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(71) Applicant: **Altopack S.P.A.**
55011 Altopascio (LU) (IT)

(72) Inventor: **VEZZANI, Giuseppe**
6902 PARADISO LUGANO (CH)

(74) Representative: **Mittler, Andrea et al**
MITTLER & C. s.r.l.
Viale Lombardia, 20
20131 Milano (IT)

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(54) **HOT PRESSING APPARATUS OF BAGS**

(57) A pressing apparatus (500) of a bag (501) for alimentary pasta is described, able to receive, from conveying means (503), said bag (501) with an upper flap (502) folded in substantially horizontal position. Said pressing apparatus (500) comprises at least a first and a second heating plate (504, 505) adjacent to each other along a moving direction (L) of the bags (501) and arranged on top with respect to the conveying means (503)

and vertical moving means (519) of said first a second heating plates (504, 505) in a direction perpendicular to said moving direction (L), configured to press said first heating plate (504) over the bag (501) in a first interval of time and also to press said second heating plate (505) over the bag (501) in a second interval of time, successive to the first interval of time.

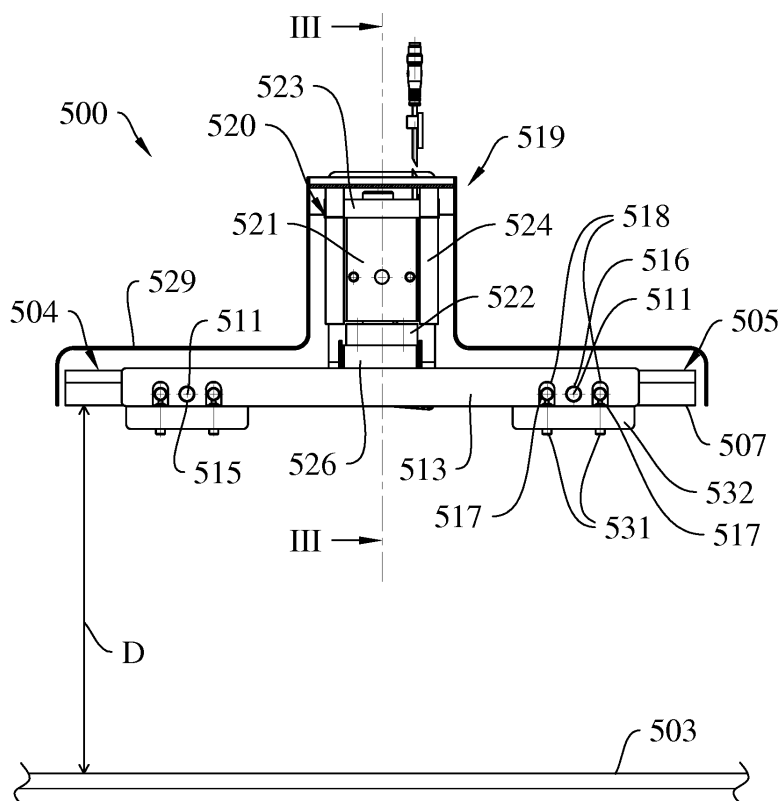


FIG.2

Description

[0001] The present invention relates to a hot pressing apparatus of bags.

[0002] Packaging machines are known, used in particular in the food-processing field, which enclose various small-size products, such as short pasta, in a bag made of flexible and transparent plastic material.

[0003] The bag may be, for example, a flat bottom package, corresponding side surfaces and an upper surface with closure in order to substantially form the shape of a parallelepiped.

[0004] In order to create a bag with the aforesaid shape, the known packaging machines comprise a flap folding share downstream of forming, filling and upper flap welding assemblies. Indeed, downstream of such assemblies, each bag is in a step of manufacturing in which an upper flap, obtained by approaching the ends of the side surfaces of the bag to each other, is vertically oriented.

[0005] The flap folding share comprises a vertical inlet and a horizontal outlet, connected to each other by a slot which gradually descends and rotates from 0° to 90°, said share being able to receive in input the upper flap of the bag, rotating it by 90° and outputting it in a substantially horizontal position, ready to be labeled and sent in output to the packaging machine.

[0006] However, the shape of the bag thus obtained is not exactly square, this being an important requirement for an optimal presentation of the packages of pasta on shop shelves.

[0007] GB-A-1311447 describes an apparatus for forming full bags comprising two pressing plates for pressing two different bags at the same time.

[0008] It is the object of the present invention to make an apparatus able to confer a squared shape to the bag.

[0009] According to the invention, such an object is achieved by a pressing apparatus as defined in claim 1.

[0010] 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 perspective view of the pressing apparatus according to the present invention;

figure 2 shows a front view of the pressing apparatus of Fig. 1;

figure 3 shows a section view of a part of the pressing apparatus in Fig. 1 taken along line III-III of Fig. 2;

figure 4 shows a side view of the part of the pressing apparatus of Fig. 1;

figure 5 shows a section view of a part of the pressing apparatus in Fig. 1 taken along line V-V of Fig. 4;

figures 6-9 show steps of operation of the pressing apparatus of Fig. 1.

[0011] Fig. 1 shows a pressing apparatus 500 for pressing bags 501 for alimentary pasta, according to the present invention. The pressing apparatus 500 is com-

prised in a packaging machine, used in particular in the food-processing field, which encloses various small-size products, such as short pasta, for example, in one of said bags 501. Each of said bags 501 is, for example, a flat bottom package made of plastic material filled with short pasta and said pressing apparatus 500 is configured to make the shape square by hot pressing (Fig. 6).

[0012] The pressing apparatus 500 is able to confer a squared shape to the previously filled bag 501, by compression, in order to improve the quality of the shape. Particularly, inside the packaging machine, the pressing apparatus 500 is 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 501 filled with the short pasta are mutually approached and welded so as to form a vertical upper flap 502, the top portion of which is also folded. The purpose of the flap folding share is to receive in input the upper flap 502 of the vertical inlet slot and by virtue of the gradual angular variation of the slot to turn the upper flap 502 by 90° and to output it in substantially horizontal position.

[0013] So, the pressing apparatus 500 according to the present invention is able to receive from said share the bags 501 with an upper flap 502 folded over the bag 501 in substantially horizontal position, said bags 501 being taken to the pressing apparatus 500 by conveying means 503 able to convey a paced sequence of said bags 501 along a moving direction L.

[0014] The pressing apparatus 500 comprises at least a first and a second heating plate 504, 505 (Fig. 5), which are mutually adjacent along the moving direction L of the bags 501 and arranged above with respect to the conveying means 503 at a given height D, which is greater than height of the bags 501 (Fig. 2). Each of said first and second heating plates 504, 505 comprises a heating plate 506 made of heat conducting material (Fig. 1).

