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(54) Title: CARRIER

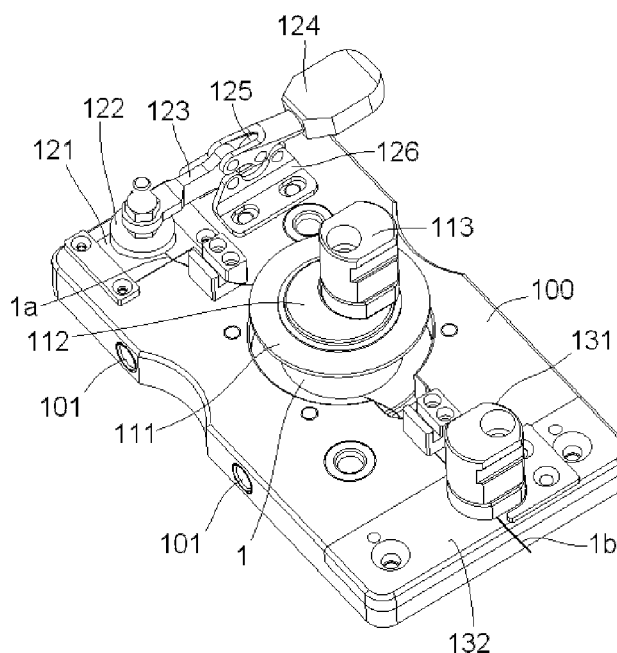


Fig. 1

(57) Abstract: Disclosed is a carrier including: a base (100) on which a circuit board (121) is mounted; a loading device (111) mounted on the base (100) and configured to load an electronic device (1) thereon; a first pressing device mounted on the base (100) and configured to press a first lead end (1a) protruding from the electronic device (1) on the circuit board (121) to electrically contact the circuit board (121); and a second pressing device mounted on the base (100) and configured to press a second lead end (1b) of the electronic device (1) on the base (100). The carrier is provided with the first pressing device and the second pressing device adapted to fix the first lead end and the second lead end of the electronic device. Thereby, the carrier is adapted to load an electronic device with flexible lead ends.



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CARRIER

CROSS-REFERENCE TO RELATED APPLICATION

This application claims the benefit of Chinese Patent Application No. 201710160075.X filed on March 17, 2017 in the State Intellectual Property Office of China, the whole disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

Field of the Invention

Embodiments of the present disclosure relate to a carrier, particularly, to a carrier adapted to load an electronic device.

Description of the Related Art

In the field of manufacturing an electronic device, a carrier is usually used to load an electronic device. A common electronic device includes rigid needlelike leads, and the electronic device may be put directly in a tray. However, some electronic devices, for example, a heat sensitive sensor made of heat sensitive material, include fine flexible leads. During manufacturing such electronic devices, the flexible leads of the electronic devices are easily pulled off or deformed, and thus the current tray is not suitable to load such electronic devices.

In the prior art, such electronic devices with flexible leads are usually manufactured in an artificial way, which not only lowers manufacturing efficiency, but also easily damages the leads of the electronic device.

SUMMARY OF THE INVENTION

An objective of the present disclosure is to solve at least one aspect of the above mentioned problems and disadvantages occurred in the prior art.

According to an object of the present disclosure, there is provided a carrier adapted to load an electronic device with two flexible lead ends, achieving automatic assembly of the electronic device with the flexible lead ends, improving the manufacturing efficiency, and effectively protecting the lead ends of the electronic device.

According to an aspect of the present disclosure, there is provided a carrier including: a base on which a circuit board is mounted; a loading device mounted on the base and configured to load an electronic device thereon; a first pressing device mounted on the base and configured to press a first lead end protruding from the

electronic device on the circuit board to electrically contact the circuit board; and a second pressing device mounted on the base and configured to press a second lead end of the electronic device on the base..

According to an exemplary embodiment of the present disclosure, the base is provided with a positioning post, the loading device including a center hole in which the positioning post is adapted to be received.

According to another exemplary embodiment of the present disclosure, the carrier further includes a pressing block constructed to hold a loading device on the base and rotatably installed on a top surface of the positioning post to rotate between a press position and a release position; when the pressing block is driven to rotate to the press position, the pressing block presses the loading device to hold the loading device on the base; and when the pressing block is driven to rotate to the release position, the pressing block is separated from the loading device to allow the loading device to be detached from the base.

