

(19)



(11)

EP 3 339 191 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
27.06.2018 Bulletin 2018/26

(51) Int Cl.:
B65B 7/08 (2006.01) **B65B 51/14** (2006.01)
B65B 51/30 (2006.01)

(21) Application number: **17208675.3**

(22) Date of filing: **19.12.2017**

(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 MK MT NL NO
 PL PT RO RS SE SI SK SM TR**
 Designated Extension States:
BA ME
 Designated Validation States:
MA MD TN

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

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

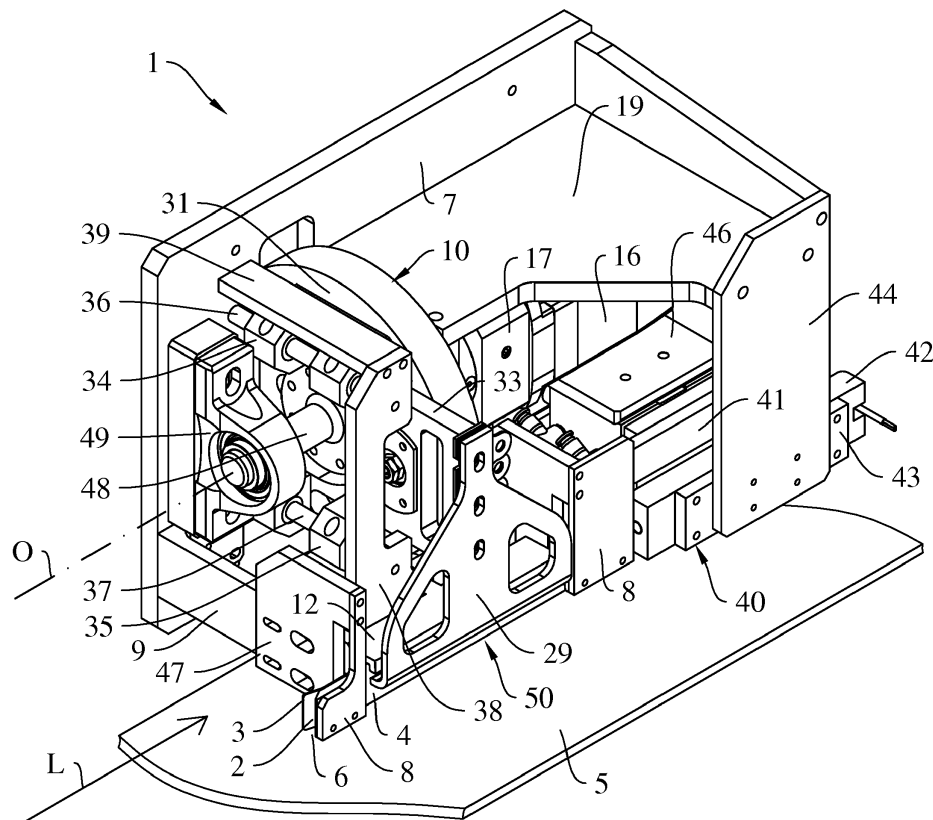
(74) Representative: **Mittler, Andrea et al**
MITTLER & C. s.r.l.
Viale Lombardia, 20
20131 Milano (IT)

(30) Priority: **22.12.2016 IT 201600129850**

(54) **APPARATUS FOR FOLDING AND PRESSING AN UPPER FLAP OF A FOOD BAG**

(57) It is disclosed an apparatus (1) for folding a previously welded upper flap (100) of a bag (101) for foods taken by conveying means (5) along a moving direction (L), said apparatus (1) being configured to fold a part (103) of the previously welded upper flap (100) of the bag (101) on the upper flap (100) not subject to folding, where-

by making an angle smaller than 45° between the two parts. Said apparatus (1) comprises a folding sheet (4) and a "U"-shaped element (13), and moving means (50) able to make said "U"-shaped element (13) mate with the folding sheet (4) to fold the previously welded upper flap (100) of the bag (101). (Fig. 1).

**FIG.1**

Description

[0001] The present invention relates to an apparatus for folding and pressing an upper flap of a food bag.

[0002] Apparatuses for folding and pressing an upper flap of bags made of flexible and transparent material, usually polypropylene, are known, said devices being comprised in packaging machines, used in particular in the food-processing field which enclose various small-sized products, such as short pasta, in a wrapping.

[0003] For example, patent EP1633633 shows a folding and pressing apparatus essentially comprising a first fold guide pneumatic cylinder, which controls the downward and upward movement of a fold guide, a second pneumatic cylinder, which moves, by a piston, a blade holder block, which supports a folding sheet, in front of which a flap lead-in is placed, and a fold pressing bar fixed to a tablet which faces an abutment.

[0004] In operation, when the bags are taken to the inlet of the apparatus, the combined action of the folding sheet, the flap lead-in, the fold guide and the abutment makes it possible to fold the upper part of the welded flap by an angle of about 120°. Continuing along the apparatus, the aforesaid upper part of the flap is then pressed against the remaining part of the flap itself by the folding pressing bar, pushed transversally by the pneumatic piston.

[0005] DE-1265643 describes a folding apparatus of an upper flap of a bag.

[0006] It is the object of the present invention to make an innovative apparatus for folding and pressing the upper flap of bags for alimentary pasta.

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

[0008] A practical embodiment of the present invention is shown by way of non-limiting example in the accompanying drawings, in which:

figure 1 is a perspective view of an apparatus, according to the present invention, for folding the flaps of bags for alimentary pasta;

figure 2 shows a second perspective view of the folding apparatus of Fig. 1;

figure 3 shows a paced sequence of bags taken by conveying means to the folding apparatus of Fig. 1;

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

figure 5 shows a front, partial section view of the folding apparatus of Fig. 1;

figure 6 shows a section view of the folding apparatus of Fig. 5 taken along line VI-VI;

figure 7 shows a section view of the folding apparatus of Fig. 4 taken along line VII-VII;

figure 8 shows a section view of the folding apparatus of Fig. 4 taken along line VIII-VIII;

figure 9 shows a top view of the folding apparatus in Fig. 1;

figures 10-13 show first steps of operation of the fold-

ing apparatus in a section view taken along line X-X of Fig. 5;

figures 14-15 show second steps of operation of the folding apparatus in a section view taken along line XIV-XIV of Fig. 5.

