the above embodiment, the first groove A and the second groove B are V-shaped; and/or, an angle between two walls of the first groove A is greater than 90 degrees, and an angle between two walls of the second groove B is greater than 90 degrees.

[0062] In the present embodiment, in order to facilitate the bending of the folding wall 11 and the second folding edge 13, the first groove A and the second groove B may be thinned by the punch with the V-shaped structure, so that the angle between two walls of the first groove A is greater than 90 degrees, and the angle between two walls of the second groove B is greater than 90 degrees. Alternatively, the angle between two walls of the first groove A ranges from 110 degrees to 120 degrees, and the angle between two walls of the second groove B ranges from 110 degrees to 120 degrees, in order to avoid the bending from failing to preset angle.

[0063] On the basis of the above embodiment, a depth of the first groove A ranges from 1/3 to 1/2 of a thickness of the first sheet 10, and a depth of the second groove B ranges from 1/3 to 1/2 of the thickness of the first sheet 10.

[0064] In this embodiment, the depth of the first groove A ranges from 1/3 to 1/2 of a thickness of the first sheet 10, and the depth of the second groove B ranges from 1/3 to 1/2 of the thickness of the first sheet 10, so that the bending deformation resistance can be effectively reduced, the bending progress can be improved, and the loss of the punch can be reduced. Alternatively, the depth of the first groove A is 1/2 of a thickness of the first sheet 10, and the depth of the second groove B is 1/2 of the thickness of the first sheet 10.

[0065] The present disclosure also provides a method for processing a backplane 100, including:

[0066] Providing a sheet material including a first sheet 10, a second sheet 60, and a connecting sheet 70, wherein the connecting sheet 70 is connected between the first sheet 10 and the second sheet 60, and at least one groove is provided on a side of the first sheet 10;

[0067] Bending the first sheet 10 for a plurality of times, wherein the bending first sheet 10 for a plurality of times at least includes bending the first sheet 10 from the groove, and the first sheet 10 is bent toward a same side as an opening of the groove on the first sheet;

[0068] Conducting a first bending to define a folding wall 11, wherein the folding wall 11 is with an angle to the first sheet 10, and the groove is disposed on the folding wall 11;

[0069] Conducting a second bending to the folding wall 11, wherein the folding wall 11 is bent at the first groove A to

define a first folding edge 12 parallel to the first sheet 10, wherein the second bending is conducted toward a same side of an opening of the first groove A; and

[0070] Conducting a third bending to the first folding edge 12, wherein the first folding edge 12 is bent at the first groove A to define a second folding edge 13 against the folding wall 11, the second groove B is disposed on the second folding edge 13, and he third bending is conducted toward a same direction as the second bending;

[0071] The distance between the second folding edge 13 and the first sheet 10 is greater than or equal to 1 mm.

[0072] The groove further includes a second groove B, wherein the first groove A and the second groove B are disposed on different surfaces of the folding wall 11 and arranged in a staggered manner. After conducting the third bending to the first folding edge 12, the bending the first sheet 10 for a plurality of times further includes:

[0073] Conducting a fourth bending to the second folding edge 13, wherein the second folding edge 13 is bent at the second groove B to define a third folding edge 14. Optionally, the third folding edge 14 is arranged parallel to the first sheet 10, wherein the fourth bending direction is conducted toward an opposite direction of the third bending, and the second folding edge 13 is bent toward a same side as an opening of the second groove B.

[0074] The folding wall 11 is bent for 90 degrees at the second bending, and the second folding edge 13 is bent for 90 degrees at the fourth bending.

[0075] The first groove A and the second groove B are V-shaped, and/or an angle between two walls of the first groove A is greater than 90 degrees, and an angle between two walls of the second groove B is greater than 90 degrees.

[0076] A depth of the first groove A ranges from 1/3 to 1/2 of a thickness of the first sheet 10, and a depth of the second groove B ranges from 1/3 to 1/2 of the thickness of the first sheet 10.

[0077] The disclosure also provides a backplane 100. The backplane 100 in this embodiment is manufactured by the method for processing backplane described above.

