(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 458 694 A1**

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
06.11.2024 Bulletin 2024/45

(21) Application number: **24163144.9**

(22) Date of filing: **13.03.2024**

(51) International Patent Classification (IPC):
B65B 13/18 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
B65B 13/025; B65B 13/185; B65B 13/187

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
GE KH MA MD TN

(30) Priority: **02.05.2023 TW 112116304**

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(54) STRAPPING TOOL

(57) A strapping tool has a press unit. The press unit includes a servo and an axle. The servo has an output shaft. The output shaft is connected to a connecting shaft. The connecting shaft is connected to one side of the axle. The output shaft, the connecting shaft and the axle are rotated simultaneously. Another side of the axle is integrally formed with an eccentric shaft. The eccentric shaft is fitted with a shaft seat. A press block is pivotally connected to the shaft seat. When in use, the servo lifts the press block for a packing strap to pass therethrough or lower the press block to press against the packing strap. The strapping tool has the effect of improving the quality and efficiency of packaging operations.

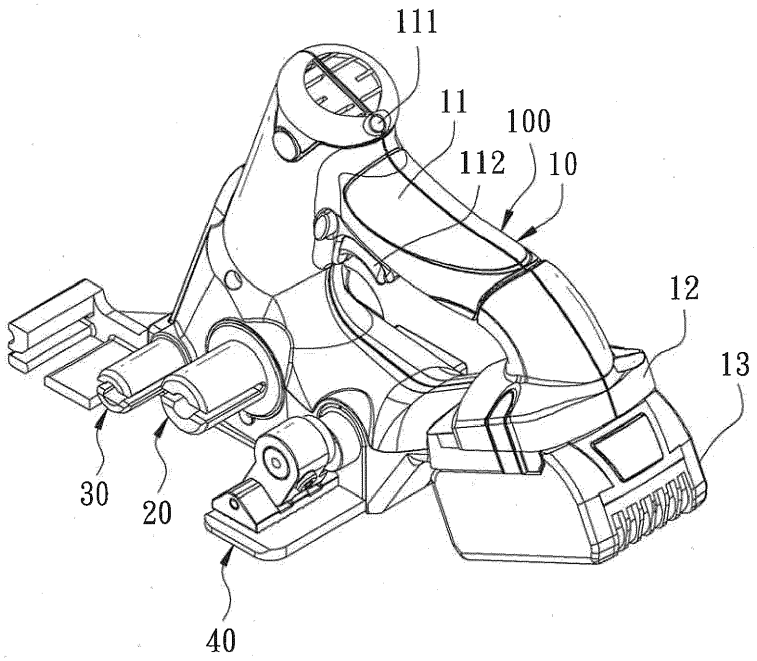

FIG. 1

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Description

FIELD OF THE INVENTION

[0001] The present invention relates to a strapping tool, and more particularly to a strapping tool having a press unit

BACKGROUND OF THE INVENTION

[0002] For transporting goods, an electric packing tool is used for packing the goods. A conventional electric packing tool comprises a body. The body includes a cutting unit, a reeling unit, a press unit, a press plate, and a battery. The press unit includes a spindle. A hand-operated lever and a press block are provided at both ends of the spindle, respectively. The press block and the press plate are arranged oppositely. First, the user presses the hand-operated lever to rotate the spindle for lifting the press block. Then, one end of the packing strap is inserted between the press block and the press plate. After that, the user releases the hand-operated lever, such that the press block presses against the packing strap through a spring. Then, the other end of the packing strap passes through the cutting unit and the reeling unit. The packing strap is tightened by the reeling unit. Finally, the unnecessary packing strap is cut by the cutting unit to complete the packaging operation.

[0003] However, it is necessary for the user to operate the hand-operated lever of the conventional electric strapping tool before and after the goods are packed by the strapping tool. In addition to the smoothness of the strapping operation, it is required to consider the stability of holding the electric strapping tool. As a result, it is more complicated and inconvenient to use the electric strapping tool. Accordingly, the inventor of the present invention has devoted himself based on his many years of practical experiences to solve these problems.

SUMMARY OF THE INVENTION

[0004] The primary object of the present invention is to provide a strapping tool having a press unit, which can simply and effortlessly lift a press block of the press unit for a packing strap to pass therethrough or lower the press block to press the packing strap.

[0005] In order to achieve the forgoing object, the strapping tool provided by the present invention comprises a main body. The body includes a reeling unit, a cutting unit, and a press unit. The press unit includes a press plate. The press plate is fixed to a bottom of the body and extends outward. The body includes a grip portion and a mounting portion. A button is provided on the grip portion. The mounting portion is equipped with a power unit. The press unit includes a servo and an axle. The servo is electrically connected to the button. The servo has an output shaft. The output shaft is connected to a connecting shaft. The connecting shaft is connected to one side of the axle. The output shaft, the connecting shaft and the axle are rotated simultaneously. Another side of the axle is integrally formed with an eccentric shaft. The eccentric shaft extends outward. The eccentric shaft is fitted with a shaft seat. A press block is pivotally connected to the shaft seat.

[0006] As to the strapping tool provided by the present invention, when the button is pressed, the servo will lift the press block for a packing strap to pass therethrough; when the button is released, the servo will lower the press block to press against the packing strap.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

FIG. 1 is a perspective view in accordance with a first embodiment of the present invention;

FIG. 2 is an exploded view in accordance with the first embodiment of the present invention;

FIG. 3 is a schematic view in accordance with the first embodiment of the present invention when in use, wherein the press block is lifted;

FIG. 4 is a schematic view in accordance with the first embodiment of the present invention when in use, wherein the press block is lowered;

FIG. 5 is a schematic view in accordance with the first embodiment of the present invention when in use, wherein the packing strap is cut;

FIG. 6 is a partial exploded view in accordance with a second embodiment of the present invention;

FIG. 7 is a schematic view in accordance with the second embodiment of the present invention when in use, wherein the blade shaft is placed flat; and

FIG. 8 is a schematic view in accordance with the second embodiment of the present invention when in use, wherein the blade shaft is rotated.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0008] Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings.

