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(54) **APPARATUS FOR TRANSFERRING ELECTRONIC COMPONENT, METHOD FOR TRANSFERRING ELECTRONIC COMPONENT AND MANUFACTURING METHOD OF LIGHT-EMITTING DIODE PANEL**

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(30) **Foreign Application Priority Data**

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H01L 21/683 (2006.01)
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CPC ***H01L 21/67132*** (2013.01); ***H01L 21/6835*** (2013.01); ***H01L 24/80*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC H01L 21/67132; H01L 21/6835; H01L 24/80; H01L 25/167
See application file for complete search history.

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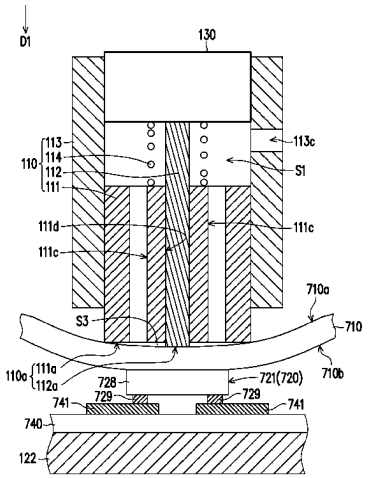
(57) **ABSTRACT**

An apparatus for transferring an electronic component is configured to transfer an electronic component on a flexible carrier to a target substrate. The apparatus includes a first frame, a second frame, an abutment module, an actuator, and a negative pressure generating device. The abutment module includes an abutting component and a guide. The guide guides a movement of the abutting component. The actuator actuates the abutment module so that the abutting component and the guide are respectively moved between a start position and an end position of an abutment path. The negative pressure generating device is pumped through the abutment module. When the abutment module abuts against the flexible carrier, a negative pressure is generated between the abutment module and the flexible carrier by the negative pressure generating device. The abutting component and the
(Continued)



guide are moved simultaneously in at least a portion of the abutment path.

4 Claims, 7 Drawing Sheets

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H01L 25/16 (2023.01)

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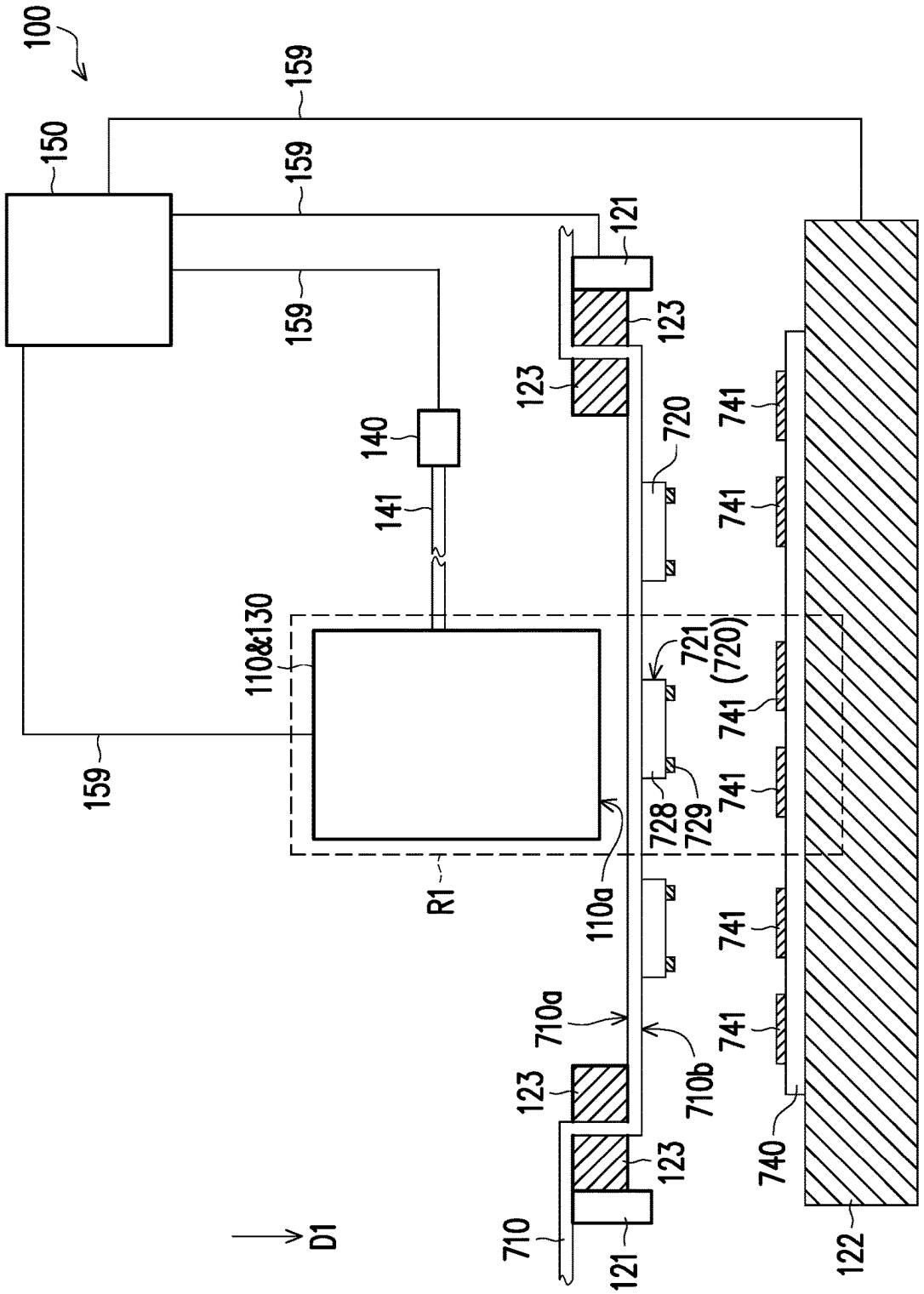
100
159
150
159
121
159
123
123
140
720
741
141
741
110&130
721
(720)
741
159
728
729
741
R1
110a
741
710a
741
710b
123
740
123
710
121
122
D1