According to another exemplary embodiment of the present disclosure, the loading device includes an upper flange portion, a lower flange portion and a neck portion between the upper flange portion and the lower flange portion; and the electronic device comprises a flexible device adapted to wind on the neck portion of the loading device.

According to another exemplary embodiment of the present disclosure, the first pressing device includes: a pressing lever; a pressing block connected to a front end of the pressing lever; a handle connected to a back end of the pressing lever; a support frame mounted on the base, the back end of the pressing lever being rotatably connected to the support frame; and an elastic component located on the base and adapted to push the handle upward. When downward pressure is not applied to the handle, the elastic component pushes the handle upward, so that the pressing block on the front end of the pressing lever tightly presses down the first lead end.

According to another exemplary embodiment of the present disclosure, when the downward pressure is applied to the handle, the handle may drive the front end of the pressing lever to rotate upward, so that the pressing block is driven to lift up and release the first lead end; and when the pressure applied to the handle is released, the handle may drive the front end of the pressing lever to rotate downwards due to the handle being pushed against by the elastic component, so that the first lead end is pressed on the circuit board by the pressing block.

According to another exemplary embodiment of the present disclosure, the second pressing device includes: a positioning plate mounted on the base and formed

with a positioning slot adapted to position the second lead end of the electronic device; and a pressing block rotatably installed on the positioning plate and adapted to rotate between the press position and the release position; when the pressing block is rotated to the press position, the pressing block is arranged to press the second lead end in the positioning slot; and when the pressing block is rotated to the release position, the pressing block is separated from the second lead end, so that the second lead end may be detached from the positioning slot.

According to another exemplary embodiment of the present disclosure, the carrier further includes a clamping device adapted to clamp the base.

According to another exemplary embodiment of the present disclosure, the base is formed on both sides thereof with first positioning structures, the clamping device includes a pair of finger parts that are openable and closable, and second positioning structures are formed inside each of the finger parts; when the pair of finger parts of the clamping device is in a closed position, the second positioning structure is mated with the first positioning structure, such that the base is reliably clamped and positioned on the clamping device.

According to another exemplary embodiment of the present disclosure, one of the first positioning structure and the second positioning structure comprises a protruding pin, and the other of the first positioning structure and the second positioning structure comprises a slot mated with the protruding pin.

According to another exemplary embodiment of the present disclosure, the clamping device further includes a flange adapted to be connected to a robot.

In the above exemplary embodiments of the present disclosure, the carrier is provide with the first pressing device and the second pressing device adapted to hold the first lead end and the second lead end of the electronic device. Thereby, the carrier is adapted to load an electronic device with flexible lead ends, and it may realize the automatic loading of the electronic device with the flexible lead ends, improve the manufacturing efficiency, and effectively protect the lead ends of the electronic device.

Other objectives and advantages of the present disclosure will become apparent from the following description of the present disclose when taken in conjunction with the accompanying drawings, and may give a comprehensive understanding of the present disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other features of the present disclosure will become more apparent by describing in detail exemplary embodiments thereof with reference to the accompanying drawings, in which:

Fig. 1 shows an illustrative perspective view of a base, a loading device mounted on the base, a first pressing device and a second pressing device of a carrier according to an exemplary embodiment of the present disclosure;

Fig. 2 shows an illustrative perspective view of the loading device and an electronic device winding the loading device as shown in Fig. 1;

Fig. 3 shows an illustrative perspective view of a clamping device configured to clamp the base as shown in Fig. 1; and

Fig. 4 shows an illustrative perspective view illustrating using the clamping device of Fig. 3 to clamp the base of Fig. 1.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

The technical solution of the present disclosure will be described hereinafter in further detail with reference to the following embodiments, taken in conjunction with the accompanying drawings. In the specification, the same or similar reference numerals indicate the same or similar parts. The description of the embodiments of the present disclosure hereinafter with reference to the accompanying drawings is intended to explain the general inventive concept of the present disclosure, and should not be constructed as a limitation to the present disclosure.

In addition, in the following detailed description, for the sake of explanation, numerous specific details are set forth in order to provide a thorough understanding of the disclosed embodiments. It will be apparent, however, one or more embodiments may also be practiced without these specific details. In other instances, well-known structures and devices are illustrated schematically in order to simplify the drawing.

According to a general technical concept of the present disclosure, there is provided a carrier including: a base on which a circuit board is mounted; a loading device mounted on the base and configured to load an electronic device; a first pressing device mounted on the base and configured to press a first lead end protruding from the electronic device on the circuit board to electrically contact the circuit board; and a second pressing device mounted on the base and configured to press a second lead end of the electronic device on the base.

