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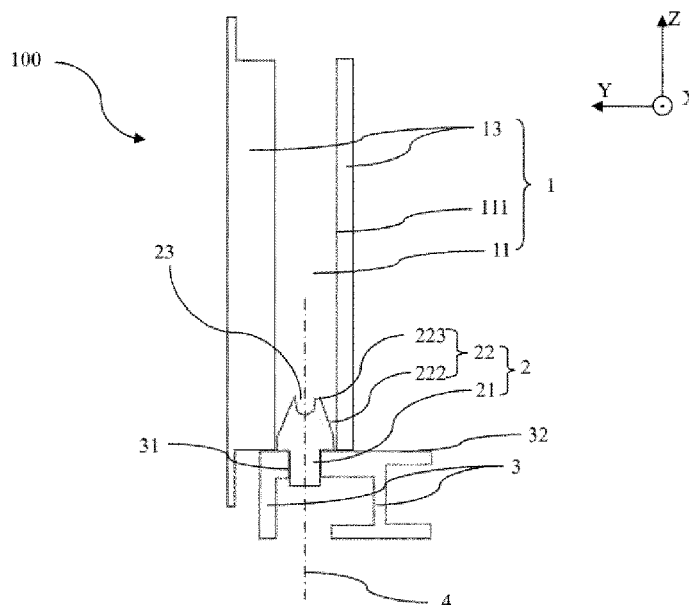


FIG. 6a

(57) **Abstract:** The present disclosure relates to a battery assembly for a vehicle and a vehicle comprising the same. The battery assembly comprises: a battery housing provided with a limiting groove; a supporting frame provided with a mounting hole; and a locator provided between the battery housing and the supporting frame to position the battery housing to the supporting frame, wherein the locator comprises: a connecting portion fixed to the mounting hole; and a guiding portion mounted to the limiting groove and provided with a guiding surface and an abutting surface, wherein the guiding surface is inclined relative to an inner wall of the limiting groove to guide the guiding portion into the limiting groove, and the abutting surface abuts against the supporting frame.



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BATTERY ASSEMBLY FOR VEHICLE, AND VEHICLE

This invention claims the priority of the Chinese patent application 202310700220.4 filed on June 13, 2023, of which the content (Text, Drawings and Claims) is incorporated by reference.

5 RELATED FIELD

[0001] The present disclosure generally relates to the field of vehicle components, and more particularly, to a battery assembly for a vehicle and a vehicle.

[0002]

BACKGROUND

10 [0003] A vehicle battery pack is provided with a battery assembly comprising a supporting frame and a battery module mounted to the supporting frame, wherein a locator is provided between a housing of the battery module and the supporting frame.

[0004] When the battery module needs to be removed from the supporting frame, due to the interference from the locator, the battery module can only be removed vertically from the supporting frame, which is very laborious. If a lever could be inserted below the battery housing
15 to lever the battery module up, it would be more labor-saving to tilt the battery housing first and then to remove the battery module. However, the configuration of the current locator hinders the tilting of the battery module.

20 SUMMARY

[0005] The present disclosure aims at overcoming at least one of the defects in the prior art by providing a battery assembly for a vehicle. In other words, the battery assembly according to the present disclosure facilitates the assembly and disassembly of a housing of a battery module with a supporting frame.

25 [0006] For this object, a first aspect of the present disclosure provides a battery assembly for a vehicle, comprising: a battery housing provided with a limiting groove; a supporting frame provided with a mounting hole; and a locator provided between the battery housing and the supporting frame to position the battery housing to the supporting frame. The locator comprises: a connecting portion fixed to the mounting hole; and a guiding portion mounted to the limiting
30 groove and provided with a guiding surface and an abutting surface, wherein the guiding surface

is inclined relative to an inner wall of the limiting groove to guide the guiding portion into the limiting groove, and the abutting surface abuts against the supporting frame.

[0007] According to an alternative embodiment of the present disclosure, the guiding portion and the connecting portion are provided to be coaxial.

5 [0008] According to an alternative embodiment of the present disclosure, the guiding portion and the connecting portion are formed as one piece.

[0009] According to an alternative embodiment of the present disclosure, the guiding portion is provided to have a truncated cone shape.

10 [0010] According to an alternative embodiment of the present disclosure, the guiding portion has a free end surface provided with a recess.

[0011] According to an alternative embodiment of the present disclosure, the connecting portion has a free end surface provided with a chamfer.

15 [0012] According to an alternative embodiment of the present disclosure, the connecting portion comprises: a connecting column having a radial dimension mated with that of the mounting hole; and a plurality of protrusions protruding radially and outwards from the connecting column.