FIG. 1

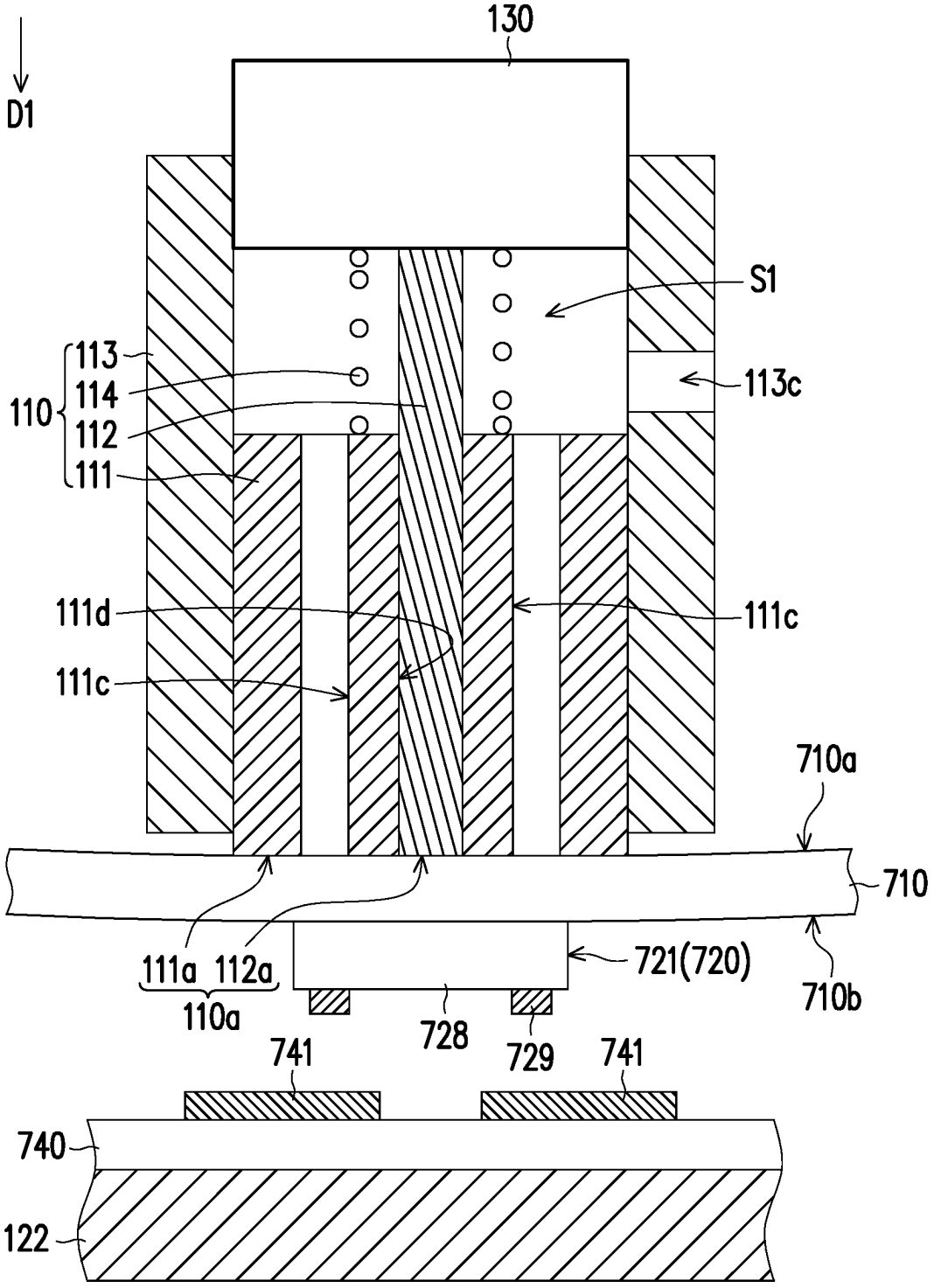
130
D1
S1
113
114
110
112
111
113c
111d
111c
111c
710a
710
111a
112a
110a
721(720)
710b
728
729
741
741
740
122

FIG. 2

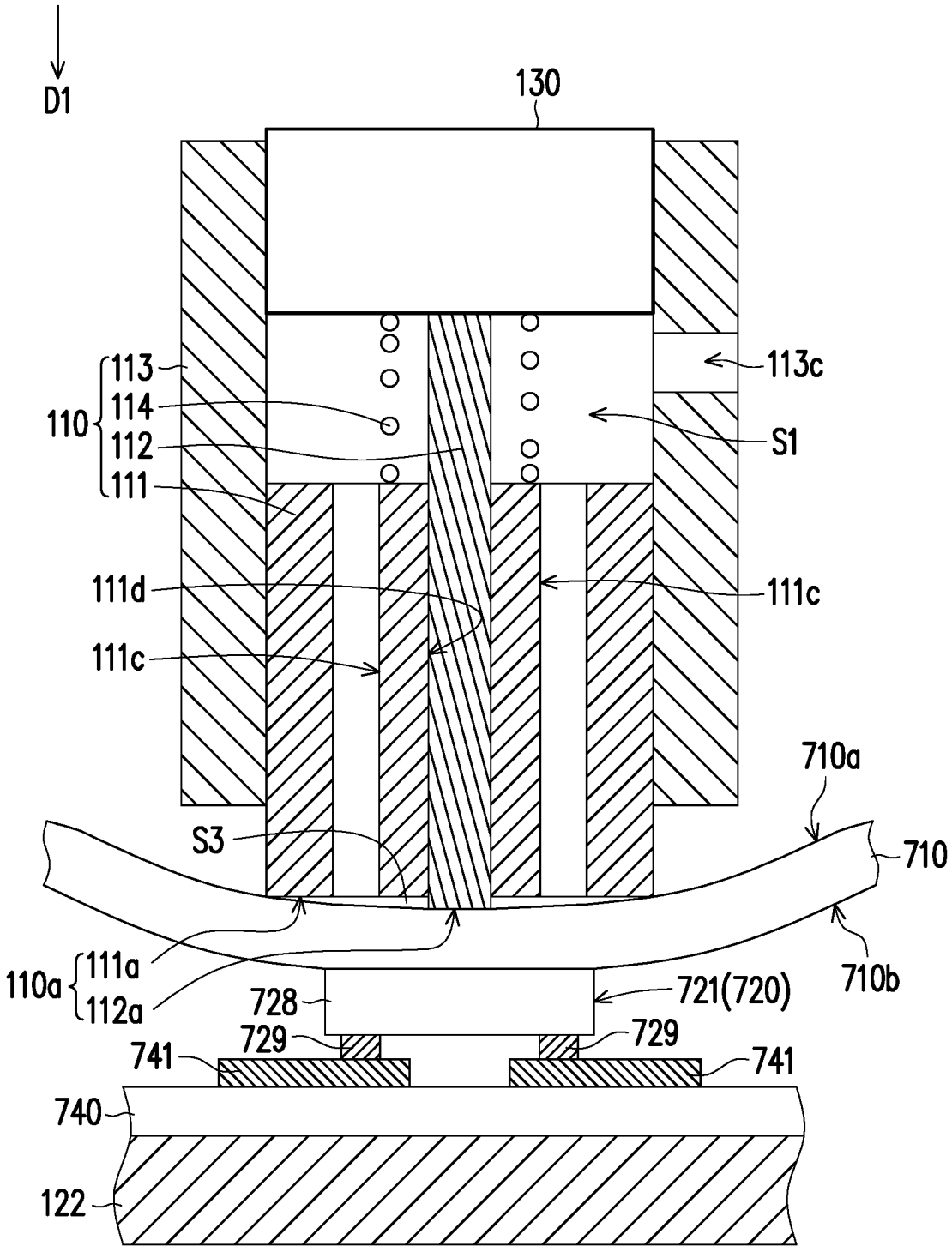
D1
130
113
114
110
112
111
113c
S1
111d
111c
111c
710a
710
S3
111a
110a
112a
710b
728
721(720)
729
729
741
741
740
122