[0009] FIG. 1 is a perspective view in accordance with a first embodiment of the present invention. FIG. 2 is an exploded view in accordance with the first embodiment of the present invention. The present invention discloses a strapping tool 100. In a preferred embodiment, the strapping tool 100 is a portable electric strapping tool. The strapping tool 100 comprises a body 10, a reeling

unit 20, a cutting unit 30, and a press unit 40.

[0010] The body 10 is a shell. The body 10 includes a grip portion 11 and a mounting portion 12. A first button 111 is provided on the top of the grip portion 11. A second button 112 is provided on the bottom of the grip portion 11. The mounting portion 12 is equipped with a power unit 13. The power unit is a battery. The first button 111, the second button 112, and the electrical unit 13 are electrically connected to a control module 14.

[0011] The reeling unit 20 is disposed on the body 10. The reeling unit 20 includes a motor 21, a reduction gear set 22 that is a planetary gear set, a worm rod 23, and a spindle 24. The motor 21 is electrically connected to the second button 112 and the control module 14. The motor 21, the reduction gear set 22 and the spindle 23 are connected to one another. The spindle 24 is fitted with a worm wheel 25 and bearings located on both sides of the worm wheel 25. The worm rod 23 is meshed with the worm wheel 25. The spindle 24 has an extension portion 26 extending out of the body 10. The extension portion 26 has a pair of grooves 27 for a packing strap 200 to pass therethrough. When the second button 112 is pressed, the motor 21 drives the reduction gear set 22, the worm rod 23, the worm wheel 25 and the spindle 24, and the spindle 24 is rotated to tighten the packing strap 200.

[0012] The cutting unit 30 is disposed on the body 10. The cutting unit 30 includes a hollow blade tube 31 and a blade shaft 32. The blade tube 31 has an extension portion 33 extending out of the body 10. The extension portion 33 has a pair of grooves 34 for the packing strap 200 to pass therethrough. The blade shaft 32 is rotatably connected in the blade tube 31. A handle 36 is connected to a fixed end 35 of the blade shaft 32 in the radial direction. The handle 36 is configured to drive the blade shaft 32 to rotate, thereby cutting the packing strap 200.

[0013] The press unit 40 is disposed on the body 10. The press unit 40 includes a servo 41, a press plate 42, and an axle 43. The servo 41 is an actuator. The servo 41 is electrically connected to the first button 111 and the control module 14. The servo 41 has a servo motor (not shown in the figures) and an output shaft 411. The control module 14 controls the rotation angle of the output shaft 411 of the servo 41. The output shaft 411 is connected to a connecting shaft 44 through a screw (not shown in the figures), so that the output shaft 411 and the connecting shaft 44 are rotated simultaneously. The connecting shaft 44 is a sleeve. The outer peripheral wall of the connecting shaft 44 has a recess 441. The press plate 42 is fixed to the bottom of the body 10 and extends outward. An axle seat 421 is provided on the press plate 42. The axle seat 421 has an axle hole 422. The axle 43 is inserted in the axle hole 422. The axle 43 has a connecting hole 431. The connecting shaft 44 is disposed in the connecting hole 431. The axle 43 is provided with a stop screw (not shown) and is pressed against the recess 441, so that the connecting shaft 44 and the axle 43 are rotated simultaneously. The other side of the axle 43 is integrally formed with an eccentric shaft 432. The eccentric shaft 432 extends outward. The eccentric shaft 432 is fitted with a shaft seat 45. The shaft seat 45 is connected to the eccentric shaft 432 through a screw (not shown in the figures). A pivot 46 is insertedly connected to the shaft seat 45 for pivoting a press block 47.

[0014] Please refer to FIG. 3 in cooperation with FIG. 2. When in use, first, the first button 111 is pressed to start the servo 41 to rotate the output shaft 411 clockwise and drive the connecting shaft 44, the axle 43, the eccentric shaft 432, the shaft seat 45, and the press block 47. Thereby, the press block 47 is lifted, so that the press block 47 is moved away from the press plate 42. As shown in FIG. 4, at this time, the packing strap 200 is inserted between the press block 47 and the press plate 42, and then the first button 111 is released. The servo 41 rotates the output shaft 411 counterclockwise to lower the press block 47 so that the press block 47 presses against the packing strap 200. Then, after an article 201 is packed by the packing strap 200, the packing strap 200 is inserted in the blade tube 31 and the spindle 24. The second button 112 is pressed for the spindle 24 to reel the packing strap, thereby tightening the packing strap 200. Finally, as shown in FIG. 5, the handle 36 is operated to rotate the blade shaft 32 for cutting the packing strap 200. The first button 111 is pressed again to lift the press block 47, so that the packaging operation is completed. In the present invention, the servo 41 is controlled by the first button 111 to lift the press block 47 for the packing strap to pass therethrough or to lower the press block 47 for pressing the packing strap. Besides, the first button 111 and the second button 112 of the present invention are disposed on the top and the bottom of the grip portion 11, respectively. The user may press the first button 111 with his/her thumb or press the second button 112 with his/her index finger without changing the holding manner when holding the grip portion 11. In this way, the strapping tool provided by the present invention has the effect of improving the quality and efficiency of packaging operations.