[0009] Figs. 1, 2 show an apparatus 1, according to the present invention, for folding an upper flap (or fin) 100 of a bag 101 containing foods (Fig. 3).

[0010] The apparatus 1 is comprised 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 a wrapping.

[0011] For example, the bag 101 is a flat bottom package made of plastic material, which may have a quadrilateral shape and corresponding side surfaces. As shown in Fig. 3, the upper ends of the bag 101 which will be let into the apparatus 1 are approached and welded, so as to form said upper flap 100. Each upper flap 100 of the bags 101 is substantially two-dimensional and therefore may be represented by a plane P. Such welding operation, together with the cutting operations, is performed by a welding and cutting assembly (not shown in the figure) arranged upstream of the apparatus 1 in the packaging machine.

[0012] The bag 101 is taken to the folding apparatus 1 by conveying means 5 able to transport a paced succession of bags 101 oriented with the plane P of each upper flap 100 parallel to said moving direction L (Fig. 3) along a moving direction L.

[0013] The apparatus 1 is configured to fold a part or a free end 103, of the previously welded upper flap 100 of the bag 101 onto the part of the upper flap 100 not subject to folding, whereby making an angle smaller than 45° between the parts. In particular, the apparatus 1 comprises a folding sheet 4 and a "U"-shaped element 13, and moving means 50 able to make said "U"-shaped element 13 mate with the folding sheet 4 to fold the previously welded upper flap 100 of the bag 101.

[0014] The folding apparatus 1 also comprises a guiding plate 3 parallel to said folding sheet 4, both defining a space able to receive, through an inlet slot 2, the upper flaps 100 of one bag 101 at a time of said paced succession of bags 101, said bags 101 being oriented with the plane P of the upper flaps 100 parallel to said guiding plate 3 and said folding sheet 4.

[0015] Said space between the guiding plate 3 and folding plate 4 is configured to house at least the upper flap 100 of one bag 101 at a time introduced through the inlet slot 2 (Figs. 2, 4). So, the longitudinal measurement of the guiding plate 3 and of the folding plate 4 is greater than or equal to the longitudinal measure of the upper flap 100. Advantageously, the ends of both the guiding plate 3 and the folding plate 4 have a spreading 6 at the inlet slot 2 able to promote the introduction of the upper flap 100 of the bags 101 into the apparatus 1 (Fig. 1).

[0016] The conveying means 5 are arranged at a lower height than the apparatus 1 (Fig. 1), so that only the upper

flap 100 of the bags 101 is introduced inside the apparatus 1, and so that such free end 103 of the upper flap 100 itself exceeds the folding sheet 4 in height (Fig. 10).

[0017] The apparatus 1 comprises a rear supporting plate 7 (Fig. 4) which constitutes an anchoring support for the various elements of which the apparatus 1 is formed. The folding sheet 4 is fixed to a pair of first plates 8, each fixed in turn by a front guiding support 47 to a corresponding support angle bar 9, which is anchored to the rear supporting plate 7. The guiding plate 3 is instead fixed directly to said supporting angle bars 9 (Figs. 1, 2).

[0018] Said moving means 50 comprise a cam 10, rotating about a first rotation axis O parallel to the moving direction L of the bags 101 (Figs. 1, 2), by virtue of a supporting shaft 48, to which the cam 10 is fixed, free to turn inside the support 49 anchored to the rear supporting plate 7.

[0019] The cam 10 is able to move by first linkages 11 at least one folding lever 12 with said "U"-shaped elements able to fold the upper flap 100 of the bags 101, transversally to the plane P of the upper flaps 100 and over said folding sheet 4.

[0020] In particular, said "U"-shaped element 13 (Fig. 6) is able to fold the free end 103 of the upper flap 100 which exceeds the folding sheet 4 in height, pushing it and putting it into contact with an outer surface of the folding blade 4. The "U"-shaped element 13 is shaped so as to have a cavity 14 substantially complementary with the profile of the folding sheet 4, so that the hook-shaped end is able to be superimposed on the top, interlocking the folding sheet 4.

[0021] The folding lever 12 is fixed by first pins 15 (Fig. 5) to both the supporting angle bars 9 and may turn partially about a second rotation axis O', also parallel to the moving direction L of the bags 101, between an opening position, in which it is raised (Fig. 10), and a folding position, in which it is in contact with the upper flap 100 of the given bag 101 over the folding sheet 4 (Fig. 11). As will be explained better below, the upper flap 100 of a bag 101 is inserted during the opening position, while the same upper flap 100 is folded during the closing position.

[0022] The cam 10 is actuated by a motor 16 with reducer 17 (Figs. 7, 8) positioned in axis with respect to the cam 10, the drive shaft 16 coinciding with the first rotation axis O of the cam 10. The motor 16 is also fixed to the rear supporting plate 7 by a supporting plate of the reducer 18 and of a supporting plate of the assembly 19 (Figs. 5, 9).

[0023] The cam 10 comprises a first groove 20 of eccentric shape (Fig. 6), present on a first side 21 of its surface, which acts as sliding rail for a first bearing 22 connected to said first linkages 11 (Fig. 7).

[0024] In particular, the first linkages 11 (Fig. 6) comprise a first lever 23 to which the first bearing 22 is centrally hinged; a second plate 25, which is fixed to the rear supporting plate 7 of the apparatus 1, and a connecting rod 26, which is hinged to the folding lever 12 by a second pin 27, are connected to the ends of said first lever 23

by further pins 24.