FIG. 3

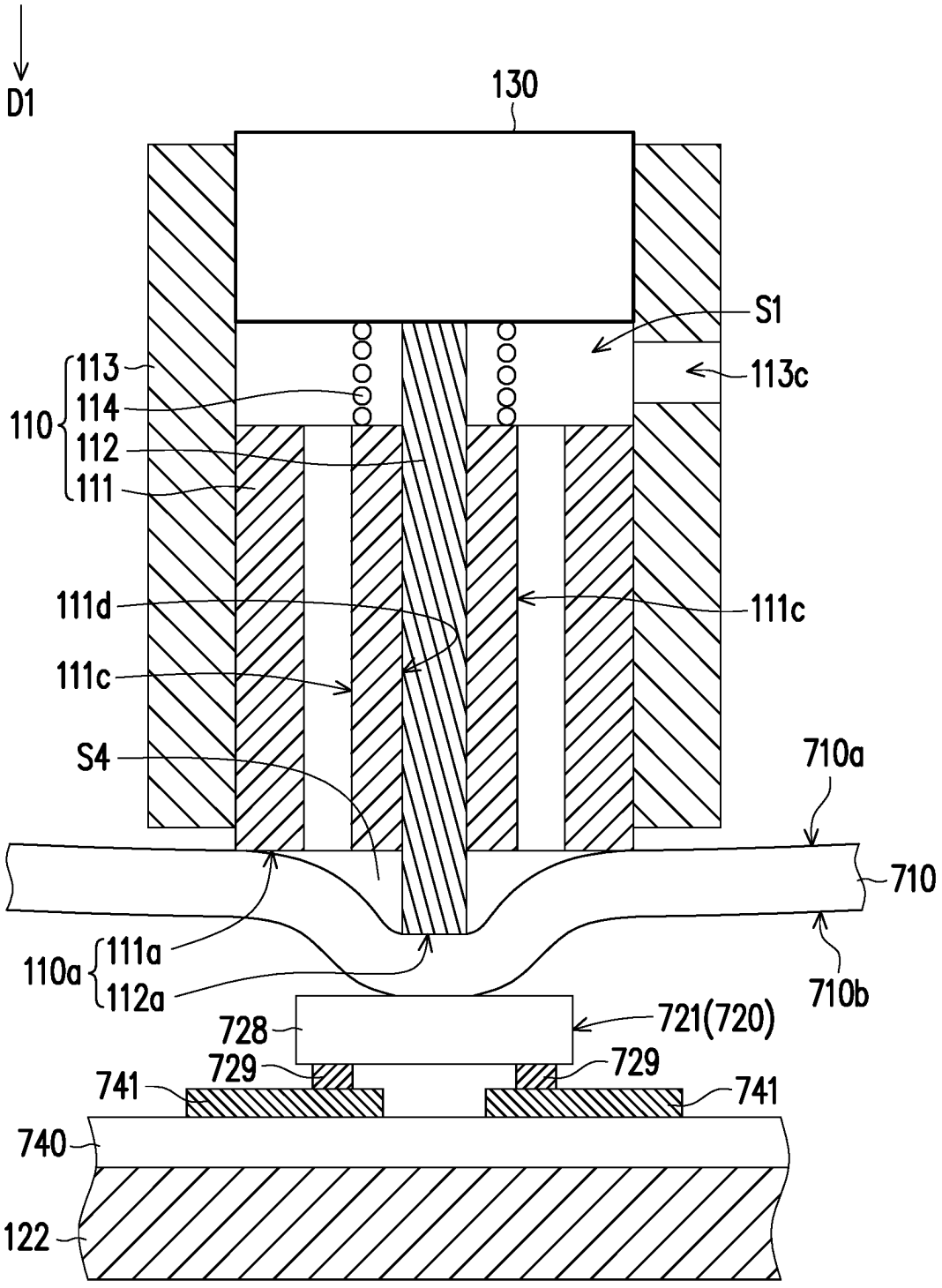
D1
130
S1
113c
113
114
110
112
111
111d
111c
111c
S4
710a
710
110a
111a
112a
710b
728
721(720)
729
729
741
741
740
122