Fig. 1 shows an illustrative perspective view of a base 100, a loading device 111

mounted on the base 100, a first pressing device and a second pressing device of a carrier according to an exemplary embodiment of the present disclosure.

As shown in Fig. 1, in an illustrated embodiment, the carrier mainly includes: a base 100 on which a circuit board 121 is mounted; a loading device 111 mounted on the base 100 and configured to load an electronic device 1; a first pressing device mounted on the base 100 and configured to press a first lead end 1a protruding from the electronic device 1 on the circuit board 121 to electrically contact the circuit board 121; and a second pressing device mounted on the base 100 and configured to press a second lead end 1b of the electronic device 1 on the base 100.

Fig. 2 shows an illustrative perspective view of the loading device 111 and an electronic device 1 winding the loading device 111 as shown in Fig. 1.

As shown in Figs. 1-2, in an illustrated embodiment, the base 100 is provided with a positioning post 112. The loading device 111 includes a center hole 111d. The positioning post 112 of the base 100 is adapted to be received in the center hole 111d of the loading device 111 to mount the loading device 111.

As shown in Figs. 1-2, in an illustrated embodiment, the carrier further includes a pressing block 113 for holding the loading device on the base, which may be rotatably installed on a top surface of the positioning post 112 and is adapted to rotate between a press position and a release position.

When the pressing block 113 is driven to rotate to the press position (a position shown in Fig. 1), the pressing block 113 presses the loading device 111 in order to hold the loading device 111 on the base 100.

When the pressing block 113 is driven to rotate to the release position, the pressing block 113 is separated from the loading device 111 to allow the loading device 111 to be detached from the base 100.

In an embodiment of Fig. 1, a rotation axis of the pressing block 113 is offset from an axis of the positioning post 112 by a predetermined distance.

As shown in Fig. 2, in an illustrative embodiment, the loading device 111 includes an upper flange portion 111a, a lower flange portion 111b and a neck portion 111c between the upper flange portion 111a and the lower flange portion 111b. The electronic device 1 comprises a flexible device adapted to wind on the neck portion 111c of the loading device 111.

In an exemplary embodiment of the present disclosure, the above-mentioned electronic device 1 may be a fine flexible heat sensitive resistance sensor made of the heat sensitive material. In the aforesaid embodiment, the electronic device 1 may be tested by an electrical contact of the first lead end 1a of the electronic device 1 and the

circuit board 121. In the embodiment, after the second lead end 1b of the electronic device 1 is mounted on the base 100, tin plating process may be performed on the second lead end 1b.

With continued reference to Fig. 1, in an illustrated embodiment, the first pressing device mainly includes: a pressing lever 123; a pressing block 122 connected to a front end of the pressing lever 123; a handle 124 connected to a back end of the pressing lever 123; a support frame 126 mounted on the base 100, the back end of the pressing lever 123 being rotatably connected to the support frame 126; and an elastic component 125 located on the base 100 and adapted to push the handle 124 upward.

As shown in Fig. 1, when downward pressure is not applied to the handle 124, the elastic component 125 is arranged to push the handle 124 upward, so that the pressing block 122 on the front end of the pressing lever 123 tightly presses down the first lead end 1a.

As shown in Fig. 1, when downward pressure is applied to the handle 124, the handle 124 may drive the front end of the pressing lever 123 to rotate upward, so that the pressing block 122 is driven to lift up and release the first lead end 1a; and when the pressure applied to the handle 124 is released, the handle 124 may drive the front end of the pressing lever 123 to rotate downwards due to the handle 124 being pushed against by the elastic component 125, so that the first lead end 1a is pressed on the circuit board 121 by the pressing block 122.

As shown in Fig. 1, in the illustrated embodiment, the second pressing device mainly includes: a positioning plate 132 mounted on the base 100 and formed with a positioning slot adapted to position the second lead end 1b of the electronic device 1; and a pressing block 131 rotatably mounted on the positioning plate 132 and adapted to rotate between the press position and the release position. When the pressing block 131 is rotated to the press position (a position as shown in Fig. 1), the pressing block 131 is arranged to press the second lead end 1b in the positioning slot; and when the pressing block 131 is rotated to the release position, the pressing block 131 is separated from the second lead end 1b, so that the second lead end 1b may be detached from the positioning slot.

