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(54) **POSITION ADJUSTMENT MECHANISM FOR LIFTING BALANCE DEVICE**

(57) A position adjustment mechanism for a lifting balance device (2) contains: a first cover (11) and an adjustment device (3). The first cover (11) includes at least one lifting balance device (2), and each of the at least one lifting balance device (2) includes a first support (21), a second support (22) intersected with the first support (21), and a shaft (23) configured to connected the first and second support (22)s. The adjustment device (3) is located bellow the shaft (23). The adjustment device (3) is fixed inside the first cover (11), the first cover (11) has a first opening (111) located below the shaft (23). A threaded sleeve (31) is connected with the first opening (111) and is screwed with a threaded tube (33), such that the threaded tube (33) is adjustably moved relative to the threaded sleeve (31) so as to change a position of a top of the threaded tube (33) and to limit a lowest descending position of each of the first support (21) and the second support (22).

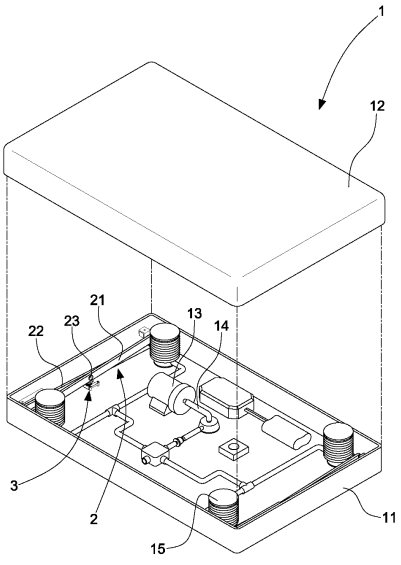

Fig.1

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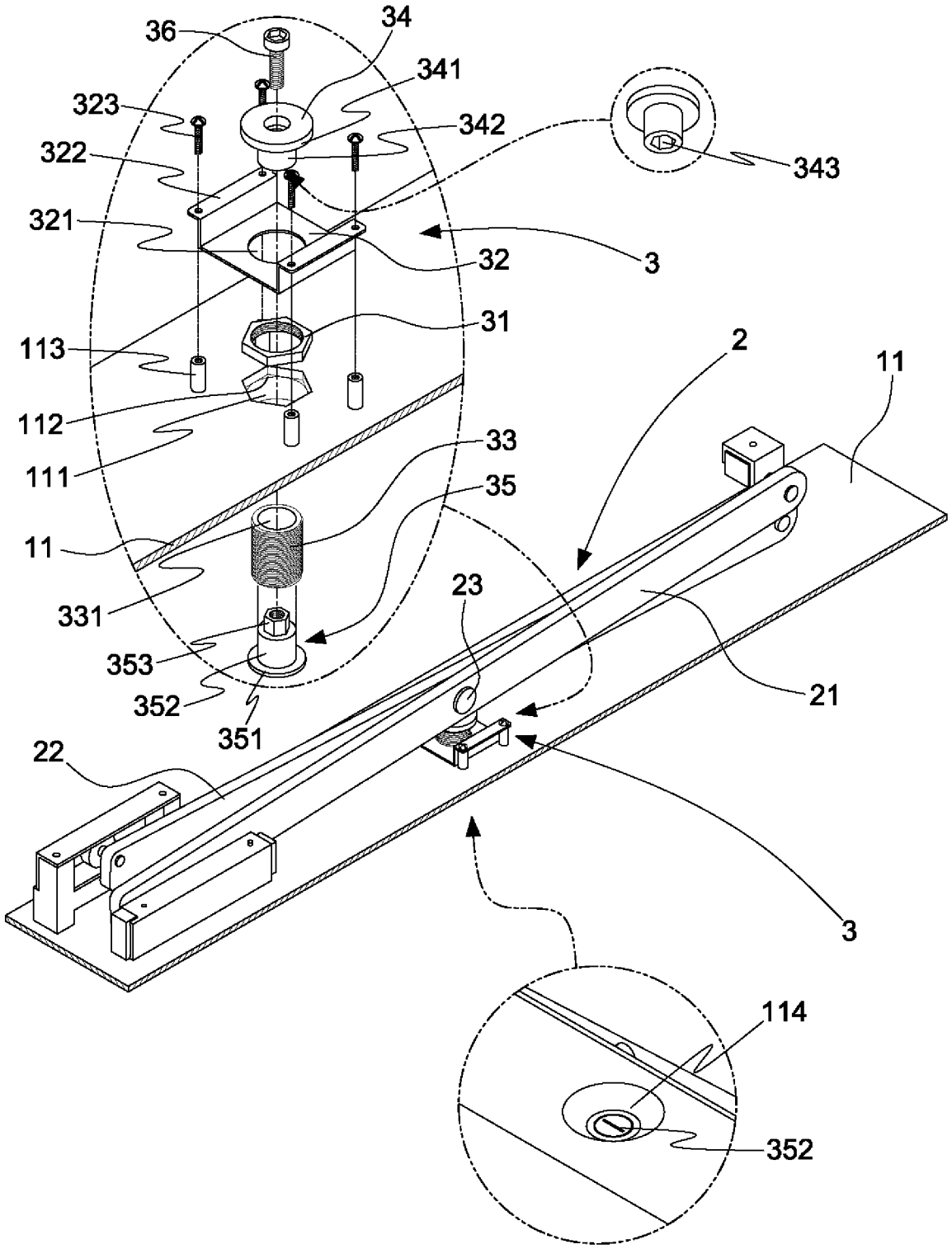
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Fig.2

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a position adjustment mechanism which is fixed below a lifting balance device of a pillow so as to adjust the pillow to a lowest descending height based on using requirements.

BACKGROUND OF THE INVENTION

[0002] It is essential for people to adjust a height of a pillow when sleeping on their backs or on their sides. However, the pillow cannot be adjusted to a desired height.

[0003] A conventional adjustable pillow has been developed, but it can only be adjustably lifted to a fixed height. In other words, the conventional adjustable pillow cannot be adjusted to a lowest descending and height based on using requirements, the conventional adjustable pillow also cannot be adjusted to a highest lifting height based on using requirements.

[0004] The present invention has arisen to mitigate and/or obviate the afore-described disadvantages.

SUMMARY OF THE INVENTION

[0005] The primary aspect of the present invention is to provide a position adjustment mechanism which is fixed below a lifting balance device of a pillow so as to adjust the pillow to a lowest descending height based on using requirements.

[0006] To obtain above-mentioned aspect, a position adjustment mechanism provided by the present invention contains: a first cover and an adjustment device.

[0007] The first cover includes at least one lifting balance device arranged therein, and each of the at least one lifting balance device includes a first support, a second support intersected with the first support, and a shaft configured to connected the first support and the second support.

[0008] The adjustment device is located bellow the shaft.

[0009] The adjustment device is fixed inside the first cover, the first cover has a first opening defined thereon and located below the shaft, a threaded sleeve is connected with the first opening and is screwed with a threaded tube, such that the threaded tube is adjustably moved relative to the threaded sleeve so as to change a position of a top of the threaded tube and to limit a lowest descending position of each of the first support and the second support.

[0010] Preferably, a shoulder is formed around an inner rim of the first opening and is configured to stop a removal of the threaded sleeve.

[0011] Preferably, the threaded sleeve is polygonal, and the adjustment device includes a positioning sheet located above the threaded sleeve and formed in a C shape, wherein the fixing sheet has a second opening defined in a center thereof, two extensions extending from two sides of an upper end of the adjustment device respectively, and multiple screw bolts configured to screw the two extensions with multiple locking elements of the first cover respectively.

[0012] Preferably, the threaded tube has a through hole defined therein so as to connect with a first connector and a second connector by mating with a screwing element.

[0013] Preferably, the first connector has a first tab surrounding around a top thereof, a first connection column extending from a center of a bottom thereof, and a notch defined in the first connection column and formed in a polygon shape; the second connector has a second tab surrounding around a bottom thereof, a second connection column extending from a center of a top thereof, and a peg extending from the second connection column and formed in a polygon shape so as to rotatably connect with the notch.