[0078] The backplane includes a first sheet 10, a second sheet 60, and a connecting sheet 70 connecting the first sheet 10 and the second sheet 60. The first sheet 10 includes a folding wall 11 and a first folding edge 12. The folding wall 11 and the first folding edge 12 are defined by bending the first sheet 10 for a plurality of times. The first folding edge 12 includes a second folding edge 13 and a third folding edge 14. The second folding edge 13 and the third folding edge 14 are defined by bending the first folding edge 12 for a plurality of times.

[0079] The folding wall 11 is arranged at an angle to the first sheet 10, and at least one groove is provided on the folding wall 11. The at least one groove includes a first groove A, the second folding edge 13 abuts against the folding wall 11, and the first groove A is located at a junction between the second folding edge 13 and the folding wall 11. An end of the second folding edge 13 is connected to the folding wall 11, and the other end of the second folding edge 13 is connected to the third folding edge 14.

[0080] The third folding edge 14 is arranged parallel to the first sheet 10, and the at least one groove further includes a second groove B. The second groove B is located at a junction between the second folding edge 13 and the third folding edge 14. The angle between the second folding edge 13 and the third folding edge 14 is 90 degrees. The depth of the first groove ranges from 1/3 to 1/2 of a thickness of the first sheet, and the depth of the second groove ranges from 1/3 to 1/2 of the thickness of the first sheet.

[0081] In this embodiment, the third folding edge 14 cooperates with the folding wall 11 to form a mounting cavity C for placing the optical component.

[0082] The present disclosure also provides a display device including the backplane 100 described above. With reference to the above-described embodiments, since the display device employs all the technical solutions of the above-described embodiments, the display device has at least all the beneficial effects of the technical solutions of the above-described embodiments, and details are not described herein.

[0083] The foregoing description is merely an alternative embodiment of the present disclosure, and is therefore not intended to limit the scope of the present disclosure. The equivalent structural changes based on the description and drawings of the present disclosure, or direct/indirect application in other relevant technical fields are intended to be included within the scope of the present disclosure.

Claims

1. A method for processing backplane, comprising:

providing a sheet material including a first sheet, a second sheet, and a connecting sheet, wherein the connecting sheet is connected between the first sheet and the second sheet, and at least one groove is provided on the first sheet; and

bending the first sheet for a plurality of times, wherein the bending first sheet for a plurality of times at least includes bending the first sheet at the at least one groove, and the first sheet is bent toward a same side as an opening of the at least one groove on the first sheet.

2. The method for processing backplane of claim 1, wherein the bending the first sheet for a plurality of times comprises:
conducting a first bending to the first sheet to define a folding wall with an angle to the first sheet, wherein the at least one groove is disposed on the folding wall.

3. The method for processing backplane of claim 2, wherein the at least one groove includes a first groove and a second groove, after conducting the first bending to the first sheet to define the folding wall with the angle to the first sheet, the bending the first sheet for a plurality of times further comprises:
conducting a second bending to the folding wall, wherein the folding wall is bent at the first groove to define a first folding edge parallel to the first sheet, and the second bending is conducted toward a same side of an opening of the first groove.

4. The method for processing backplane of claim 3, wherein after conducting the second bending to the folding wall, the bending the first sheet for a plurality of times further comprises:
conducting a third bending to the first folding edge, wherein the first folding edge is bent at the first groove to define a second folding edge against the folding wall, the second groove is disposed on the second folding edge, and the third bending is conducted toward a same direction as the second bending.

5. The method for processing backplane of claim 4, wherein the first groove and the second groove are disposed on different surfaces of the folding wall and are staggered, after conducting the third bending to the first folding edge, the bending the first sheet for a plurality of times further comprises:
conducting a fourth bending to the second folding edge, wherein the second folding edge is bent at the second groove to define a third folding edge parallel to the first sheet, the fourth bending direction is conducted toward an opposite direction of the third bending, and the fourth bending is conducted toward a same side of an opening of the second groove.

6. The method for processing backplane of claim 5, wherein the folding wall is bent for 90 degrees at the second bending, and the second folding edge is bent for 90 degrees at the fourth bending.

7. The method for processing backplane of claim 5, wherein a distance between the second folding edge and the first sheet is greater than or equal to 1 mm.