[0015] The heating plate 506 comprises a first face 507 (Fig. 4) able to come into contact on top with one of the bags 501 of the paced succession, a second face 508 opposite to the first one 507 with a recessed portion 509, and side faces 510 of which at least two mutually opposite centrally comprise a pair of pins 511, arranged along an oscillation axis P of the heating plate 504, 505 perpendicular with respect to the moving direction L of the bags 501 (Fig. 1).

[0016] In the embodiment shown in Fig. 1, the heating plate 506 has a square (or rectangular) shape, with four side faces 510. A serpentine-shaped conductor 512, through which electric current runs, is housed in said recessed portion 509 of said heating plate 506, said conductor 512 being placed in contact with said heating plate 506 and being able to transfer the heat generated by Joule effect produced by the electric current running through the conductor 512 to the heating plate 506. Each heating plate 504, 505 comprises an upper closing cover

533 fixed on top of said heating plate 506.

[0017] The first and the second heating plate 504, 505 are connected to each other in adjacent position by a first and a second bar 513, 514, which are mutually parallel and symmetric, each of said first and second bars 513, 514 (Fig. 3) being oriented parallel to the moving direction L of the bags 501 and comprising at least one first transverse hole 515 and one second transverse hole 516 at the end of the bar 513, 514 (Fig. 2). Each of said first and second heating plates 504, 505 are hinged between the first and the second bar 513, 514 by said pair of pins 511 with which they are provided, which are inserted between a symmetric pair of said first transverse holes 515, in the case of the first heating plate 504, and a symmetric pair of said second transverse holes 516, in the case of the second heating plate 505.

[0018] The pins 511 are free to turn inside the transversal holes 515, 516 so each heating plate 504, 505 can oscillate at least partially on the oscillation axis P. This is partially because the first and the second heating plate 504, 505 comprise a pair of stop pins 517 (Fig. 1), again at the side surfaces of the heating plates, said pins 517 being able to be inserted inside a respective pair of further transverse holes 518 equally distant with respect to said first transverse holes 515 and said second transverse holes 516, so that the oscillation of the respective heating plates 504, 505 is partial and constrained to the movement of the pins 517 inside the further holes 518 (Fig. 2). The space of the further holes 518 is indeed greater than that occupied by the pins 517 inserted inside.

[0019] The space of the further holes 518 may be modified by screws 531 able to be inserted in each further hole 518 after having crossed a tablet 532; by said screws 531, even the oscillatory movement of the respective heating plate 504, 505 can be locked.

[0020] Furthermore, the pressing apparatus 500 comprises vertical moving means 519 of said first and second heating plate 505 in perpendicular direction with respect to the moving direction L. For each of the bags 501 of the paced succession, said moving means 519 are configured to press said first heating plate 504 over the bag 501 in a first interval of time and also to press said second heating plate 505 over the package 501 in a second interval of time, after the first interval of time.

[0021] In particular, the moving means 519 are able to move said first and second heating plate 504, 505 vertically between a resting position, in which they are at said height D with respect to the conveying means 503 (Fig. 6), and a working position, in which the bag 501 is pressed against the conveying means 503 by either the first or the second heating plate (Fig. 7 shows the simplified case related to the manufacturing of a single bag 501). Each bag 501 of the succession is pressed twice, a first time by the first heating plate 504 and a second time by the second heating plate 505.

[0022] The moving means 519 comprise a pneumatic actuator 520 with a cylinder 521 and at last one piston 522 (Fig. 3). Said cylinder 521 is fixed by an upper plate

523, and a pair of side supporting plate 524 which are anchored in turn to a support 525 able to fix the entire pressing apparatus 500 to a frame wall of the packaging machine (not shown in the figures). Said at least one piston 522 is fixed to a lower block 526 to which a passage guide 527 of bag 501, substantially at the same height D as said first and second heating plate 505. The guide 527 (Fig. 5) is a sheet shaped so as to have a substantially "U"-shaped section with two vertical portions fixed to two sides of said lower block 526 and a base 528 which has a certain inclination able to vertically compress, if the flap can lift up again, the upper flap 502 of each bag 501 over the bag itself in the passage from said first heating plate 504 to said second heating plate 505.

[0023] Said first and second bar 513, 514 are both connected at a central portion thereof to said lower block 526.

[0024] Finally, said pressing apparatus 500 comprises a casing 529 shaped to cover said pressing apparatus 500 on top, said casing 529 being fixed by spacers 530 to said pair of supporting side plates 524 (Fig. 3).

[0025] In operation, the pressing apparatus 500 according to the present invention works according to the following steps of operation.

[0026] By said conveying means 503, a paced succession of said bags 501 is taken at said pressing apparatus 500. As mentioned, each of the bags 501 which reach the heating plates have its upper flap 502 folded over the bag 501 in substantially horizontal position. However, for the sake of simplicity of description, hereinafter a single bag 501 isolated from the paced succession will be considered.

[0027] Both heating plates 504, 505 are in resting position in said height D which, as mentioned, is higher than the height of the bag 501, until the bag 501, carried by the conveying means 503, is under the first heating plate 504 (Fig. 6).

[0028] When the bag 501 is under the first heating plate 504, the moving means 519 move the heating plates downwards until the first face 507 of the heating plate 506 of the first plate 504 is in contact with the upper flap 502 and the top part of the bag 501 (working position) (Fig. 7). The pins 511 with which the first heating plate 504 is provided ensure that during the step of hot pressing the heating plate 504 itself can oscillate slightly adapting to the initial conformation of the bag 501, which is not perfectly square. The oscillation is constrained by virtue of the pins 517 inside the further holes 518. Such first step of pressing lasts for said first interval of time, during which the heating plate 506 is kept in contact cover upper flap 502 and bag 501.

[0029] After said first interval of time, the moving means 519 move both heating plates 504, 505 upwards from the resting position again to the working position, at said height D (Fig. 8). At this point, the first bag 501, again conveyed by the conveying means 503, is taken passing under the guide 527 which, by virtue of its inclined conformation descends in height in the moving direction L, keeps the upper flap 502 of the bag 501 folded

in the passage from said first to said second plate, avoiding the upper flap 502 (which has not been fixed yet to the top of part of the bag 501) can lift up and interlock in parts of the bending apparatus 500.

[0030] When the bag 501 is under the second heating plate 505, the moving means 519 move both heating plates 504, 505 downwards again until the first face 507 of the heating plate 506 of the second plate 505 is in contact with upper flap 502 and the top of the bag 501 (working position) (Fig. 9). Such successive step of pressing lasts for a second interval of time, during which the heating plate 506 is kept in contact cover upper flap 502 and bag 501.