FIG. 4

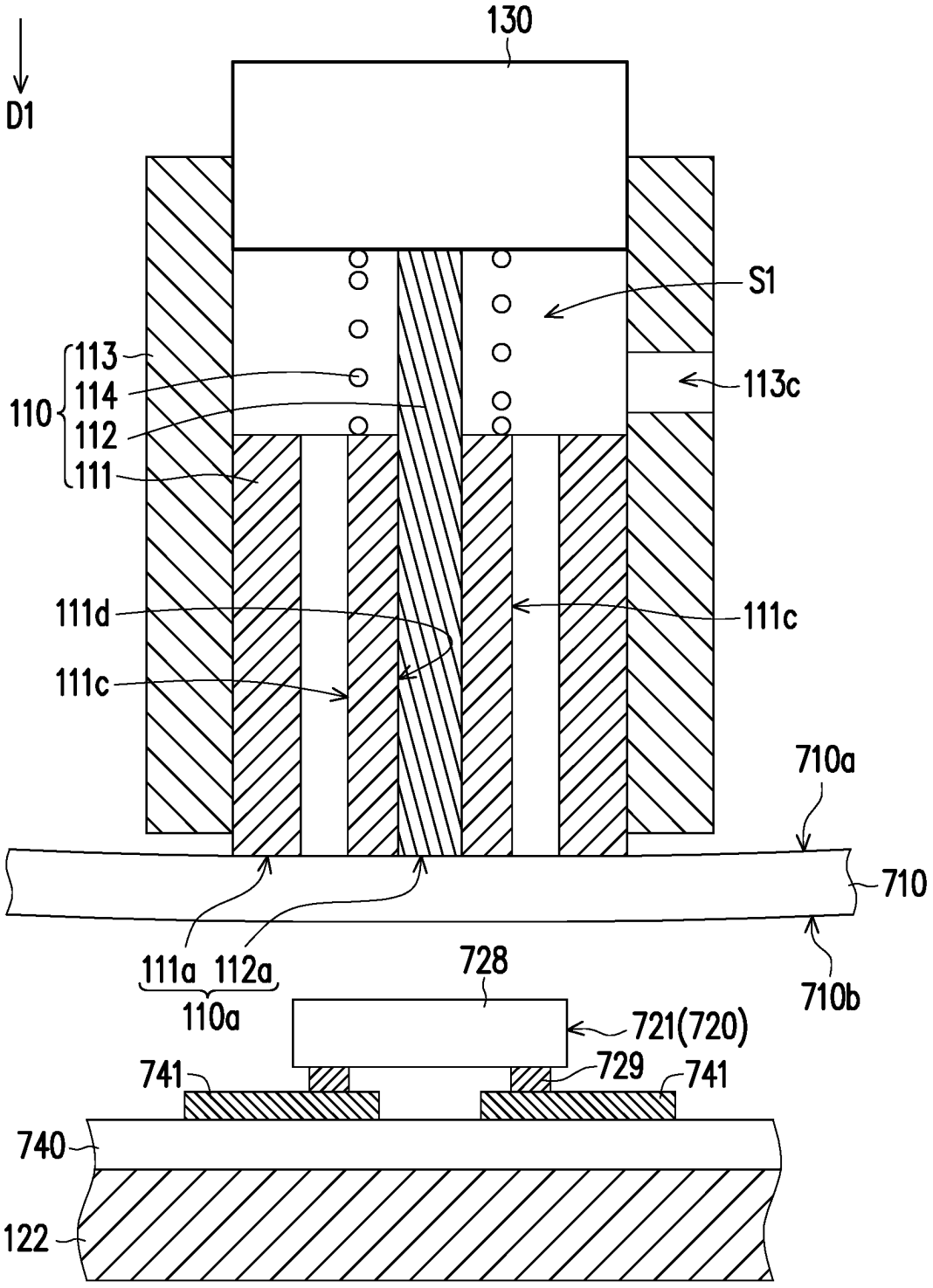
130
D1
S1
113
114
112
111
110
113c
111d
111c
111c
710a
710
111a
112a
110a
728
721(720)
741
729
741
740
122
710b

FIG. 5

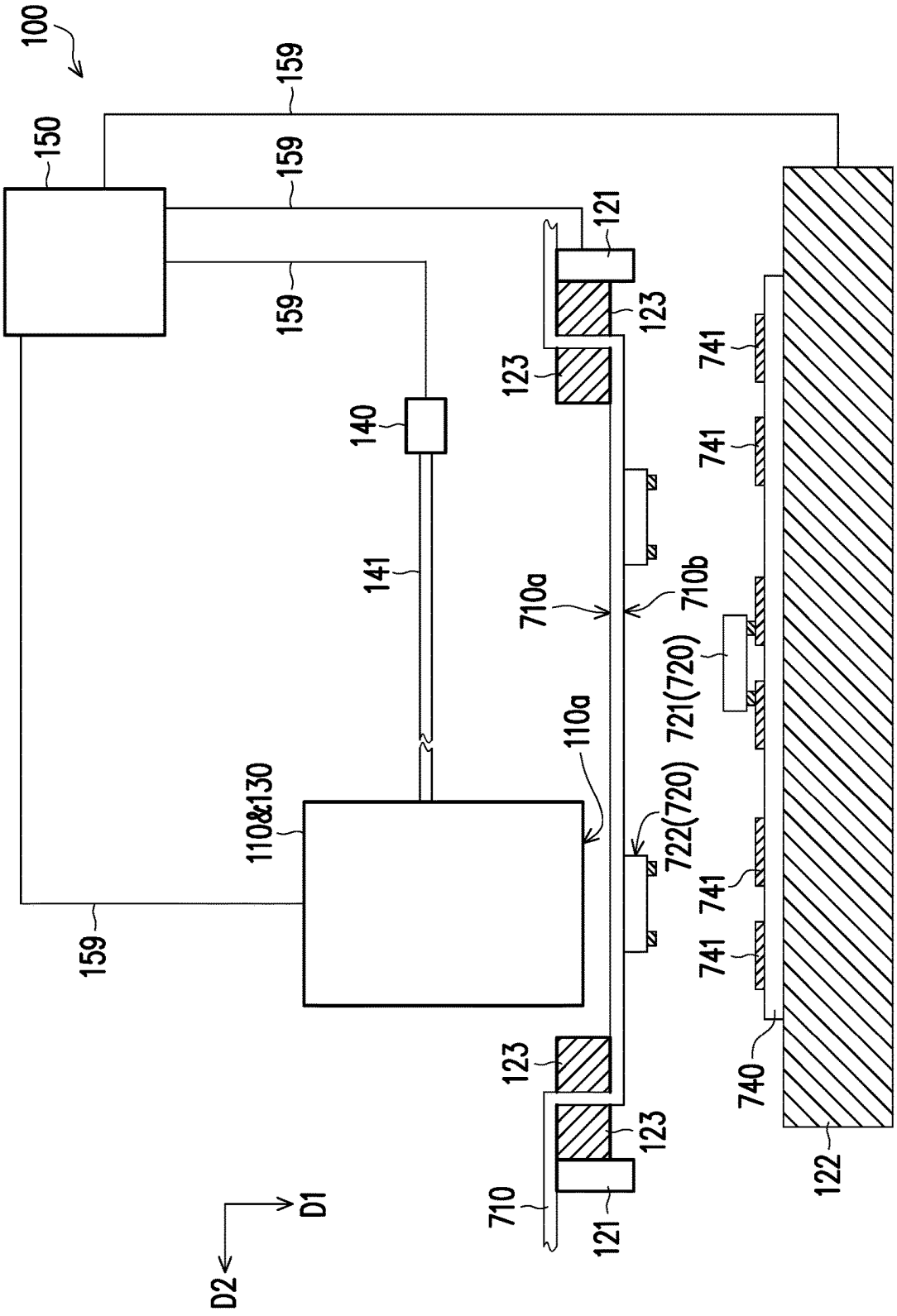
100
159
150
159
121
159
123
123
741
140
741
141
710a
710b
721(720)
110a
110&130
722(720)
741
741
159
123
740
123
122
710
121
D1
D2