[0015] FIG. 6 is a partial exploded view in accordance with a second embodiment of the present invention. The second embodiment of the present invention is substantially similar to the aforementioned first embodiment with the exceptions described hereinafter. The servo 41 further includes a linking member 48. The linking member 48 has a first linking ring 481, a second linking ring 482, and a connecting rod 483. The first linking ring 481 is sleeved on the connecting shaft 44 and secured by a stop screw (not shown in the figures) or a C-shaped snap (not shown in the figures), so that the first linking ring 481 and the connecting shaft 44 are rotated simultaneously. The second linking ring 482 is sleeved on the fixed end 35 of the blade shaft 32. In this embodiment, the cross section of the fixed end 35 of the blade shaft 32 is non-circular. The second linking ring 482 has a non-circular through hole 484. The cross section of the fixed end 35 corresponds to the shape of the through hole 484, so that

the second linking ring 482 and the blade shaft 32 are rotated simultaneously. The first linking ring 481 and the second linking ring 482 are pivoted at both ends of the connecting rod 483 through positioning pins 485 respectively, so that the first linking ring 481 and the second linking ring 482 are driven to rotate. Thereby, the servo 41 can rotate the blade shaft 32 through the linking member 48 without using the handle 36. When the first button 111 is pressed, the servo 41 will lift the press block 47 for the packing strap to pass therethrough and rotate the blade shaft 32. When the first button 111 is released, as shown in FIG. 7, the servo 41 will lower the press block 47 to press against the packing strap 200 and the press plate 42. The blade shaft 32 is placed flat for the packing strap 200 to be inserted in the blade tube 31. Finally, as shown in FIG. 8, when the first button 111 is pressed again, the servo 41 will rotate the blade shaft 32 to cut the packing strap 200 and the press block 47 will be lifted, so that the packaging operation is completed.

[0016] Although particular embodiments of the present invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the present invention. Accordingly, the present invention is not to be limited except as by the appended claims.

Claims

1. A strapping tool, comprising a body, the body including a reeling unit, a cutting unit and a press unit, the press unit including a press plate, the press plate being fixed to a bottom of the body and extending outward; **characterized by**:

   the body including a grip portion and a mounting portion, a button being provided on the grip portion, the mounting portion being equipped with a power unit;
   the press unit including a servo and an axle, the servo being electrically connected to the button, the servo having an output shaft, the output shaft being connected to a connecting shaft, the connecting shaft being connected to one side of the axle, the output shaft, the connecting shaft and the axle being rotated simultaneously, another side of the axle being integrally formed with an eccentric shaft, the eccentric shaft extending outward, the eccentric shaft being fitted with a shaft seat, a press block being pivotally connected to the shaft seat.

2. The strapping tool as claimed in claim 1, wherein when the button is pressed to start the servo to rotate the output shaft, the press block is lifted to move away from the press plate; when the button is released, the servo rotates the output shaft to lower the press block for the press block to press against a packing strap.

3. The strapping tool as claimed in claim 1, wherein the servo is an actuator.

4. The strapping tool as claimed in claim 1, wherein an axle seat is provided on the press plate, the axle seat has an axle hole, and the axle is inserted in the axle hole.

5. The strapping tool as claimed in claim 1, wherein the cutting unit includes a blade tube and a blade shaft, the blade shaft is inserted in the blade tube, the servo further includes a linking member, the linking member is connected to the blade shaft, and the servo drives the blade shaft to rotate.

6. The strapping tool as claimed in claim 5, wherein the linking member has a first linking ring, a second linking ring and a connecting rod, the first linking ring is sleeved on the connecting shaft, the second linking ring is sleeved on a fixed end of the blade shaft, the first linking ring and the second linking ring are pivoted at two ends of the connecting rod respectively, such that the connecting shaft, the first linking ring, the connecting rod, the second linking ring and the blade shaft are driven to rotate together.

7. The strapping tool as claimed in claim 5, wherein when the button is pressed, the servo rotates the blade shaft to cut a packing strap and lifts the press block to release the packing strap.