8. The method for processing backplane of claim 5, wherein the first groove and the second groove are V-shaped; and/or an angle between two walls of the first groove is greater than 90 degrees, and an angle between two walls of the second groove is greater than 90 degrees.

9. The method for processing backplane of claim 5, wherein a depth of the first groove ranges from 1/3 to 1/2 of a thickness of the first sheet, and a depth of the second groove ranges from 1/3 to 1/2 of the thickness of the first sheet.

10. A method for processing backplane, comprising:

providing a sheet material including a first sheet, wherein at least one groove is provided on the first sheet; and bending the first sheet for a plurality of times, wherein the bending first sheet for a plurality of times at least includes bending the first sheet at the at least one groove.

11. The method for processing backplane of claim 10, wherein the sheet material further comprises a second sheet and a connecting sheet, and the connecting sheet is connected between the first sheet and the second sheet;
wherein the first sheet is bent toward a same side as an opening of the at least one groove on the first sheet.

12. The method for processing backplane of claim 11, wherein the bending the first sheet for a plurality of times comprises:

conducting a first bending to the first sheet to define a folding wall with an angle to the first sheet, wherein the at least one groove is disposed on the folding wall, and the at least one groove includes a first groove and a second groove; and
conducting a second bending to the folding wall, wherein the folding wall is bent at the first groove to define a first folding edge parallel to the first sheet, and the second bending is conducted toward a same side of an opening of the first groove.

13. The method for processing backplane of claim 12, wherein after conducting the second bending to the folding wall,

the bending the first sheet for a plurality of times further comprises:

conducting a third bending to the first folding edge, wherein the first folding edge is bent at the first groove to define a second folding edge against the folding wall, the second groove is disposed on the second folding edge, and the third bending is conducted toward a same direction as the second bending; wherein the first groove and the second groove are disposed on different surfaces of the folding wall and are staggered; and conducting a fourth bending to the second folding edge, wherein the second folding edge is bent at the second groove to define a third folding edge parallel to the first sheet, the fourth bending direction is conducted toward an opposite direction of the third bending, and the fourth bending is conducted toward a same side of an opening of the second groove.

14. A backplane, comprising a first sheet, wherein the first sheet comprises a folding wall and a first folding edge, and the folding wall and the first folding edge are defined by bending the first sheet for a plurality of times.

15. The backplane of claim 14, wherein the backplane further comprises a second sheet and a connecting sheet, and the connecting sheet is connected between the first sheet and the second sheet, wherein the first folding edge comprises a second folding edge and a third folding edge, and the second folding edge and the third folding edge are defined by bending the first folding edge for a plurality of times.

16. The backplane of claim 15, wherein the folding wall is disposed with an angle to the first sheet, and at least one groove is provided on the folding wall.

17. The backplane of claim 16, wherein the at least one groove comprises a first groove, the second folding edge is against the folding wall, and the first groove is disposed at a junction of the second folding edge and the folding wall.

18. The backplane of claim 16, wherein an end of the second folding edge is connected to the folding wall, and another end of the second folding edge is connected to the third folding edge.

19. The backplane of claim 16, wherein the third folding edge is parallel to the first sheet, the at least one groove further comprises a second groove, and the second groove is disposed at a junction of the second folding edge and the third folding edge.

20. The backplane of claim 19, wherein a depth of the first groove ranges from 1/3 to 1/2 of a thickness of the first sheet, and a depth of the second groove ranges from 1/3 to 1/2 of the thickness of the first sheet.