[0014] Preferably, the first cover has a peripheral surround portion extending from a peripheral side of the first opening.

[0015] Preferably, the second connection column has a recess for accommodating an adjusting element.

[0016] Preferably, the recess is in any one of a "1" shape, a cross shape, a double intersected cross shape, and a polygon shape.

[0017] Preferably, the adjusting element includes a first fixing portion defined on a center of a first end of the adjusting element, wherein the first fixing portion has two first stop portions arranged on two sides thereof respectively, wherein a width of the first fixing portion is equal to that of the second connection column, and the width of the first fixing portion is more than a diameter of the first opening of the first cover.

[0018] Preferably, the adjusting element is formed in a cross shape and further includes a first fixing portion defined on a center of a first end of the adjusting element, wherein the first fixing portion has two first stop portions arranged on two sides thereof respectively; the adjusting element includes a second fixing portion defined on a center of a side of the adjusting element, wherein the second fixing portion has two second stop portions arranged on two sides thereof respectively, and the adjusting element further includes a third fixing portion formed on a center of a second end thereof, wherein the third fixing portion has two third stop portions arranged on two sides thereof respectively; wherein a height of the first fixing portion is different from a height of the second fixing portion, the height of the second fixing portion is different from a height of the third fixing portion, and the height of the third fixing portion is different from that of the first fixing portion.

[0019] Preferably, The primary aspect of the present invention is to provide a position adjustment mechanism which is fixed below a lifting balance device of a pillow so as to adjust the pillow to a highest lifting height based

on using requirements.

[0020] Another aspect of the present invention is to provide a position adjustment mechanism which is capable of adjusting the highest lifting position of each lifting balance device by rotating the tangent planes of the second adjustment device in the first track groove.

[0021] To obtain above-mentioned aspects, a position adjustment mechanism provided by the present invention contains: a first cover in which at least one lifting balance device is arranged, and each of the at least one lifting balance device including a first support, a second support intersected with the first support, and a first shaft configured to connected the first support and the second support.

[0022] The first support includes a first roller arranged on a first end thereof adjacent to the first cover and accommodated in a first track groove on the first cover;

The first track groove has an adjustment device arranged therein opposite to the first roller, such that the second adjustment device is adjustable to limit a highest lifting position of each of the first support and the second support.

[0023] Preferably, the first support includes a second shaft fixed on a second end thereof and rotatably connected with a positioning plate; the second support includes a third shaft rotatably fixed on a first end thereof adjacent to the first cover, and the second support includes a second roller arranged on a second end thereof and accommodated in a second track groove below the second cover.

[0024] Preferably, the first track groove has a first stop block and a second stop block mounted on two ends of the first track groove respectively.

[0025] Preferably, the first track groove includes an opening defined on a bottom thereof proximate to the second stop block, the opening accommodates the second adjustment device, and the second adjustment device is rotated on the opening.

[0026] Preferably, the second adjustment device is formed on a column shape, and the second adjustment device includes a fourth shaft disposed on a top thereof and includes a rotation portion arranged on a bottom of the second adjustment device; the second adjustment device further includes multiple tangent plane arranged on a peripheral side thereof, wherein multiple distances between the multiple tangent plane and a center of the second adjustment device are different.

[0027] Preferably, the rotation portion has an engagement portion extending from a bottom of the rotation portion.

[0028] Preferably, the second stop block has an arcuate face defined thereon facing the first stop block, and a limiting extension is secured on the arcuate face; the second adjustment device includes a defining slot defined on the peripheral side of the second adjustment device and contacting with the arcuate face of the second stop block so that the defining slot rotates within a predetermined angle relative to the limiting extension.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029]

FIG. 1 is a perspective view showing the application of a position adjustment mechanism for a lifting balance device according to a preferred embodiment of the present invention.

FIG. 2 is a perspective view showing the exploded components of the position adjustment mechanism for the lifting balance device according to the preferred embodiment of the present invention.

FIG. 3 is a cross sectional view showing the assembly of a part of the position adjustment mechanism for the lifting balance device according to the preferred embodiment of the present invention.

FIG. 4 is a perspective view showing the operation of a part of the position adjustment mechanism for the lifting balance device according to the preferred embodiment of the present invention.

FIG. 5 is a cross sectional view showing the operation of a part of the position adjustment mechanism for the lifting balance device according to the preferred embodiment of the present invention.

FIG. 6 is a perspective view showing the assembly of the position adjustment mechanism for the lifting balance device according to the preferred embodiment of the present invention.

FIG. 7 is a perspective view showing the exploded components of a part of the position adjustment mechanism for the lifting balance device according to the preferred embodiment of the present invention.

FIG. 8 is a cross sectional view showing the assembly of a part of the position adjustment mechanism for the lifting balance device according to the preferred embodiment of the present invention.

FIG. 9 is a cross sectional view showing the operation of a part of the position adjustment mechanism for the lifting balance device according to the preferred embodiment of the present invention.

FIG. 10 is a side plan view showing the operation of the position adjustment mechanism for the lifting balance device according to the preferred embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0030] With reference to FIGS. 1-3, a position adjustment mechanism for a lifting balance device according to a preferred embodiment of the present invention comprises: an adjustable pillow 1 including a first cover 11, a second cover 12, an air pump 13 defined between the first cover 11 and the second cover 12, multiple air pipes 14, multiple capsules 15, and two lifting balance devices 2.

[0031] Each of the two lifting balance devices 2 in-

cludes a first support 21, a second support 22 intersected with the first support 21, and a shaft 23 configured to connected the first support 21 and the second support 22.

[0032] An adjustment device 3 is located bellow the shaft 23 and is movably adjusted to a highest lifting position so as to limit a lowest descending position of each of the first support 21 and the second support 22.

[0033] The adjustment device 3 is fixed inside the first cover 11, wherein the first cover 11 has a first opening 111 defined thereon and located below the shaft 23, a shoulder 112 formed around an inner rim of the first opening 111, and multiple locking elements 113 mounted around the first opening 111.

[0034] The adjustment device 3 includes a threaded sleeve 31 which is polygonal and is connected with the first opening 111 of the first cover 11 securely, and the shoulder 112 of the first opening 111 stops a removal of the threaded sleeve 31. The adjustment device 3 includes a positioning sheet 32 located above the threaded sleeve 31 and formed in a C shape, wherein the fixing sheet 32 has a second opening 321 defined in a center thereof, two extensions 322 extending from two sides of an upper end of the adjustment device 3 respectively, and multiple screw bolts 323 configured to screw the two extensions 322 with the multiple locking elements 113 of the first cover 11 respectively. The threaded sleeve 31 is screwed with and is rotated relative to a threaded tube 33, the threaded tube 33 has a through hole 331 defined in a center thereof so as to connect with a first connector 34 and a second connector 35 by mating with a screwing element 36. The first connector 34 has a first tab 341 surrounding around a top thereof, a first connection column 342 extending from a center of a bottom thereof, and a notch 343 defined in the first connection column 342 and formed in a polygon shape. The second connector 35 has a second tab 351 surrounding around a bottom thereof, a second connection column 352 extending from a center of a top thereof, and a peg 353 extending from the second connection column 352 and formed in a polygon shape so as to rotatably connect with the notch 343. Thereby, when the second connector 35 is rotated, it is rotatably connected with the second connector 34 so as to drive the threaded tube 33 to rotatably move upward and downward.

[0035] The first cover 11 has a peripheral surround portion 114 extending from a peripheral side of the first opening 111 so as to enhance reinforcement of the first cover 11 and to accommodate the adjustment device 3.

[0036] The second connector 35 has the second connection column 352 having a recess in any one of a "1" shape, a cross shape, a double intersected cross shape, and a polygon shape so as to connect with an adjustment element 4 (as shown in FIG. 4).