Fig. 3 shows an illustrative perspective view of a clamping device 200 configured to clamp the base 100 as shown in Fig. 1; and Fig. 4 shows an illustrative perspective view illustrating using the clamping device 200 of Fig. 3 to clamp the base 100 of Fig. 1.

As shown in Figs. 3-4, in an embodiment of the present disclosure, a carrier further includes a clamping device 200 adapted to clamp the base 100.

As shown in Figs. 1 and 3-4, in the illustrated embodiment, the base 100 is formed on both sides thereof with first positioning structures 101. The clamping device 200 includes a pair of finger parts 210, 220 that are openable and closable. Second positioning structures 201 are formed inside each of the finger parts 210, 220.

As shown in Figs. 1 and 3-4, in the illustrated embodiment, when the pair of finger parts 210, 220 of the clamping device 200 is in a closed position, the second positioning structure 201 is mated with the first positioning structure 101, such that the base 100 is reliably clamped and positioned on the clamping device 200.

As shown in Figs. 1 and 3-4, in the illustrated embodiment, one of the first positioning structure 101 and the second positioning structure 201 comprises a protruding pin, and the other of the first positioning structure 101 and the second positioning structure 201 comprises a slot mated with the protruding pin.

In an exemplary embodiment, as shown in Figs. 3 and 4, the clamping device 200 further includes a flange 230 adapted to be connected to a robot. In this way, it is easy to connect the carrier to the robot by the flange 230, in order to move or rotate the carrier by the robot.

It should be appreciated by those skilled in the art that the above embodiments are intended to be illustrative, modifications may be made to the above embodiments by those skilled in the art, and structures described in various embodiments may be freely combined without having structural or principle conflict.

Although the present disclosure has been described with reference to the attached drawings, the embodiments disclosed in the drawings are intended to illustrate the preferred embodiments of the present disclosure, but should not be constructed as a limitation to the present disclosure.

Although some embodiments of the general concept of the present disclosure have been shown and described, it would be appreciated by those skilled in the art that modifications may be made to these embodiments without departing from the principle and spirit of the disclosure, the scope of which is defined in the claims and their equivalents.

It should be noted that term “comprising” or “including” should be understood as not excluding other elements or steps, and term “a” or “an” should be understood as not excluding plural elements or steps. Further, reference numeral in claims should not be understood as a limitation of the present disclosure.

What is claimed is,

1. A carrier, characterized in that the carrier includes:
 - a base (100) on which a circuit board (121) is mounted;
 - a loading device (111) mounted on the base (100) and configured to load an electronic device (1) thereon;
 - a first pressing device mounted on the base (100) and configured to press a first lead end (1a) protruding from the electronic device (1) on the circuit board (121) to electrically contact the circuit board (121); and
 - a second pressing device mounted on the base (100) and configured to press a second lead end (1b) of the electronic device (1) on the base(100).
2. The carrier according to claim 1, wherein:
 - the base (100) is provided with a positioning post (112), the loading device (111) including a center hole (111d) in which the positioning post (112) is adapted to be received.
3. The carrier according to claim 2, further including a pressing block (113) constructed to hold the loading device on the base and rotatably installed on a top surface of the positioning post (112) to rotate between a press position and a release position;
 - when the pressing block (113) is driven to rotate to the press position, the pressing block (113) presses the loading device (111) in order to hold the loading device (111) on the base (100); and
 - when the pressing block (113) is driven to rotate to the release position, the pressing block (113) is separated from the loading device (111) to allow the loading device (111) to be detached from the base (100).
4. The carrier according to claim 2, wherein:
 - the loading device (111) includes an upper flange portion (111a), a lower flange portion (111b) and a neck portion (111c) between the upper flange portion (111a) and the lower flange portion (111b); and
 - the electronic device (1) comprises a flexible device adapted to wind on the neck portion (111c) of the loading device (111).
5. The carrier according to any one of claims 1-4, wherein:

the first pressing device includes:

- a pressing lever (123);
- a pressing block (122) connected to a front end of the pressing lever (123);
- a handle (124) connected to a back end of the pressing lever (123);
- a support frame (126) mounted on the base (100), the back end of the pressing lever (123) being rotatably connected to the support frame (126); and
- an elastic component (125) located on the base (100) and adapted to push the handle (124) upward,

when downward pressure is not applied to the handle (124), the elastic component (125) pushes the handle (124) upward, so that the pressing block (122) on the front end of the pressing lever (123) tightly presses down the first lead end (1a).