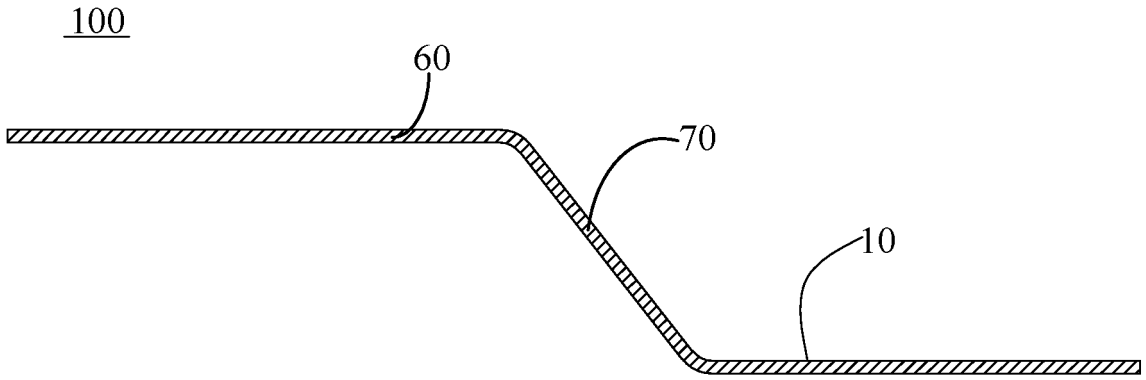

FIG. 1

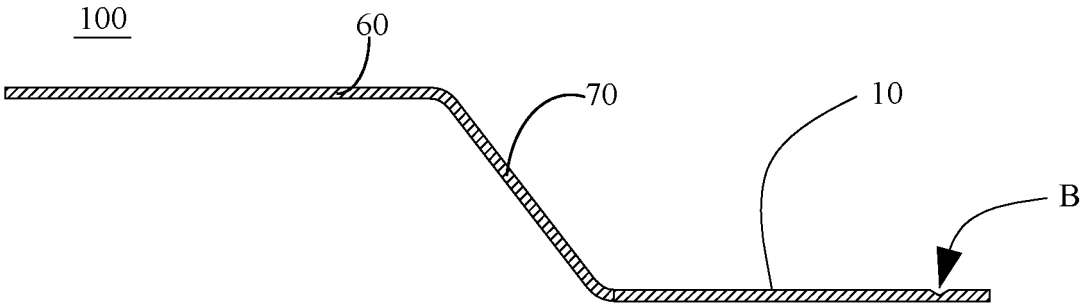

FIG. 2

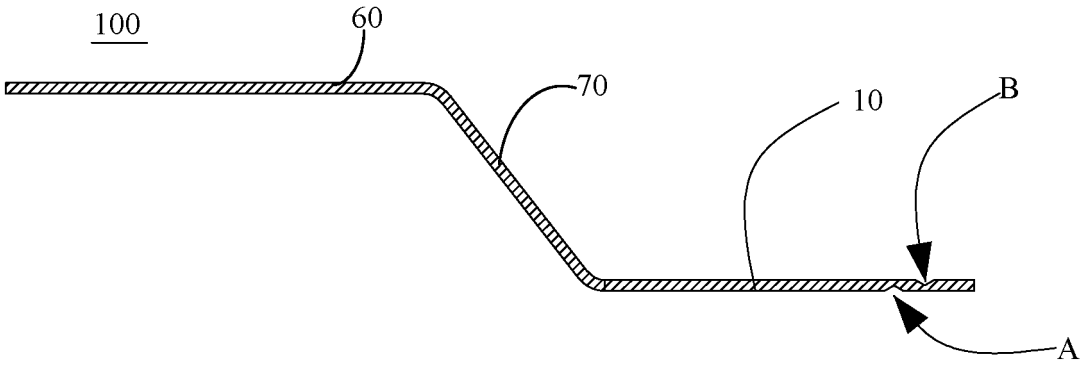

FIG. 3

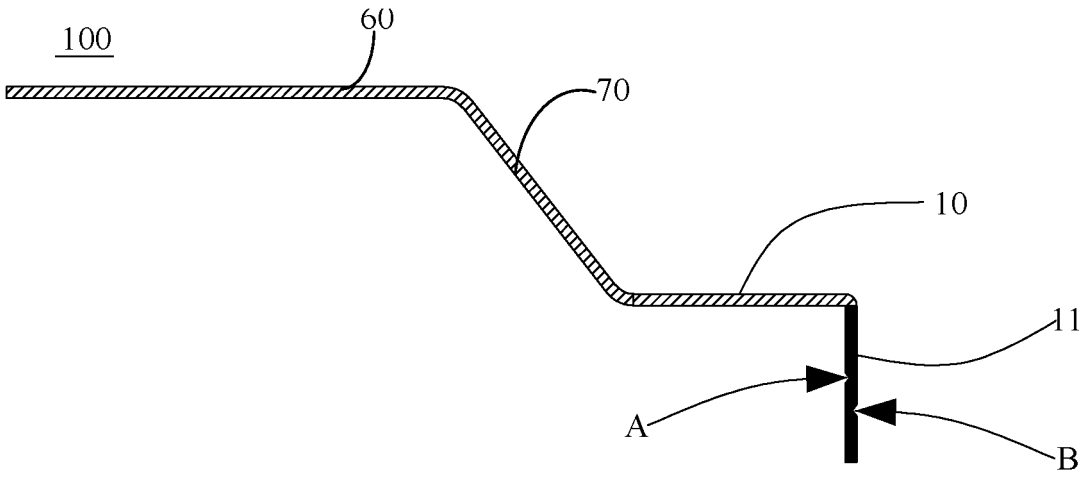

FIG. 4

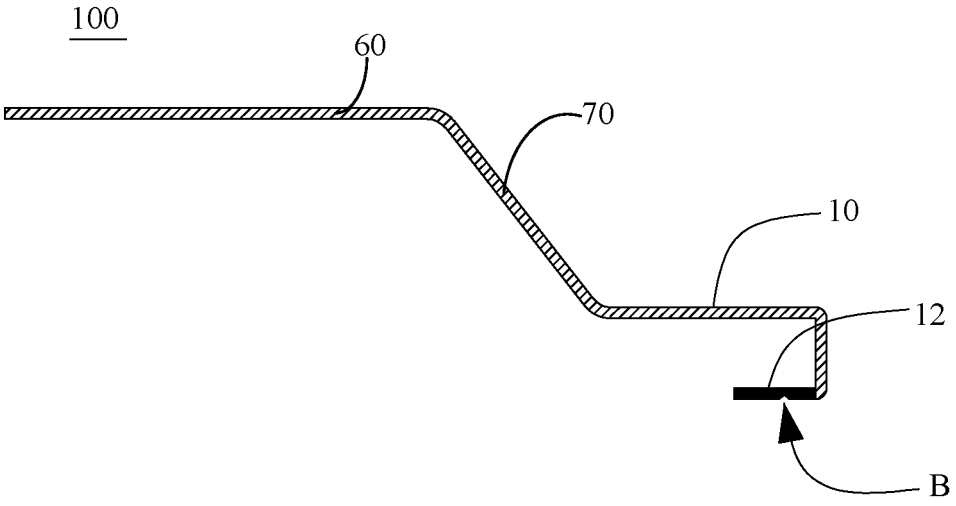

FIG. 5

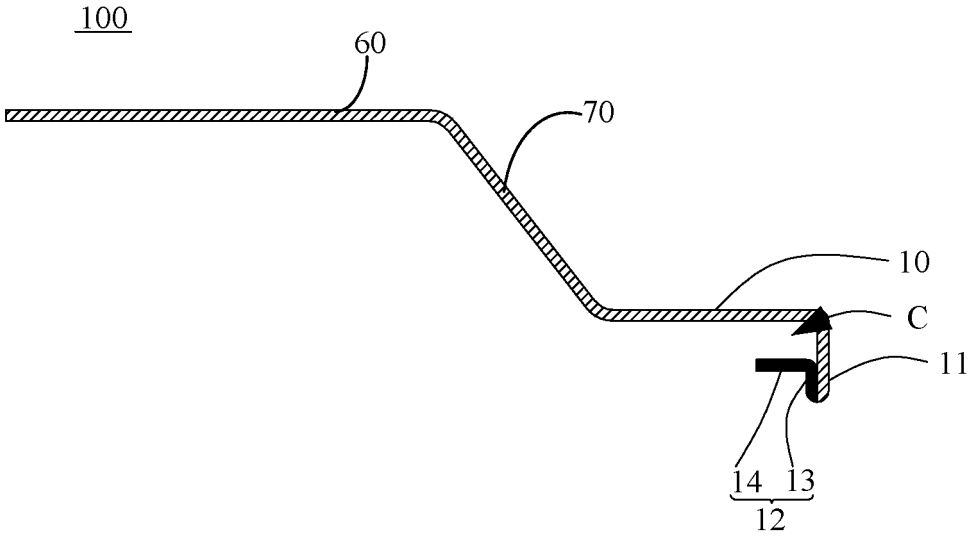

FIG. 6

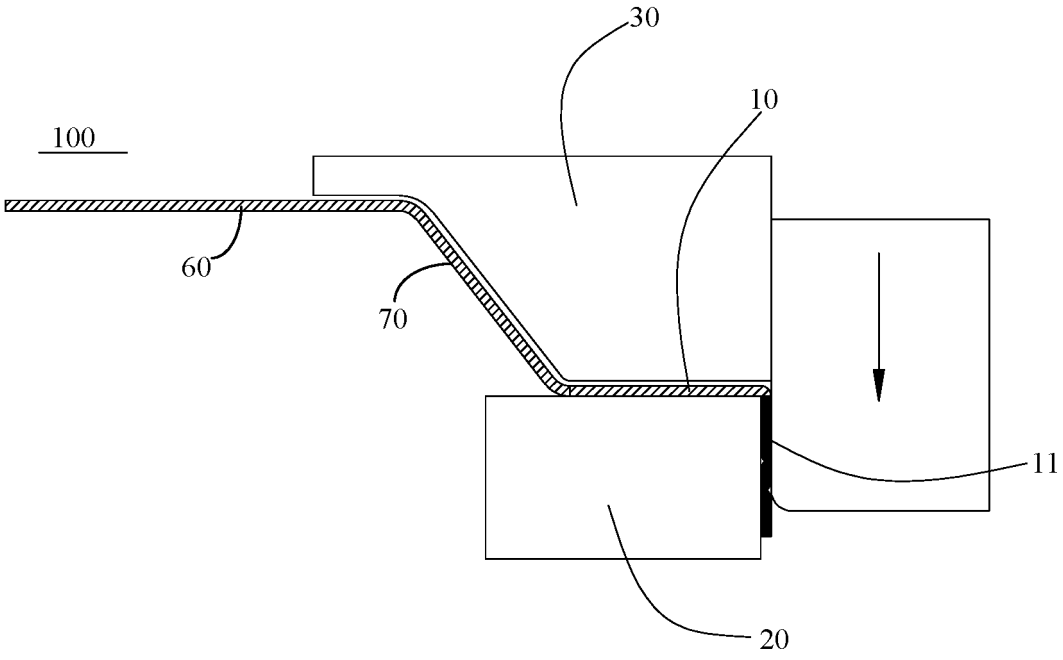

FIG. 7

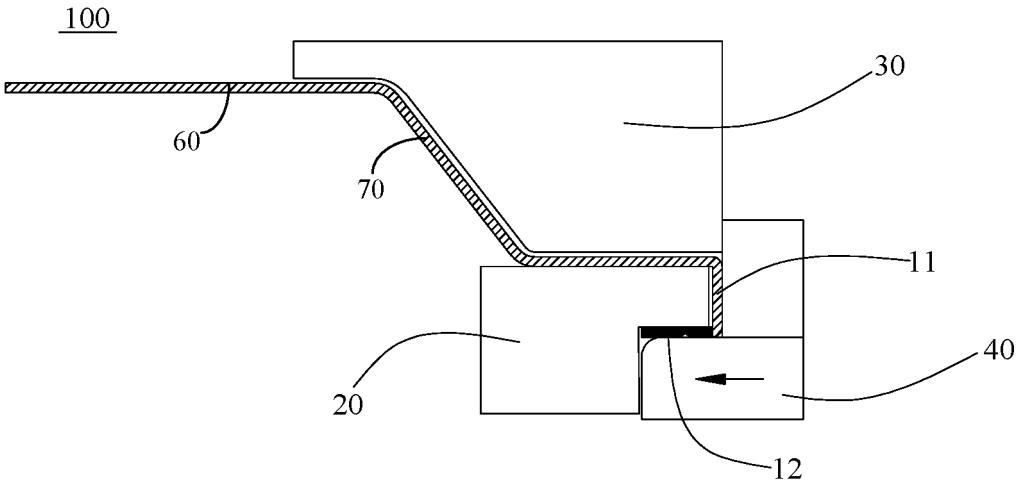

FIG. 8

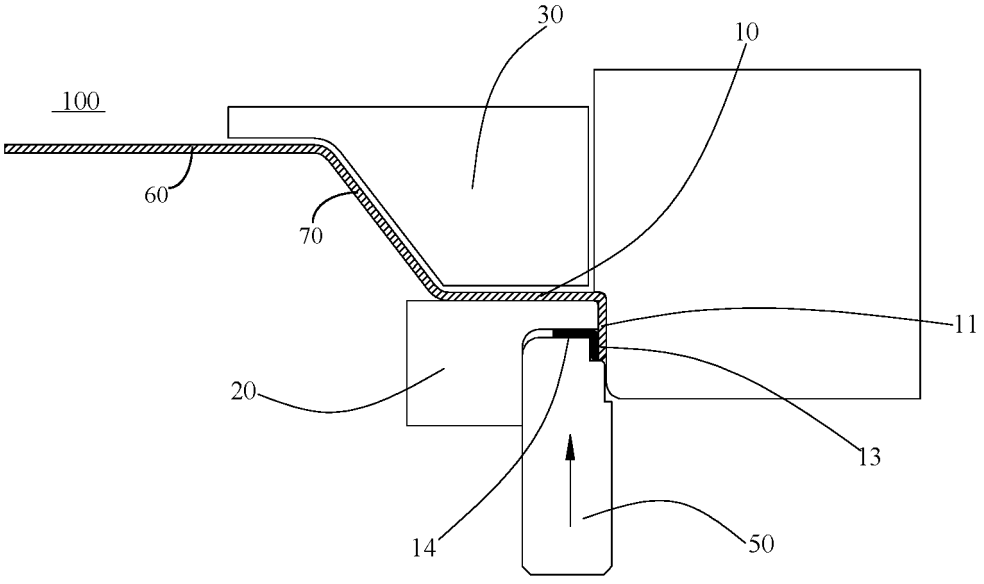

FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/113882

A. CLASSIFICATION OF SUBJECT MATTER

B21D 5/04(2006.01)i; B21D 5/06(2006.01)i; H04N 5/64(2006.01)n