[0013] According to an alternative embodiment of the present disclosure, the plurality of protrusions extend parallel to a central axis of the connecting column.

20 [0014] According to an alternative embodiment of the present disclosure, the locator is made of stainless steel.

[0015] A second aspect of the present disclosure provides a vehicle comprising the battery assembly according to the first aspect of the present disclosure.

25 [0016] Compared with the prior art, the battery assembly according to the present disclosure has multiple advantages, especially: the guiding portion provided on the locator on the one hand, allows the battery housing to slide along the guiding surface to be positioned to the supporting frame during installation, and on the other hand, provides an avoidance space for removing the battery housing from the supporting frame, allowing the battery housing to be removable by levering it. In addition, the locator has a simple structure, convenient installation and low cost, and can be widely used in various types of vehicle battery assemblies.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] Other features and advantages of the present disclosure will be readily understood by the following preferred embodiments described in detail in conjunction with the accompanying drawings, in which a same reference numeral indicates a same or similar component.

- 5 [0018] FIG. 1 is a schematic view of a vehicle, in which a battery pack is shown;
- [0019] FIG. 2 shows a battery assembly according to an embodiment of the present disclosure;
- [0020] FIG. 3 is a front view of a locator in the battery assembly in FIG. 1;
- [0021] FIG. 4 is a perspective view of the locator in the battery assembly in FIG. 1;
- [0022] FIG. 5 is a bottom view of the locator in the battery assembly in FIG. 1;
- 10 [0023] FIG. 6a is a partial cross-sectional view taken along the section A-A in FIG. 2; and
- [0024] FIG. 6b is a partial cross-sectional view similar to FIG. 6a when removing a battery housing of the battery assembly.

DETAILED DESCRIPTION

- 15 [0025] The implementation and usage of specific embodiments are discussed in detail below. However, it is understood that the specific embodiments discussed herein are merely intended to illustrate specific ways of implementing and using the present disclosure, and are not intended to limit the protection scope of the present disclosure.

- [0026] In the specification, when describing structures and positions of components, the
20 directional expressions such as "up", "down", "left", "right", "top" and "bottom" are not absolute, but relative. These directional expressions are appropriate when the components are provided as shown in the accompanying drawings, but should be changed accordingly when the positions of the components in the drawings are changed.

- [0027] Besides, in the specification, the X direction indicates a longitudinal direction of the
25 vehicle V (i.e., a direction of travel of the vehicle), the Y direction indicates a transverse direction of the vehicle V (i.e., a direction at an angle of 90 degrees relative to the direction of travel), and a Z direction indicates a vertical direction of the vehicle V (i.e., an up-down direction).

- [0028] A preferred embodiment of the present disclosure is described below with reference to

FIGS. 1 to 6b. In order to clearly show the structure, the obscured portions in FIGS. 3 to 5 are shown as dashed lines.

[0029] As shown in FIGS. 1, 2, and 6a, the vehicle V, such as an electric vehicle or a hybrid vehicle, is provided with a battery pack E at its bottom, and the battery pack E is provided with a battery assembly 100 therein. The battery assembly 100 comprises a supporting frame 3, a battery module 10 mounted to the supporting frame 3, and a locator 2 provided between the battery module 10 and the supporting frame 3. More specifically, the battery module 10 is composed of cells (not shown) and a battery housing 1 that encloses the cells. The supporting frame 3 is located below left and right side plates 13 (also referred to as end plates) of the battery housing 1 in the Z direction. The supporting frame 3 is provided with a mounting hole 31. The two side plates 13 of the battery housing 1 are each provided with a cylindrical limiting groove 11 extending along the Z direction.

[0030] As shown in FIG. 2, multiple battery modules 10 may be horizontally arranged along the X or Y direction, or stacked vertically along the Z direction. When two battery modules 10 are stacked vertically along the Z direction, the supporting frame 3 is positioned below the left and right side plates 13 of the upper battery module 10.

[0031] The locator 2 comprises a connecting portion 21 and a guiding portion 22 extending from the connecting portion 21. The connecting portion 21 is fixed to the mounting hole 31 of the supporting frame 3, and the guiding portion 22 is mounted to the limiting groove 11 of the battery housing 1, thereby positioning the battery housing 1 onto the supporting frame 3 to avoid its left-right movement. It will be appreciated that the number and position of the locator 2 may be determined according to actual needs, which are not limitative in the present disclosure. For example, one locator 2 may be provided at the middle position of the connection region between each of the left and right side plates 13 of the battery housing 1 and the supporting frame 3.