[0025] The cam 10 is also able to move a keeping mallet 29 of the folding of the upper flap 100 of a bag 101 by second linkages 28 (Fig. 4), said second linkages 28 being actuated by the cam 10 in manner substantially alternating with respect to said first linkages 11. The keeping mallet 29 is able to keep the upper flap 100 folded over the folding sheet 4. In particular, the keeping mallet 29 is made by a substantially triangle-shaped sheet (Figs. 1, 2), with the plane of the sheet parallel to the moving direction L of the bags 101; the base of the triangle is curved by about 90° and forms the head of the mallet. The keeping mallet 29 is able to keep, by the mallet head, the free end 103 of the upper flap 100 in contact with the outer surface of the folding sheet 4.

[0026] Furthermore, the cam 10 comprises a second groove 30 of eccentric shape (different by conformation with respect to said first groove 20) present on a second side 31 of its surface, which acts as sliding rail for a second bearing 32 (Fig. 8) connected to said second linkages 28. In particular, the second linkages 28 comprise a carriage 33, to an end of which the keeping mallet 29 is fixed. Said second bearing 32 is hinged to said carriage 33 in central position, said carriage 33 being able to slide transversally with respect to the moving direction L of the bags 101 between an opening position, in which the keeping mallet 29 is distanced from the bending sheet 4 (Fig. 10), and a keeping position, in which the keeping mallet 29 is placed in contact with the upper flap 100 folded against the folding sheet 4 (Fig. 12). As shown in greater detail below, during the opening position, the upper flap 100 of a bag 101 is folded by the folding lever 12, while during the closing position the upper flap 100 itself is kept pressed against the folding sheet 4 by the keeping mallet 29.

[0027] The carriage 33 comprises an upper pair and a lower pair of runners 34, 35 (Figs. 1, 7) fixed to a surface of the carriage 33, each of which comprising a cylindrical opening, able to house an upper tubular guide 36 and a lower tubular guide 37, fixed orthogonally respectively between the rear supporting plate 7 and a further supporting plate 38. Said further supporting plate 38 is fixed, in turn, between said supporting angle bars 9 and by a shim 39 to the rear supporting plate 7 (Fig. 1). The runners of the upper and lower pair 34, 35 are able to slide on the respective upper and lower tubular guides 36, 37 to allow the movement of the carriage 33 transversally with respect to the moving direction L of the bags 101.

[0028] Advantageously, the keeping mallet 29 is fixed to the carriage 33 by one or more shims, which define the distance of the keeping mallet 29 (and thus of the mallet head) from the folding sheet 4.

[0029] Finally, the apparatus 1 comprises a pressing assembly 40 (Figs. 1, 2) arranged downstream of the space defined between the guiding sheet 3 and the folding sheet 4, in the moving direction L of the bags 101. Said pressing assembly 40 being able to firmly fix the flap of the upper flap 100 of the bags 101.

[0030] In particular, the pressing assembly 40 comprising an insulating element 41 transversally movable with respect to the moving direction L of the bags 101 and able to come into contact with the upper flap 100 folded against a hot mallet 42 (heated by a cartridge resistor). The pressing assembly 40 is positioned substantially at the same height as the guiding plate 3 and the folding plate 4 and is able to receive one bag 101 at a time with the upper flap 100 of the bag 101 folded so that it is in a space comprised between the insulating element 41 and the hot mallet 42, said pressing assembly 40 being able to fix the folding of the upper flap 100. For this purpose, the longitudinal measure of insulating element 41 and mallet must be either greater than or equal to that of the upper flap 100.

[0031] The hot mallet 42 is fixed and is fixed, by a front cylinder attachment 43, to a support 44, which is fixed in turn to said support plate of the assembly 19 and, thus, to the rear supporting plate 7. Conversely, the insulating element 41 is movable and moved by a pneumatic cylinder 45, fixed to the rear supporting plate 7 by a further supporting angle bar 46 (Fig. 2).

[0032] During operation, the folding apparatus 1 operates by the following steps.

[0033] In a first step (Fig. 10), a bag 101 of the paced succession of bags 101 is taken by the conveying means 5 to the folding apparatus 1 through the inlet slot 2 between the guiding sheet 3 and the folding sheet 4, along the moving direction L. Said bag 101 is thus made to advance further by the conveying means 5 until the upper flap 100 of the bag 101 is entirely inside the space between the guiding plate 3 and the folding plate 4. In said first step, the flap folding lever 4 is in opening position, i. e. raised, and the keeping mallet 29 is also in opening position and therefore distanced from the folding sheet 4.

[0034] In a second step (Fig. 11), the cam 10 moves the flap folding lever 12 by the first linkages 11. The flap folding lever 12 rotates partially about the second rotation axis O' and goes from said opening position to said folding position. The "U"-shaped element 13 of the folding lever 12 pushes, transversally with respect to the moving direction L of the bags 101, the free end 103 of the upper flap 100 which exceeds the height of the folding sheet 4, so that said free end 103 is placed into contact with the outer surface of the folding sheet 4 and the "U"-shaped element 13 of the folding lever 12 is superimposed, whereby interlocking the folding sheet 4. In said second step of operation, the cam 10, by the second linkages 28, holds the keeping mallet 29 in opening position.

[0035] In a third step (Fig. 12), the cam 10 moves, by the second linkages 28, the keeping mallet 29, which moves from the opening position to the keeping position. In this step, the folding lever 12 it is still in folding position, so that the upper flap 100 is folded over the folding sheet 4 and, particularly, the free end 103 is in contact with the outer surface of the folding sheet 4. The mallet head is thus placed into contact with the free end 103 of the upper flap 100 against the folding sheet 4, keeping the folding

of the upper flap 100.

[0036] In a fourth step (Fig. 13), the cam 10 moves, by the first linkages 11, the folding lever 12, which moves again from the folding position to the opening position. In said fourth step of operation, the cam 10, by the second linkages 28, holds the keeping mallet 29 in keeping position.