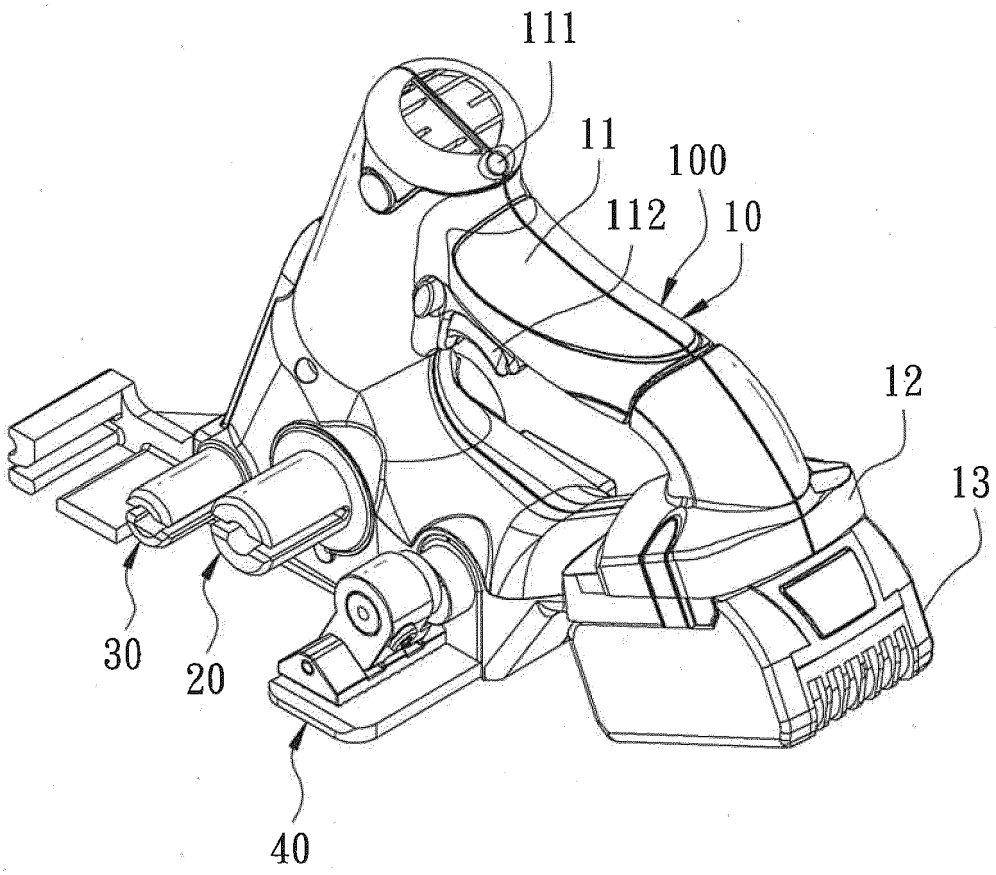

FIG. 1

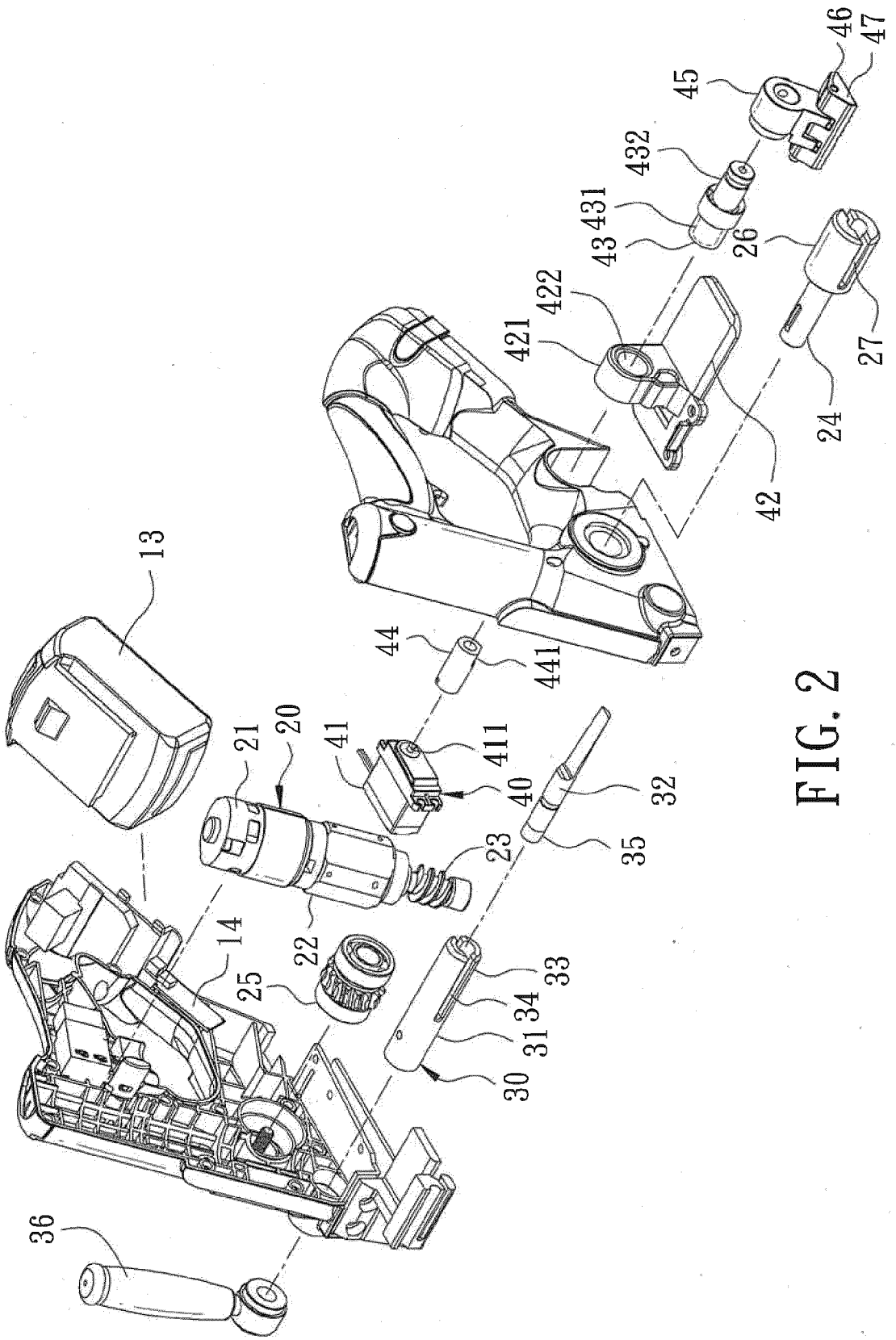
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FIG. 2