[0032] As shown in FIGS. 3 to 5, preferably, the guiding portion 22 and the connecting portion 21 are provided to be coaxial (that is, they share a same central axis 4). According to one variant, the locator 2 may be configured to have a non-axisymmetric shape, and the present disclosure is not limited thereto. The connecting portion 21 and the guiding portion 22 are preferably formed as one piece.

[0033] As shown in FIGS. 4 and 5, the connecting portion 21 comprises a connecting column

211 and multiple protrusions 213 protruding radially and outwards from the surface of the connecting column 211. The multiple protrusions 213 extend, preferably in parallel with the central axis 4 (that is, the central axis of the connecting column 211), to the free end surface 215 of the connecting portion 21. In addition, the free end surface 215 of the connecting portion 21 is preferably provided with a rounded chamfer 212. The configuration of the rounded chamfer 212 facilitates the insertion and fixation of the connecting portion 21 into the mounting hole 31.

[0034] In fact, the configuration of the connecting column 211 and the protrusions 213 achieves a crimping connection between the locator 2 and the supporting frame 3. More specifically, the radial dimension of the mounting hole 31 is mated with the radial dimension D of the connecting column 211. The connecting portion 21 is forced into the mounting hole 31 by pressure, and due to the presence of the protrusions 213, plastic deformation thereof occurs against the inner wall of the mounting hole 31, thereby achieving a locking effect.

[0035] As shown in FIGS. 4 and 6a, the side of the guiding portion 22 adjacent to the connecting portion 21 is provided with an abutting surface 221 abutting against the upper surface 32 of the supporting frame 3. The radial dimension D1 of the abutting surface 221 is greater than the radial dimension D of the connecting column 211. In addition, the guiding portion 22 has a guiding surface 222 which is configured to guide the battery housing 1 to be positioned to the supporting frame 3 and to provide an avoidance space for the inclining movement of the battery housing 1 relative to the central axis 4 during removal. The guiding surface 222 is provided to be inclined relative to the inner wall 111 of the limiting groove 11 to guide the guiding portion 22 into the limiting groove 11, such that the guiding portion 22 has, for example, a cone or truncated cone shape.

[0036] As shown in FIGS. 6a and 6b, when the battery housing 1 needs to be mounted to the supporting frame 3, the connecting column 211 of the locator 2 is first inserted and fixed into the mounting hole 31. Then, the lower edge 12 of the battery housing 1 is moved along the guiding surface 222 to a predetermined position. That is, the moving path of the lower edge 12 of the battery housing 1 coincides with the guiding surface 222. Therefore, the guiding portion 22 is guided, by the guiding surface 222, into the limiting groove 11 of the battery housing 1 with the abutting surface 221 abutting against the supporting frame 3. When the battery housing 1 needs to be removed from the supporting frame 3, a lever 5 is inserted below the lower edge 12 of the battery housing 1, and the lever 5 is then pried to tilt the battery housing 1 towards the

guiding surface 222, and then the battery housing 1 is lifted upwards for removal. Compared to the way of vertically lifting the battery housing 1 for removal, the configuration disclosed herein can reduce the force used for removal and facilitate the operation.

[0037] Preferably, the free end surface 223 of the guiding portion 22 is provided with a recess 23 recessed inwards. The configuration of the recess 23, on one hand, meets the requirement of a tooling device, and on the other hand, can reduce the overall weight of the locator 2.

[0038] The locator 2 is preferably made of stainless steel. According to other variants, the locator 2 may be made of other materials, such as aluminum, high-strength alloys, etc. The present disclosure is not limited thereto.

[0039] In addition, a connecting section 214 is provided between the guiding portion 22 and the connecting portion 21. The radial dimension D2 of the connecting section 214 is less than the radial dimension D of the connecting column 211. The connecting section 214 serves as a transition between the guiding portion 22 and the connecting portion 21.

[0040] The technical contents and features of the present disclosure have been disclosed above. However, it is understood that those skilled in the art can make various changes and improvements to the above-disclosed conception under the creative concept of the present disclosure, and all these various changes and improvements fall within the protection scope of the present disclosure.

[0041] The description of the above embodiments is exemplary rather than limitative, and the protection scope of the present disclosure is defined by the appended claims.