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B21D H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

VEN; CNABS; CNTXT; CNKI; USTXT; EPTXT; WOTXT: TCL, 创维, 背板, 弯折, 折弯, 折边, 槽, 沟, 缺口, 缝, 三次, 第三, bend+, fold+, bent, groove, ark, slot, sulcus, backboard, backplate, backplane, third

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 112642889 A (TCL DIGITAL TECHNOLOGY (SHENZHEN) CO., LTD.) 13 April 2021 (2021-04-13) description, paragraphs [0040]-[0082], and figures 1-9	1-20
X	CN 110802166 A (SHENZHEN SKYWORTH-RGB ELECTRONICS CO., LTD.) 18 February 2020 (2020-02-18) description, paragraphs [0055]-[0099], and figures 1-10	1, 2, 10, 11, 14, 15
Y	CN 110802166 A (SHENZHEN SKYWORTH-RGB ELECTRONICS CO., LTD.) 18 February 2020 (2020-02-18) description, paragraphs [0055]-[0099], and figures 1-10	3-9, 12, 13, 16-20
X	CN 108307134 A (JIANGSU LITONG ELECTRONICS CO., LTD.) 20 July 2018 (2018-07-20) description, paragraphs [0030]-[0042], and figures 2-6	14, 15
Y	CN 108307134 A (JIANGSU LITONG ELECTRONICS CO., LTD.) 20 July 2018 (2018-07-20) description, paragraphs [0030]-[0042], and figures 2-6	3-9, 12, 13

☑ Further documents are listed in the continuation of Box C. ☑ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
03 September 2021	**23 September 2021**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/113882

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Y	CN 210518594 U (DONGGUAN DEYUN INDUSTRIAL CO., LTD.) 12 May 2020 (2020-05-12) description, paragraphs [0035]-[0052], and figures 1-8	16-20
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X	US 2015208017 A1 (FUNAI ELECTRIC CO.) 23 July 2015 (2015-07-23) description paragraphs [0033]-[0043], figures 3-7, 8c	14, 15
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Information on patent family members

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		US 10397512 B2	27 August 2019
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REFERENCES CITED IN THE DESCRIPTION

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