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(54) **APPARATUS FOR APPLYING AN ADHESIVE TAPE ON A BAG CONTAINING FOOD**

(57) An apparatus (600) is described for cutting and applying a portion (601) of adhesive tape (602) over a bag (2) containing foods for fixing an upper flap (502) with which it is provided, said apparatus (600) comprising at least one spool (603) of said adhesive tape (602) arranged on an idle wheel (604) and at least one motorized roller (607) for unwinding the adhesive tape (602) from said spool (603). The apparatus (600) comprises moving means (629) of an applicator (630) provided with a cutting blade (631), said applicator (630) being configured to cut said portion (601) of adhesive tape (602) by said cutting blade (631) and simultaneously to apply said cut portion (601) onto said upper edge (502) of the bag (2).

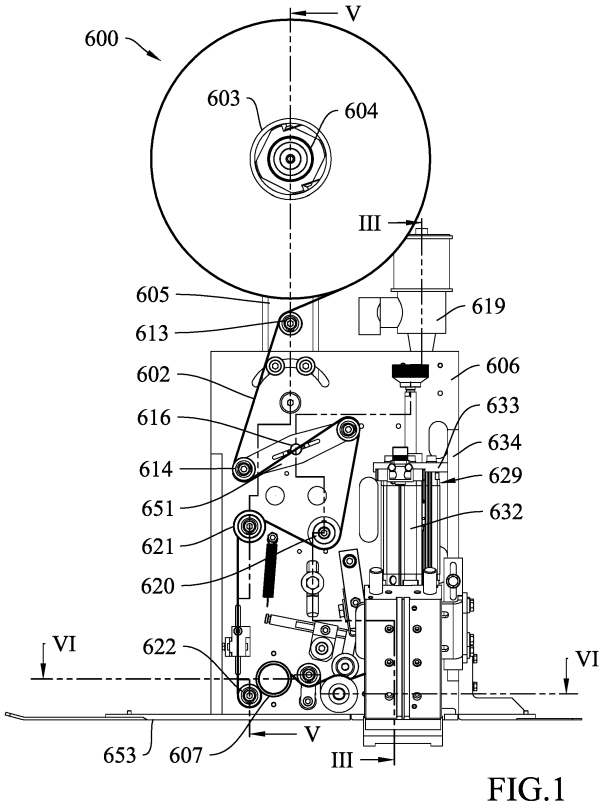


FIG.1

EP 3 339 195 A1

Description

[0001] The present invention relates to an apparatus for applying an adhesive tape on a bag containing food.

[0002] Apparatuses for applying an adhesive tape on a bag containing food are known.

[0003] For example, patent EP1633633 shows an apparatus of this type, comprised in a packaging machine. The apparatus comprises a frame which supports a driven wheel, which supports a spool about which a tape carrying a succession of adhesive labels is wound. A series of guide rollers defines the path followed by said tape which, once deprived of labels, ends its travel by winding on a spool integral with a drive wheel supported by the frame.

[0004] During operation, an adhesive label, encountering a folded top of the bags, leaves the tape of the labeling machine and adheres to the top of the bag so to ensure that the flap remains folded. The bag exiting from the machine has a welded flap, folded and arranged in horizontal position, which is held in such position by virtue of an adhesive label.

[0005] US-A-2006/137827 describes an apparatus for cutting and applying an adhesive tape on a bag.

[0006] It is the object of the present invention to make an innovative apparatus for applying an adhesive tape on a bag containing food.

[0007] According to the invention, such object is achieved by an apparatus as defined in claim 1.

[0008] Advantageously, the apparatus according to the present invention makes the cutting and simultaneous application of a portion of adhesive tape over a bag more efficient.

[0009] A practical embodiment of the present invention is shown by way of non-limiting example in the accompanying drawings, in which:

figure 1 shows a front view of an apparatus for applying an adhesive tape according to the present invention;
figure 2 shows a top view of the apparatus of Fig. 1;
figure 3 shows a section view of the apparatus of Fig. 1 taken along line III-III;
figure 4 shows a section view of the apparatus of Fig. 2 taken along line IV-IV;
figure 5 shows a section view of the apparatus of Fig. 1 taken along line V-V;
figure 6 shows a section view of the apparatus of Fig. 1 taken along line VI-VI;
figure 7 shows a perspective view of a detail of the apparatus of Fig. 1;
figures 8-16 show details of the apparatus of Fig. 1 during the operation steps.

[0010] Fig. 1 shows an apparatus 600 according to the present invention for cutting and applying a portion 601 of adhesive tape 602 over a bag 2 containing foods for fixing an upper flap 502 with which it is provided.

[0011] The adhesive tape 602 is a plastic or paper tape on a side of which an adhesive substance is applied, while the opposite side is not adhesive.

[0012] The apparatus 600 may be comprised in a packaging machine which encloses small-sized food, e.g. short pasta, inside said bag 2, belonging to a paced succession of bags 2. The bag 2 is for example a flat bottom package made of plastic material filled with short pasta. However, the apparatus 600 may also be comprised in further types of industrial machines.

[0013] In the case of packaging machine, the apparatus 600 may be arranged downstream of an upper flap folding share (not shown in the figures), which has a vertical inlet and a horizontal outlet connected to each other by a slot which gradually descends and rotates by 90°. When it arrives at the inlet of the share, the upper flaps of each bag 2 filled with the short pasta are mutually approached and welded so as to form a vertical upper flap, the top portion of which is also folded. The purpose of the flap folding share is to receive in input the upper flap of the vertical inlet slot and by virtue of the gradual angular variation of the slot to turn the upper flap by 90° and to output it in substantially horizontal position, whereby forming a flap 502.

[0014] So, the apparatus 600 according to the present invention is able to receive the bags 2 with the upper flap 502 folded over the bag 2 in substantially horizontal position from said share, said bags 2 being taken to the apparatus 600 by conveying means 700 able to convey a paced sequence of said bags 2 along a moving direction X.

[0015] Between the share and said apparatus 600 there may be a pressing apparatus (not shown in the figures) able to provide a squared shape to the previously filled bag 2, by compression, in order to improve the shape quality.

[0016] The apparatus 600 for applying said portion 601 of adhesive tape 602 comprises at least one spool 603 of said adhesive tape 602 arranged on an idle wheel 604 positioned in a tape holder bracket 605, said tape holder bracket 605 being hinged on a rear supporting plate 606, in order to be able to change its orientation. As shown in Fig. 1, the spool 603 of adhesive tape 602 is positioned in a top part of the apparatus 600.

[0017] Furthermore, the apparatus 600 comprises at least one motorized roller 607 for unwinding the adhesive tape 602 from said spool 603. Said at least one motorized roller 607 comprises at least one rough surface able to feed the adhesive tape 602 to allow its unwinding from said spool 603 of adhesive tape 602. In particular, the apparatus 600 comprises a motor 608 able to move at least one pulley 610 integral with said motorized roller 607 by a belt 609. The motor 608 is supported by a motor holder plate 611, which is fixed to the rear supporting plate 606 by a movable bracket 612. The motorized roller 607 is positioned in a lower part of the apparatus 600.

[0018] Arranged underneath said idle wheel 604 on which the spool 603 of adhesive tape 602 is arranged,

there is a first idle roller 613 on top of which the adhesive tape 602 winds; said first idle roller 613 is also positioned on said tape holder bracket 605.

[0019] The apparatus 600 comprises at least one pair of pivoting idle rollers 614, 615 fixed to the end of the plate 651 elastically hinged on the rear supporting plate 606 and able to keep the adhesive tape 602 taut between the idle wheel 604 and said motorized roller 607, said pair of pivoting idle rollers 614, 615 being arranged at a lower height than the first idle roller 613. Particularly, the plate 651 is fixed to a pin 616 inserted in a specific hole made in the rear supporting plate 606, a spring 617 being inserted on said pin 616 and having a first end coupled to a first socket head screw integral with the pin 616 and a second end coupled to the rear supporting plate 606.

[0020] One roller 614 of said pair of pivoting idle rollers 614, 615 is able to receive the adhesive tape 602 from said first idle roller 613, said adhesive tape 602 being wound as an "S" between the rollers of the pair of pivoting idle rollers 614, 615, so that the elastic force of the spring 617 opposes the unwinding of the adhesive tape 602 caused by the traction by the motorized roller 607. The adhesive tape 602 is wound under the second idle roller 614 which receives the adhesive tape 602 from said first idle roller 613, while it is wound on top of the other roller 615 of the pair which provides it to the motorized roller 607.

[0021] A second idle roller 620, arranged at a lower height with respect to the pair of pivoting idle rollers 614, 615, is able to receive the adhesive tape 602 from said roller 615 of the pair, the adhesive tape 602 being wound underneath said second idle roller 620 and being sent through at least one idle roller 621, 622 towards said motorized roller 607. In particular, a third idle roller 621 is configured to receive the adhesive tape 602, winding it on top and sending it to a fourth idle roller 622 (positioned substantially at the same height as the motorized roller 607) which, after having wound it underneath, sends it to said motorized roller 607. Said third and fourth idle rollers 621, 622 are vertically aligned with each other.

[0022] The motorized roller 607 is able to take, by a fifth idle roller 623, the adhesive tape 602 in interposition by a roller with central groove 624 and with a roller with central relief 625 of complementary shape with respect to that of the central groove and cooperating with each other so that the central relief is at least partially inserted in the central groove.

[0023] The adhesive tape 602 is wound on top of the motorized roller 607, near the fifth motorized roller 623 and between the roller with central groove 624 and roller with central relief 625. The roller with central relief 625 is pressed onto said roller with central groove 624 and both are configured to deform the adhesive tape 602 so as to longitudinally stiffen the structure and facilitate its cutting. The roller with central relief 625 is supported by a pair of mutually orthogonal levers 626, 627, of which one (lever 626) is coupled with a plate hinged to said rear supporting plate 606, in order to be able to lift the central relief 625 to replace the adhesive tape 602.

[0024] The motor 608, by said belt 609, also moves a further pulley 628 which is integral with at least said roller with a central groove 624, which therefore is also motorized and synchronized with said motorized roller 607 (Figs. 2, 4).

[0025] The apparatus 600 comprises moving means 629 of an applicator 630 provided with a cutting blade 631, said moving means 629 being configured to vertical move the applicator 630 with the cutting blade 631 which slides on a counter-blade 640 between a resting position and a cutting and applying position. When cutting, the cutting blade 631 cooperates with the counter-blade 640 of cutting said portion 601 of adhesive tape 602 and simultaneously applying said cut portion 601 onto said upper flap 502, as will be explained in greater detail below.