[0037] In a fifth step (Fig. 14), the cam 10 moves, by the second linkages 28, the keeping mallet 29, which moves from the keeping position to the opening position. In the meantime, the bag 101 with the folded upper flap 100 is taken, again by the conveying means 5, along the moving direction L towards the pressing assembly 40 arranged downstream of the space defined between the guiding sheet 3 and the folding sheet 4. The movable insulating element 41 is distanced with respect to the hot mallet 42, so that in said fifth step the folded upper flap 100 is taken into the space comprised between the insulating element 41 and the hot mallet 42.

[0038] In a sixth step (Fig. 15), the insulating element 41 is moved transversally (by the pneumatic cylinder 45) with respect to the movement direction L of the bags 101 and is put into contact with the upper flap 100 folded against the hot mallet 42, whereby firmly fixing the folding of the upper flap 100 of the bag 101 which may be taken to the successive steps of manufacturing.

Claims

- Apparatus (1) for folding and pressing an upper flap (100) of a bag (101) for foods taken by conveying means (5) along a moving direction (L), said apparatus (1) being configured to fold a part (103) of the previously welded upper flap (100) of the bag (101) onto the part of the upper flap (100) which is not subject to folding, whereby forming an angle smaller than 45° between the two parts, said apparatus (1) comprises a folding sheet (4) and a "U"-shaped element (13), and moving means (50) able to combine said "U"-shaped element (13) with the folding sheet (4) to fold of the previously welded upper flap (100) of the bag (101),
characterized in that said moving means (50) comprise a motorized cam (10), rotating about a first rotation axis (O) parallel to the moving direction (L) of the bags (101), said cam (10) being able to move, by first linkages (11) at least one folding lever (12) with said "U"-shaped element (13) to fold the upper flap (100) of the bags (101) over said folding sheet (4), said cam (10) being also able to move by second linkages (28) a keeping mallet (29) able to keep the upper flap (100) folded over the folding sheet (4).
- Apparatus (1) according to claim 1, **characterized in that** said "U"-shaped element (13) is able to fold a free end (103) of the upper flap (100) which exceeds in height the folding sheet (4), pushing it and

taking it into contact with an outer surface of the folding blade (4), said "U"-shaped element (13) being shaped so as to have a cavity (14) substantially complementary to the profile of the folding sheet (4), so that the "U"-shaped element (13) is able to overlap on top, interlocking the folding sheet (4).

3. Apparatus (1) according to claim 1, **characterized in that** said cam (10) comprises a first groove (20) of eccentric shape, present on a first side (21) of its surface, which acts as sliding rail for a first bearing (22) connected to said first linkages (11), said first linkages (11) comprising a first lever (23), to which said first bearing (22) is centrally hinged and to the ends of which are respectively connected, by further pins (24), a second plate (25), which is fixed to a rear supporting plate (7) of the apparatus (1), and a connecting rod (26), which is hinged to the folding lever (12) by a second pin (27), said folding lever (12) rotating partially about a second rotation axis (O') between an opening position, in which is it raised, and a folding position, in which the "U"-shaped element (13) is placed in contact with the upper flap (100) of said bag (101) over the folding sheet (4).
4. Apparatus (1) according to claim 1, **characterized in that** said cam (10) comprises a second groove (30) of eccentric shape present on a second side (31) of its surface, which acts as sliding rail for a second bearing (32) connected to said second linkages (28), said second linkages (28) comprising a carriage (33) to which said second bearing (32) is centrally hinged and to an end of which said keeping mallet (29) is fixed, said carriage (33) being able to slide transversally with respect to the moving direction (L) of the bags (101) between an opening position, in which the keeping mallet (29) is distanced from the folding sheet (4), and a keeping position, in which the keeping mallet (29) is placed in contact with the upper flap (100) folded against the outer surface of the folding sheet (4).
5. Apparatus (1) according to claim 4, **characterized in that** said carriage (33) comprises an upper pair and a lower pair of runners (34, 35) fixed to a surface of the carriage (33), each of which comprising a cylindrical opening able to accommodate, respectively, an upper tubular guide (36) and a lower tubular guide (37), said upper and lower pair of runners (34, 35) being able to slide on the respective upper and lower tubular guides (36, 37) to allow the movement of the carriage (33) transversally with respect to the moving direction (L) of the bags (101).
6. Apparatus (1) according to claim 4, **characterized in that** said keeping mallet (29) is made by a substantially triangle shape sheet, with the plane of the sheet parallel to the moving direction (L) of the bags

(101), the base of the triangle being curved by approximately 90° and forming the head of the mallet by which said free end (103) of the upper edge (100) is kept in contact with the outer surface of the folding sheet (4).

7. Apparatus (1) according to claim 1, **characterized in that** it comprises a pressing assembly (40) able to receive, by said conveying means (5), the bag (101) with the upper flap (100) folded and to press the folding to fix it firmly, said pressing assembly (40) comprising an insulating element (41) transversally movable with respect to the moving direction (L) of the bags (101) and able to be put into contact with the upper flap (100) folded against a hot mallet (42).
8. Apparatus (1) according to claim 7, **characterized in that** said hot mallet (42) is fixed, while said insulating element (41) is movable and moved by a pneumatic cylinder (45).
9. Apparatus (1) according to any one of the preceding claims, **characterized in that** said cam (10) is moved by a motor (16) with reducer (17) positioned in axis with the cam (10), said drive shaft (16) coinciding with the first rotation axis (O) of the cam (10).