[0037] The adjusting element 4 is formed in a cross shape, wherein the adjusting element 4 includes a first fixing portion 41 defined on a center of a first end of the adjusting element 4 (as illustrated in FIG. 5), wherein the first fixing portion 41 has two first stop portions 411 arranged on two sides thereof respectively, wherein a width of the first fixing portion 41 is equal to that of the second connection column 352, and the width of the first fixing portion 41 is more than a diameter of the first opening 111 of the first cover 11 so the first fixing portion 41 does not move into the first opening 111.

[0038] The adjusting element 4 further includes a second fixing portion 42 defined on a center of a side of the adjusting element 4, wherein the second fixing portion 42 has two second stop portions 421 arranged on two sides thereof respectively, and the adjusting element 4 further includes a third fixing portion 43 formed on a center of a second end thereof, wherein the third fixing portion 43 has two third stop portions 431 arranged on two sides thereof respectively.

[0039] A height of the first fixing portion 41 is different from a height of the second fixing portion 42, the height of the second fixing portion 42 is different from a height of the third fixing portion 43, and the height of the third fixing portion 43 is different from that of the first fixing portion 41, wherein a length of the first fixing portion 41 is less than a length of the second fixing portion 42, and the length of the second fixing portion 42 is less than a length of the third fixing portion 43. The first fixing portion 41, the second fixing portion 42, the third fixing portion 43 are inserted into and rotated in the second connection column 352 so as to rotatably move the second connector 35, the threaded tube 33, and the first connector 34 upward and downward until the two first stop portions 411, the two second stop portions 421, the two third stop portions 431 contact with the peripheral surround portion 114 of the first cover 11.

[0040] When lifting each lifting balance device 2, the adjustment device 3 does not move. Referring to FIGS. 4 and 5, when descending each lifting balance device 2, the third fixing portion 43 is inserted into the second connection column 352, and the adjusting element 4 is rotated to drive the second connector 35 and the threaded tube 33 to move upward relative to the threaded sleeve 31 until the two third stop portions 431 contact with the peripheral surround portion 114 of the first cover 11. In the meantime, the first connector 34 moves upward to a desired height. When descending each lifting balance device 2, bottoms of the first support 21 and the second support 22 contact with the first connector 34 so as to limit the lowest descending position of each of the first support 21 and the second support 22, wherein the lowest descent portion of each of the first and second supports 22 is a sleeping height of the pillow 1.

[0041] When a lowest descending position of the third fixing portion 43 inserted into and rotated in the second connection column 352 does not match with the desired height, the first fixing portion 41 or the second fixing portion 42 is inserted into the second connection column 352 to adjust the lowest descending position of the first fixing portion 41 or the second fixing portion 42 toward the desired height.

[0042] In another embodiment, the adjusting element

4 includes more than three fixing portions configured to insert into the second connection column based on using requirements.

[0043] Accordingly, the position adjustment mechanism is mounted below the lifting balance device so as to adjust the pillow toward the lowest descending position. Preferably, the adjustment device is capable of adjusting two sides of the pillow consistently.

[0044] In addition, with reference to FIGS. 6-8, a position adjustment mechanism for a lifting balance device according to a preferred embodiment of the present invention comprises: an adjustable pillow 1 including a first cover 11, a second cover 12, an air pump 13 defined between the first cover 11 and the second cover 12, multiple air pipes 14, multiple capsules 15, and two lifting balance devices 2.

[0045] Each of the two lifting balance devices 2 includes a first support 21, a second support 22 intersected with the first support 21, and a first shaft 23 configured to connected the first support 21 and the second support 23.

[0046] The first support 21 includes a first roller 211 arranged on a first end thereof adjacent to the first cover 11 and accommodated in a first track groove 16 on the first cover 11. The first support 21 includes a second shaft 212 fixed on a second end thereof and rotatably connected with a positioning plate 213. The second support 22 includes a third shaft 222 rotatably fixed on a first end thereof adjacent to the first cover 11. The second support 22 includes a second roller 221 arranged on a second end thereof and accommodated in a second track groove 223 below the second cover 12. The first track groove 16 has an adjustment device 5 arranged therein opposite to the first roller 211, such that the second adjustment device 5 is adjustable to limit a highest lifting position of each of the first support 21 and the second support 22.

[0047] The first track groove 16 has a first stop block 162 and a second stop block 163 mounted on two ends of the first track groove 16 respectively, wherein the second stop block 163 has an arcuate face 164 defined thereon facing the first stop block 162, and a limiting extension 165 is secured on the arcuate face 164; the first track groove 16 includes an opening 161 defined on a bottom thereof proximate to the second stop block 163, where the opening 161 accommodates the second adjustment device 5, and the second adjustment device 5 is rotated on the opening 161.

[0048] The second adjustment device 5 is formed on a column shape, and the second adjustment device 5 includes a fourth shaft 51 disposed on a top thereof, a rotation portion 52 arranged on a bottom of the second adjustment device 5, and an engagement portion 53 extending from a bottom of the rotation portion 52. The second adjustment device 5 further includes a first tangent plane 54, a second tangent plane 55, and a third tangent plane 56 which are arranged on a peripheral side of the second adjustment device 5, wherein a distance between the first tangent plane 54 and a center of the second adjustment device 5, a distance between the second tangent plane 55 and the center of the second adjustment device 5, and a distance between the third tangent plane 56 and the center of the second adjustment device 5 are different. Furthermore, the second adjustment device 5 includes a defining slot 57 defined on the peripheral side of the second adjustment device 5 and contacting with the arcuate face 164 of the second stop block 163 so that the defining slot 57 rotates within a predetermined angle relative to the limiting extension 165.

[0049] When desiring to lift each lifting balance device 2, the first roller 211 is moved to the second stop block 163 from the first stop block 162 until the first roller 211 is stopped by the second adjustment device 5 (as shown in FIG. 8). The engagement portion 53 of the rotation portion 52 of the second adjustment device 5 is rotated by using a coin or a screwdriver so as to change three position of the first tangent plane 54, the second tangent plane 55, and the third tangent plane 56 relative to the first roller 211 (as illustrated in FIG. 9). Since the distance between the first tangent plane 54 and the center of the second adjustment device 5, the distance between the second tangent plane 55 and the center of the second adjustment device 5, and the distance between the third tangent plane 56 and the center of the second adjustment device 5 are different, the first roller 211 is stopped at three stop position, thus adjusting the highest lifting position of each lifting balance device 2 (as illustrated in FIG. 10).

[0050] In another embodiment, the second adjustment device 5 includes more than three tangent planes.

[0051] Preferably, multiple fixing portions are arranged around the opening of the first cover so as to adjust the second adjustment device with a user's eyes.

[0052] Accordingly, the highest lifting position of each lifting balance device is adjustable by rotating the tangent planes of the second adjustment device in the first track groove.

Claims

1. A position adjustment mechanism for a lifting balance device comprising:

   a first cover (11) in which at least one lifting balance device (2) is arranged, and each of the at least one lifting balance device (2) including a first support (21), a second support (22) intersected with the first support (21), and a shaft (23) configured to connected the first support (21) and the second support (22); and
   an adjustment device (3) located bellow the shaft (23);
   wherein the adjustment device (3) is fixed inside the first cover (11), the first cover (11) has a first opening (111) defined thereon and located below the shaft (23), a threaded sleeve (31) is con-

nected with the first opening (111) and is screwed with a threaded tube (33), such that the threaded tube (33) is adjustably moved relative to the threaded sleeve (31) so as to change a position of a top of the threaded tube (33) and to limit a lowest descending position of each of the first support (21) and the second support (22).

2. The position adjustment mechanism as claimed in claim 1, wherein a shoulder (112) is formed around an inner rim of the first opening (111) and is configured to stop a removal of the threaded sleeve (31), wherein the threaded tube (33) has a through hole (331) defined therein so as to connect with a first connector (34) and a second connector (35) by mating with a screwing element (36).