FIG. 6

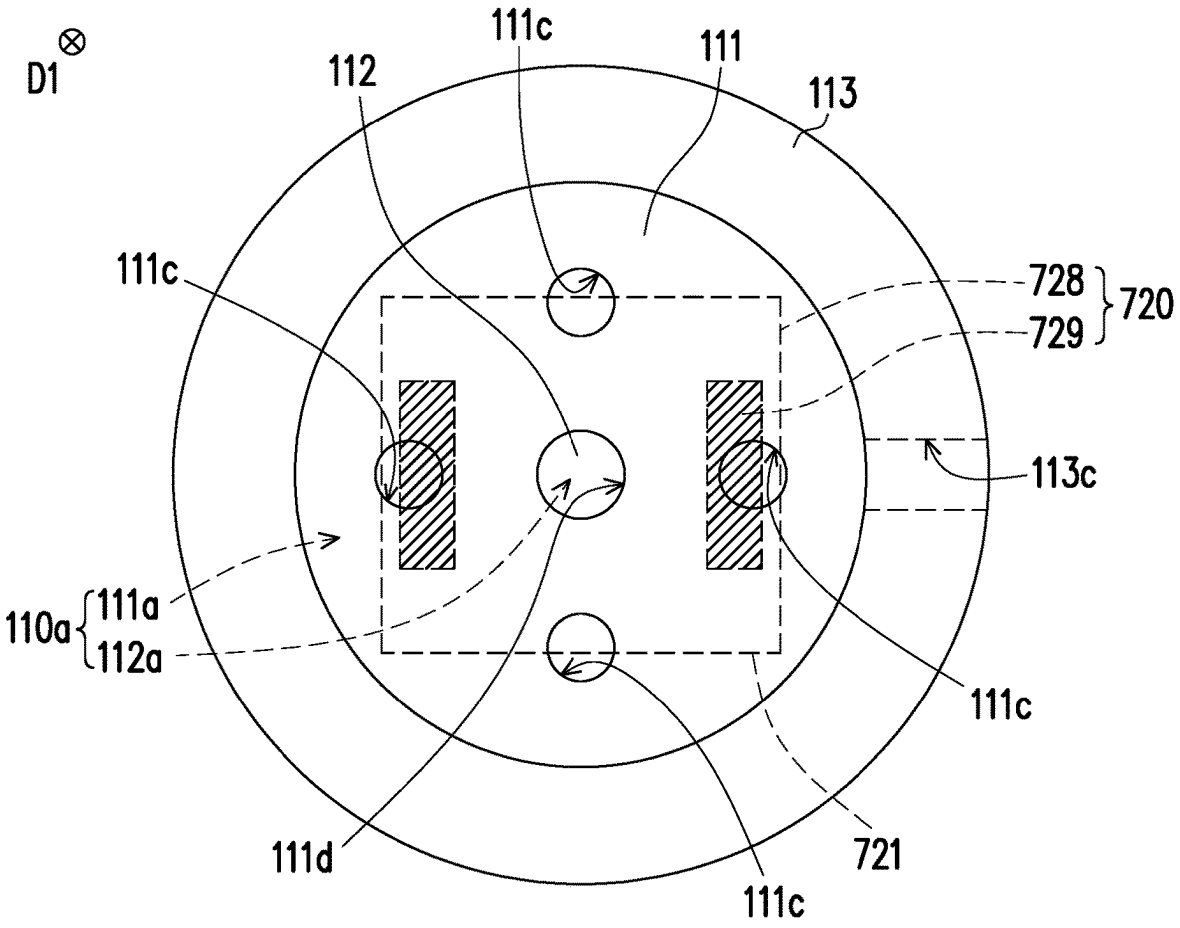
D1
111c
112
111
113
111c
728
729
720
113c
110a
111a
112a
111c
111d
721
111c

FIG. 7

APPARATUS FOR TRANSFERRING ELECTRONIC COMPONENT, METHOD FOR TRANSFERRING ELECTRONIC COMPONENT AND MANUFACTURING METHOD OF LIGHT-EMITTING DIODE PANEL

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the priority benefit of U.S. provisional application Ser. No. 63/227,340, filed on Jul. 30, 2021 and Taiwan application serial no. 110140161, filed on Oct. 28, 2021. The entirety of each of the above-mentioned patent applications is hereby incorporated by reference herein and made a part of this specification.

BACKGROUND

Technical Field

The disclosure relates to an apparatus for transferring an electronic component and a method for transferring an electronic component, and a manufacturing method of a light-emitting diode panel.

Description of Related Art

In a manufacturing process of an electronic product, the process usually includes related steps of transferring an electronic component. For example, in a manufacturing process of an LED display, a light-emitting diode is commonly placed on a TFT array substrate first through a pick-and-place apparatus. Then, the light-emitting diode on the TFT array substrate is fixed and electrically connected to the TFT array substrate. However, the throughput or the yield of the method above may be relatively low.

SUMMARY

The disclosure provides an apparatus for transferring an electronic component and a method for transferring an electronic component configured to transfer an electronic component.

An apparatus for transferring an electronic component is configured to transfer an electronic component on a flexible carrier to a target substrate. The apparatus for transferring the electronic component includes a first frame, a second frame, an abutment module, an actuator, and a negative pressure generating device. The first frame is configured to carry the flexible carrier. The second frame is configured to carry the target substrate so that the target substrate is disposed opposite to the flexible carrier. The abutment module is disposed adjacent to the first frame. The abutment module includes an abutting component and a guide. The guide may guide a movement of the abutting component. The actuator is configured to actuate the abutment module so that the abutting component and the guide of the abutment module may be respectively moved between a start position and an end position of an abutment path. The negative pressure generating device may be pumped through the abutment module. When the abutment module abuts against the flexible carrier, a negative pressure may be generated between the abutment module and the flexible carrier by the negative pressure generating device. The abutting component and the guide of the abutment module are simultaneously moved in at least a portion of the abutment path.

A method for transferring an electronic component includes the following. A flexible carrier is provided, and an electronic component is carried on a surface of the flexible carrier. A target substrate is provided such that the surface of the flexible carrier with the electronic component is disposed opposite to the target substrate. A first abutting surface and a second abutting surface respectively moving toward a surface of the flexible carrier without carrying the electronic component are provided, and an area of the first abutting surface is greater than an area of the second abutting surface. The first abutting surface and the second abutting surface are moved so that at least the second abutting surface contacts the surface of the flexible carrier without carrying the electronic component. The electronic component abuts against the target substrate, and a space is formed between the flexible carrier and the first abutting surface. A negative pressure is generated in the space. The second abutting surface leaves the flexible carrier.

A manufacturing method of a light-emitting diode panel includes adopting the method above to transfer a light-emitting diode to a panel.