[0026] The applicator 630 is arranged at a higher height with respect to the conveying means 700 of the bags 2 and with respect to each of the bags 2 themselves.

[0027] In particular, the applicator 630 is a solid "L"-shaped element, connected to said moving means 629 by a joint 618, said "L"-shaped element comprising a vertical face and a horizontal face 635. The cutting blade 631 is fixed to the vertical face of the "L"-shaped element with the sharp edge underneath, while the horizontal face 635, i.e. the lower one, acts as a contact surface with the non-adhesive side of the portion 601 of adhesive tape 602.

[0028] On the other hand, the counter-blade 640 comprises a plate provided with an opening 637 through which the adhesive tape 602 is introduced, said opening 637 having a sharp base 652, as the cutting blade 631; the shape of the sharp base 652 may be, for example, straight, slightly curved or "V"-shaped.

[0029] The deformed adhesive tape 602, coming from said roller with central groove 624 and roller with central relief 625, arranged upstream and near the cutting blade 631 is inserted in said opening 637 of the counter-blade 640; the free end of the adhesive tape 602 which crosses the opening 637 of the counter-blade 640 is the portion 601 of adhesive tape 602 which will be cut by the sliding of the cutting blade 631 and applied on the bag 2.

[0030] As mentioned, the applicator 630 is arranged on top with respect to the bag 2 and so that, in cutting and applying position, the portion 601 of adhesive tape 602 is applied in part on said upper horizontal flap 502, folded over the bag 2, and in part on at least one surface of the bag 2 (e.g. for example the upper and side surface) to ensure that the upper flap 502 remains folded.

[0031] Advantageously, the applicator 630 comprises an air suction hole 636 able to allow the portion 601 of adhesive tape 602 to adhere to the applicator 630 once it has been cut and positioned accurately over the upper flap 502 and bag 2. In particular, said suction hole 636 is made in said horizontal face 635 of the "L"-shaped element.

[0032] The moving means 629 comprise a pneumatic cylinder 632 connected to said applicator 630. The pneu-

matic cylinder 632 is fixed to said rear supporting plate 606 by an angular plate 633 connected between a side 634 and the rear supporting plate 606 itself.

[0033] The counter-blade 640 is fixed to a support 638 in turn hinged to the rear supporting plate 606 so as to be able to regulate the position as a function fo the type of bag 2. An appropriately shaped and height-adjustable protection sheet 639 is able to keep the belt in horizontal position along its entire advancement path.

[0034] Furthermore, the counter-blade 640 is provided with a layer of felt 641, over said opening 637, able to lubricate the cutting blade 631 by a lubricant received from a lubricator 619 through a lubrication conduit arranged behind the counter-blade 640. The cutting blade 631 and the counter-blade 640 are lubricated by the sliding of the cutting blade 631 on the felt layer 641 moistened by the lubricant.

[0035] The apparatus 600 also comprises further moving means 642 of a brush element 643 able to press an end of said portion 601 of adhesive tape 602 on at least one surface of the bag 2. In particular, the brush element 643 slide on said upper part intended to come into contact with a surface of the bag 2 to attach it to said at least one surface of the bag 2. Said further moving means 642 are configured to move the brush element 643 between a resting position, in which it is not in contact with the portion 601 of adhesive tape 602, and a working position, in which there is contact with the end of the portion 601, sliding pressed on the bag 2.

[0036] The further moving means 642 comprise a further pneumatic cylinder 644 to which said brush element 643 is connected, which in turn comprises a brush 645 which departs from an attachment plate 646. Said further pneumatic cylinder 644 is fixed to the rear supporting plate 606 by adjustment means 647 able to vary the positioning of the brush 645. The adjustment means 647 comprise a block 648 fixed to the rear supporting plate 606 provided with a pair of elongated holes (height adjustment), through which an orientation plate 649 is fixed by screw; the pneumatic cylinder 632 is fixed to said orientation plate 649 by supporting angle bar 650 partially hinged (angular position) to said orientation plate 649.

[0037] Finally, the apparatus 600 comprises on the bottom a guide 653 represented by a plate arranged along the moving direction X of the bags 2, able to take the bag 2 to near an opening in which the guide 653 itself is provided at the applicator 630.

[0038] In the operation, the apparatus 600 for applying a portion 601 of adhesive tape 602 operates according to the following steps.

[0039] The motorized roller 607 feeds the adhesive tape 602, unwinding it from said spool 603. The adhesive tape 602 is always appropriately tensioned by virtue of the action of the pair of pivoting idle rollers 614, 615 through which the adhesive tape 602 is wrapped.

[0040] In a first step (Figs. 8, 9), the adhesive tape 602 let out from said roller with central groove 624 and roller with central relief 625, after having been mutually interposed, is arranged inside the opening 637 of the counter-blade 640. As mentioned, the free end of the adhesive tape 602 which crosses the opening 637 of the counter-blade 640 is the portion 601 of adhesive tape 602 which will be applied on the bag 2. The applicator 630 is in resting position, i.e. arranged over and not in contact with the free end of the adhesive tape 602 which crosses the opening 637 of the counter-blade 640. The brush element 643 is also in resting position, and therefore the brush 645 is not in contact with the adhesive tape 602.

[0041] In a second step (Fig. 10), the applicator 630 is moved downwards by the moving means 629 and moved to cutting position. The cutting blade 631, by sliding on the counter-blade 640, cuts the free end of the adhesive tape 602 which crosses the opening 637 of the counter-blade 640; particularly, the lower sharp flap of the cutting blade 631 and the sharp base 652 of the opening 637 of the counter-blade 640 work as scissors and cut the portion 601 of adhesive tape 602 which will be applied onto the bag 2. Such portion 601 is sucked against the horizontal face 635 of the applicator 630 by the air suction hole 636, thus remaining firmly positioned in contact with the applicator 630 with the non-adhesive side of the portion 601. The brush element 643 remains in the resting position (Fig. 11).

[0042] In a third step (Fig. 12), the applicator 630 is moved upwards by the moving means 629 and moved to cutting position. The horizontal face 635 of the "L"-shaped element is placed in contact with the bag 2 and the portion 601 of adhesive tape 602 is positioned so as to be applied on said upper flap 502 folded over the bag 2 in substantially horizontal portion and in part intended to come into contact with a surface of the bag 2. The brush element 643 is moved downwards by the further moving means 642 and taken towards the working position near the portion 601 (Fig. 13).

[0043] In a fourth step (Fig. 14), the brush element 643 is in working position and the blade 645 runs on said portion 601 of adhesive tape 602 intended to come into contact with a surface of the bag 2 to attach it to the top and side surface of the bag 2. The applicator 630 is moved upwards by the moving means 629 and moved to cutting position.

[0044] In a fifth step (Fig. 15), the applicator 630 is in resting position, like the brush element 643. The portion 601 of adhesive tape 602 is applied onto the bag 2 and the apparatus 600 is ready to manufacture a successive bag 2 of the paced succession.

[0045] By virtue of the apparatus 600, according to the present invention, the cutting and the simulation application of a portion 601 of adhesive tape 602 over a bag 2 is allowed, making it possible to speed up manufacturing.

Claims

1. Apparatus (600) for cutting and applying a portion (601) of adhesive tape (602) over a bag (2) contain-

ing foods for fixing an upper flap (502) with which it is provided, comprising
at least one spool (603) of said adhesive tape (602) arranged on an idle wheel (604) and at least one motorized roller (607) for unwinding the adhesive tape (602) from said spool (603),
moving means (629) of an applicator (630) provided with a cutting blade (631), said applicator (630) being configured to cut said portion (601) of adhesive tape (602) by said cutting blade (631) and simultaneously to apply said cut portion (601) onto said upper edge (502) of the bag (2),
characterized in that said apparatus further comprises at least one pair of tilting idle rollers (614, 615) fixed to the ends of a plate (651) which is elastically hinged to a rear support plate (606) of the apparatus (600) and able to apply tension to the adhesive tape (602) between said idle wheel (604) and the motorized roller (607), said adhesive tape (602) being wrapped up like a "S" between the rollers of the pair of tilting idle rollers (614, 615), so that an elastic force is opposed to the unwinding of the adhesive tape (602) caused by the traction of said motorized roller (607).

2. Apparatus (600) according to claim 1, **characterized in that** said applicator (630) is arranged on top with respect to the bag (2) and **in that** said moving means (629) are configured to vertically move the applicator (630) with the cutting blade (631) which slides on a counter-blade (640), said cutting blade (631) cooperating with the counter blade (640) to cut said portion (601) of adhesive tape (602) and to simultaneously apply said cut portion (601) onto said upper flap (502) of the bag (2).

3. Apparatus (600) according to claim 2, **characterized in that** said counter-blade (640) comprises a plate provided with an opening (637) with a sharp base (652) through which the adhesive tape (602) is introduced, said portion (601) of adhesive tape (602) being the free end of the adhesive tape (602) which passes through the opening (637) of the counter-blade (640) and which is cut by the sliding of the cutting blade (631) and applied onto the bag (2).