6. The carrier according to claim 5, wherein:

when the downward pressure is applied to the handle (124), the handle (124) drives the front end of the pressing lever (123) to rotate upward, so that the pressing block (122) is driven to lift up and release the first lead end (1a); and

when the pressure applied to the handle (124) is released, the handle (124) drives the front end of the pressing lever (123) to rotate downwards due to the handle (124) being pushed against by the elastic component (125), so that the first lead end (1a) is pressed on the circuit board (121) by the pressing block (122).

7. The carrier according to any one of claims 1-6, wherein:

the second pressing device includes:

a positioning plate (132) mounted on the base (100) and formed with a positioning slot adapted to position the second lead end (1b) of the electronic device (1); and

a pressing block (131) rotatably mounted on the positioning plate (132) and adapted to rotate between the press position and the release position,

when the pressing block (131) is rotated to the press position, the pressing block (131) is arranged to press the second lead end (1b) in the positioning slot; and

when the pressing block (131) is rotated to the release position, the pressing block (131) is separated from the second lead end (1b), so that the second lead end (1b) may be detached from the positioning slot.

8. The carrier according to any one of claims 1-7, further including a clamping device (200) adapted to clamp the base (100).

9. The carrier according to claim 8, wherein:

the base (100) is formed on both sides thereof with first positioning structures (101), the clamping device (200) includes a pair of finger parts (210, 220) that are openable and closable, and second positioning structures (201) are formed inside each of the finger parts (210, 220);

when the pair of finger parts (210, 220) of the clamping device (200) is in a closed position, the second positioning structure (201) is mated with the first positioning structure (101), such that the base (100) is reliably clamped and positioned on the clamping device (200).

10. The carrier according to claim 9, wherein:

one of the first positioning structure (101) and the second positioning structure (201) comprises a protruding pin, and the other of the first positioning structure (101) and the second positioning structure (201) comprises a slot mated with the protruding pin.

11. The carrier according to claim 9, wherein:

the clamping device (200) further includes a flange (230) adapted to be connected to a robot.