Based on the above, the apparatus for transferring the electronic component and the method for transferring the electronic component of the disclosure are adapted to transfer the electronic component on the flexible carrier to the target substrate.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a schematic partial side view of a portion of an action of an apparatus for transferring an electronic component according to an embodiment of the disclosure.

FIG. **2** to FIG. **5** are schematic partial cross-sectional side views of a portion of an action of an apparatus for transferring an electronic component according to an embodiment of the disclosure.

FIG. **6** is a schematic partial side view of a portion of an action of an apparatus for transferring an electronic component according to an embodiment of the disclosure.

FIG. **7** is a schematic partial top view of a portion of an action of an apparatus for transferring an electronic component according to an embodiment of the disclosure.

DESCRIPTION OF THE EMBODIMENTS

Contents of the following embodiments serve for describing instead of limiting. In addition, description of well-known apparatuses, methods, and materials may be omitted so as not to obscure the description of various principles of the disclosure. Directional terms are used herein (e.g., above, below, top, bottom) only with reference to the drawings or in correspondence to conventional terminology, and are not intended to imply absolute orientations. In addition, unless the content clearly dictates otherwise, the singular forms "a," "an," "the," or forms that do not specifically refer to a quantity may include one or plural forms, i.e., include "at least one."

In some of the drawings, some elements or film layers may be enlarged, reduced, or omitted for clarity. Similar components are denoted by the same reference numerals, and have similar functions, materials, or forming manners, and descriptions are omitted. It will be apparent to those of ordinary skill in the art to which the disclosure pertains, from the content of the embodiments and the corresponding illustrations, that the disclosure may be practiced in other embodiments that depart from the specific details disclosed herein.

Referring to FIG. **1**, an apparatus **100** for transferring an electronic component (also briefly referred to as an electronic component transfer apparatus **100**) may be adapted to transfer an electronic component **720** from a flexible carrier **710** to a target substrate **740** (as described in detail below). The apparatus **100** for transferring the electronic component includes a first frame **121**, a second frame **122**, an abutment module **110** (marked in FIG. **2**), an actuator **130** (marked in FIG. **2**), and a negative pressure generating device **140**. The first frame **121** is configured to carry the flexible carrier **710**. The second frame **122** is configured to carry the target substrate **740**. The second frame **122** may cause the target substrate **740** to be disposed opposite to the flexible carrier **710**. The abutment module **110** is disposed adjacent to the first frame **121**. The actuator **130** may be configured to actuate the abutment module **110**. The negative pressure generating device **140** may be pumped through the abutment module **110**. Detailed structures of the abutment module **110**, the actuator **130**, and/or the negative pressure generating device **140** and/or corresponding actions therebetween are described in detail below.

In the embodiment, the apparatus **100** for transferring the electronic component may further include a control system **150**. The control system **150** may be signally connected to a corresponding component, element, or unit (such as, but not limited to, the first frame **121**, the second frame **122**, the actuator **130**, and/or the negative pressure generating device **140**) in a manner of wired signal transmission through a corresponding signal wire **159**; however, the disclosure is not limited thereto. In an embodiment, the control system **150** may be signally connected to the corresponding component, element, or unit in a manner of wireless signal transmission. That is, the apparatus **100** for transferring the electronic component including the control system **150** and the first frame **121**, the second frame **122**, the actuator **130**, and/or the negative pressure generating device **140** signally connected to the control system **150** is the same equipment or machine. In addition, signal connection mentioned in the disclosure may refer to a connection method of wired signal transmission or wireless signal transmission. Furthermore, the disclosure is not intended to limit whether all the signal connection methods need to be the same or different.

In the embodiment, a material of the first frame **121** may include metal, glass, or plastic; however, the disclosure is not limited thereto. In an embodiment, the first frame **121** may include a corresponding fixing member (such as, but not limited to, a clamp and/or a clip) to be adapted to directly and/or indirectly fix the flexible carrier **710**. For example, the first frame **121** may indirectly fix the flexible carrier **710** through a carrier frame **123**. For example, at a position where the first frame **121** and the flexible carrier **710** are in contact, the flexible carrier **710** may be directly fixed through fiction between the first frame **121** and the flexible carrier **710** or in other suitable manner.

In an embodiment, the first frame **121** may include a corresponding transmission member (such as, but not limited to, a roller) to convey the the flexible carrier **710** along an appropriate direction. It is worth noting that the fixing member and the transmission member may be the same component or different components. For example, the flexible carrier **710** may be sandwiched between two rollers. In a state where the rollers are not rotated, the flexible carrier **710** may be fixed correspondingly. In a state where the rollers are rotated, the flexible carrier **710** may be conveyed correspondingly.

In an embodiment, the first frame **121** may be fixed or mounted on a movable unit. In this way, the first frame **121** may be moved and/or rotated along a corresponding direction according to design requirements. The movable unit may include a movable module (e.g. a horizontal movement module, a vertical movement module, a rotary movement module, or a combination of the above) commonly used in a design of a movable mechanism, and corresponding hardware or software may be included therein, or an auxiliary member may be further combined. For example, the movable module may have a power supply device, a motor, a belt, a gear, and other related elements, which is not limited in the disclosure. The related elements include, for example, communication elements, power elements, and the like, which is not limited in the disclosure. The software includes, for example, spatial position computing software, error recording software, communication software, and the like, which is not limited in the disclosure. The auxiliary member includes, for example, a moving rail, a moving shaft, a damping element, a positioning device, and the like, which is not limited in the disclosure.

In the embodiment, the flexible carrier **710** may include an ultraviolet tape (UV tape) or a blue tape, but the disclosure is not limited thereto. In an embodiment, the carrier frame **123** may be referred to as a blue tape frame, but the disclosure is not limited thereto.

In an embodiment, the flexible carrier **710** may be a composite material. For example, the flexible carrier **710** may have a polymer film or ultra-thin glass covered with an adhesive layer.

In the embodiment, the flexible carrier **710** may have a first surface **710***a* and a second surface **710***b* opposite to the first surface **710***a*. The electronic component **720** may be located on the second surface **710***b* of the flexible carrier **710** (e.g. the lower part in the drawings). The second surface **710***b* of the flexible carrier **710** may be disposed opposite to the target substrate **740**.

In the embodiment, the electronic component **720** may include a die **728** and a conductive connection member **729** disposed on the die **728**; however, the disclosure is not limited thereto. The die **728** may include a light-emitting die (such as, but not limited to, a light-emitting diode die) or an integrated circuit (IC); however, the disclosure is not limited thereto. In an embodiment, the conductive connection member **729** includes, for example, solder, but the disclosure is not limited thereto.