CLAIMS

1. A battery assembly (100) for a vehicle (V), comprising:
a battery housing (1) provided with a limiting groove (11);
5 a supporting frame (3) provided with a mounting hole (31); and
a locator (2) provided between the battery housing (1) and the supporting frame (3) to position the battery housing (1) to the supporting frame (3),
wherein the locator (2) comprises:
a connecting portion (21) fixed to the mounting hole (31); and
10 a guiding portion (22) mounted to the limiting groove (11) and provided with a guiding surface (222) and an abutting surface (221), wherein the guiding surface (222) is inclined relative to an inner wall (111) of the limiting groove (11) to guide the guiding portion (22) into the limiting groove (11), and the abutting surface (221) abuts against the supporting frame (3).
- 15 2. The battery assembly (100) according to claim 1, wherein the guiding portion (22) and the connecting portion (21) are provided to be coaxial.
3. The battery assembly (100) according to claim 1, wherein the guiding portion (22) and the connecting portion (21) are formed as one piece.
- 20 4. The battery assembly (100) according to any one of claims 1 to 3, wherein the guiding portion (22) is provided to have a truncated cone shape.
5. The battery assembly (100) according to claim 4, wherein the guiding portion (22) has
25 a free end surface (223) provided with a recess (23).
6. The battery assembly (100) according to any one of claims 1 to 3, wherein the connecting portion (21) has a free end surface (215) provided with a chamfer (212).

7. The battery assembly (100) according to any one of claims 1 to 3, wherein the connecting portion (21) comprises:

5 a connecting column (211) having a radial dimension (D) mated with that of the mounting hole (31); and

a plurality of protrusions (213) protruding radially and outwards from the connecting column (211).

8. The battery assembly (100) according to claim 7, wherein the plurality of protrusions
10 (213) extend parallel to a central axis (4) of the connecting column (211).

9. The battery assembly (100) according to any one of claims 1 to 3, wherein the locator (2) is made of stainless steel.

15 10. A vehicle (V) comprising the battery assembly (100) according to any one of claims 1 to 9.