3. The position adjustment mechanism as claimed in claim 1, wherein the threaded sleeve (31) is polygonal, and the adjustment device (3) includes a positioning sheet (32) located above the threaded sleeve (31) and formed in a C shape, wherein the fixing sheet has a second opening (321) defined in a center thereof, two extensions (322) extending from two sides of an upper end of the adjustment device (3) respectively, and multiple screw bolts (323) configured to screw the two extensions (322) with multiple locking elements (113) of the first cover (11) respectively.

4. The position adjustment mechanism as claimed in claim 2, wherein the first connector (34) has a first tab (341) surrounding around a top thereof, a first connection column (342) extending from a center of a bottom thereof, and a notch (343) defined in the first connection column (342) and formed in a polygon shape; the second connector (35) has a second tab (351) surrounding around a bottom thereof, a second connection column (352) extending from a center of a top thereof, and a peg (353) extending from the second connection column (352) and formed in a polygon shape so as to rotatably connect with the notch (343).

5. The position adjustment mechanism as claimed in claim 1, wherein the first cover (11) has a peripheral surround portion (114) extending from a peripheral side of the first opening (111).

6. The position adjustment mechanism as claimed in claim 2, wherein the second connection column (352) has a recess for accommodating an adjusting element; wherein the recess is in any one of a "1" shape, a cross shape, a double intersected cross shape, and a polygon shape; wherein the adjusting element (4) includes a first fixing portion (41) defined on a center of a first end of the adjusting element (4); wherein the first fixing portion (41) has two first stop portions (411) arranged on two sides thereof respectively; wherein a width of the first fixing portion (41) is equal to that of the second connection column (352), and the width of the first fixing portion (41) is more than a diameter of the first opening (111) of the first cover (11); wherein the adjusting element (4) is formed in a cross shape and further includes a first fixing portion (41) defined on a center of a first end of the adjusting element (4), wherein the first fixing portion (41) has two first stop portions (411) arranged on two sides thereof respectively; the adjusting element (4) includes a second fixing portion (42) defined on a center of a side of the adjusting element (4), wherein the second fixing portion (42) has two second stop portions (421) arranged on two sides thereof respectively, and the adjusting element (4) further includes a third fixing portion (43) formed on a center of a second end thereof, wherein the third fixing portion (43) has two third stop portions (431) arranged on two sides thereof respectively; wherein a height of the first fixing portion (41) is different from a height of the second fixing portion (42), the height of the second fixing portion (42) is different from a height of the third fixing portion (43), and the height of the third fixing portion (43) is different from that of the first fixing portion (41).

7. The position adjustment mechanism as claimed in claim 1,wherein the first support (21) includes a first roller (211) arranged on a first end thereof adjacent to the first cover (11) and accommodated in a first track groove (16) on the first cover (11);wherein the first track groove (16) has an adjustment device (3) arranged therein opposite to the first roller (211), such that the second adjustment device (3) is adjustable to limit a highest lifting position of each of the first support (21) and the second support (22).

8. The position adjustment mechanism as claimed in claim 7, wherein the first support (21) includes a second shaft (212) fixed on a second end thereof and rotatably connected with a positioning plate (213); the second support (22) includes a third shaft (222) rotatably fixed on a first end thereof adjacent to the first cover (11), and the second support (22) includes a second roller (221) arranged on a second end thereof and accommodated in a second track groove (223) below the second cover;

9. The position adjustment mechanism as claimed in claim 8, wherein the first track groove (16) has a first stop block (162) and a second stop block (163) mounted on two ends of the first track groove (16) respectively.

10. The position adjustment mechanism as claimed in claim 9, wherein the first track groove(16) includes

an opening (161) defined on a bottom thereof proximate to the second stop block (163), the opening (161) accommodates the second adjustment device (5), and the second adjustment device (5) is rotated on the opening ; wherein the second adjustment device (5) is formed on a column shape, and the second adjustment device (5) includes a fourth shaft (23) disposed on a top thereof and includes a rotation portion arranged on a bottom of the second adjustment device (5); the second adjustment device (5) further includes multiple tangent plane arranged on a peripheral side thereof, wherein multiple distances between the multiple tangent plane and a center of the second adjustment device (5) are different; wherein the rotation portion has an engagement portion extending from a bottom of the rotation portion; wherein the second stop block has an arcuate face defined thereon facing the first stop block, and a limiting extension is secured on the arcuate face; the second adjustment device (5) includes a defining slot defined on the peripheral side of the second adjustment device (5) and contacting with the arcuate face of the second stop block so that the defining slot rotates within a predetermined angle relative to the limiting extension.