In an embodiment, a material of the second frame **122** may include metal, plastic, or other material suitable for supporting or fixing the target substrate **740**.

In an embodiment, the second frame **122** may be fixed or mounted on a movable unit (not directly shown). In this way, the second frame **122** may be moved and/or rotated along a corresponding direction according to design requirements.

In the embodiment, the target substrate **740** may include a corresponding circuit, and the circuit may include a corresponding pad **741** exposed to the outside. In an embodiment, the target substrate **740** may include a rigid circuit board or a flexible circuit board, but the disclosure is not limited thereto. In an embodiment, the target substrate **740** may be a circuit board (such as, but not limited to, a thin film transistor array substrate) further including an active element.

In an embodiment, the pad **741** may be adapted to have solder disposed thereon (but not limited to). Therefore, the pad **741** may also be referred to as a bonding pad.

In an unillustrated embodiment, the electronic component **720** may include a die similar to the die **728**, and the target

substrate **740** may have a corresponding conductive connection member similar to the conductive connection member **729**.

A method for transferring the electronic component **720** from the flexible carrier **710** to the target substrate **740** through the electronic component transfer apparatus **100** may be described as below. It is worth noting that the disclosure is not limited to the method described below. In addition, for clarity, in some drawings below (e.g. FIG. **2** to FIG. **5**), merely schematic cross-sectional side views of a portion of the components corresponding to an R**1** area in FIG. **1** are illustrated for an illustrative purpose. In addition, for clarity, in some drawings below, some elements or components may be omitted (e.g. a corresponding gas pipe **141** or the corresponding signal wire **159**).

Referring to FIG. **1**, the apparatus **100** for transferring the electronic component is provided. Next, the following is performed in no particular order. The target substrate **740** is disposed on the second frame **122** of the apparatus **100** for transferring the electronic component, and the flexible carrier **710** with at least one electronic component **720** disposed thereon is disposed on the first frame **121**. In addition, the electronic component **720** disposed on the flexible carrier **710** is disposed to face the target substrate **740** with a corresponding distance therebetween. It is worth noting that, in FIG. **1**, the number and/or the configuration of the electronic components **720** disposed on the flexible carrier **710** is only illustrative, and is not limited in the disclosure. It is worth noting that, in FIG. **1**, the method of disposing the target substrate **740** on the second frame **122** of the electronic component transfer apparatus **100** and/or the method of disposing the flexible carrier **710** on the first frame **121** are only illustrative, and are not limited in the disclosure.

Referring to FIG. **1** to FIG. **2**, the abutment module **110** of the electronic component transfer apparatus **100** approaches the flexible carrier **710** along an abutting direction D**1** so that an abutting surface **110***a* of the abutment module **110** may further abut against a surface (e.g. the first surface **710***a*) of the flexible carrier **710** without carrying the electronic component **720**. For example, a guide **111** and an abutting component **112** may be moved through the actuator **130** so that at least the abutting component **112** contacts the first surface **710***a* of the flexible carrier **710**. In an embodiment, the abutting component **112** and the guide **111** may simultaneously or almost simultaneously contact the first surface **710***a* of the flexible carrier **710**, but the disclosure is not limited thereto.

Referring to FIG. **2**, the abutment module **110** may include the abutting component **112** and the guide **111**. The guide **111** may guide a movement of the abutting component **112**. The actuator **130** may directly and/or indirectly actuate the abutment module **110** so that the abutting component **112** and the guide **111** may be respectively moved from a start position of an abutment path.

For example, as shown in FIG. **2**, the abutment module **110** may further include a shell (or referred to as an outer shell) **113**. The abutting component **112** and the guide **111** may be sleeved in the shell **113**. In addition, the abutting component **112** and the guide **111** may be moved in the shell **113**. The guide **111** may be the same as or similar to a cap. The guide **112** may be the same as or similar to a pin. The abutting component **112** may be sleeved in the guide **111**. In addition, the abutting component **112** may be moved in a guide passage **111***d* of the guide **111**. The actuator **130** may directly and/or indirectly abut against the abutting component **112**. The actuator **130** may indirectly abut against the guide **111** through an elastic mechanism **114**. The guide **111** has a first abutting surface **111***a*, and the abutting component **112** has a second abutting surface **112***a*. The abutting surface **110***a* of the abutment module **110** at least includes the first abutting surface **111***a* and the second abutting surface **112***a*.

FIG. **7** may be a schematic top view corresponding to FIG. **2**. Referring to FIG. **7**, viewing along a direction parallel to the abutting direction D**1**, an area of the first abutting surface **111***a* may be greater than an area of the second abutting surface **112***a*.

Referring to FIG. **7**, projection of the abutting surface **110***a* on a projection surface (e.g. a virtual surface perpendicular to the abutting direction) is basically overlapped with projection of the electronic component **720** on the projection surface. In an embodiment, within a projection area of the abutting surface **110***a* on the projection surface, the abutting surface **110***a* basically corresponds to merely the specific electronic component **720** (e.g. an electronic component **721** corresponding to the abutment module **110** in FIG. **1** to FIG. **5** and FIG. **7**). Accordingly, the transferring accuracy and precision may be enhanced, and/or chances of transferring errors (e.g. transferring other electronic component adjacent to the electronic component **721** altogether) may be reduced.

In the embodiment, as shown in FIG. **7**, an outer edge of the shell **113** may be a circle, but the disclosure is not limited thereto. In the embodiment, as shown in FIG. **7**, an inner edge of the shell **113** and an outer edge of the guide **111** may be a circle, but the disclosure is not limited thereto. In the embodiment, as shown in FIG. **7**, a guide passage **111***d* of the guide **111** and an outer edge of the abutting component **112** may be a circle, but the disclosure is not limited thereto.

Referring to FIG. **2** to FIG. **3**, through the abutment of the abutment module **110**, the abutting component **112** and the guide **111** may at least be moved to an end position of the abutment path, and the electronic component **721** may abut against the target substrate **740**.

In the embodiment, as shown in FIG. **3**, the abutting component **112** and the guide **111** may simultaneously contact the first surface **710***a* of the flexible carrier **710**. Accordingly, shift of the electronic component **720** may be reduced, and/or a stressed area of the flexible carrier **710** and/or a stressed area of the electronic component **720** may be increased. Hence, chances of damaging the flexible carrier **710** and/or the electronic component **720** may be reduced.

In an embodiment, when the abutment module **110** contacts the first surface **710***a* of the flexible carrier **710** so that the electronic component **721** abuts against the target substrate **740**, the first abutting surface **111***a* of the guide **111** may partially contact the first surface **710***a* of the flexible carrier **710**. Taking FIG. **3** as an example, a space S**3** may be formed between the flexible carrier **710** and the first abutting surface **111***a* due to (but not limited to) bending of the flexible carrier **710**.