DRAWINGS

1/4

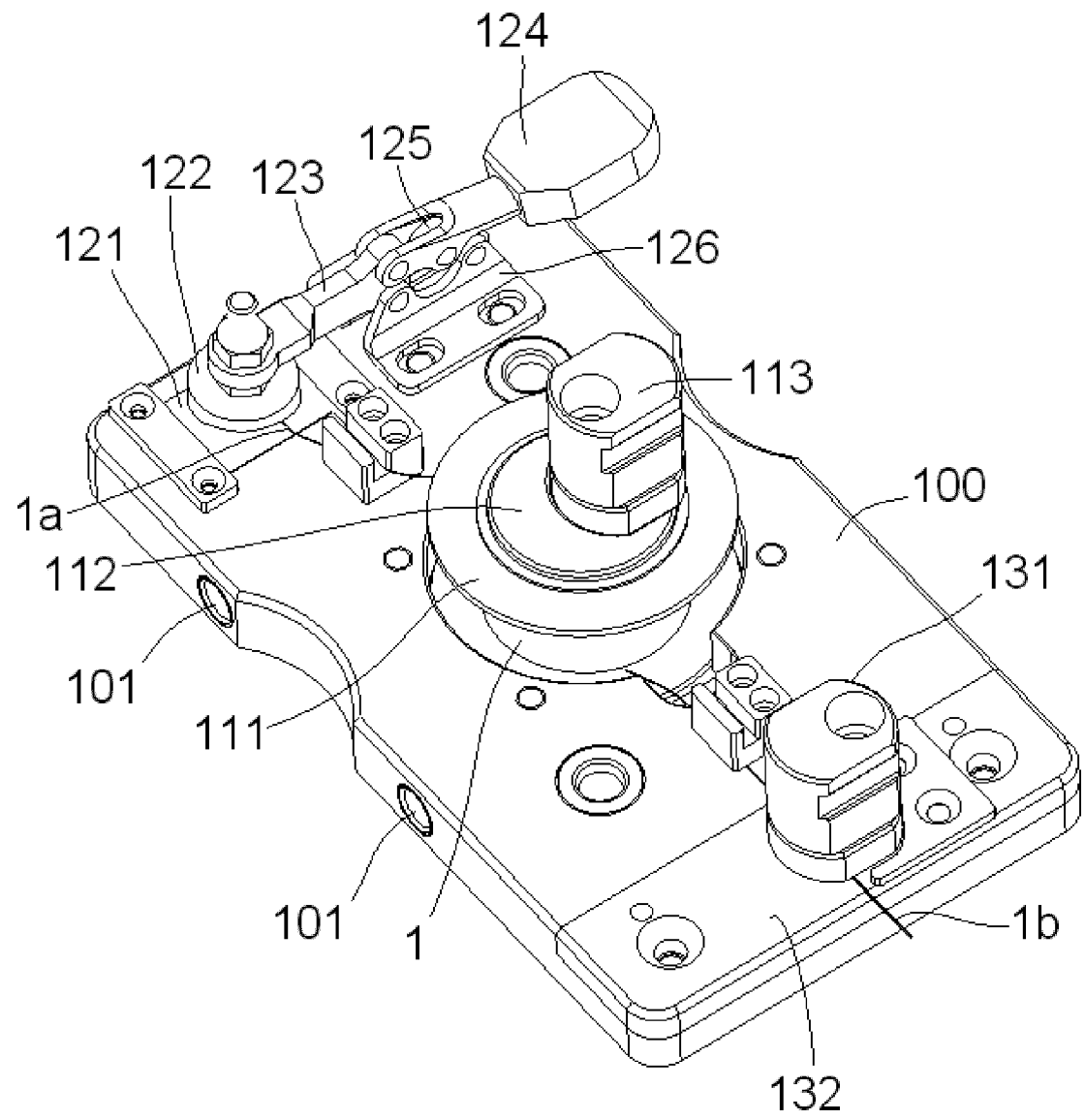


Fig. 1

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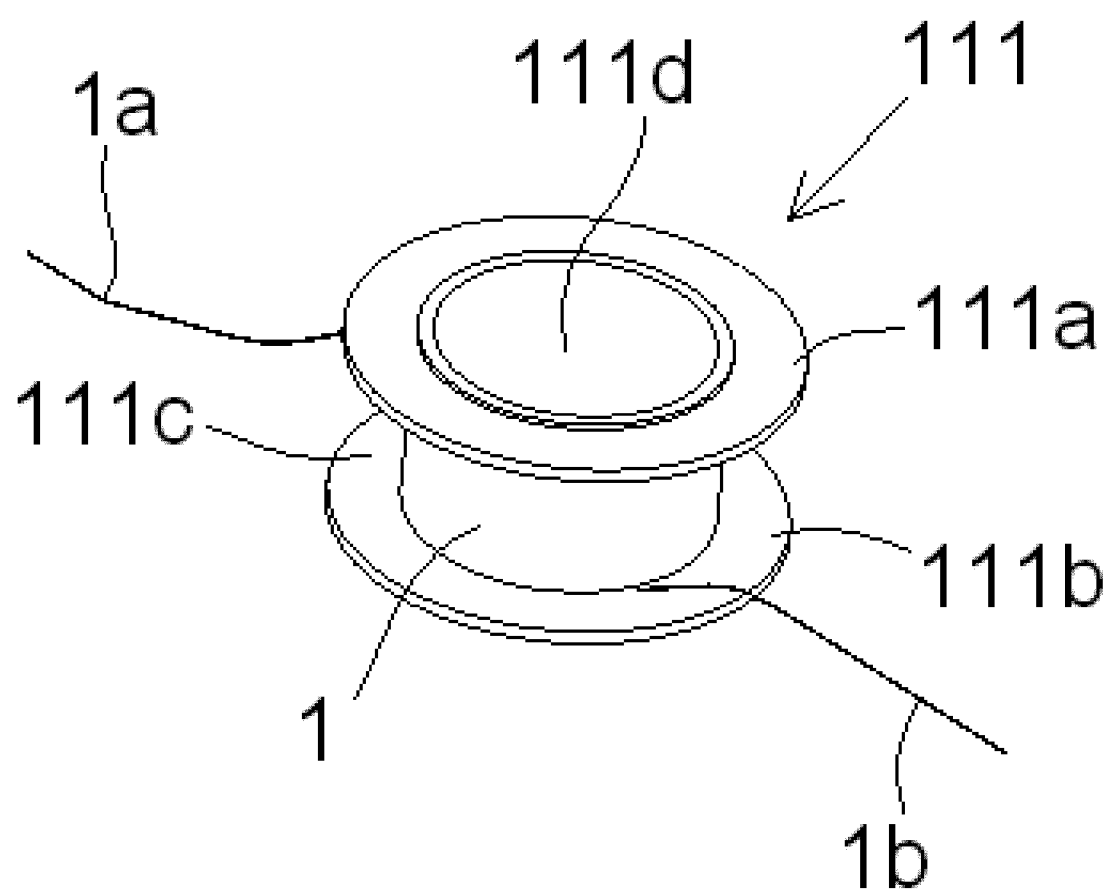