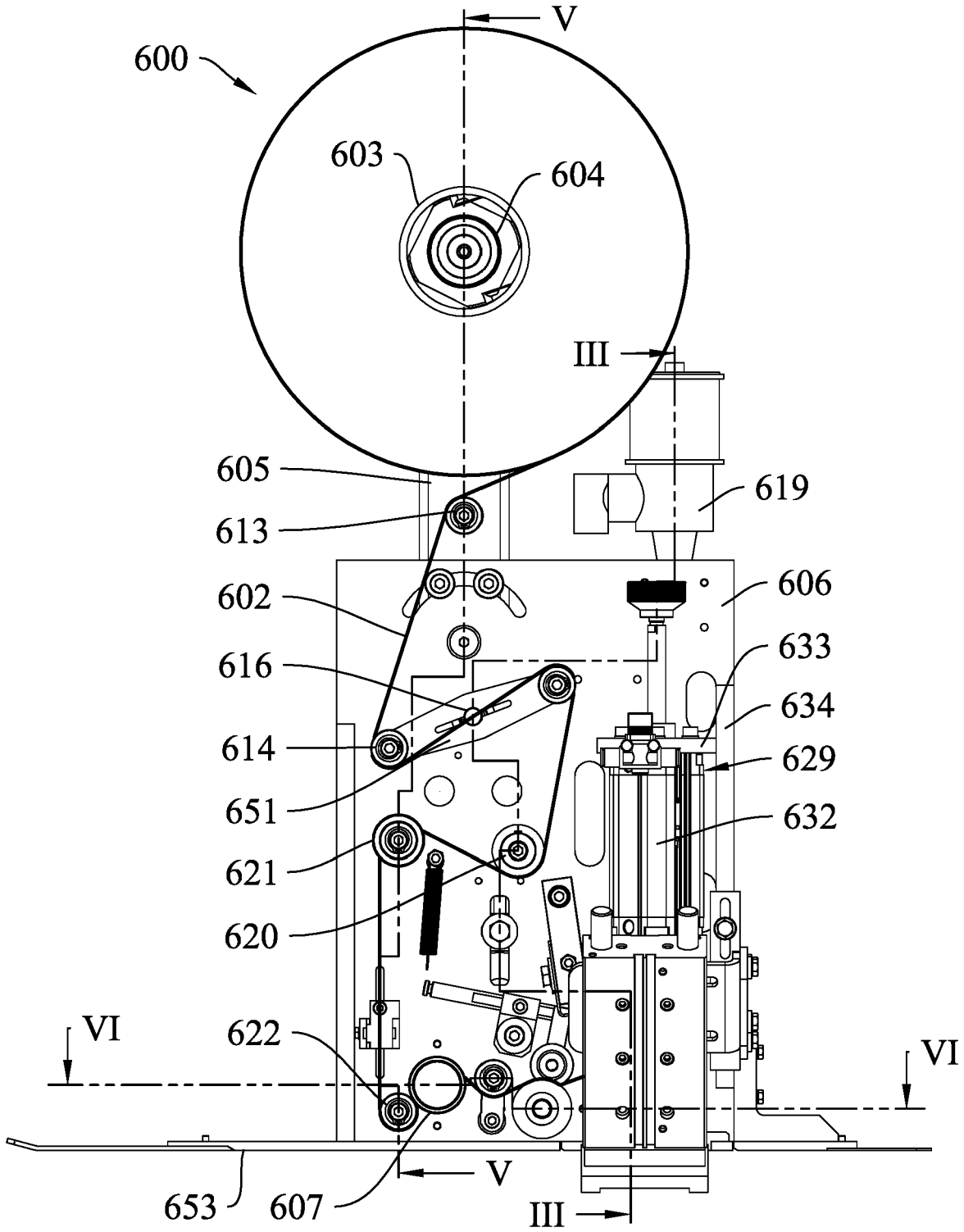
4. Apparatus (600) according to claim 2, **characterized in that** said applicator (630) is a solid "L"-shaped element, connected to said moving means (629) by a joint (618), said "L"-shaped element comprising a vertical face and a horizontal face (635), said cutting blade (631) being fixed to the vertical face of the "L"-shaped element by the lower sharp edge, while said horizontal face (635), i.e. the lower one, act as a contact surface with the non-adhesive side of the portion (601) of adhesive tape (602).

5. Apparatus (600) according to claim 4, **characterized in that** said applicator (630) comprises an air suction hole (636) able to allow the cut portion (601) of adhesive tape (602) to adhere to the applicator (630) and be positioned in a precise manner over the upper flap (502) and bag (2), said suction hole (636) being made in said horizontal face (635) of the "L"-shaped element.

6. Apparatus (600) according to claim 3, **characterized in that** said counter blade (640) is provided with a layer of felt (641), above said opening (637), able to lubricate the cutting blade (631) by a lubricant received from a lubricator (619) by a lubrication duct, said cutting blade (631) and said counter blade (640) being lubricated by the sliding of the cutting blade (631) on the felt layer (641) moistened by the lubricant.

7. Apparatus (600) according to claim 1, **characterized in that** it comprises a roller (624) with a central groove and a roller (625) with a central relief of complementary shape with respect to that of said central groove, said roller (624) with a central groove and roller (625) with a central relief being close and upstream to said cutting blade (631) and being configured to receive said adhesive tape (602) interposed between them and deforming the section to longitudinally stiffen the structure and facilitate the cutting by the cutting blade (631).

8. Apparatus (600) according to claim 1, **characterized in that** it further comprises moving means (642) of a brush element (643) able to press an end of said portion (601) of adhesive tape (602) on at least one side surface of the bag (2), sliding on a part of the portion (601) which is intended to come into contact with a surface of the bag (2), said further moving means (642) being configured to move the brush element (643) between a resting position, in which it is not in contact with the portion (601) of adhesive tape (602), and a working position, in which the end of the portion (601), by sliding under pressure, is in contact on the bag (2).


V
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603
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III
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619
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606
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633
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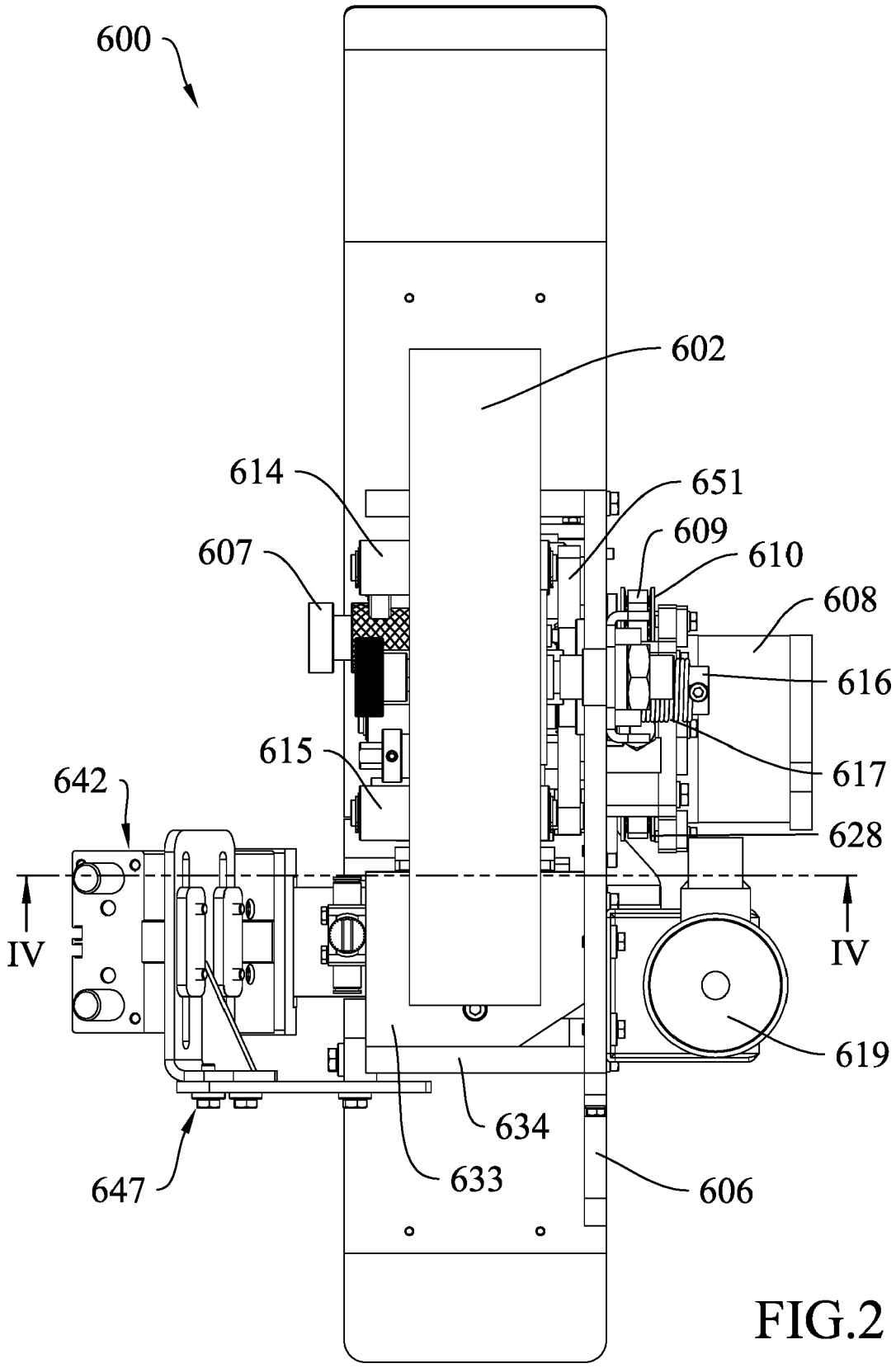
634
614
629
651
632
621
620
VI
622
VI
V
653
607
III

FIG.1


600
602
614
651
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610
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616
615
617
642
628
IV
IV
619
634
647
633
606