In an embodiment, after the electronic component **721** abuts against the target substrate **740**, the electronic component **721** may be soldered and fixed on the target substrate **740** in an appropriate manner (such as, but not limited to, heating).

Referring to FIG. **3** to FIG. **4**, a negative pressure may be generated between the first surface **710***a* of the flexible carrier **710** and the first abutting surface **111***a*, and the guide **111** may be moved in a direction away from the flexible carrier **710**.

For example, in the shell **113**, a gas cell S**1** may be formed between the actuator **130** and the guide **111**. The guide **111** has a gas passage **111***c* connected to the gas cell S**1**. The shell **113** has a gas passage **113***c* connected to the gas cell S**1**.

The negative pressure generating device **140** may be pumped through the gas pipe **141** connected to the gas passage **113***c* so that the air pressure in the gas cell S**1** is reduced to be pumped through the gas passage **111***c* of the guide **111**. Accordingly, a negative pressure may be generated in a space S**4** between the first surface **710***a* of the flexible carrier **710** and the first abutting surface **111***a* (i.e. the air pressure is less than the ambient pressure). That is, the air pressure of the gas cell S**1** and/or the air pressure of the space S**4** in FIG. **4** is basically less than the air pressure of the gas cell S**1** and/or the pressure of the space S**3** in FIG. **3**.

In an embodiment, the elastic mechanism **114** may include a passive elastic member (such as, but not limited to, a spring or an O-ring). Accordingly, at the same time when the negative pressure is generated in the space between the first surface **710***a* of the flexible carrier **710** and the first abutting surface **111***a* through the pumping method above, the guide **111** may be moved in the direction away from the flexible carrier **710** due to a pressure difference.

In an embodiment, the elastic mechanism **114** may include an active elastic member (such as, an actuating member). At the same time when or after the negative pressure is generated in the space between the first surface **710***a* of the flexible carrier **710** and the first abutting surface **111***a* through the pumping method above, the guide **111** may be moved in a direction away from the target substrate **740** through adjustment of the active elastic member at an appropriating timing.

The negative pressure is generated between the first surface **710***a* of the flexible carrier **710** and the first abutting surface **111***a*. When the guide **111** is moved in the direction away from the flexible carrier **710**, the abutting component **112** may be actuated by the actuator **130** so that the second abutting surface **112***a* of the abutting component **112** still abuts against the first surface **710***a* of the flexible carrier **710**. In addition, the electronic component **721** may still be located on a portion corresponding to the second abutting surface **112***a* in the second surface **710***b*, and the other portion corresponding to the first abutting surface **111***a* in the second surface **710***b* may be separated from the electronic component **721** due to a pressure difference.

In the embodiment, it may be referred to as a first stage separation that the flexible carrier **710** and the electronic component **721** are partially separated through the method above.

Referring to FIG. **4** to FIG. **5**, after the first stage separation is completed, the abutting component **112** may be actuated by the actuator **130** to be moved in the direction away from the target substrate **740**.

In an embodiment, when or after the abutment element **112** is moved in the direction away from the target substrate **740**, the flexible carrier **710** may be restored to its original shape through its own elasticity/deflection as shown in FIG. **5** and be completely separated from the electronic component **721**.

In an embodiment, when or after the abutment element **112** is moved in the direction away from the target substrate **740**, the negative pressure may still be generated between the first surface **710***a* of the flexible carrier **710** and the abutting surface **110***a* through the pumping method above, and the flexible carrier **710** may be restored to its original shape as shown in FIG. **5** and be completely separated from the electronic component **721**.

In the embodiment, it may be referred to as a second stage separation that the flexible carrier **710** and the electronic component **721** are completely separated from each other through the method above.

In the embodiment, through the two-stage separation method above (i.e. the first stage separation and the second stage separation), the flexible carrier **710** may be more easily or completely separated from the electronic component **721**, and/or when the flexible carrier **710** is separated from the electronic component **721**, chances that the electronic component **721** and the target substrate **740** are separated from each other or shift may be reduced.

Referring to FIG. **5** to FIG. **6**, after the electronic component **721** is well transferred to the target substrate **740**, the first frame **121**, the second frame **122**, the abutment module **110**, and/or the actuator **130** may be moved along an appropriate direction (e.g. a direction D**2** perpendicular to the abutting direction D**1**) so that another electronic component **722** (another one that is different from the specific electronic component **721** among the electronic components **720**) may be transferred by using the same or similar method.

In an embodiment, the abutment module **110** and/or the actuator **130** may be fixed or mounted on a movable unit (not shown). Accordingly, the abutment module **110** and/or the actuator **130** may be moved and/or rotated along a corresponding direction according to design requirements (as shown in FIG. **6**, but not limited thereto) through a movable module (e.g., a horizontal movement module, a vertical movement module, a rotary movement module, or a combination of the above) in a movable mechanism.

The method for transferring the electronic component of the embodiments may be adapted to any suitable manufacturing process of an electronic device. For example, the electronic component **720** may include a light-emitting diode chip, and the transferring method above may be a portion of a manufacturing process of a light-emitting diode panel.

In summary of the above, the apparatus for transferring the electronic component and the method for transferring the electronic component of the disclosure are configured to transfer the electronic component on the flexible carrier to the target substrate.

What is claimed is:

1. A method for transferring an electronic component, the method comprising:

providing a flexible carrier, wherein an electronic component is carried on a surface of the flexible carrier;

providing a target substrate;

causing the surface of the flexible carrier with the electronic component to be disposed opposite to the target substrate;

providing a first abutting surface and a second abutting surface respectively moving toward a surface of the flexible carrier without carrying the electronic component, wherein an area of the first abutting surface is greater than an area of the second abutting surface;

moving the first abutting surface and the second abutting surface so that at least the second abutting surface contacts the surface of the flexible carrier without carrying the electronic component, wherein the electronic component abuts against the target substrate, and a space is formed between the flexible carrier and the first abutting surface;

a negative pressure is generated in the space; and

causing the second abutting surface to leave the flexible carrier.

2. The method for transferring the electronic component according to claim 1, wherein the first abutting surface and the second abutting surface simultaneously contact the flexible carrier, the electronic component abuts against the target substrate, and the first abutting surface leaves the flexible carrier first.

3. The method for transferring the electronic component according to claim 1, wherein the second abutting surface leaves the flexible carrier at the same time when the negative pressure is generated.

4. A manufacturing method of a light-emitting diode panel, the method comprising using the method according to claim 1 to transfer a light-emitting diode to a panel.

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