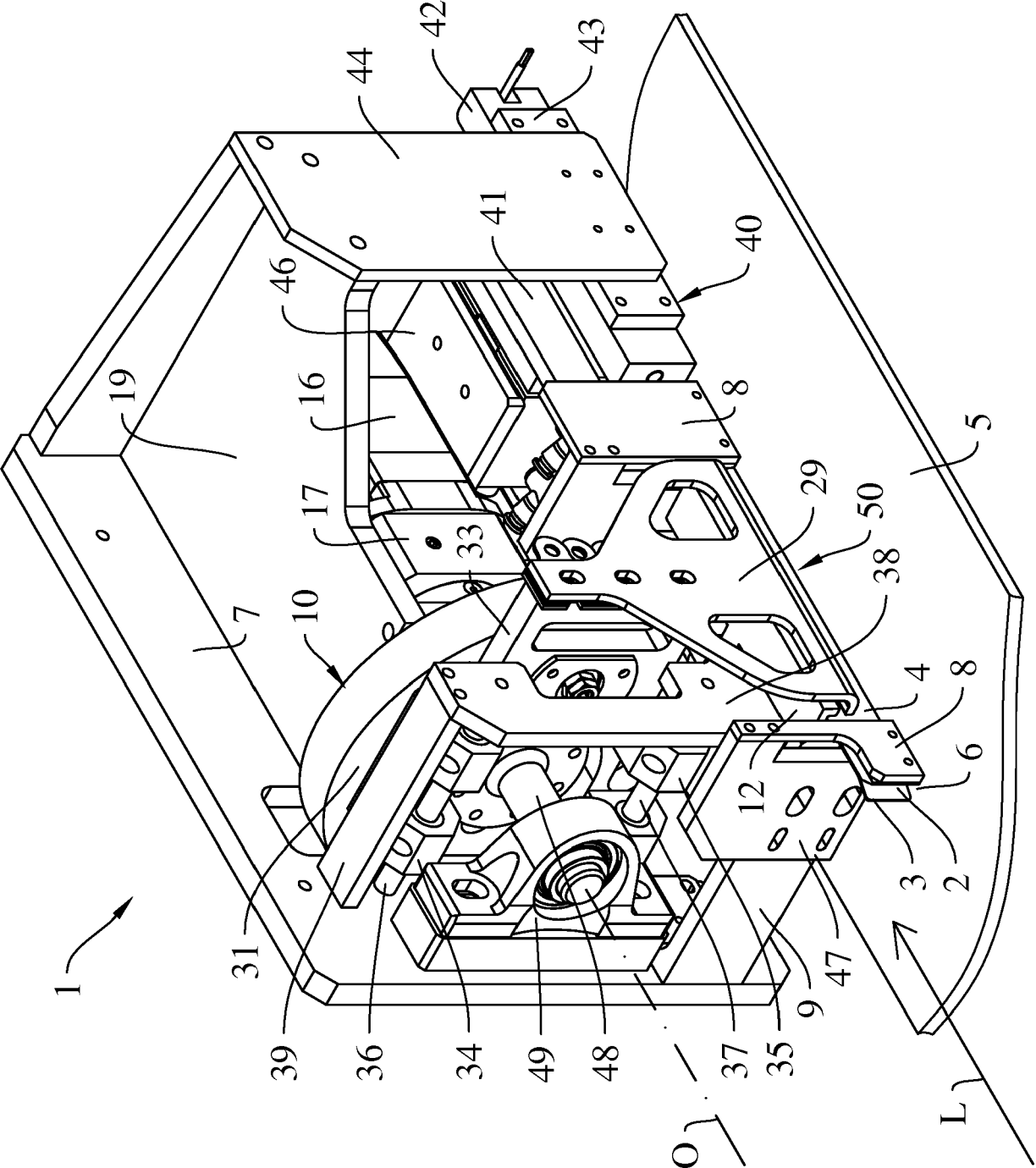


FIG.1

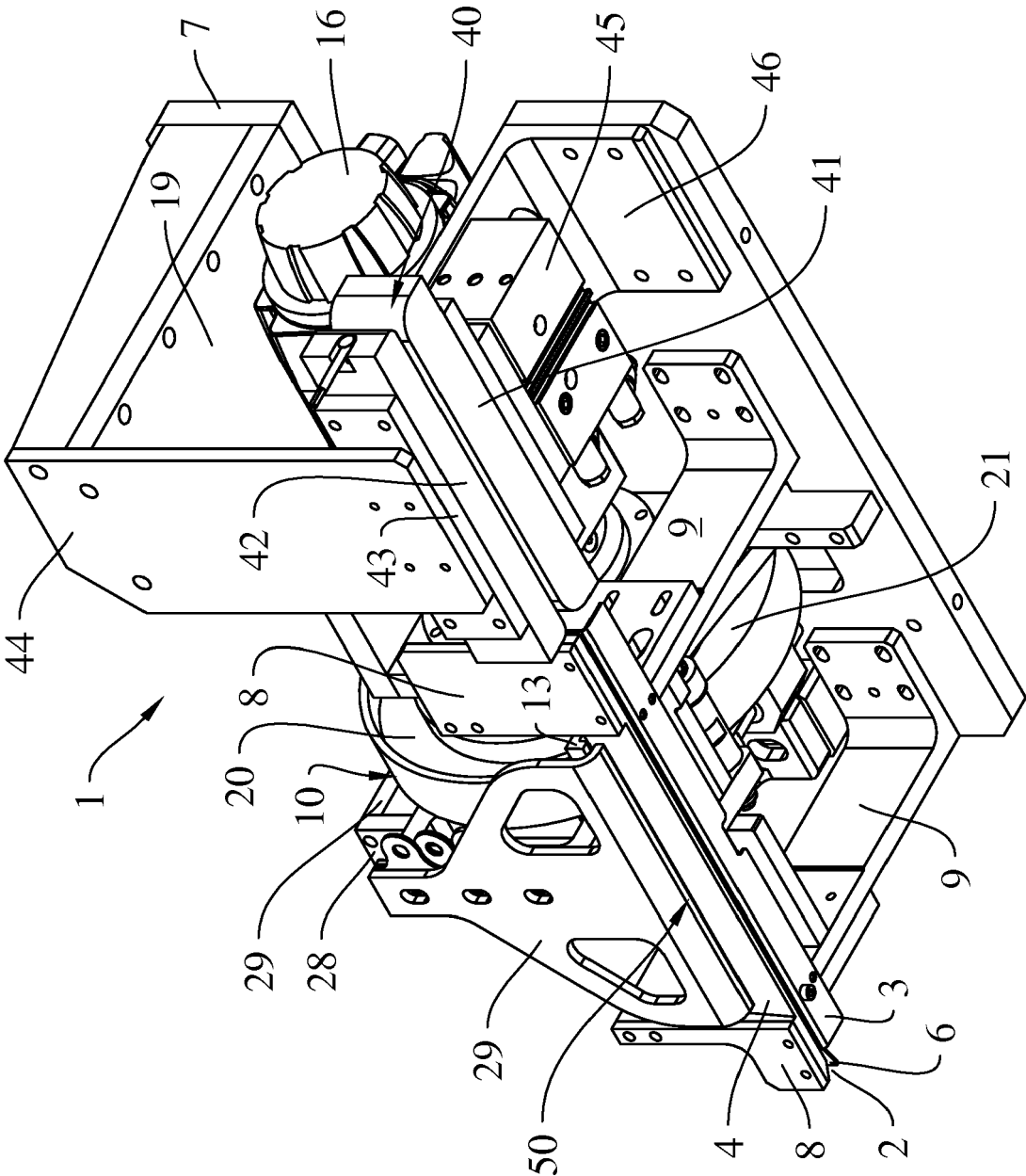