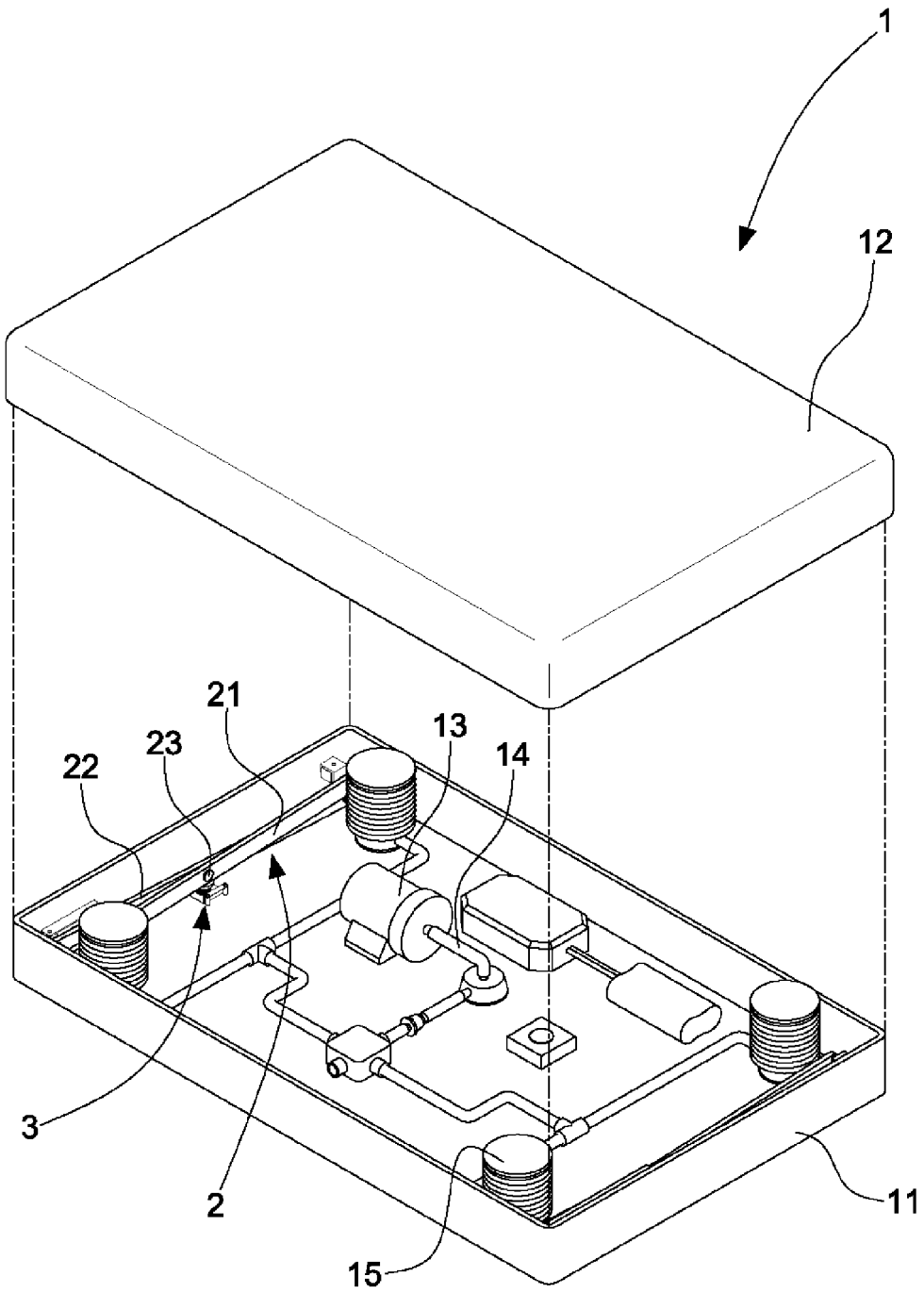

Fig.1

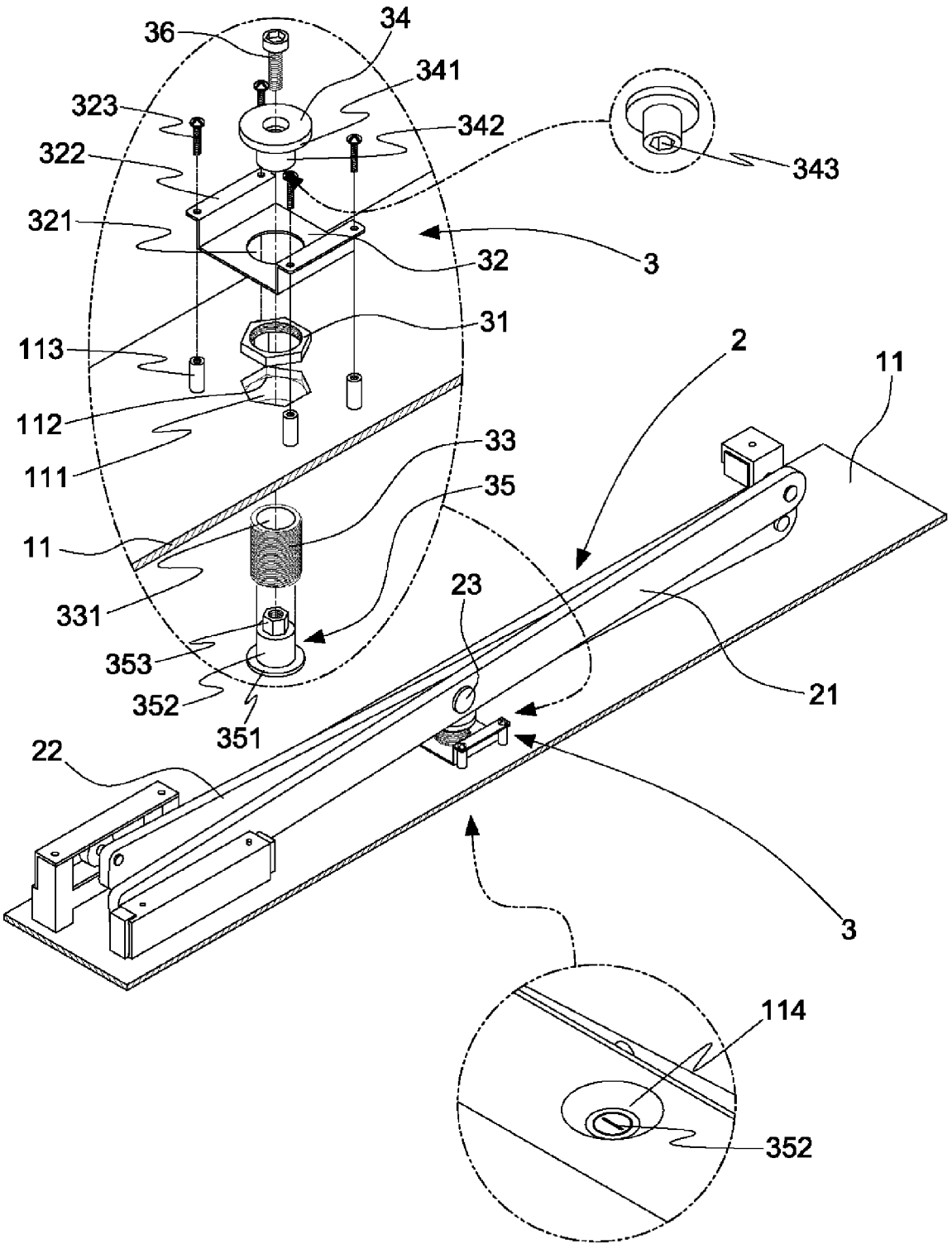
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Fig.2