[0031] Once the successive step of pressing is finished and thus after said second interval of time, the moving means 519 move both heating 504, 505 again from the working position to the resting position (Fig. 6). At this point, the bag 501 has a well squared shape by virtue of the two successive steps of pressing which convey a substantially parallelepiped shape to the bag 501.

[0032] In practice, if the bags 501 of the paced sequence are manufactured, the heating plates 504, 505 work at the same time, thus making it possible to press for the first time a given bag 501, by the first heating plate 504, when at the same time the previous bag is pressed for the second time by the second heating plate 505. Manufacturing times are optimized in this manner.

[0033] By virtue of the pressing apparatus 500 according to the present invention it is possible to make a bag 501 with a squared shape. The double pressing process of the bag 501 makes it possible to use low working temperatures of the heating plates, so as not to damage the bags 501. However, despite the low temperature of the heating plates, it is possible to speed up the moving of the pressing apparatus 500 and of the conveying means 503, whereby optimizing performance quality.

Claims

1. Pressing apparatus (500) of a bag (501) for alimentary pasta, able to receive, from conveying means (503), said bag (501) with an upper edge (502) folded over the bag (501) in substantially horizontal position, said pressing apparatus (500) comprising at least one first and one second plate (504, 505), which are mutually adjacent along a moving direction (L) of the bags (501) and arranged on top with respect to the conveying means (503) at a given height (D) which is greater than the height of the bag (501), **characterized in that** said at least one first and second plate (504, 505) are heating, and **in that** said pressing apparatus (500) further comprises vertical moving means (519) of said first a second heating plates (504, 505) in a direction perpendicular to said moving direction (L), configured to press said first heating plate (504) over the bag (501) in a first

interval of time and also to press said second heating plate (505) over the bag (501) in a second interval of time, successive to the first interval of time.

2. Pressing apparatus (500) according to claim 1, **characterized in that** each of said first and second plates (504, 505) comprises:

- a heating plate (506) made of heat conducting material (512) comprising a first face (507) able to come into contact with the bag (501) on top, a second face (508) with a recessed portion (509) and side faces (510) of which at least two opposite ones centrally comprise a pair of pins (511) arranged along an oscillation axis (P) of the plate (504, 505) perpendicular with respect to the moving direction (L),
- a serpentine-shaped conductor (512) through which an electric current flows, housed in said recessed portion (509) of said heating plate (506), said conductor (512) being placed in contact with the heating plate (506) and being able to transfer the heat generated by Joule effect by the electric current flowing through the conductor (512) to the heating plate (506),
- a top upper closing cover fixed at the top to said heating plate (506).

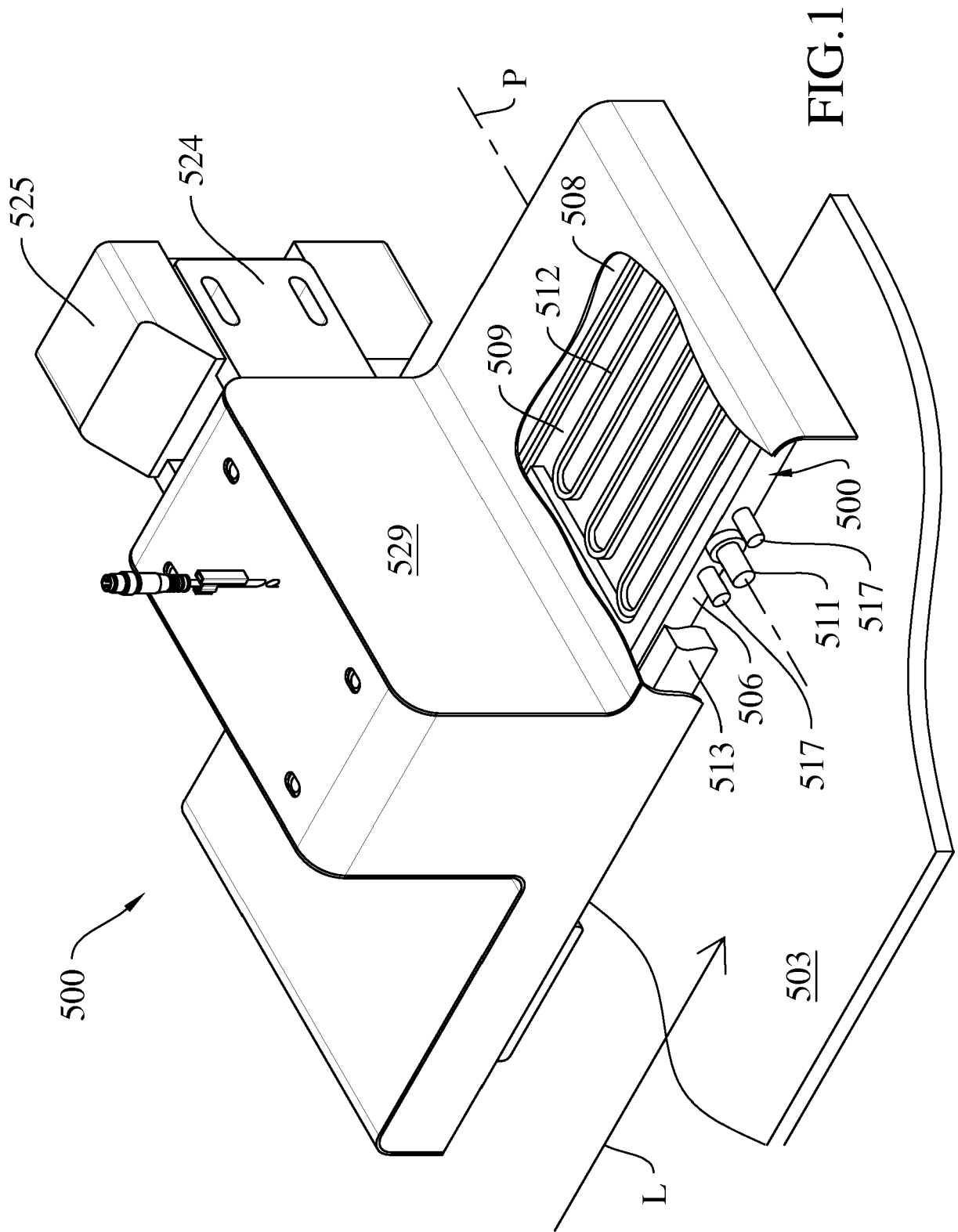
3. Pressing apparatus (500) according to claim 1, **characterized in that** said moving means (519) comprise a pneumatic actuator (520) with a cylinder (521) and at least one piston (522), said cylinder (521) being fixed to a pair of side support plates (524), which are in turn anchored to a support (525) able to fix the entire pressing apparatus (500) to a wall of a frame, a passage guide (527) for the bag (501) being fixed to said at least one piston (522), substantially at the same height (D) as said first and second plate (504, 505).