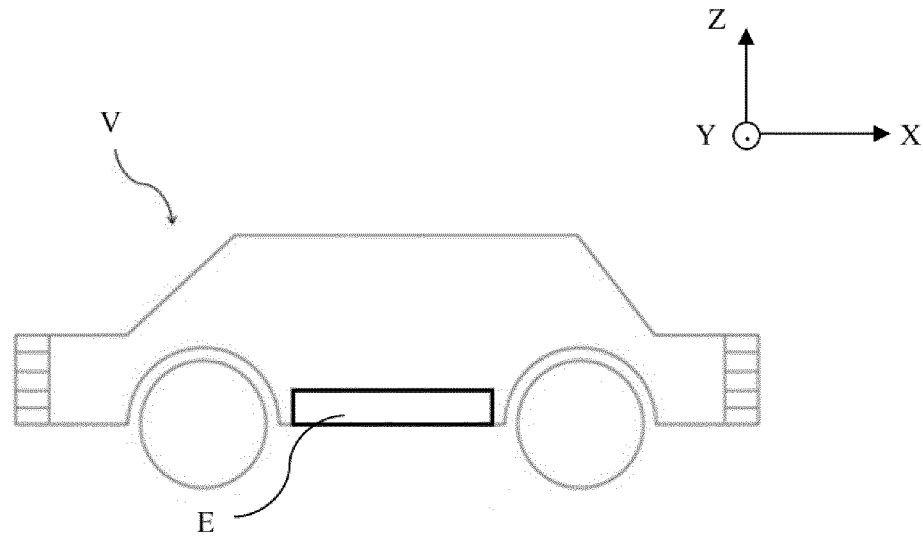


FIG. 1

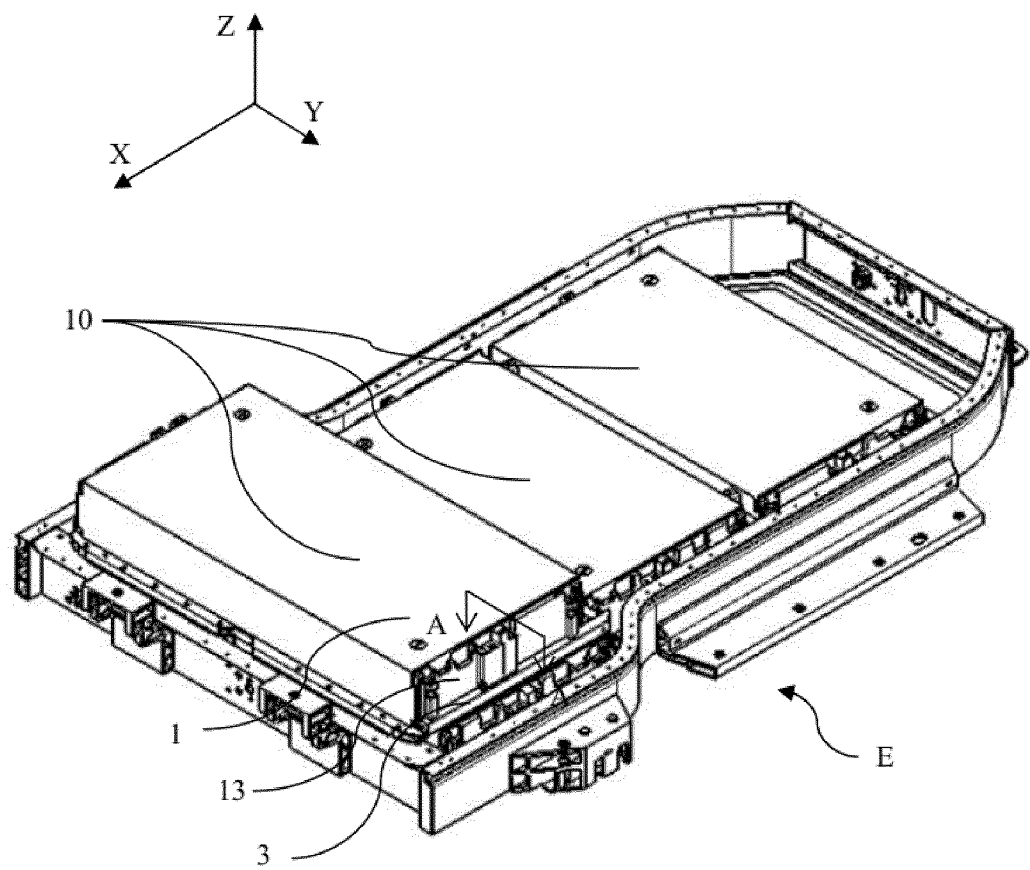


FIG. 2

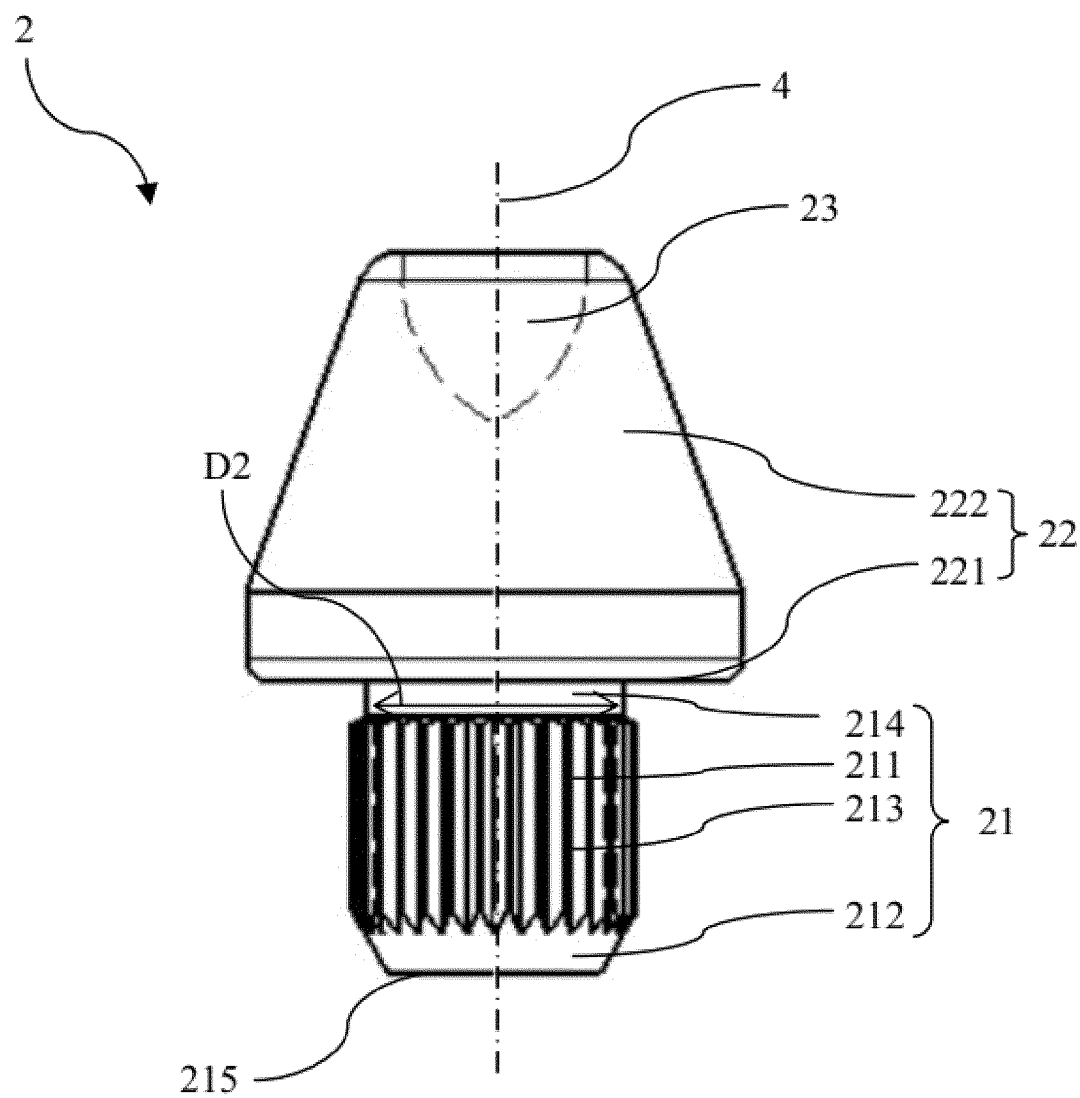


FIG. 3

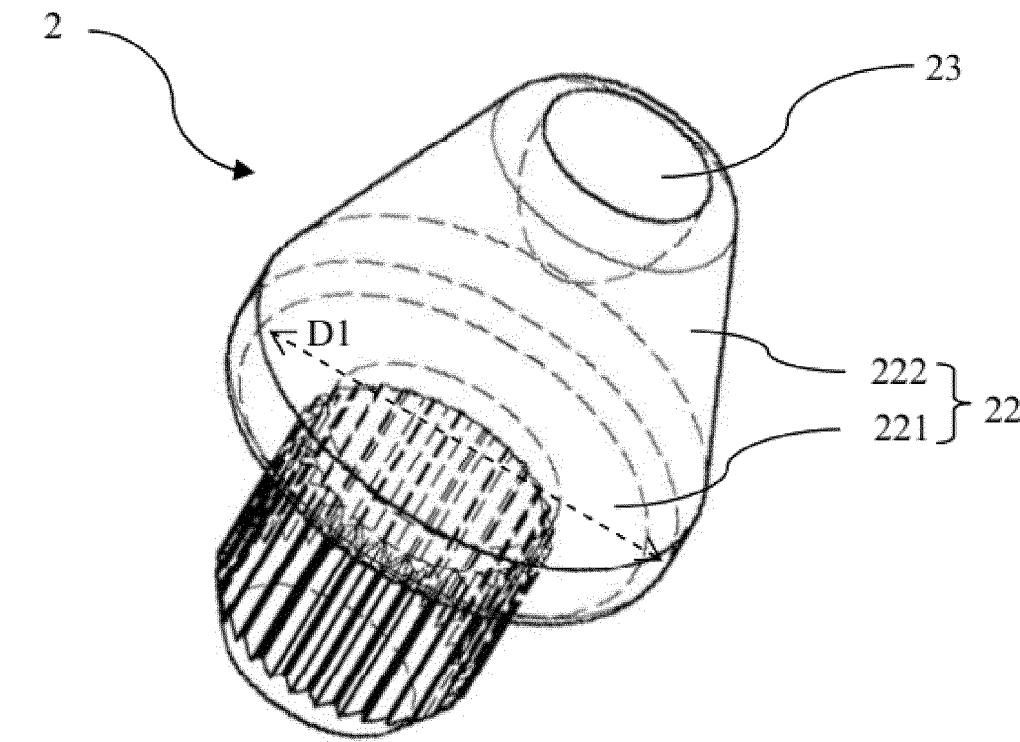


FIG. 4

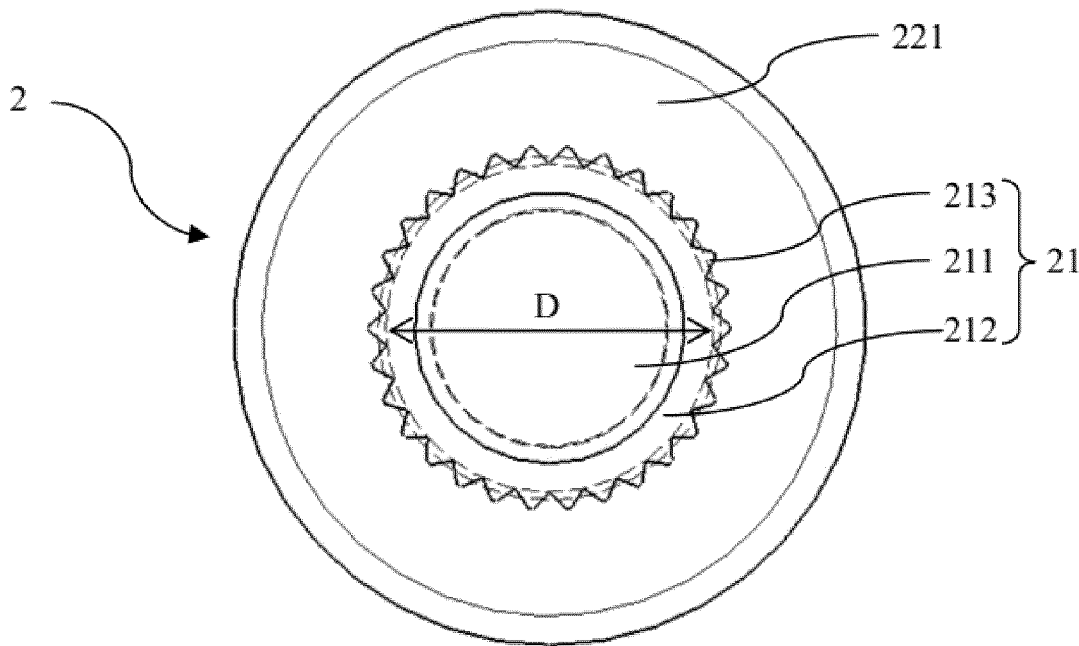


FIG. 5

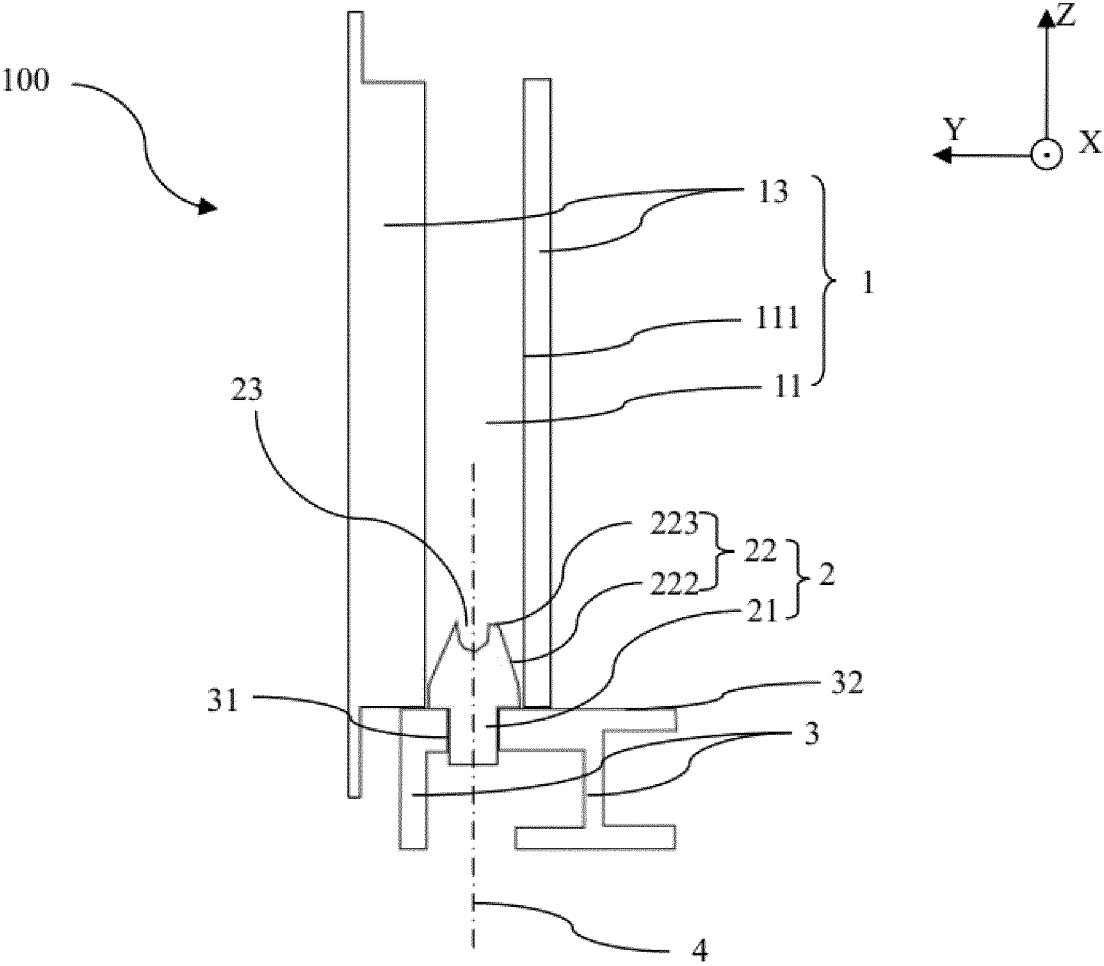


FIG. 6a