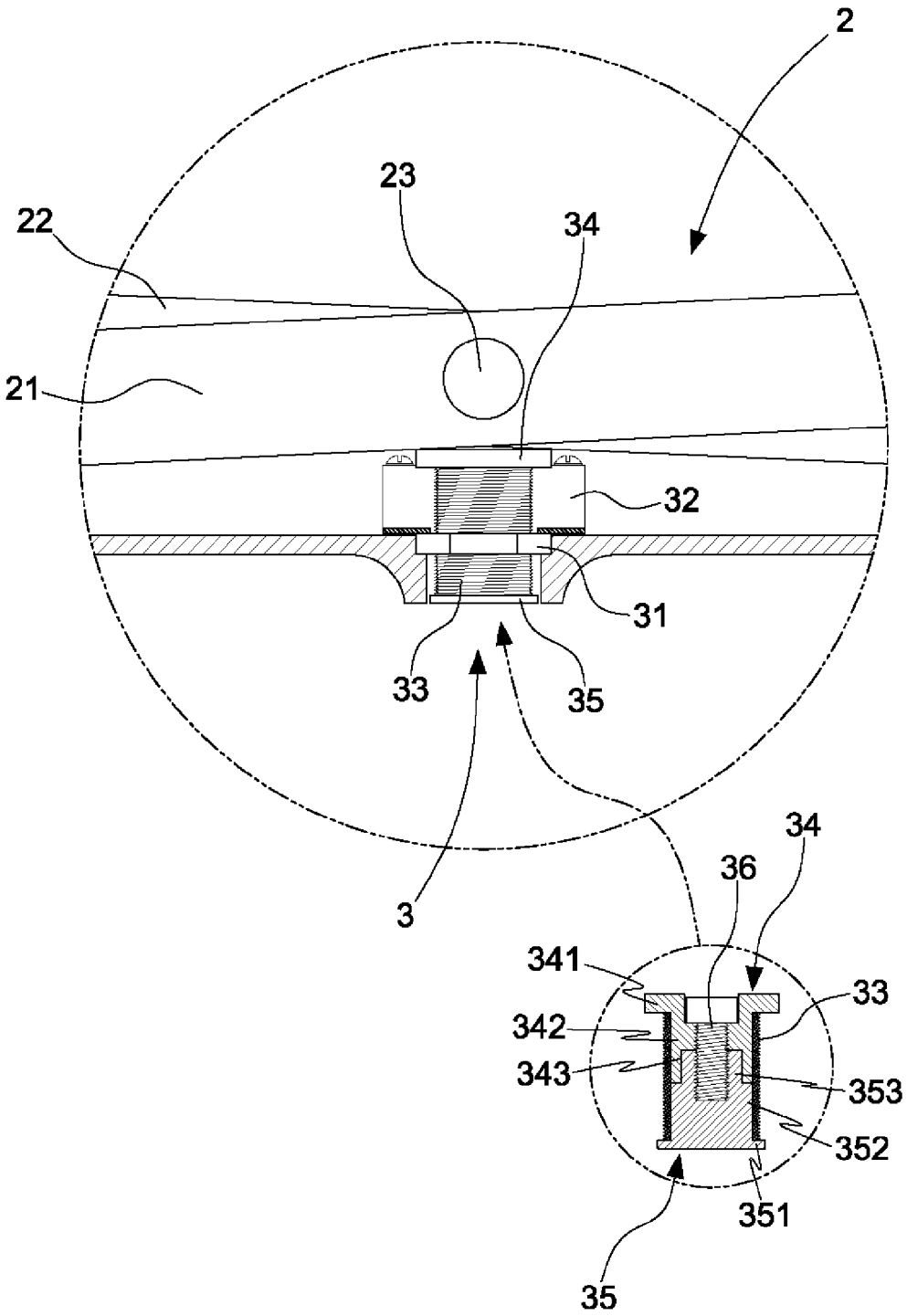

Fig.3

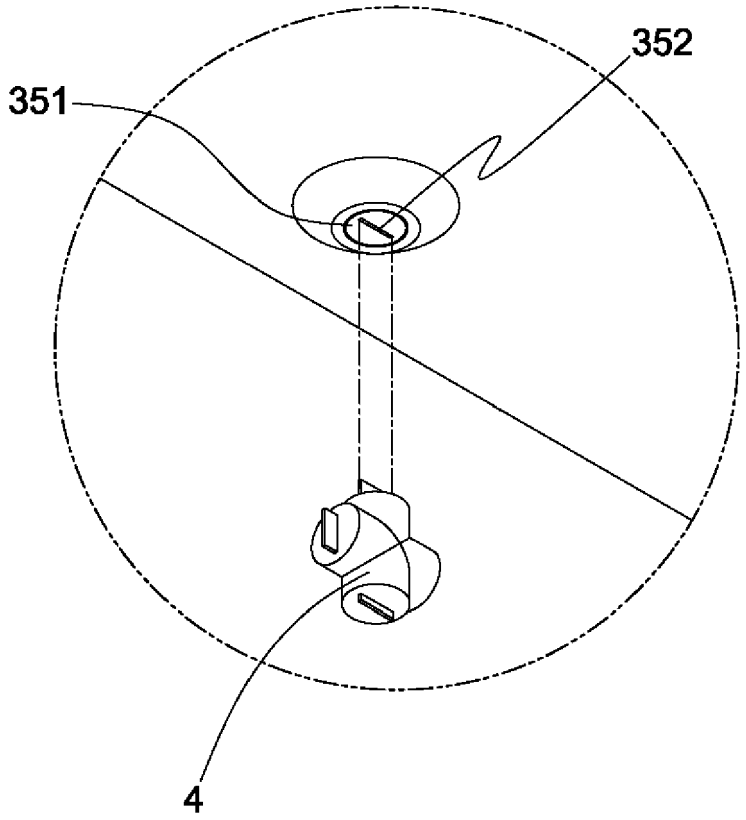

Fig.4

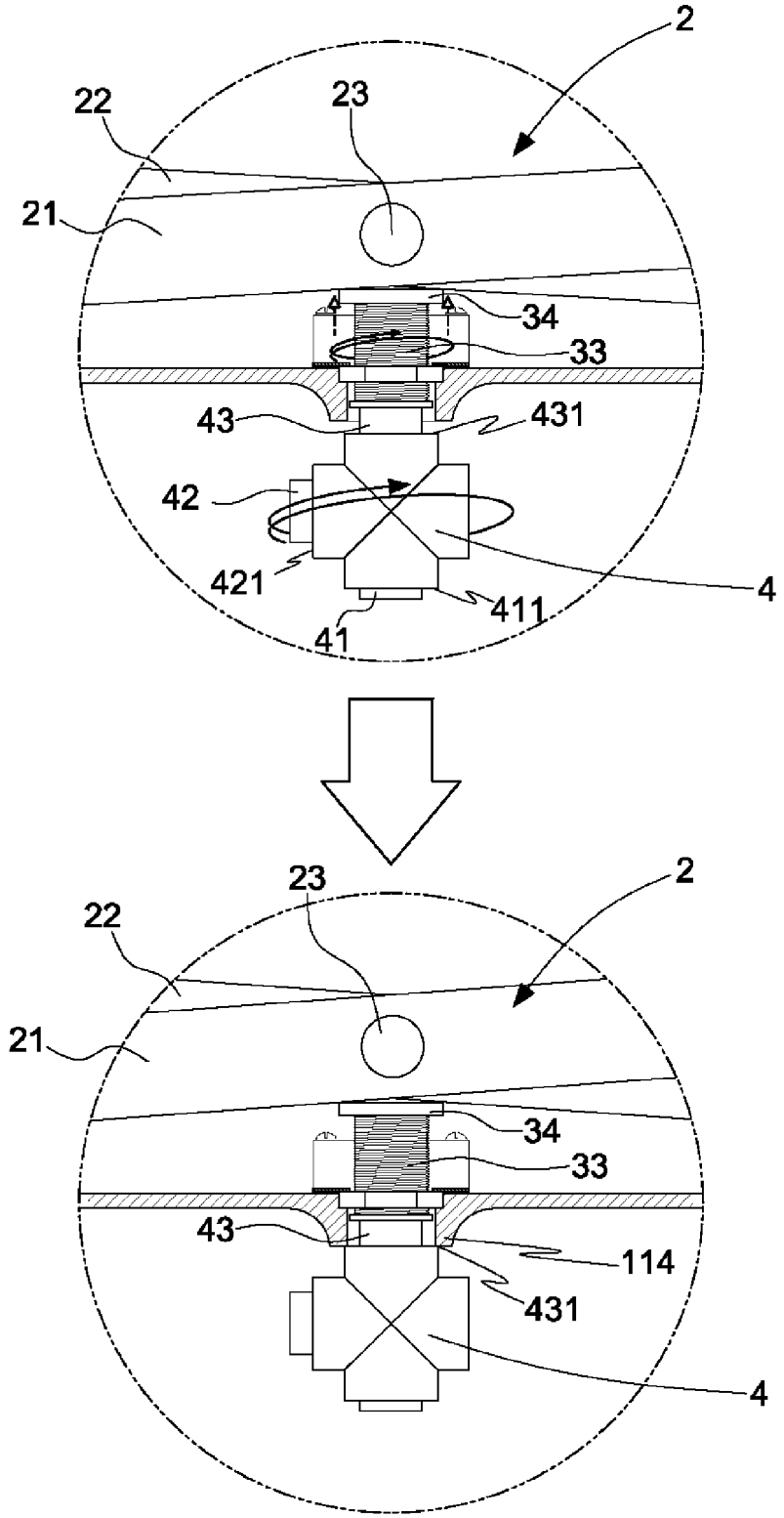

Fig.5

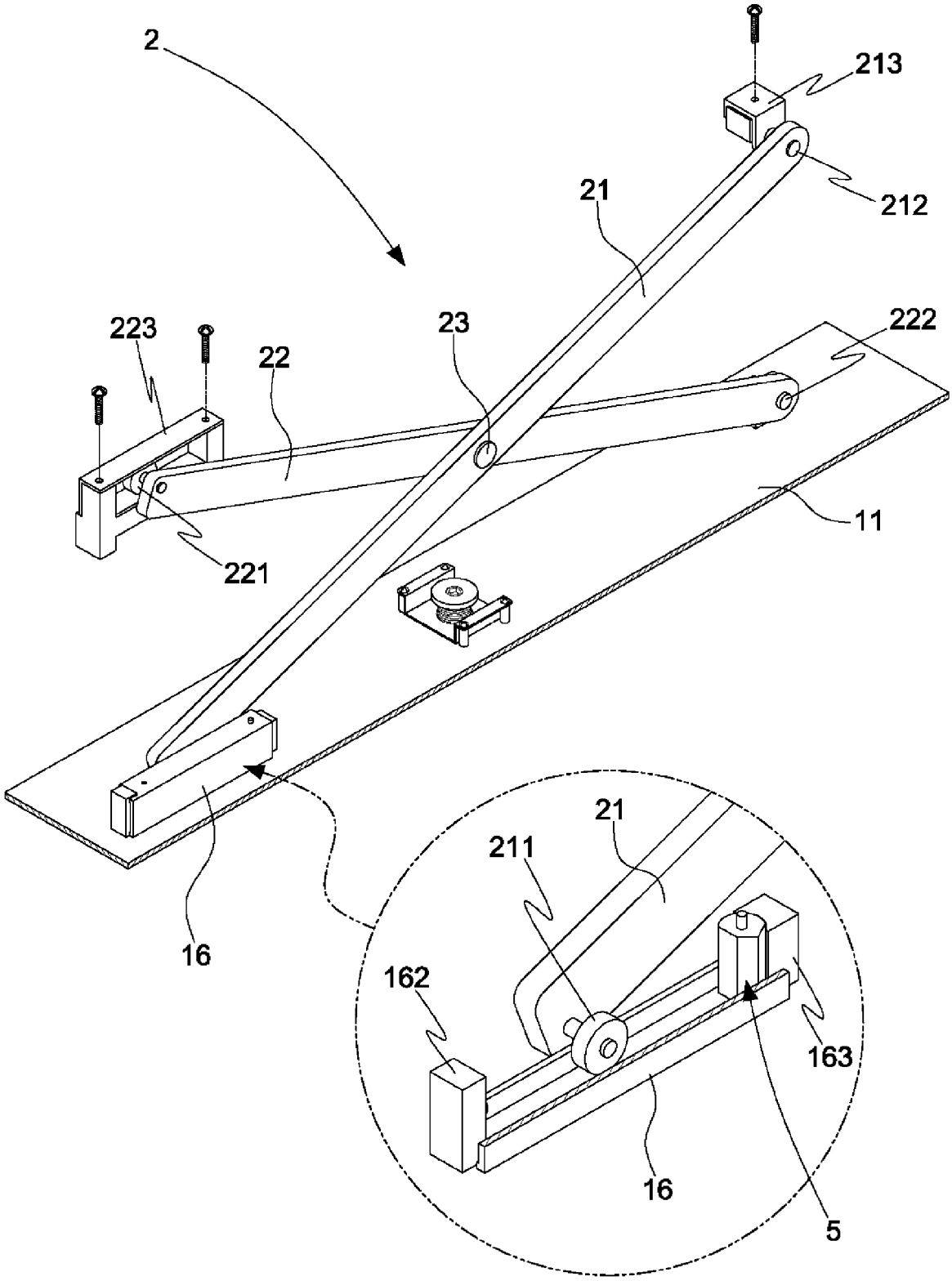

Fig.6

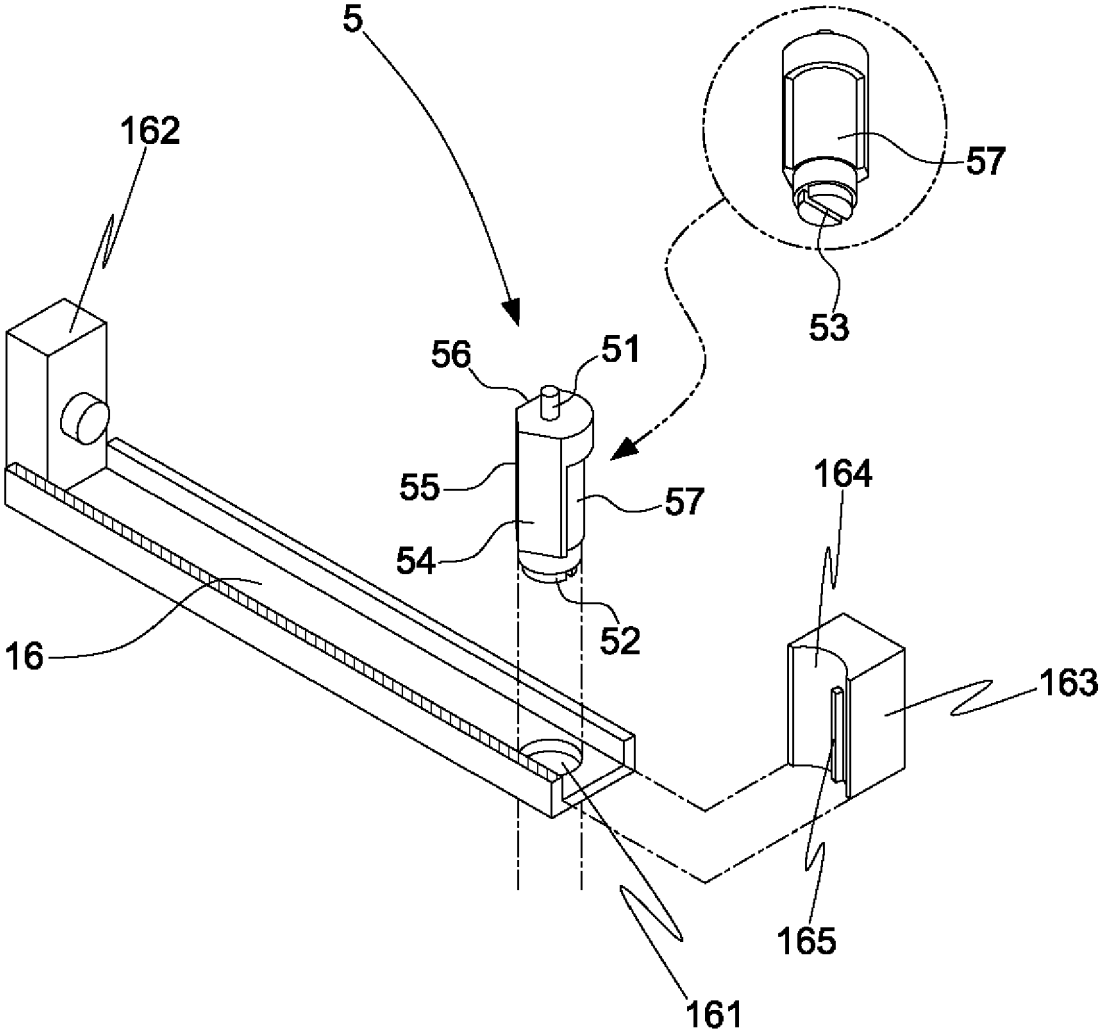

Fig.7

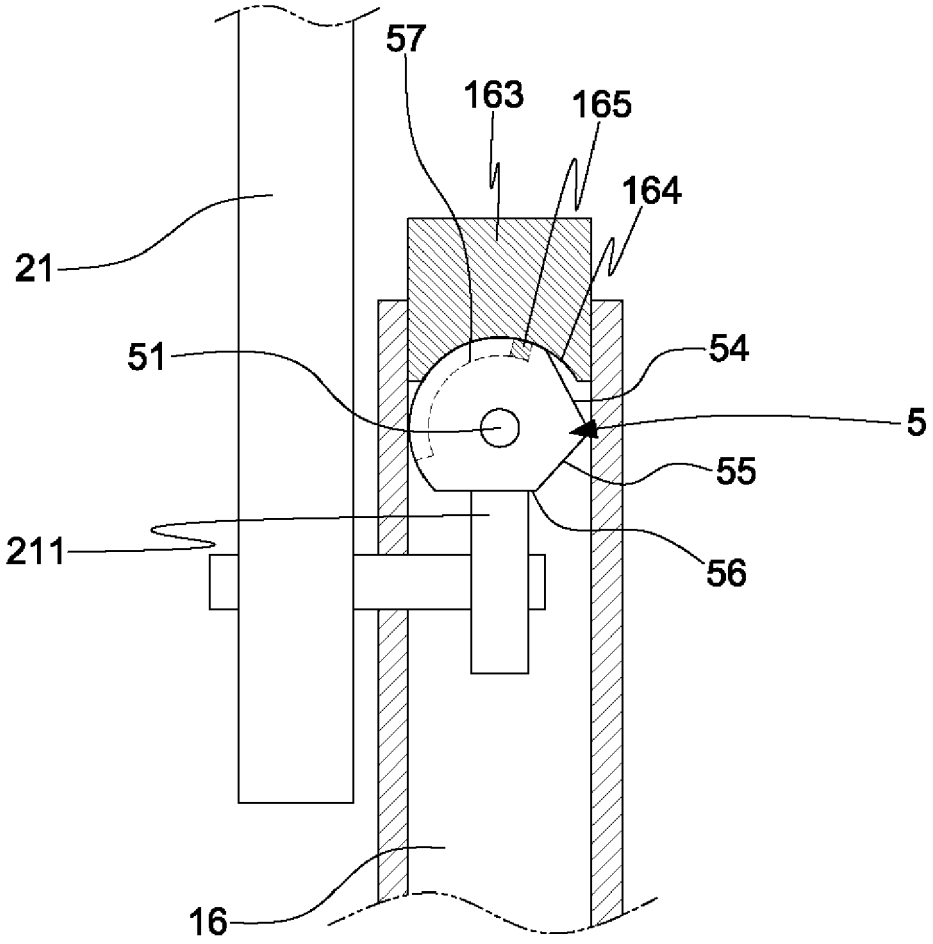

Fig.8

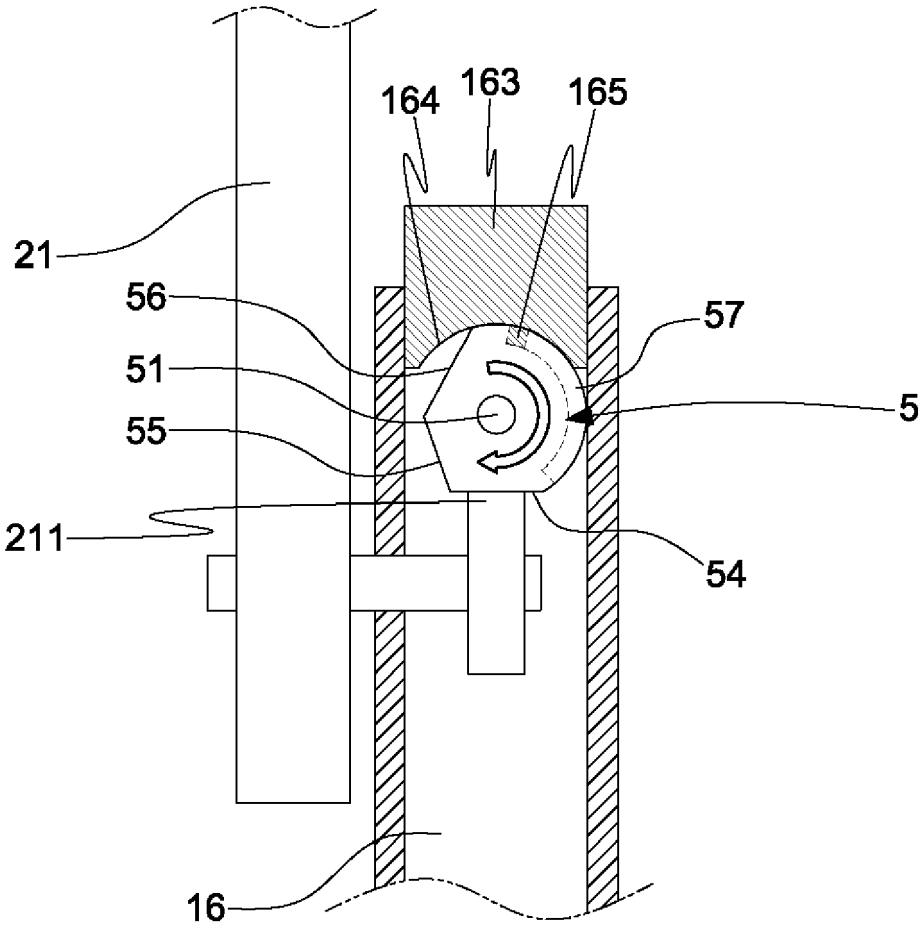