4. Pressing apparatus (500) according to claim 3, **characterized in that** said guide (527) is a metal sheet shaped so as to have a substantially "U"-shaped section with two vertical portions fixed to two sides of said lower block (526) and a base (528) that has a given inclination able to vertically compress the upper flap (502) of the bag (501) when it passes from said first plate (504) to said second plate (505).

5. Pressing apparatus (500) according to claim 2, **characterized in that** it said first and second plate (504, 505) are mutually connected in adjacent position by a first and a second bar (513, 514), which are mutually parallel and symmetric, said first and said second bar (513, 514) being both connected at their central portion to said lower block (526), each of them being parallel to the moving direction (L) and comprising at least one first transverse hole (515) and one sec-

ond transverse hole (516) at the ends of the bar (513, 514), each of said first and second plate (504, 505) being pivoted between the first and second bar (513, 514) by said pair of pins (511) with which they are provided, which are inserted between a symmetric pair of said first transverse holes (515), in the case of the first plate (504), and a symmetric pair of said second transverse holes (516), in the case of the second plate (505).

6. Pressing apparatus (500) according to claim 5, **characterized in that** said first and said second bar (513, 514) comprise two pairs of further transverse holes (518) equidistant with respect to said first transverse holes (515) and to said second transverse holes (516), and that each of said plates (504, 505) comprises a pair of stop pins (517), also at the side faces (510) of the heating plates (506), said pins (517) being able to be inserted inside a respective pair of further transverse holes (518) which are equidistant with respect to said first transverse holes (515) and to said second transverse holes (516), so that the oscillation of the respective plate (504, 505) is partial and constrained by the movement of the pins (517) inside the further holes (518).
7. Pressing apparatus (500) according to claim 6, **characterized in that** the space of said further holes (518) can be changed by screws (531) able to be inserted inside each further hole (518), by said screws (531) it being possible to stop the oscillatory movement of the respective plate (504, 505).
8. Pressing apparatus (500) according to any one of the preceding claims, **characterized in that** it comprises a casing (529) shaped to cover the upper part of said pressing apparatus (500), said casing (529) being fixed by spacers (530) to said pair of side support plates (524).