FIG.2

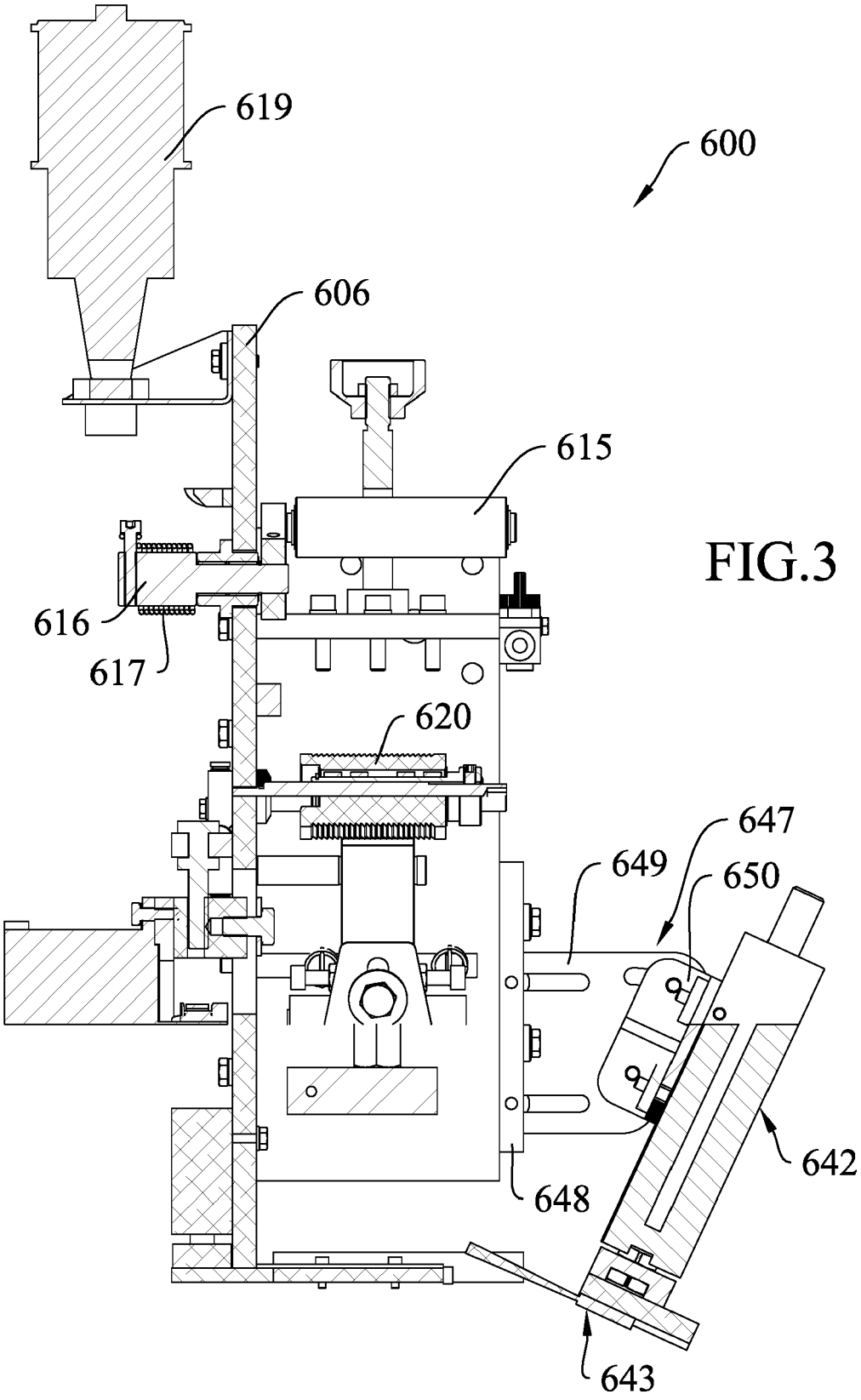


FIG.3

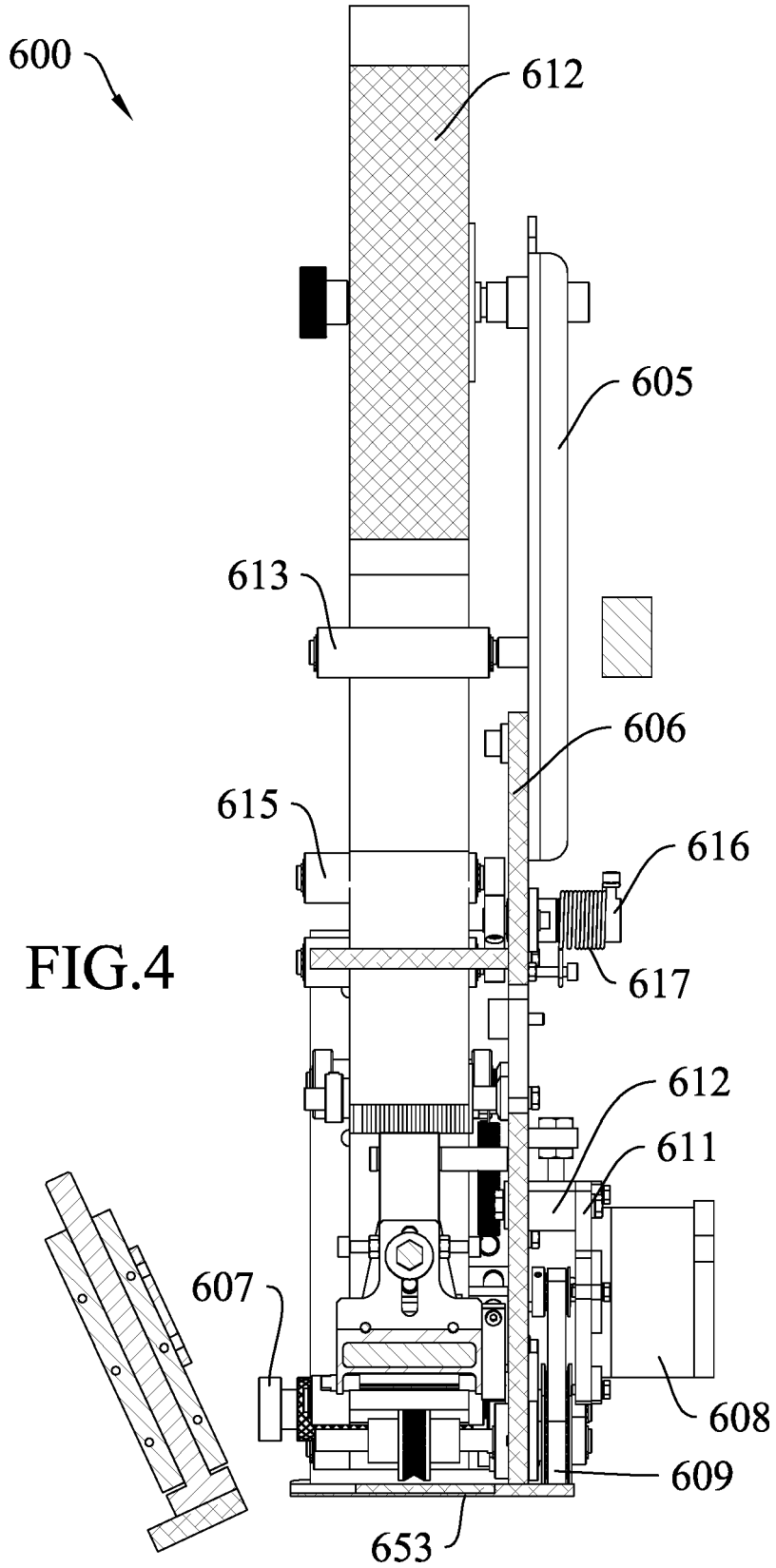


FIG.4