Fig. 2

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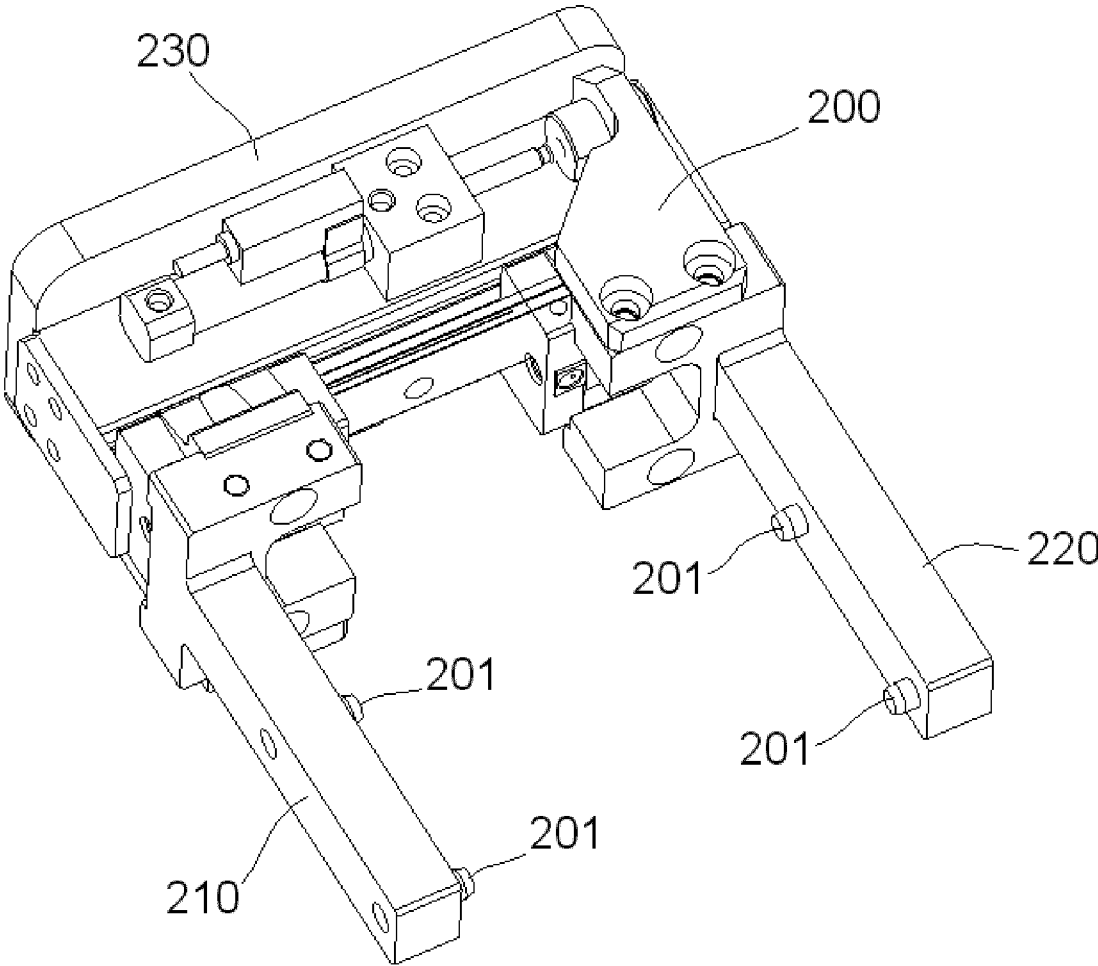