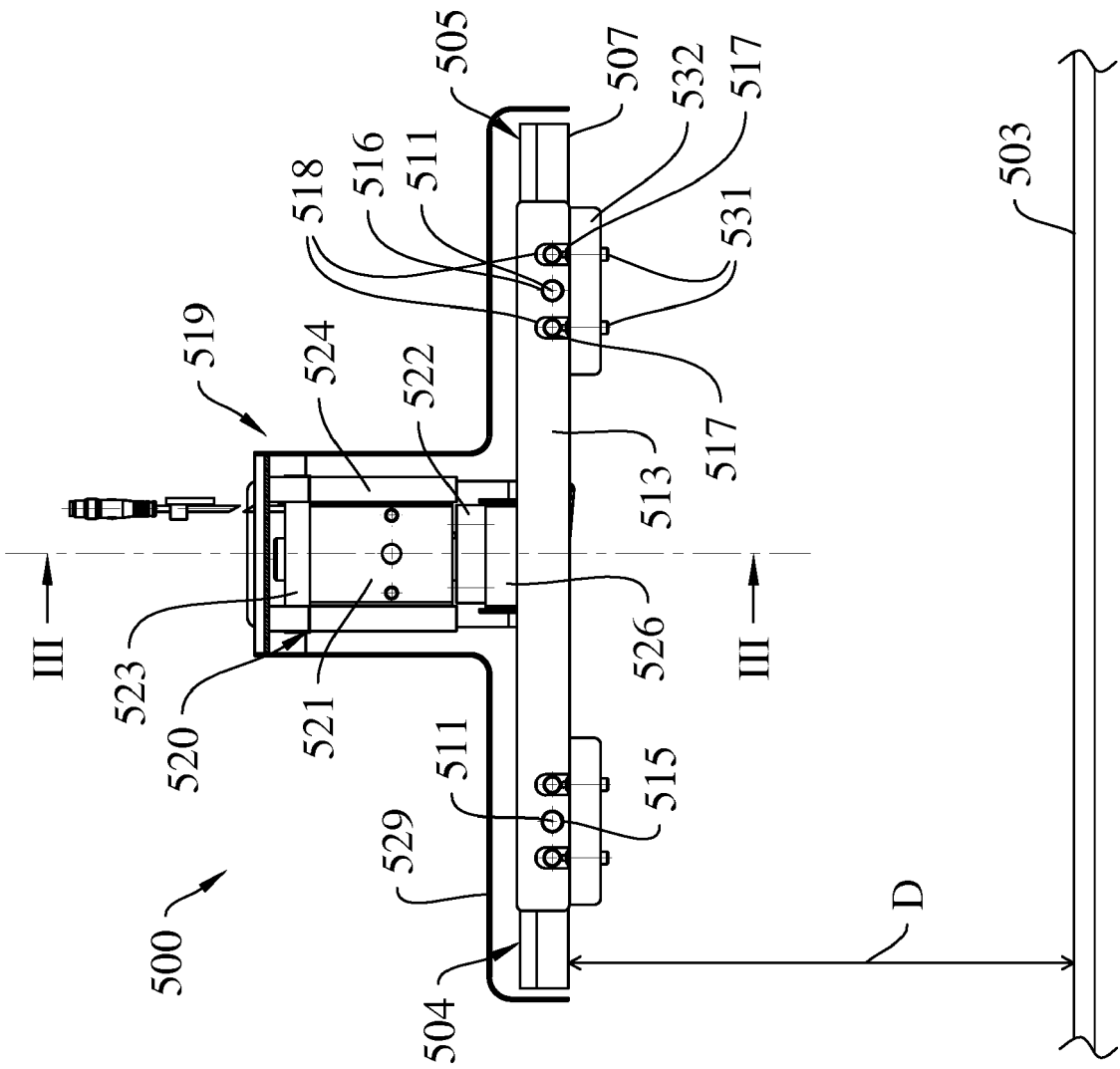


FIG.2

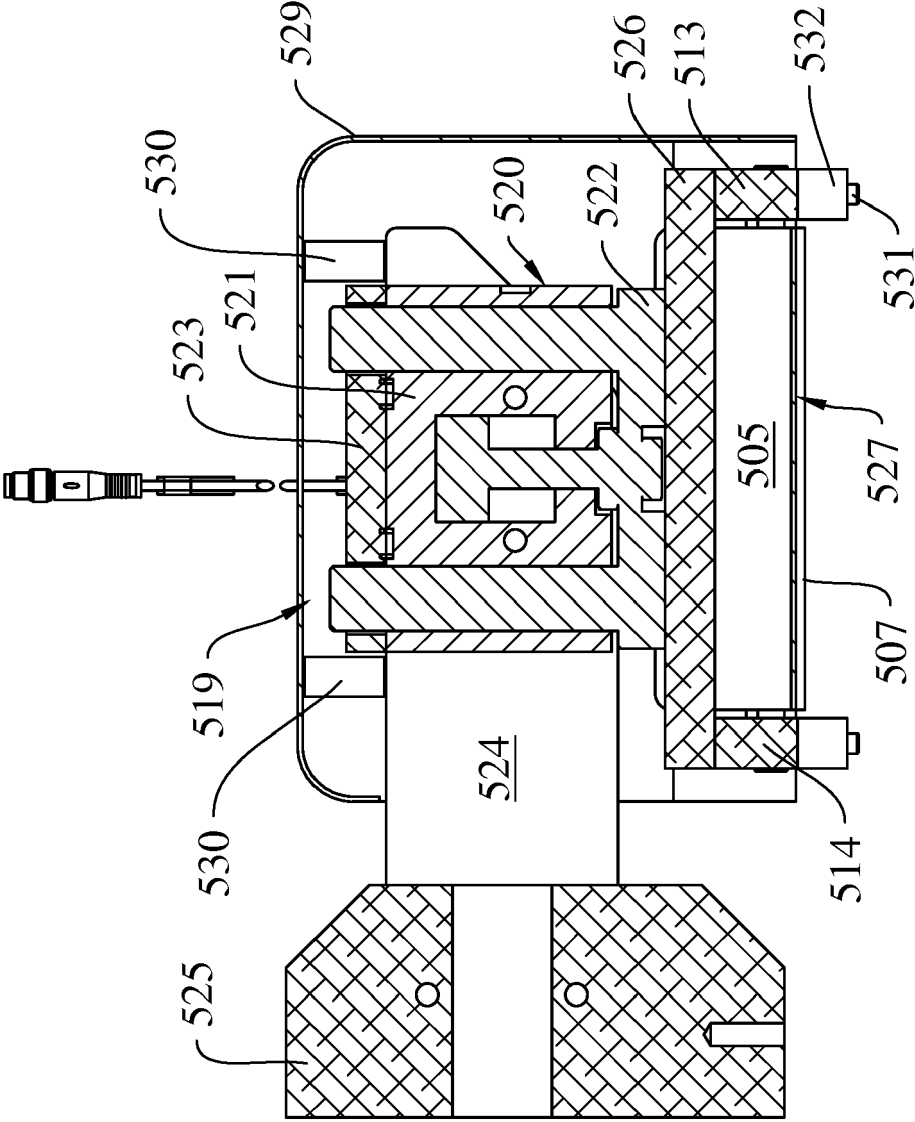
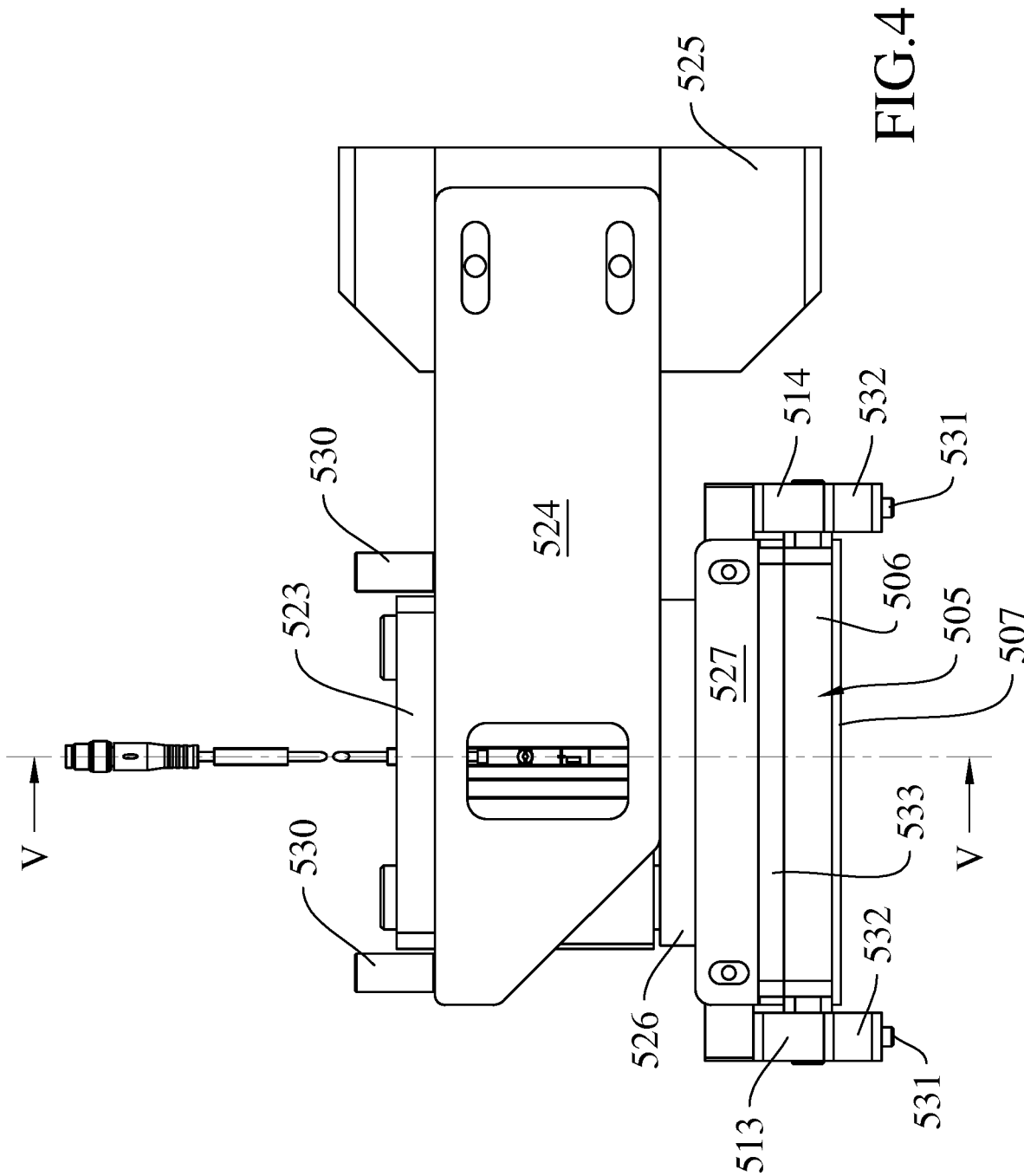