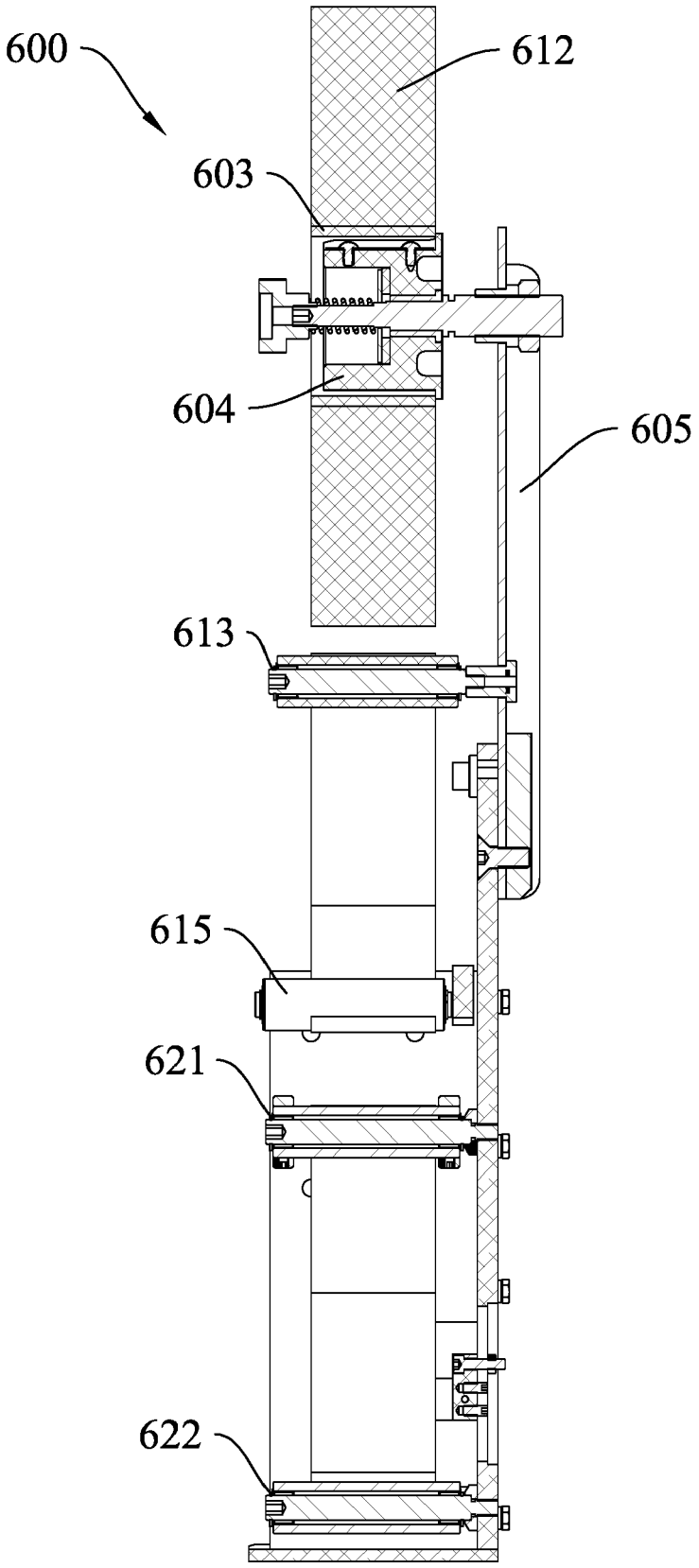


FIG.5

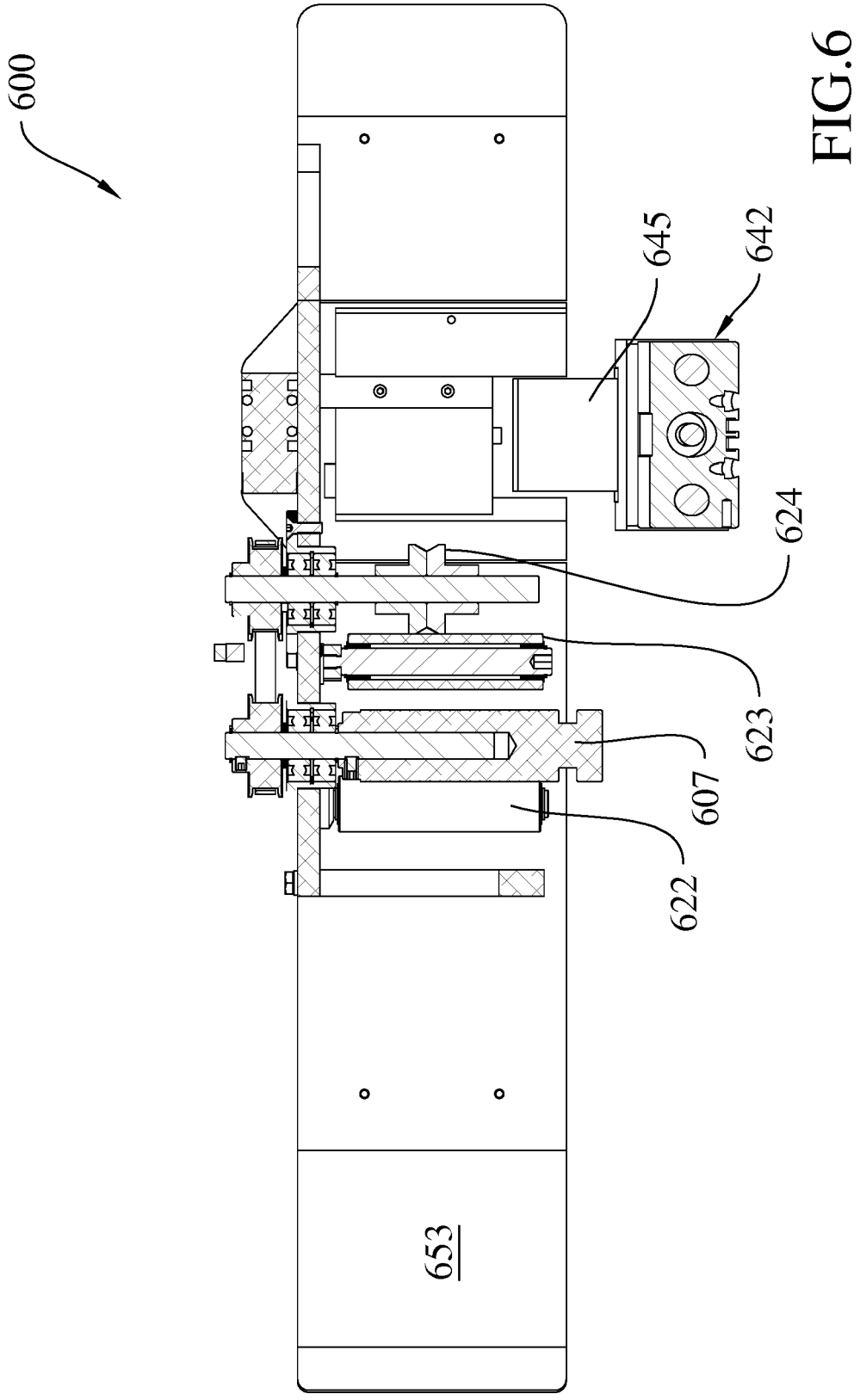
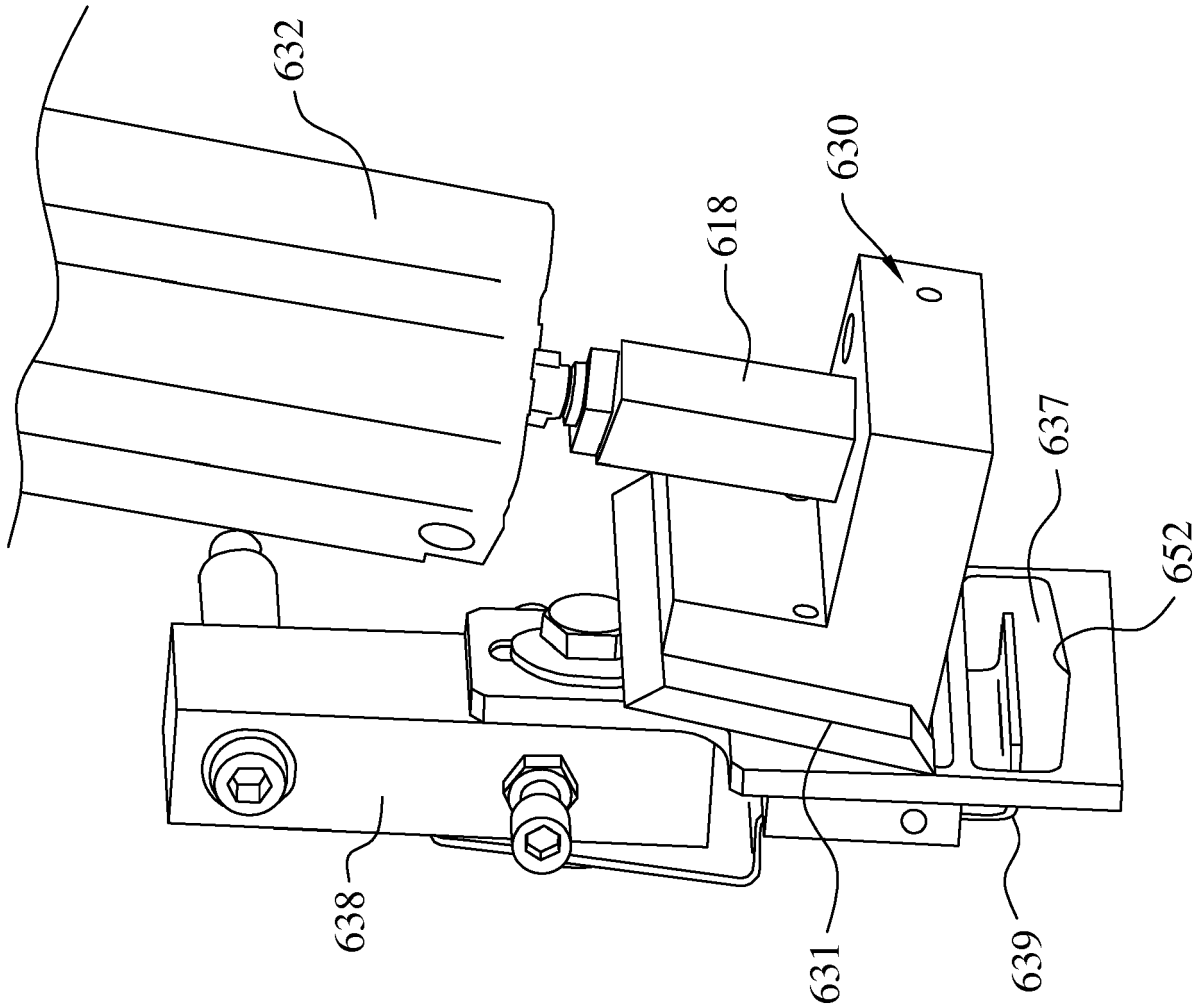