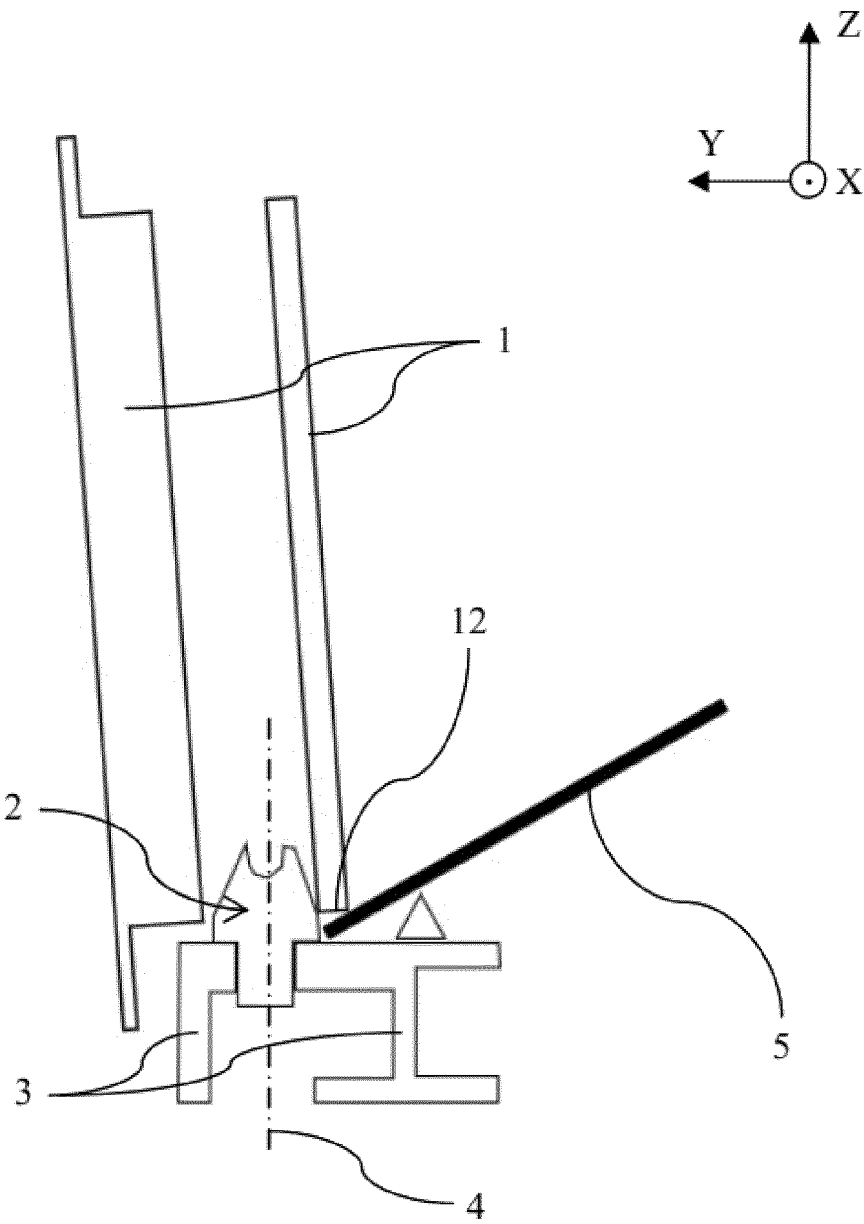


FIG. 6b

INTERNATIONAL SEARCH REPORT

International application No
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A. CLASSIFICATION OF SUBJECT MATTER INV. H01M50/244 B60K1/04 B60L50/60 H01M50/249 H01M50/264 ADD.		
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) H01M B60K B60L 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	CN 115 848 120 A (XUZHOU XUGONG SPECIAL CONSTRUCTION MACHINERY CO LTD) 28 March 2023 (2023-03-28) paragraphs [0017], [0020] - [0021]; figures 1-4 -----	1, 2, 4, 5, 7-10
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☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 8 August 2024		Date of mailing of the international search report 21/08/2024
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 Monti, Adriano

INTERNATIONAL SEARCH REPORT

International application No
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