FIG.3



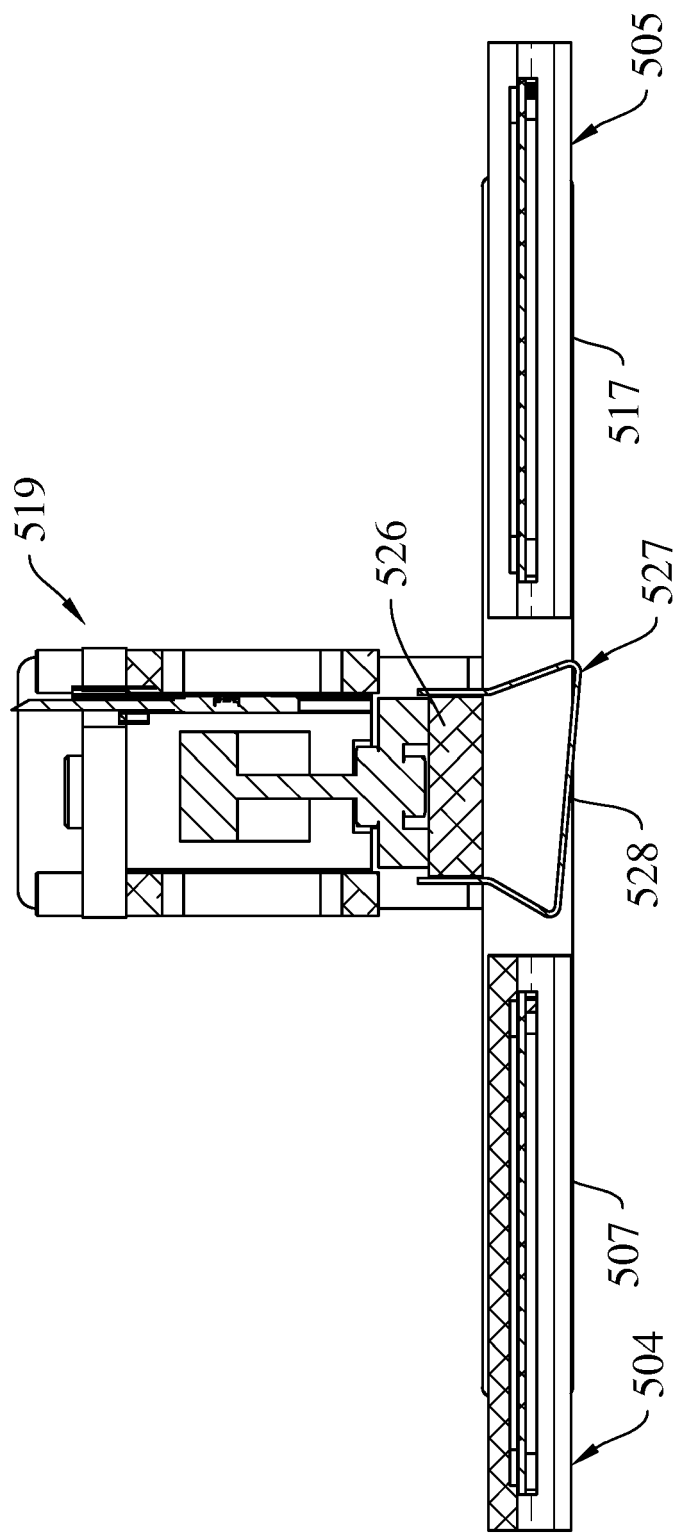


FIG.5

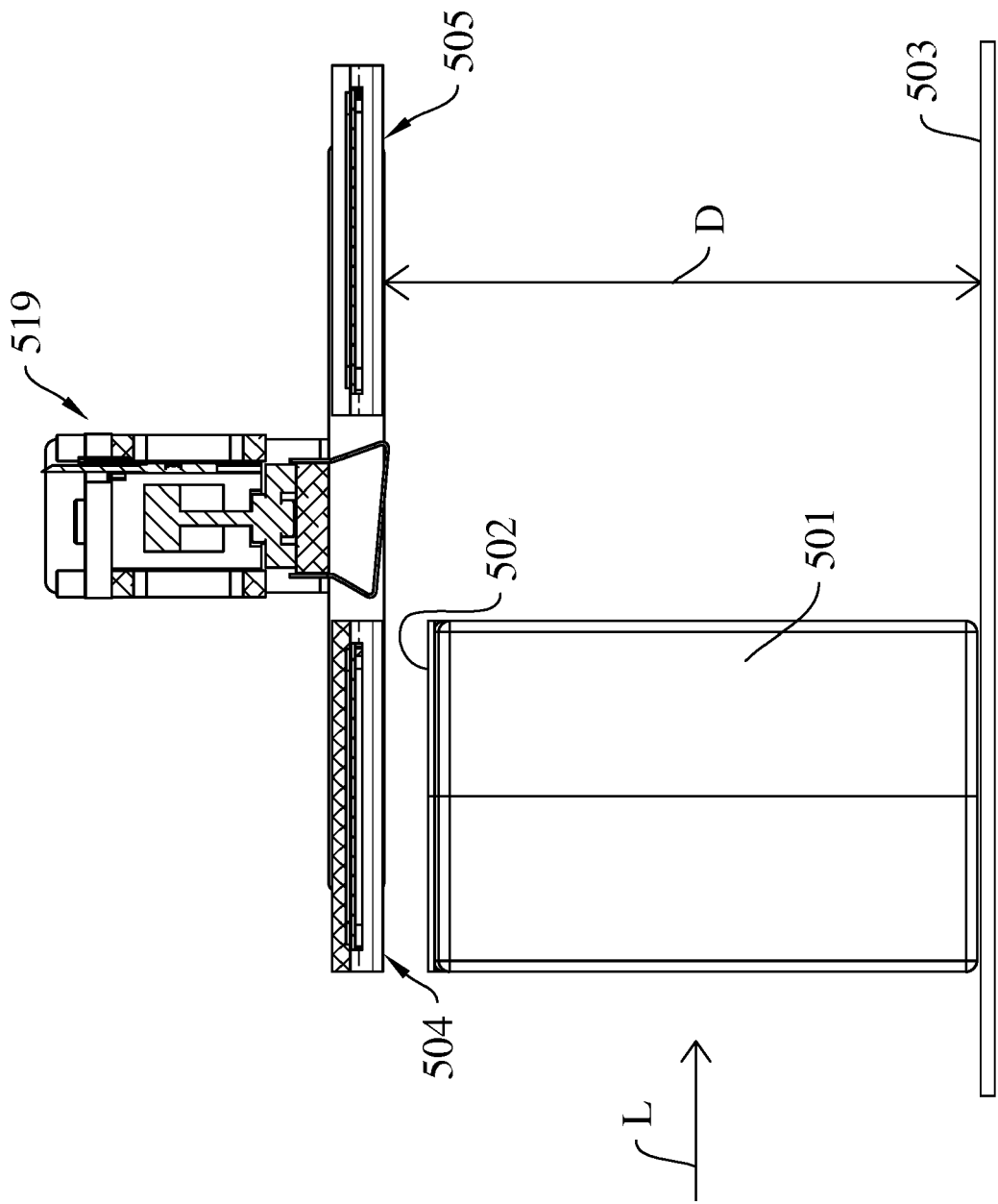


FIG.6

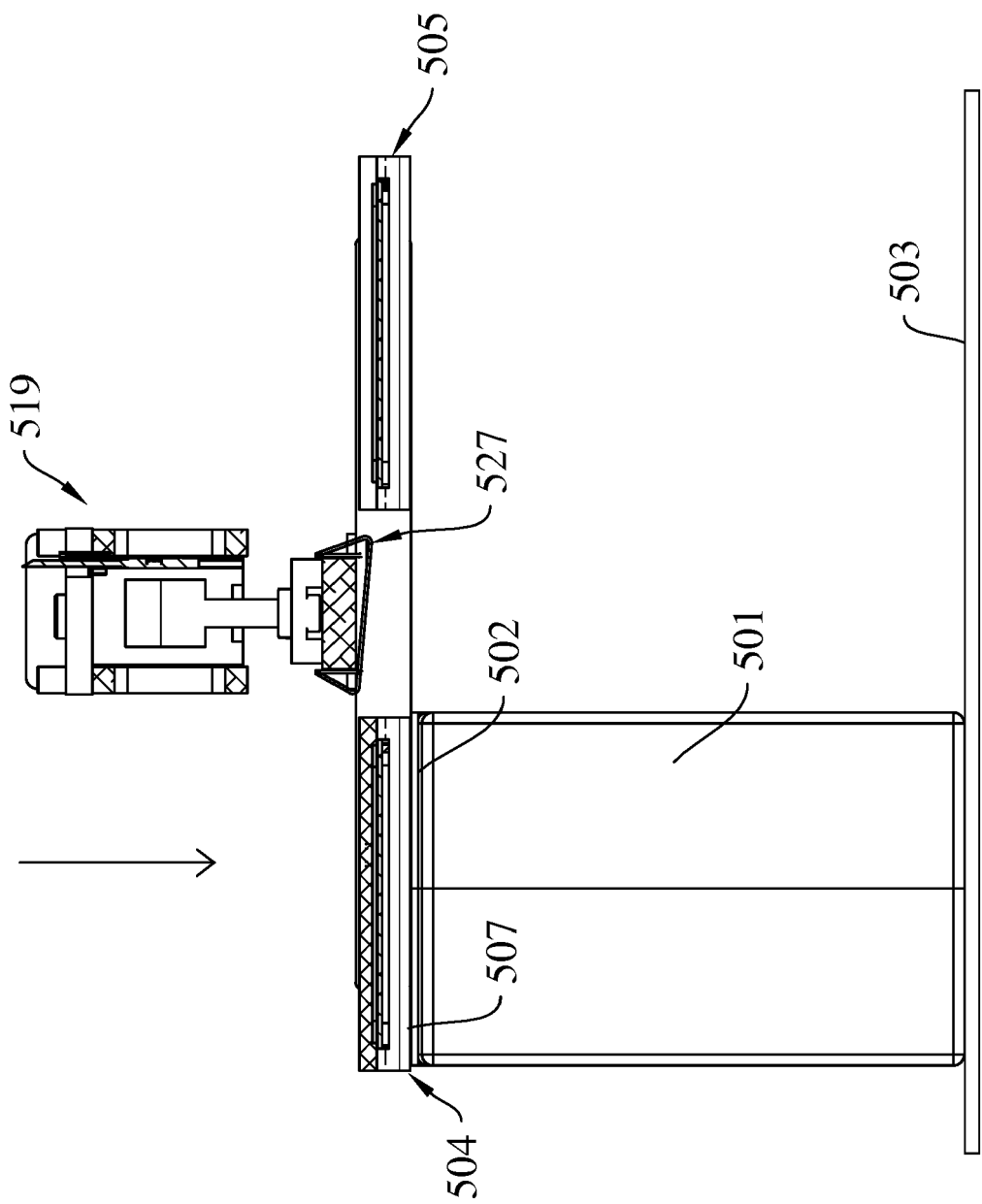


FIG. 7

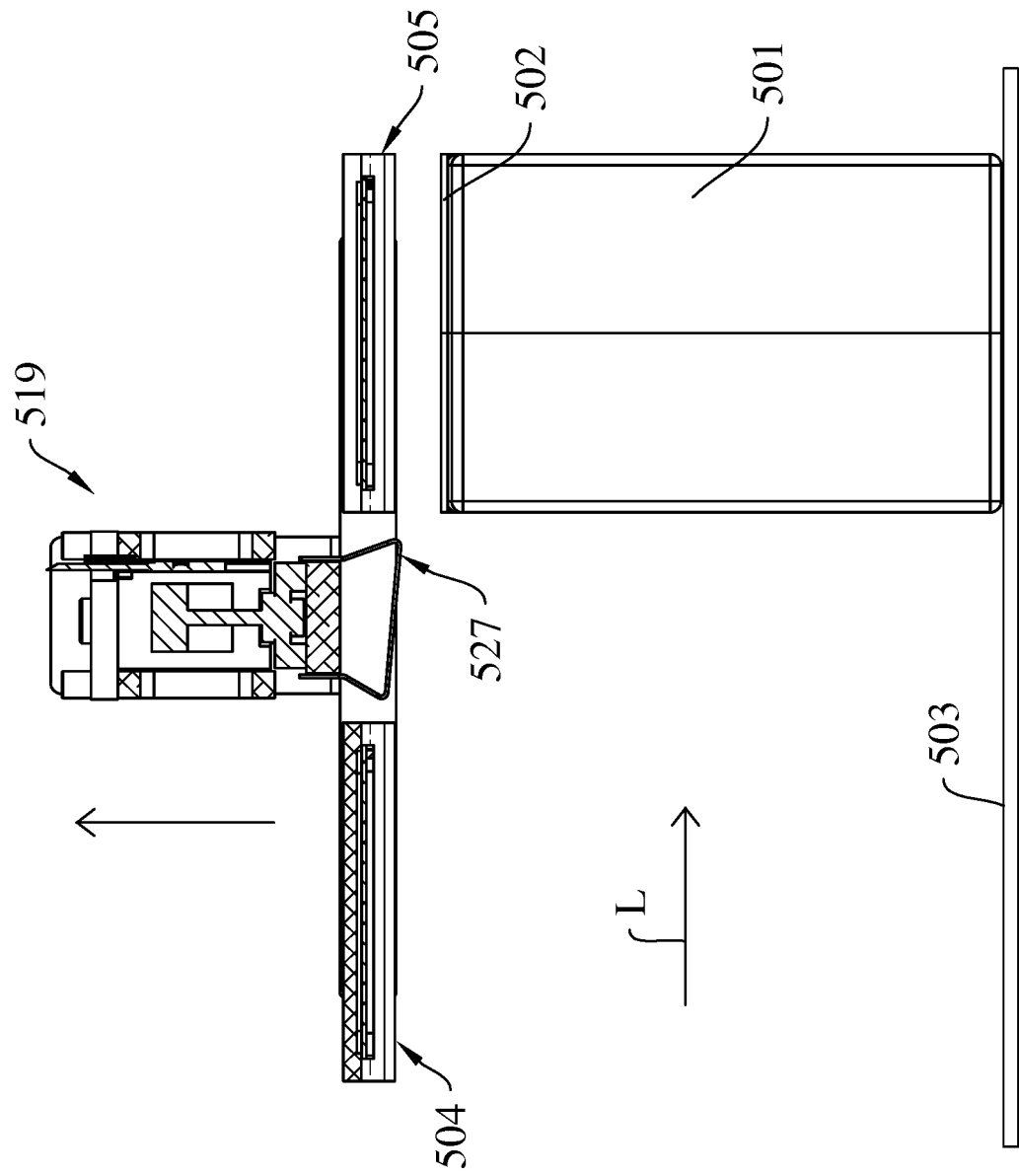