FIG.6

FIG.7



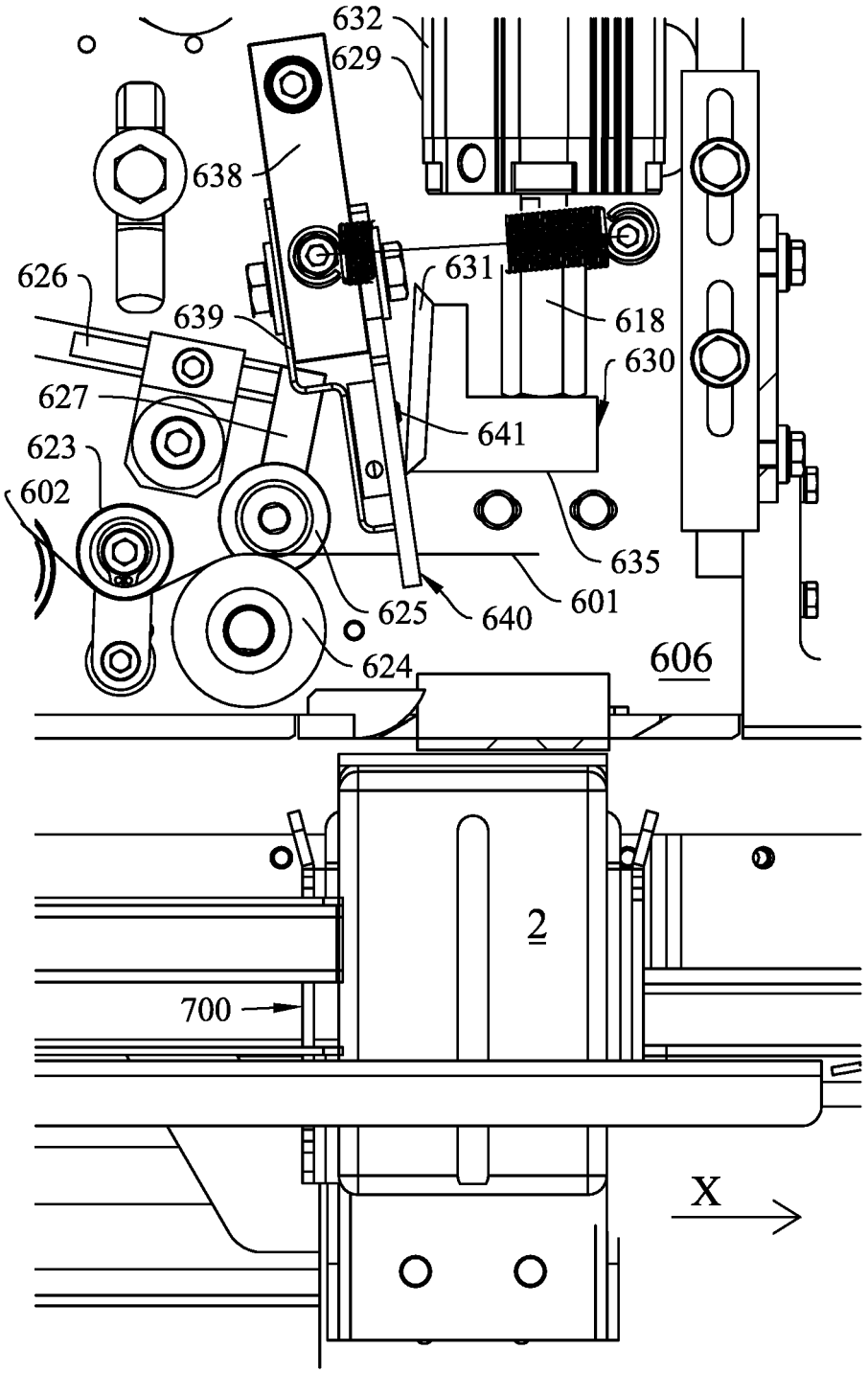

632
629
638
626
631
639
618
630
627
641
623
602
635
601
625
640
624
606
2
700
X

FIG.8

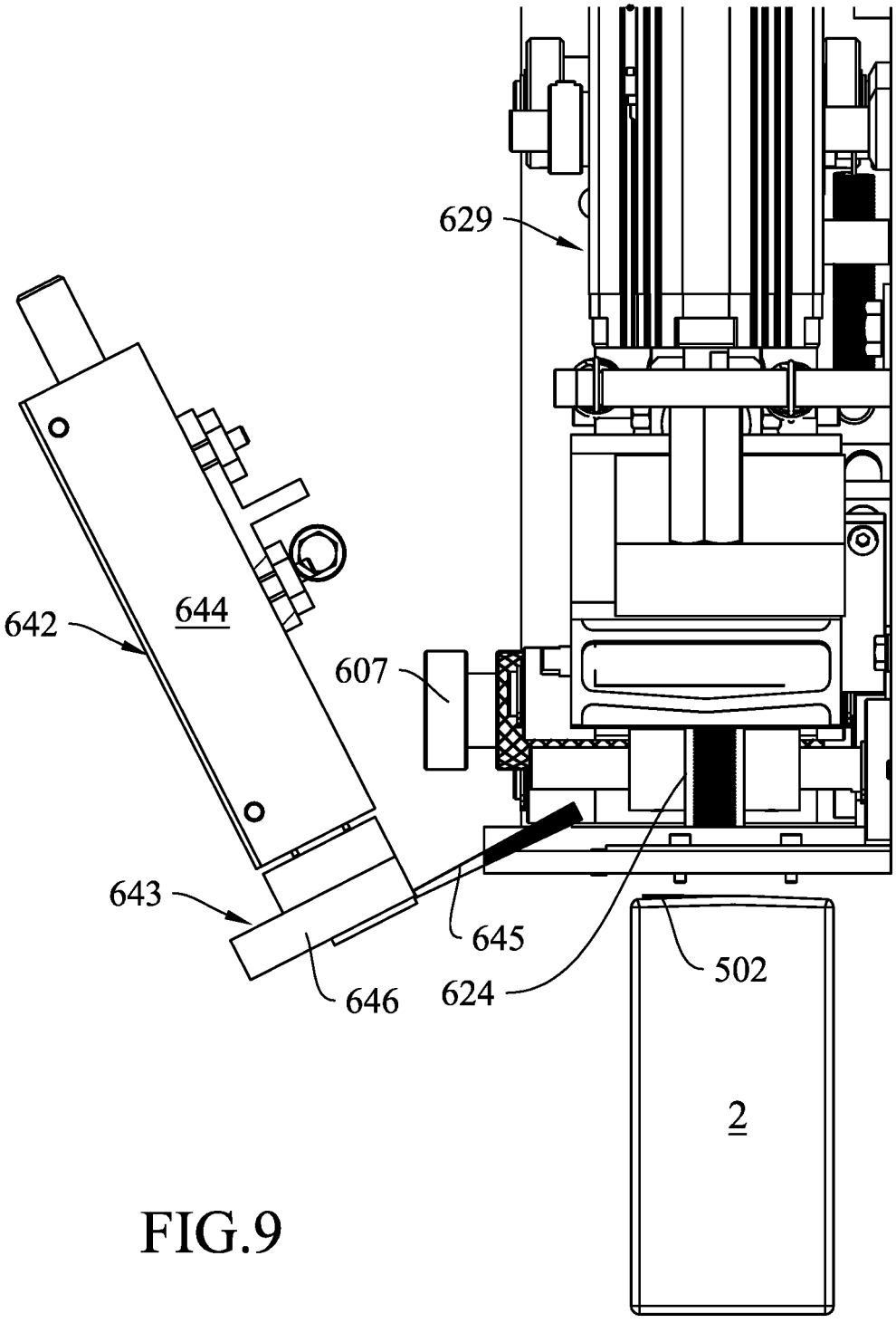


FIG.9

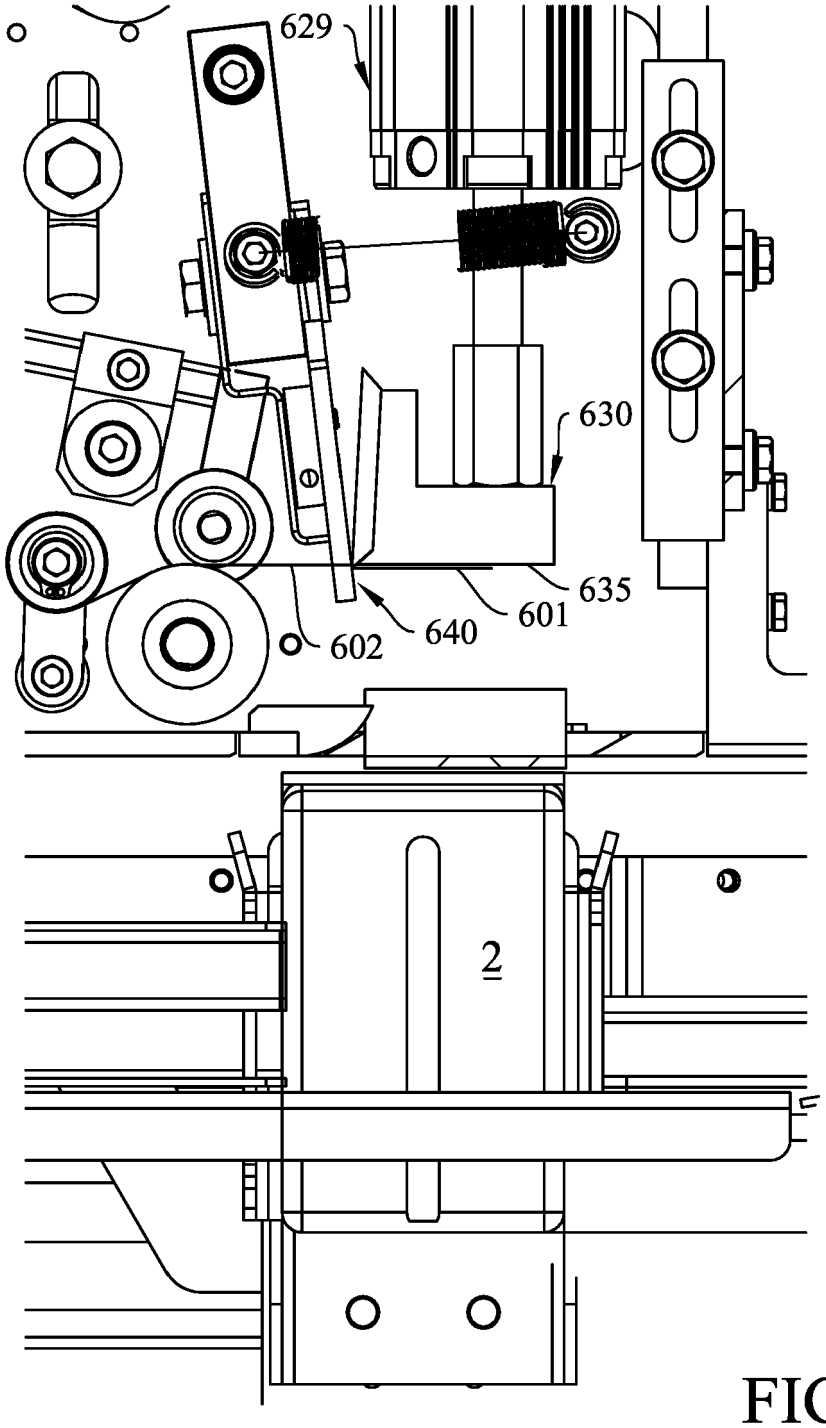


FIG.10

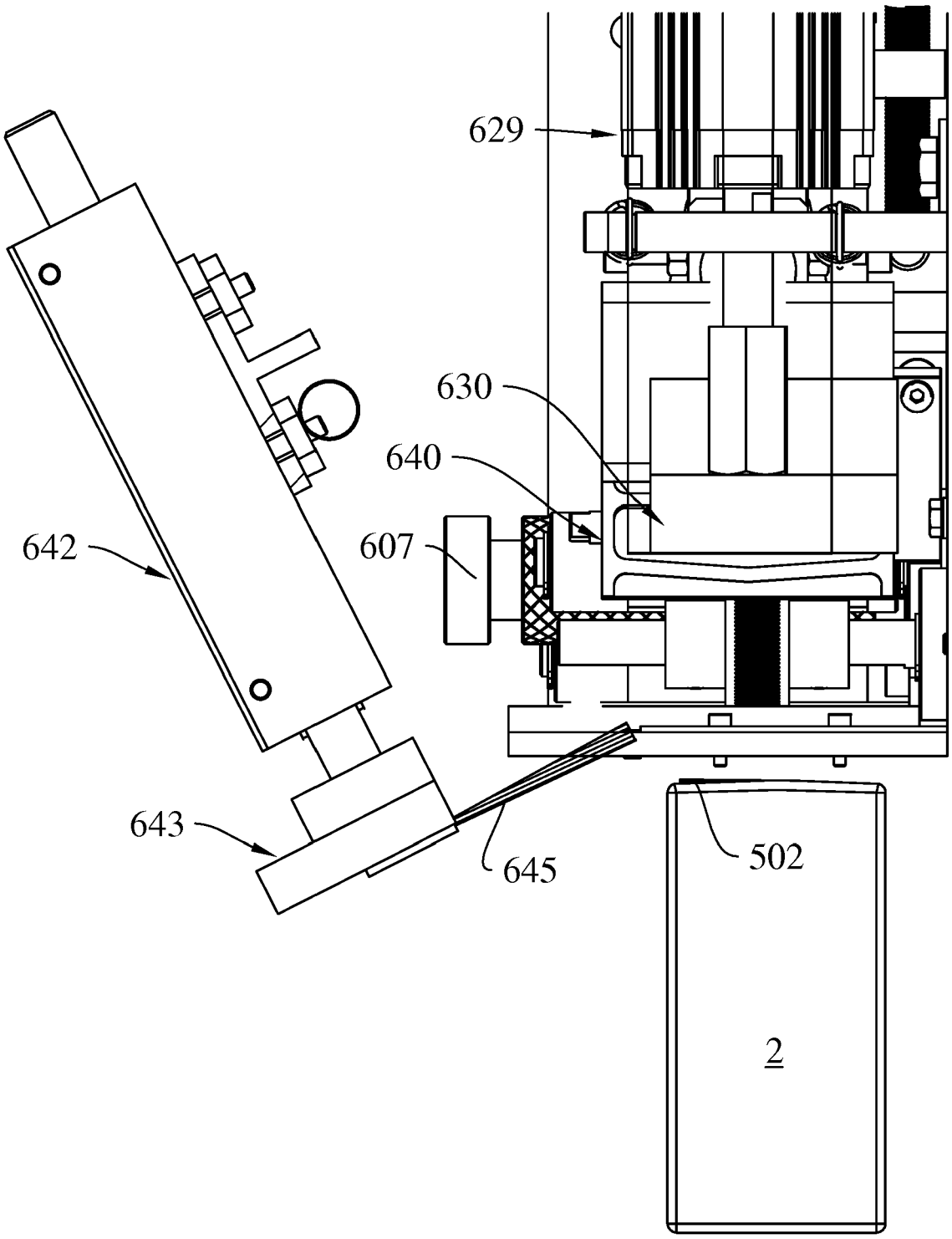


FIG.11

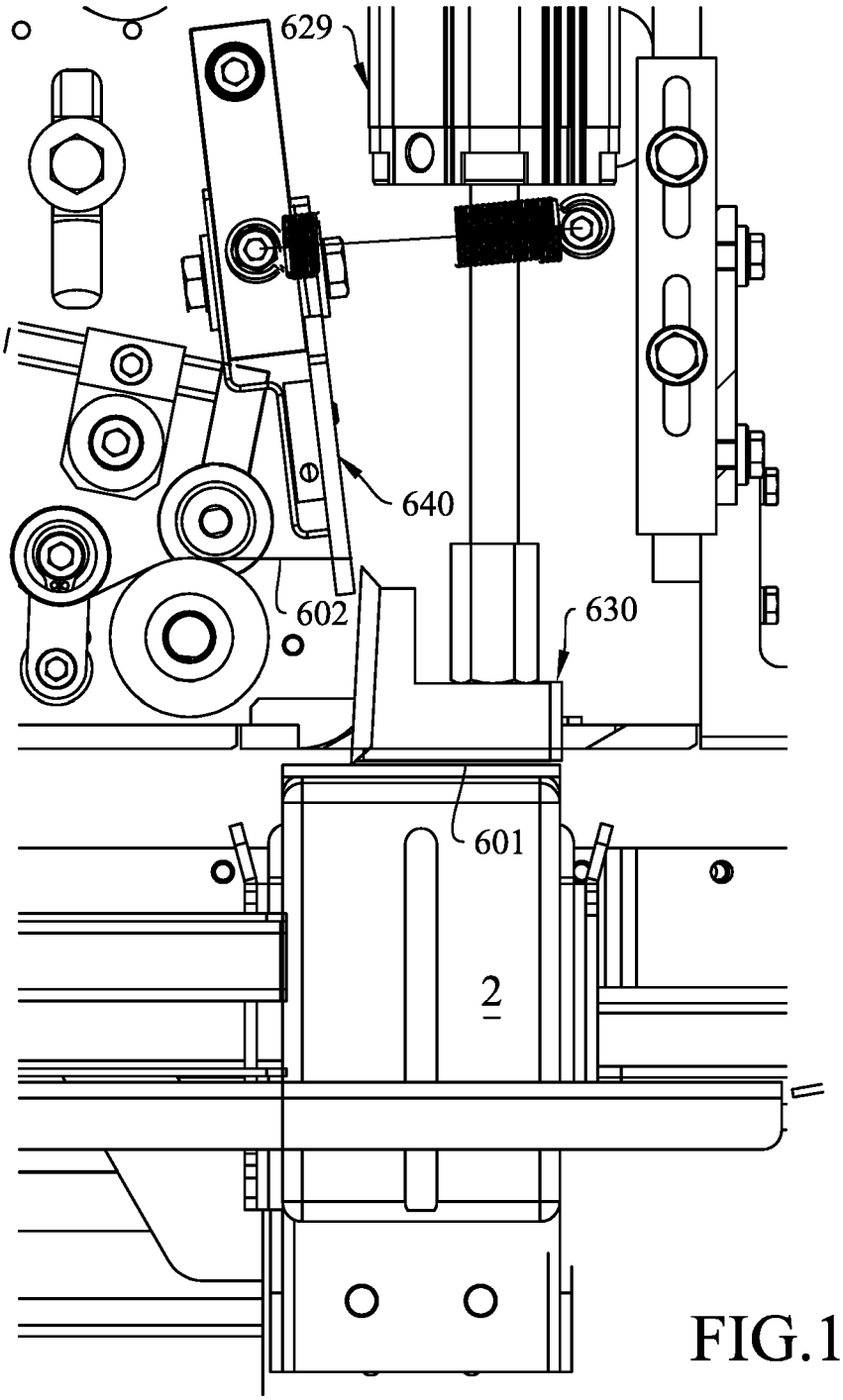


FIG.12

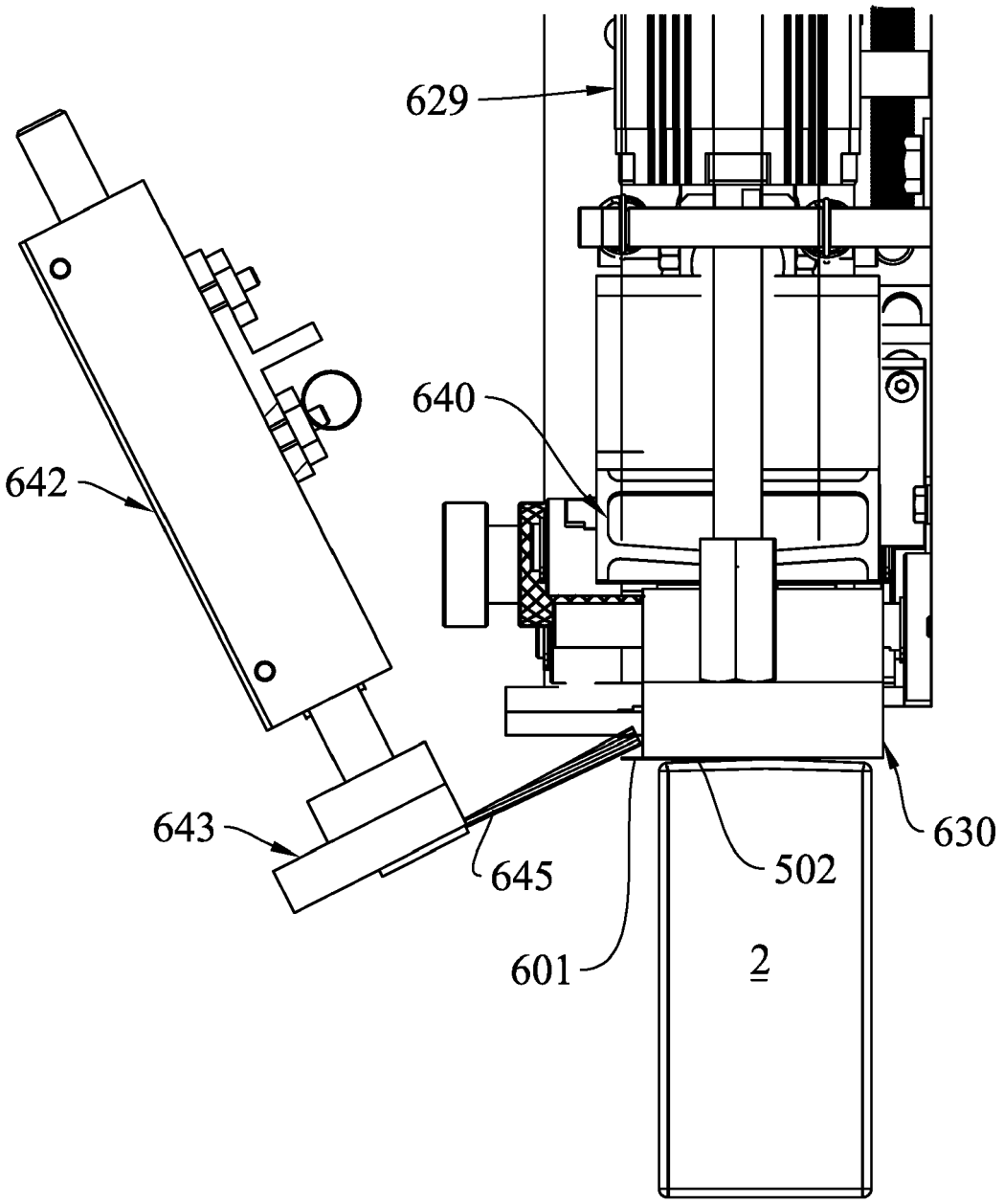


FIG.13

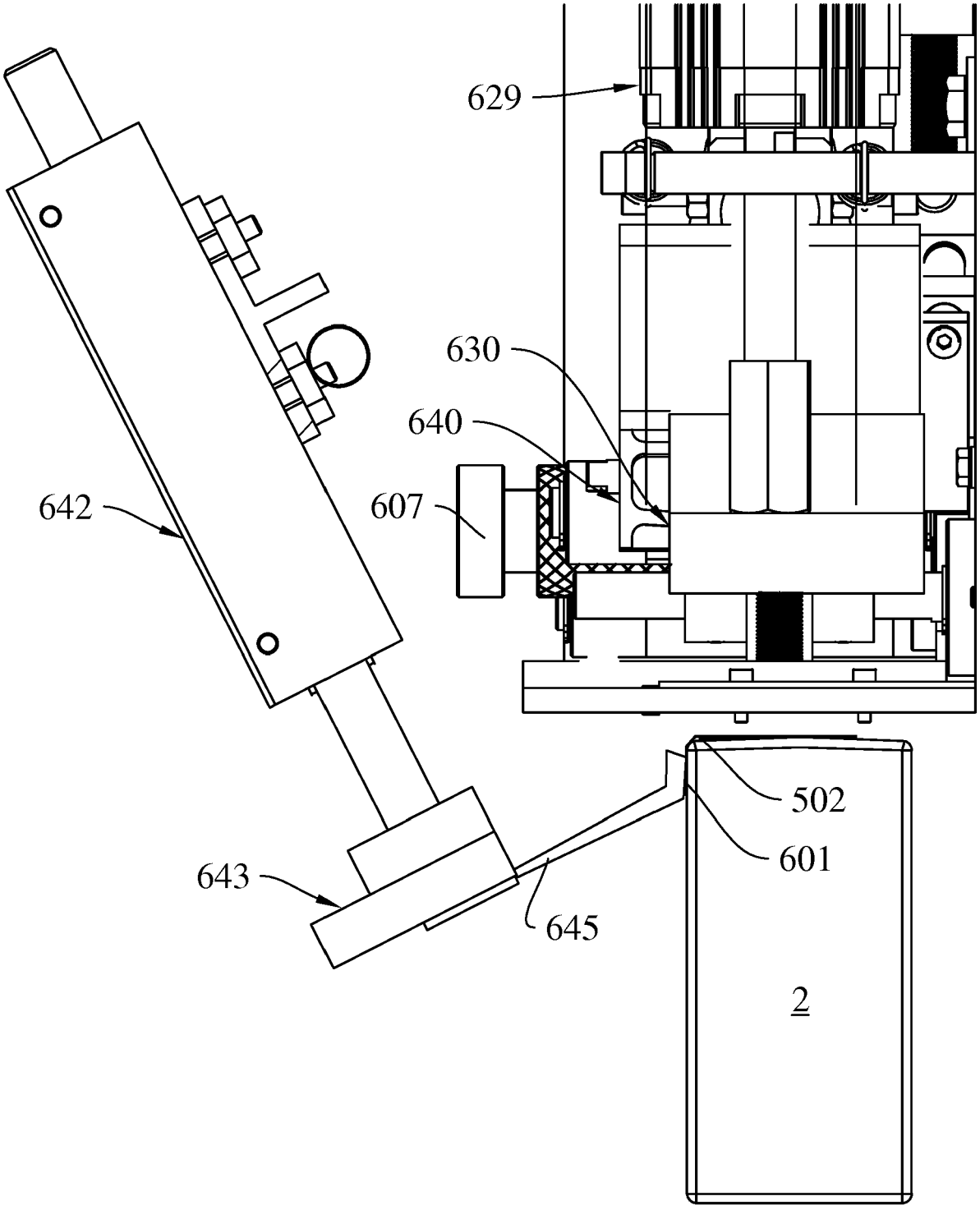


FIG.14

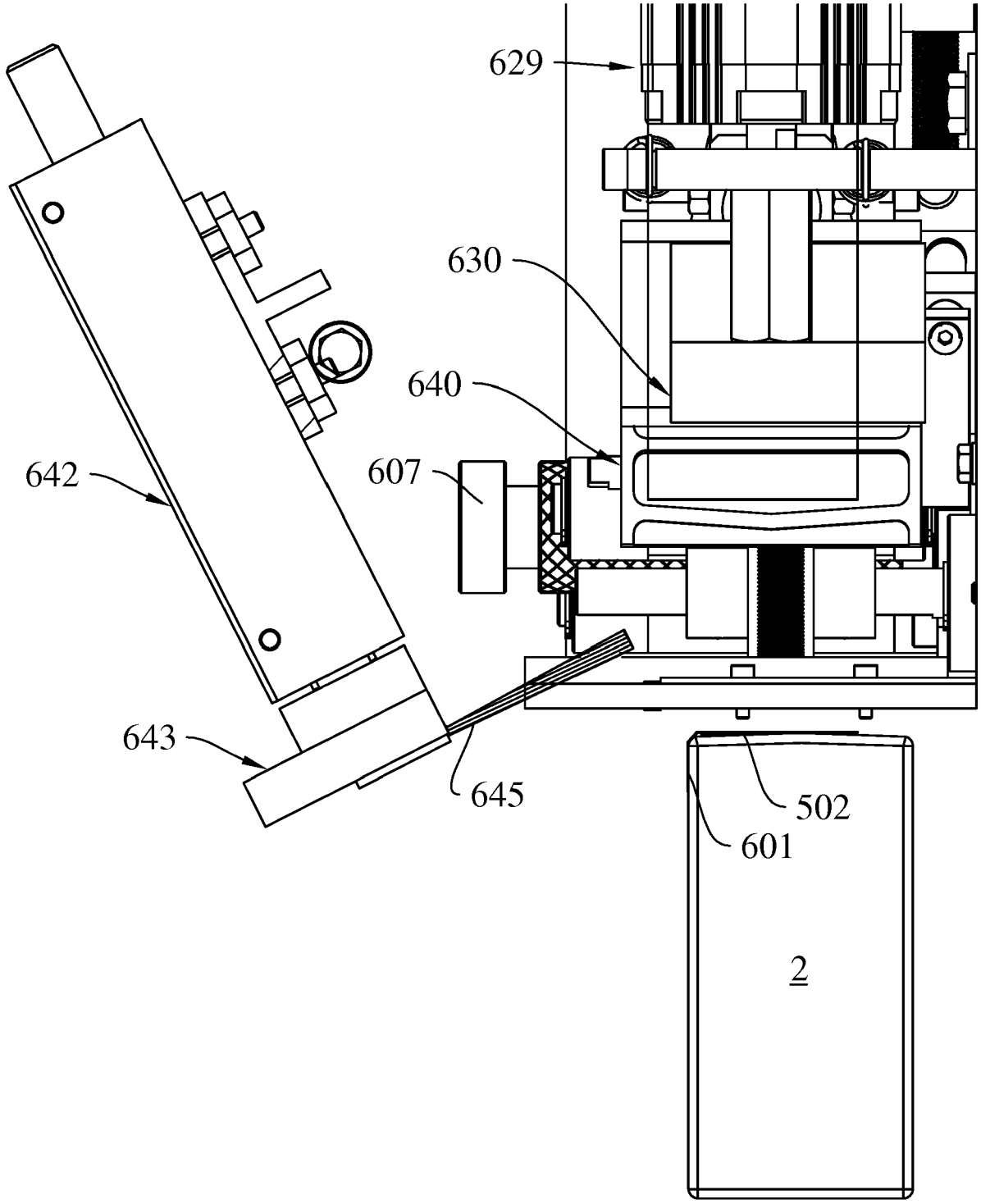


FIG.15

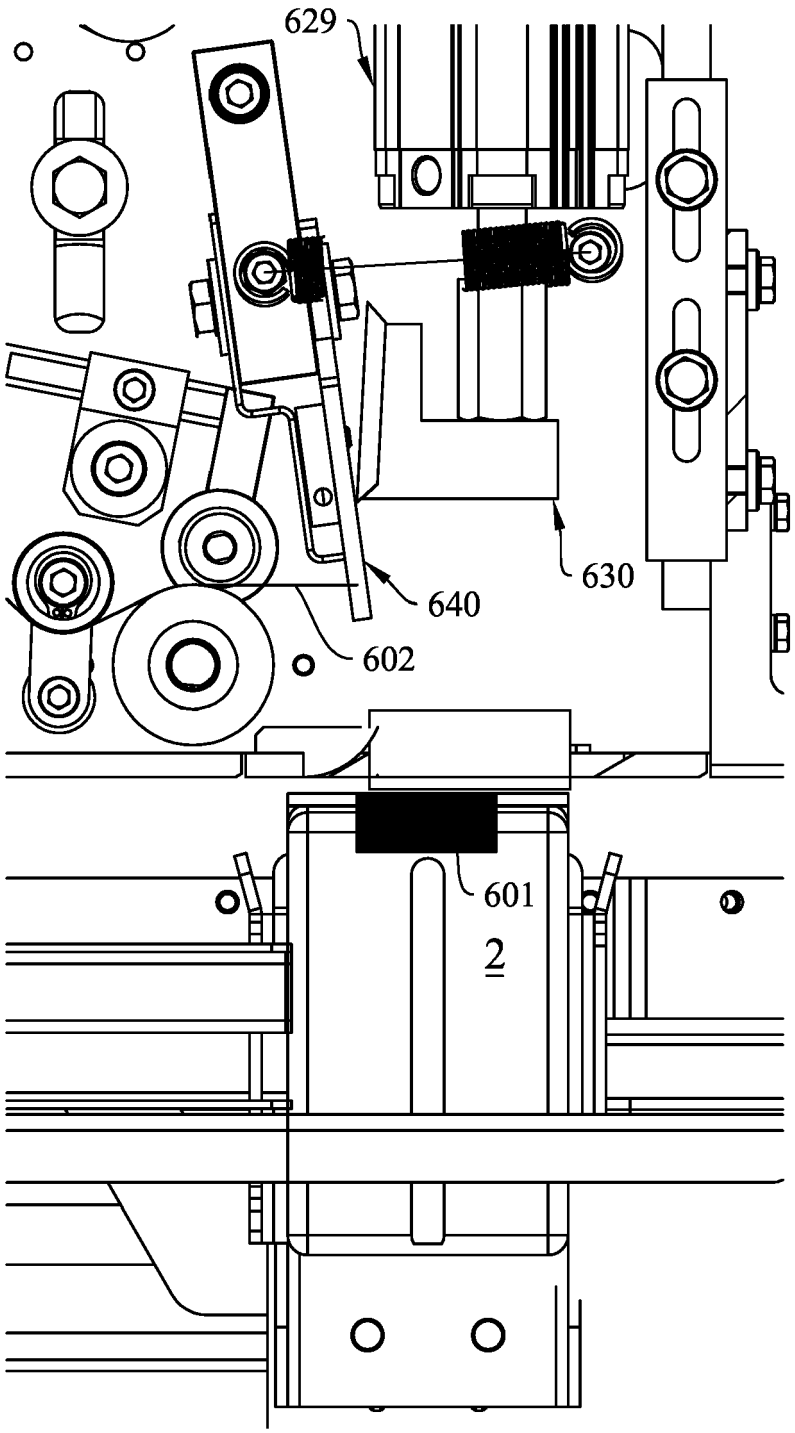


FIG.16

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EUROPEAN SEARCH REPORT

Application Number
EP 17 20 8996