Fig. 3

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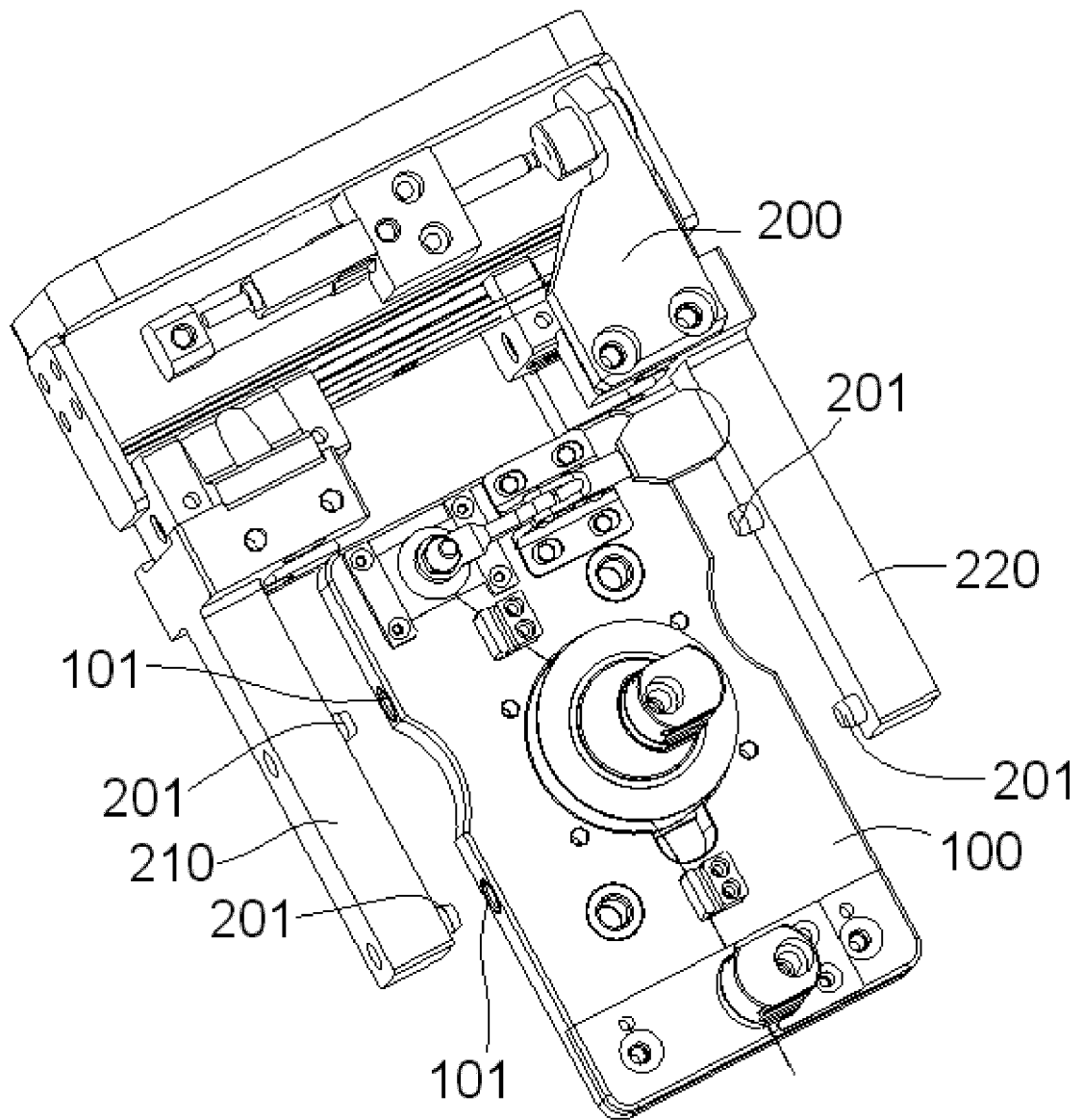


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. H05K3/30 ADD. G01R1/04 G01R31/01		
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) H05K G01R		
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) EPO-Internal, WPI Data		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 7 147 483 B1 (JU TED [TW]) 12 December 2006 (2006-12-12) column 2, line 55 - column 4, line 8 -----	1-11
X	US 2014/134880 A1 (YEH CHENG-CHI [TW]) 15 May 2014 (2014-05-15) paragraph [0022] - paragraph [0027]; figures 1-9 -----	1-11
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
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Date of the actual completion of the international search 14 June 2018		Date of mailing of the international search report 21/06/2018
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Pacholec, Darek

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2018/056521

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 7147483	B1	12-12-2006	NONE

US 2014134880	A1	15-05-2014	TW 201419672 A 16-05-2014
		US 2014134880 A1	15-05-2014