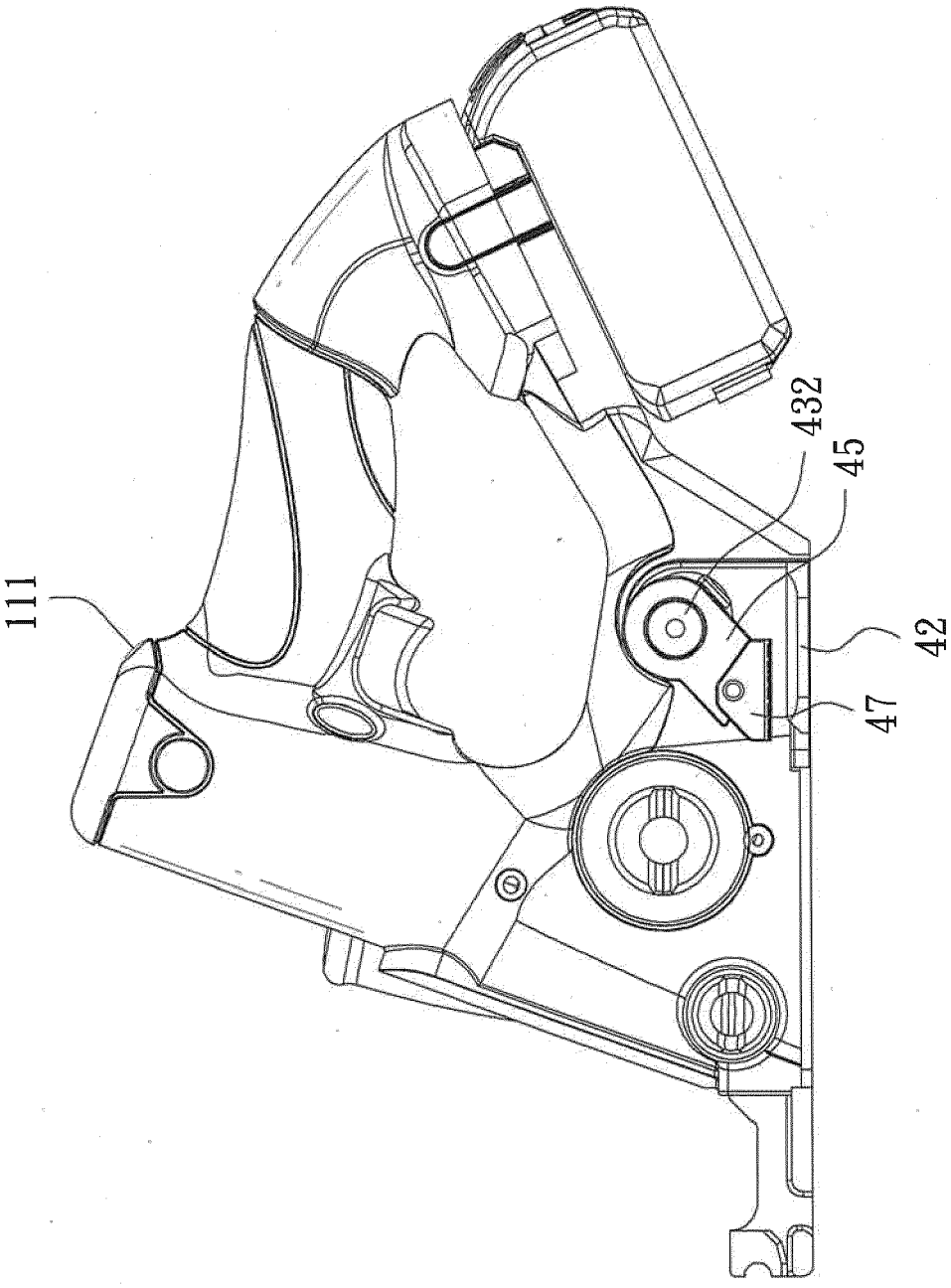

FIG. 3

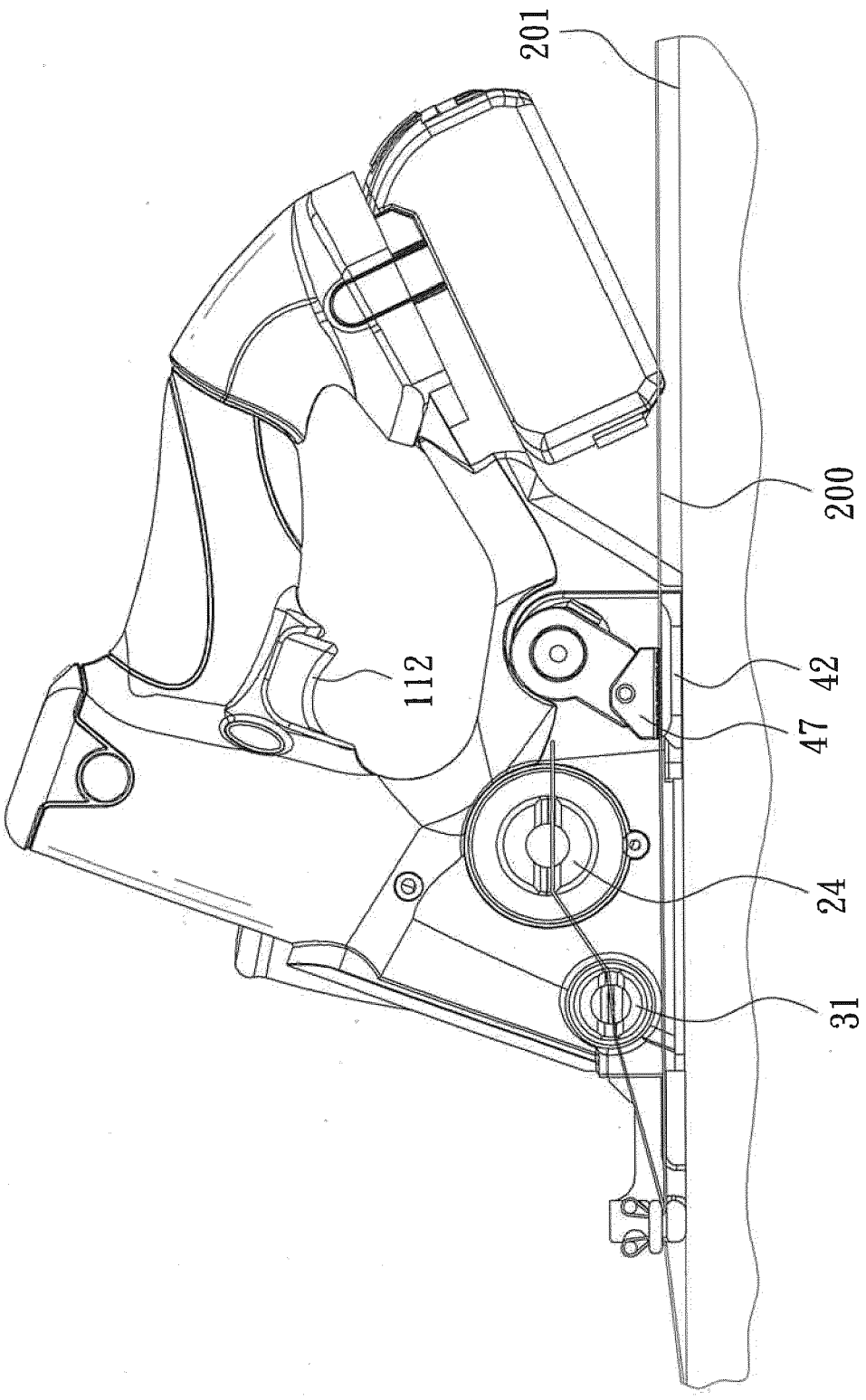

FIG. 4

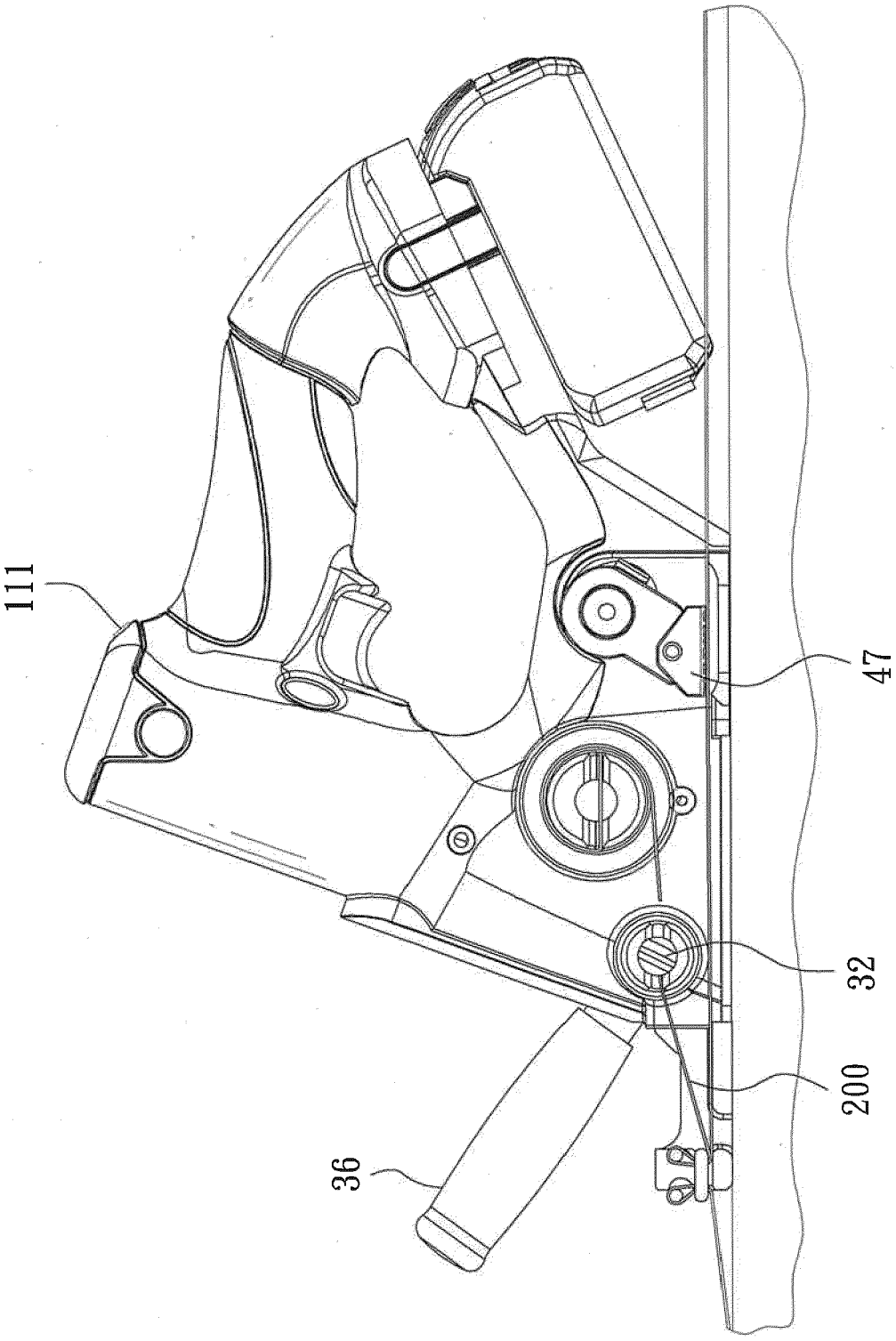

FIG. 5

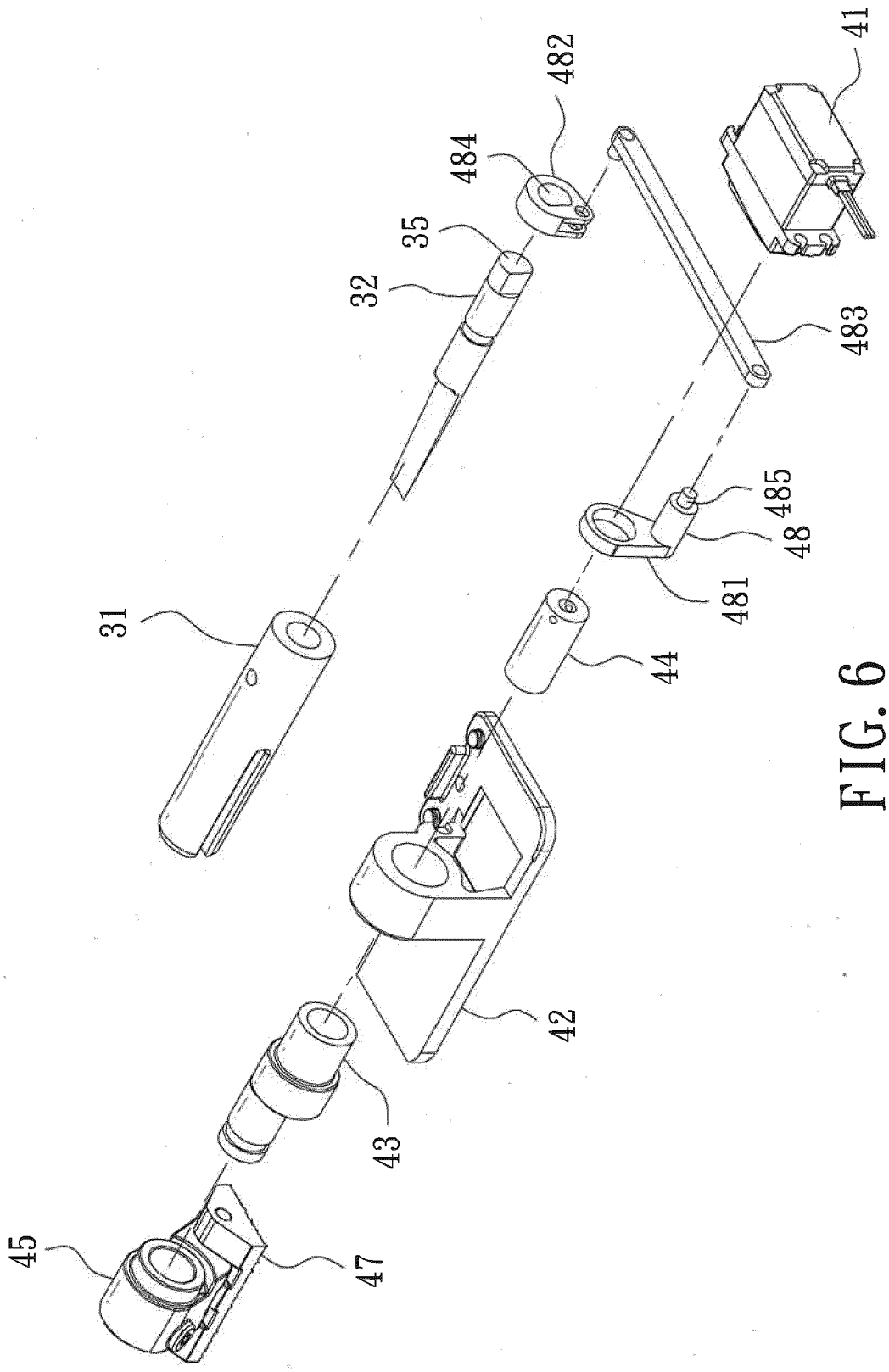

FIG. 6

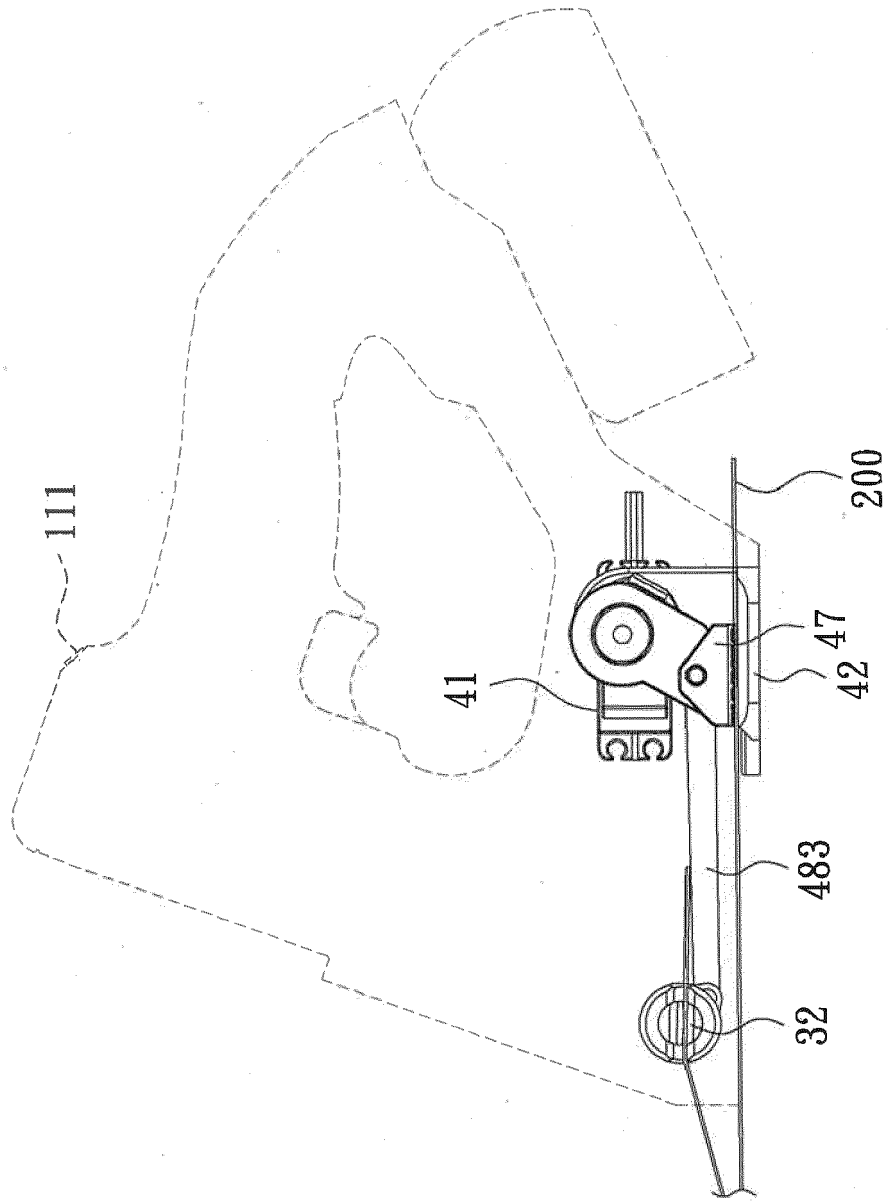

FIG. 7

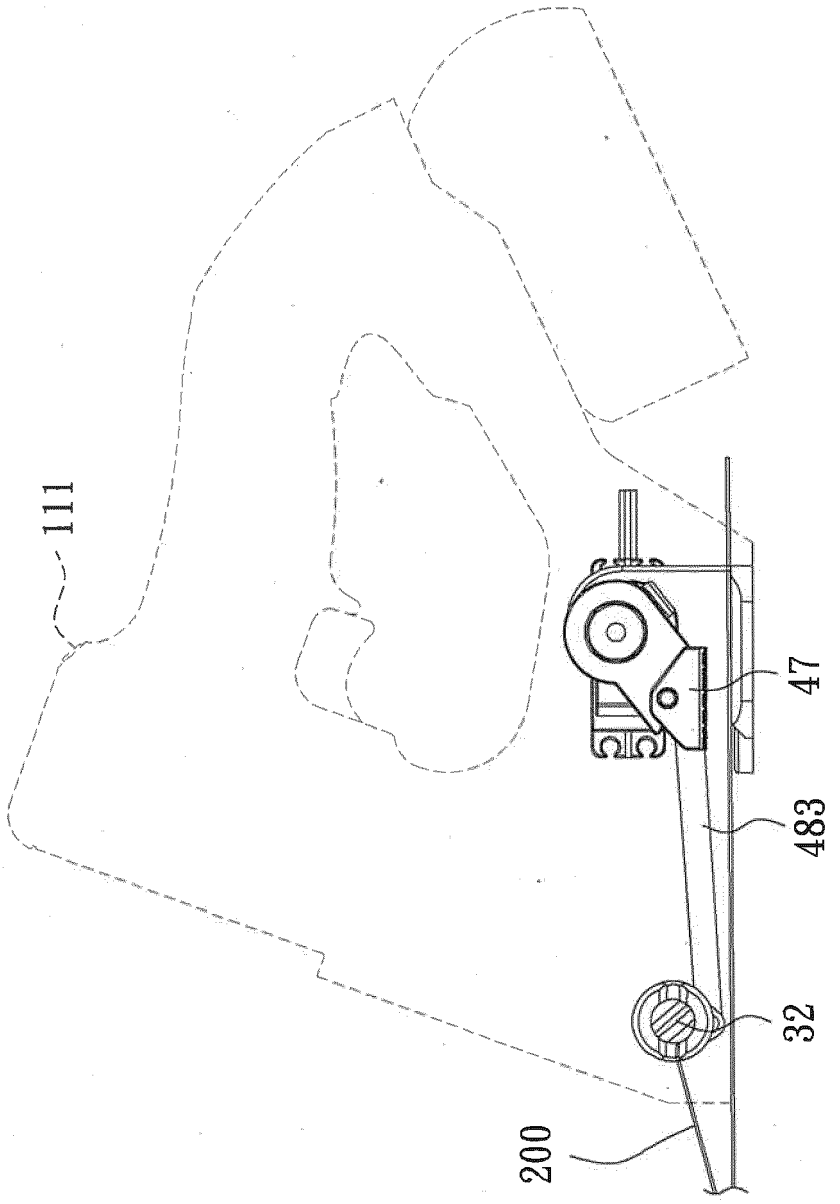

FIG. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 24 16 3144

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2022/297861 A1 (CORDSTRAP B V [NL]) 22 September 2022 (2022-09-22) * paragraphs [0059] - [0085]; figure 1 *	1-7	INV. B65B13/18
A	US 11 053 034 B1 (SIKORA JOSHUA ROBERT [US] ET AL) 6 July 2021 (2021-07-06) * columns 3-4; figure 7 *	1-7	
A	US 2021/309400 A1 (YU TENG-CHI [TW]) 7 October 2021 (2021-10-07) * the whole document *	1-7	
A	DE 20 2014 102576 U1 (YU CHEN HSIU MAN [TW]) 3 July 2014 (2014-07-03) * claim 1; figure 3 *	1-7	
A	WO 2015/162171 A1 (CORDSTRAP B V [NL]) 29 October 2015 (2015-10-29) * claims; figure 7b *	1-7	
A	DE 20 2017 000364 U1 (YU CHEN HSIU-MAN [TW]) 9 May 2017 (2017-05-09) * claims; figures *	1-7	TECHNICAL FIELDS SEARCHED (IPC) B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	28 August 2024	Klinger, Thierry

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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