Fig.9

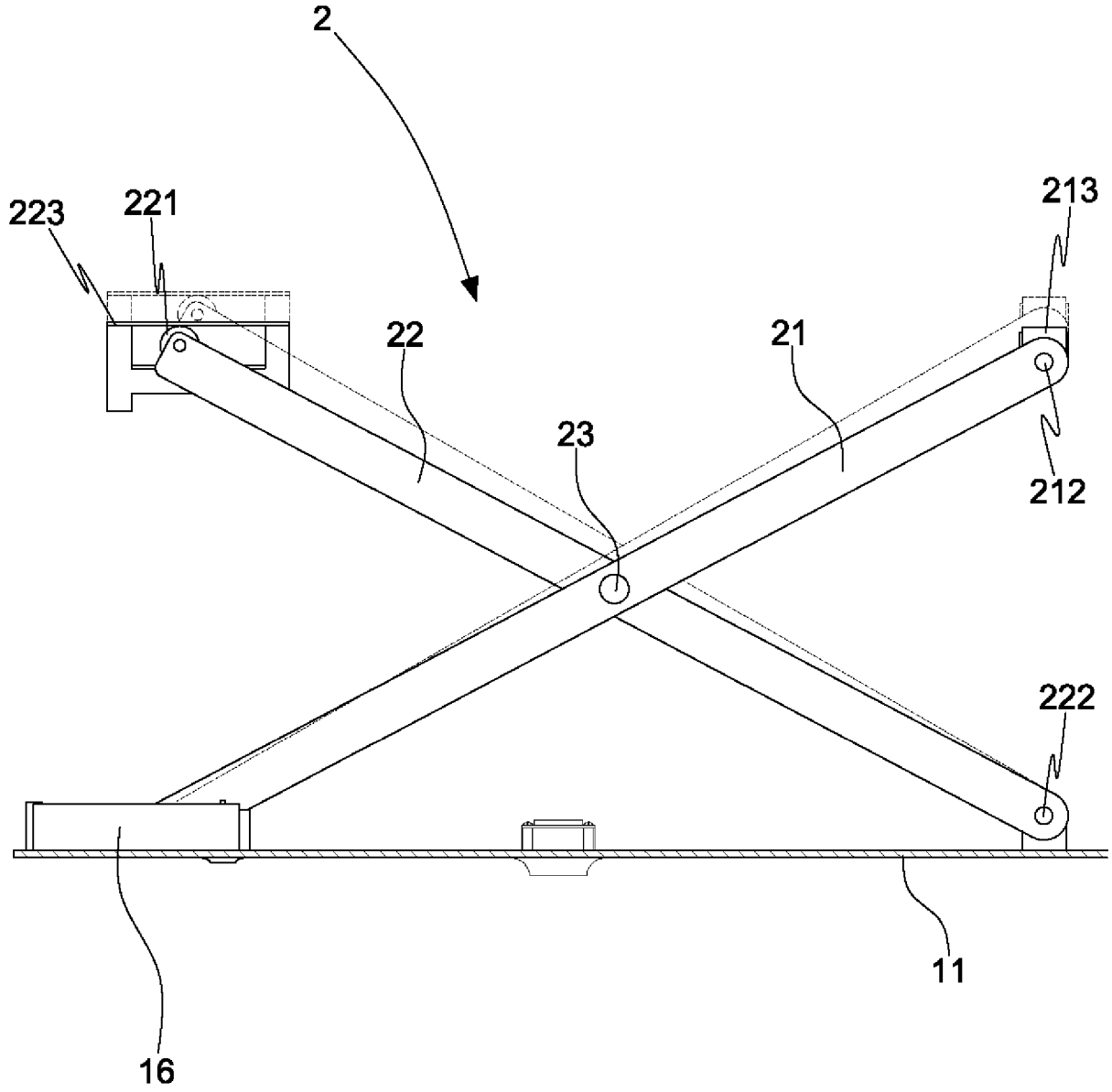

Fig.10

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EUROPEAN SEARCH REPORT

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	KR 101 223 959 B1 (HKENC CO LTD [KR]) 21 January 2013 (2013-01-21) * paragraphs [0015], [0023]; figure 4 *	1	INV. A47G9/10 B66F7/06
A	US 682 083 A (JAMES HENRY BENSON [GB]) 3 September 1901 (1901-09-03)	1	
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TECHNICAL FIELDS SEARCHED (IPC)

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 April 2020	van Overbeek, Kajsa

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