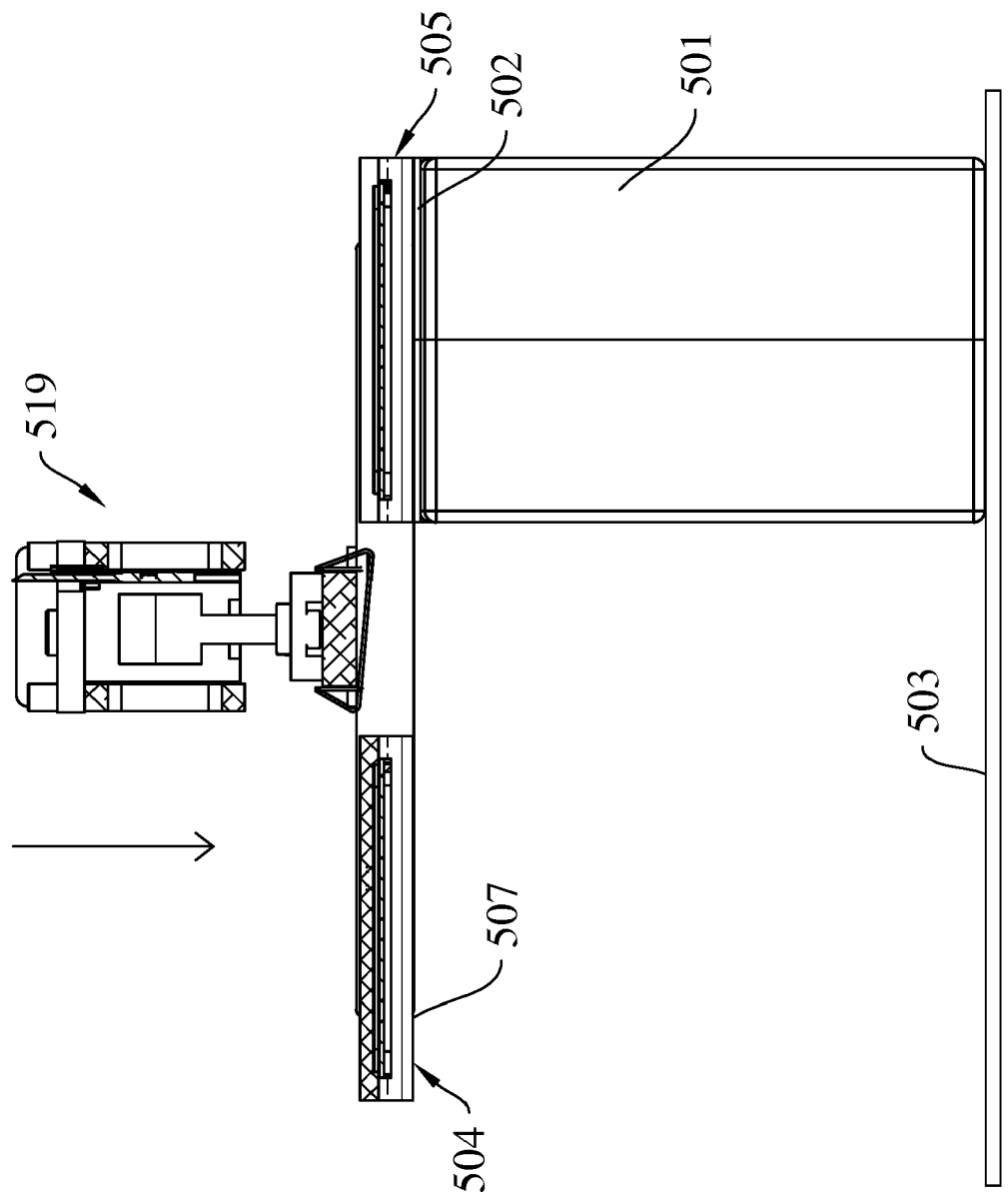


FIG.8





EUROPEAN SEARCH REPORT

Application Number
EP 17 20 8773

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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 Munich		Date of completion of the search 16 March 2018	Examiner Kulhanek, Peter
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ON EUROPEAN PATENT APPLICATION NO.**

EP 17 20 8773

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