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y A	US 2006/137827 A1 (UNEYAMA NORIAKI [JP] ET AL) 29 June 2006 (2006-06-29) * paragraphs [0031] - [0040]; figure 1 *	1 2-8	INV. B65B51/06
A	US 3 206 911 A (CARLE ROBERT A ET AL) 21 September 1965 (1965-09-21) * column 1, line 66 - column 4, line 27; figures 1,4 *	1-8	
A	US 5 735 101 A (SHING-TAK LAM JOE AUGUSTINE [CA]) 7 April 1998 (1998-04-07) * column 3, line 15 - column 5, line 6; figures 1-4 *	1-8	
A	US 5 687 544 A (WATABE NOBUYUKI [JP] ET AL) 18 November 1997 (1997-11-18) * column 19, line 61 - column 20, line 48; figures 35-40 *	1-8	
A	WO 01/74667 A1 (3M INNOVATIVE PROPERTIES CO [US]) 11 October 2001 (2001-10-11) * page 9, lines 13-22; figure 1 *	1-8	TECHNICAL FIELDS SEARCHED (IPC) B65B
Y A	EP 0 189 735 A1 (FRECH AG GEB [CH]) 6 August 1986 (1986-08-06) * page 5, line 4 - page 7, line 17; figure 1 *	1 2-8	
A	DE 21 49 483 A1 (STANG HANS) 19 April 1973 (1973-04-19) * page 3, line 12 - page 4, line 10; figure 1 *	1-8	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	7 March 2018	Kulhanek, Peter

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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A : technological background
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L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

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07-03-2018

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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- US 2006137827 A **[0005]**