FIG.2

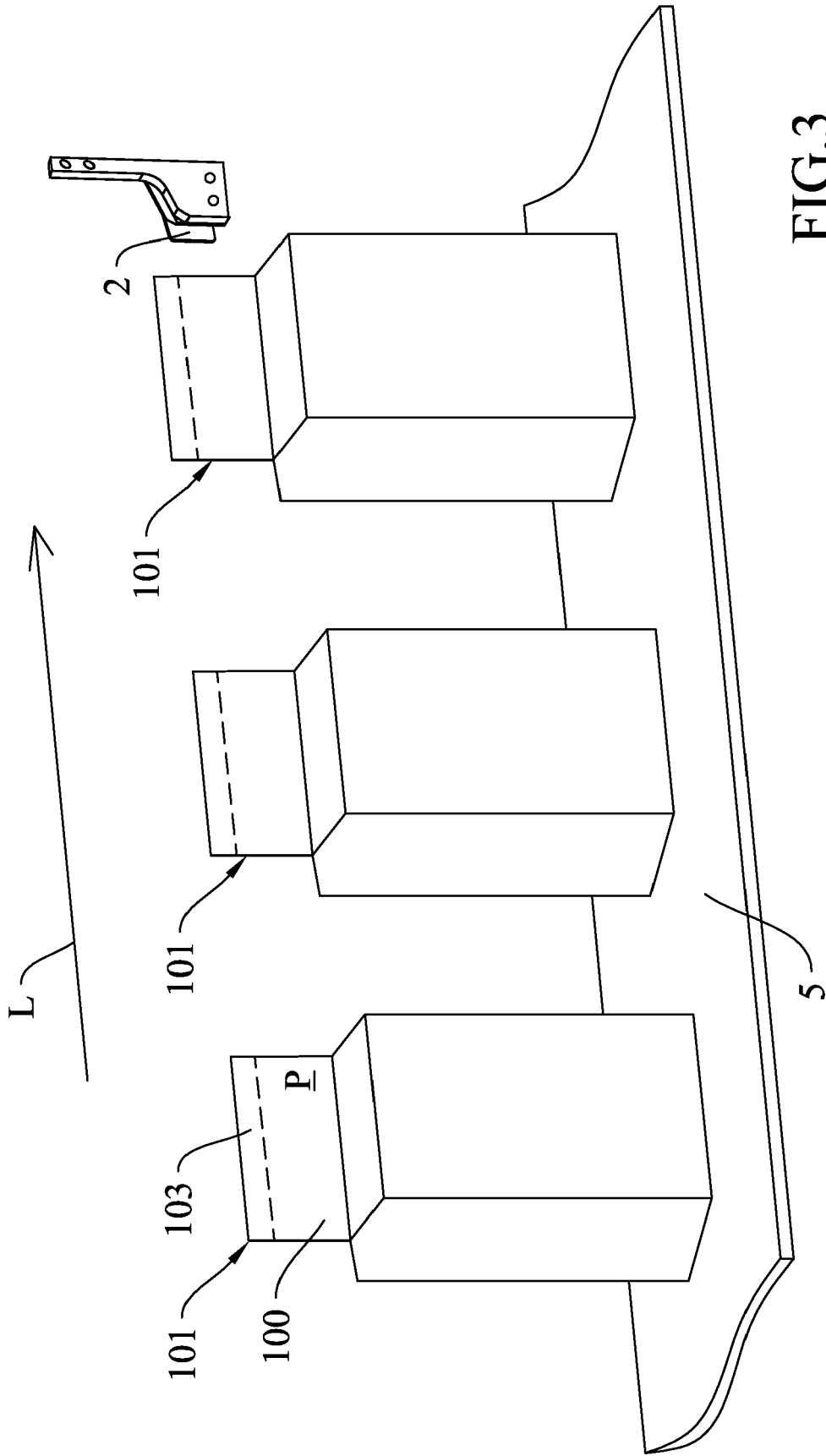


FIG.3

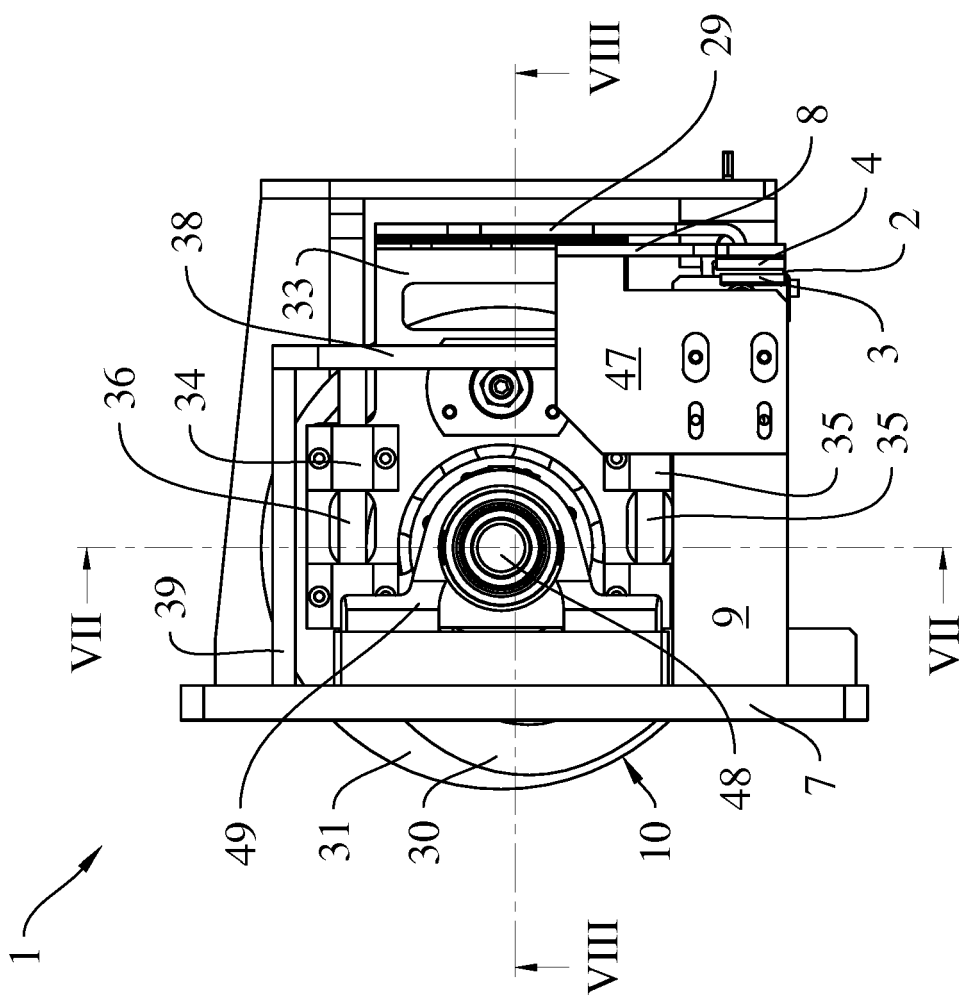


FIG.4

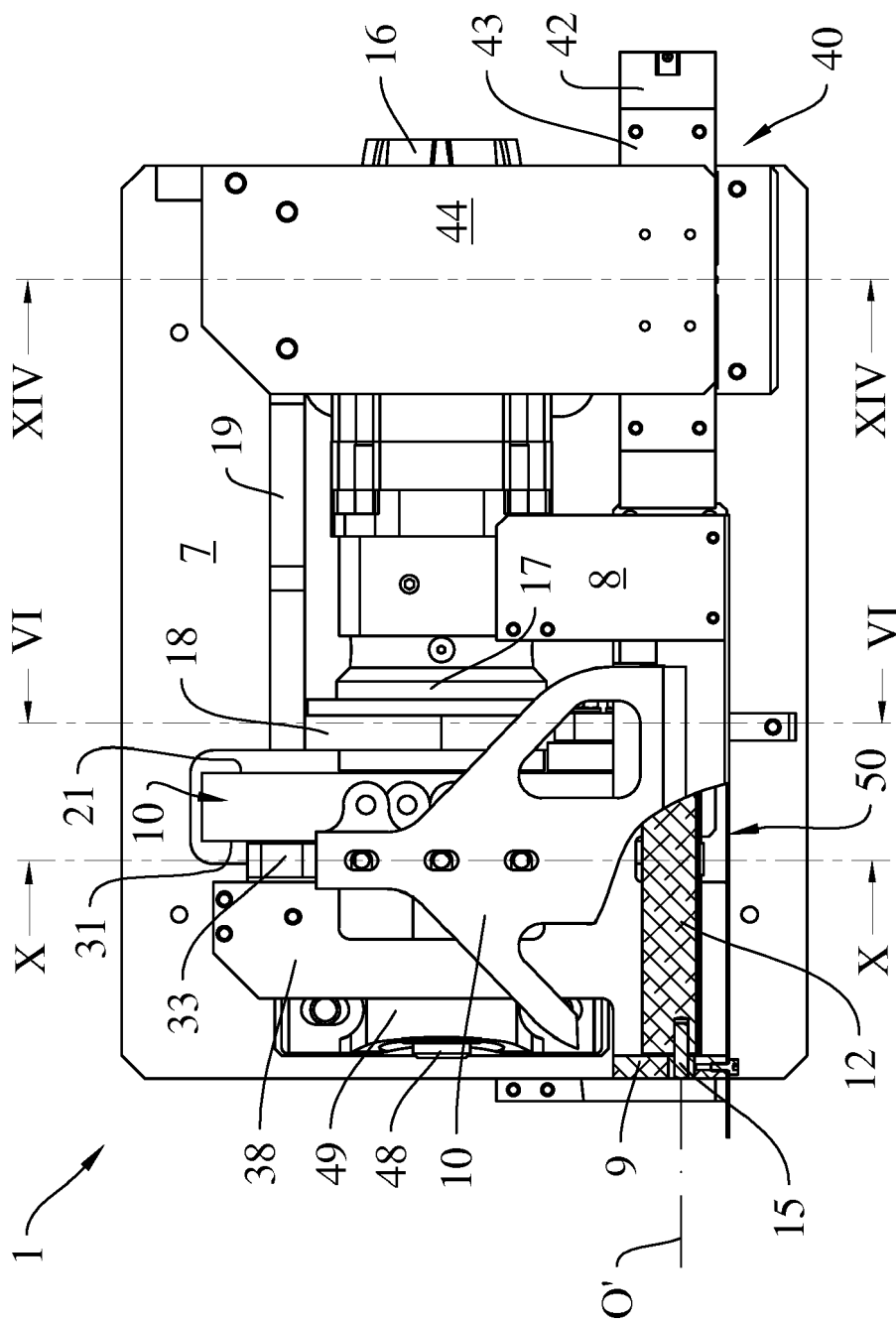


FIG. 5

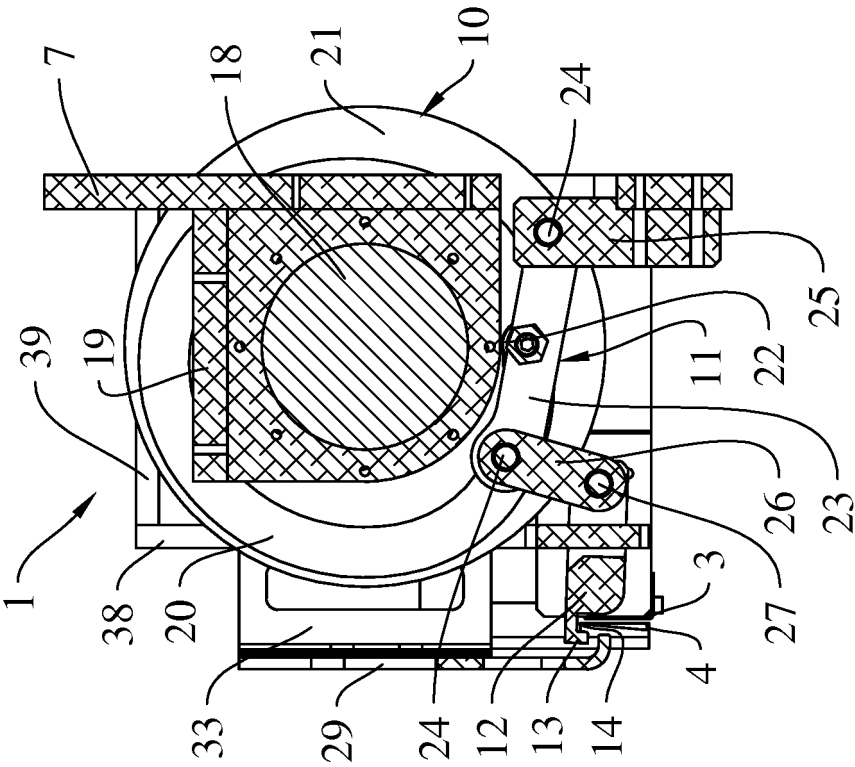


FIG.6

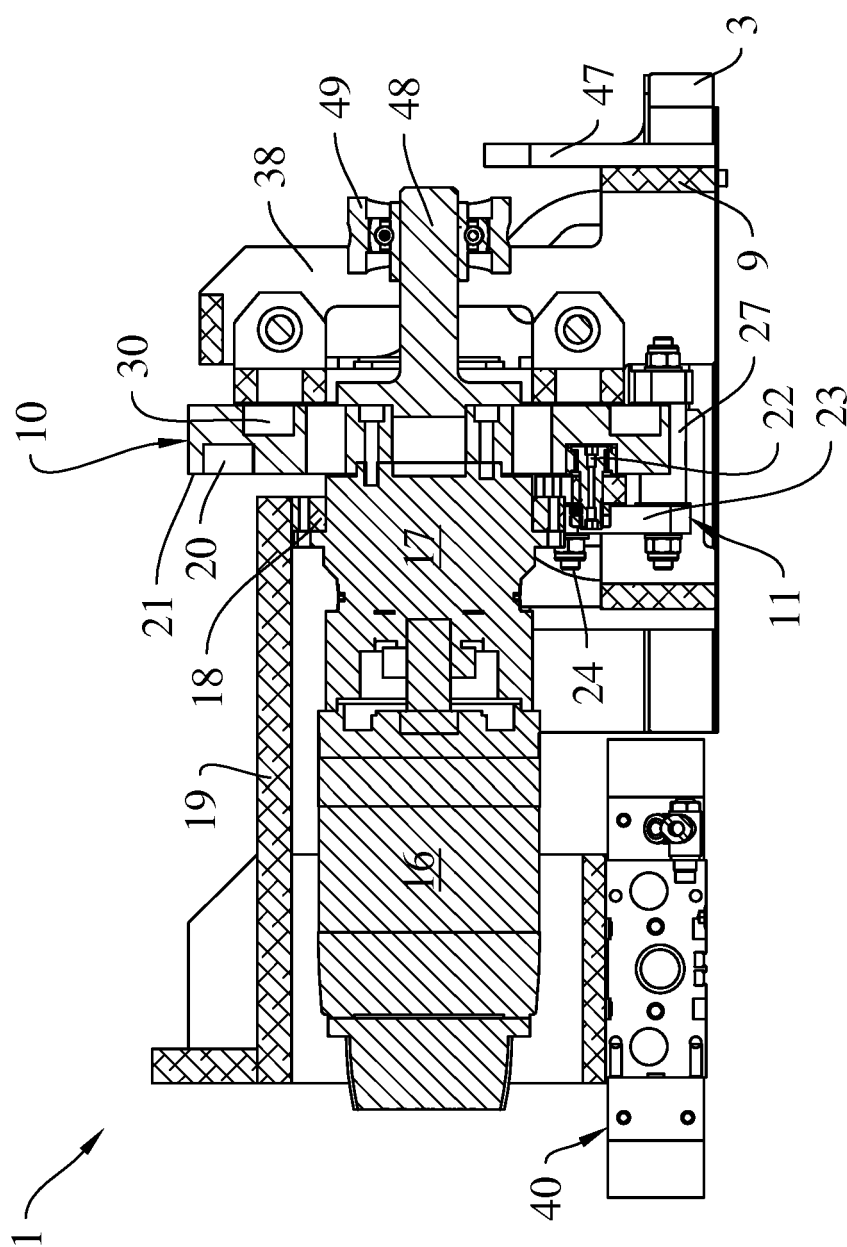


FIG. 7

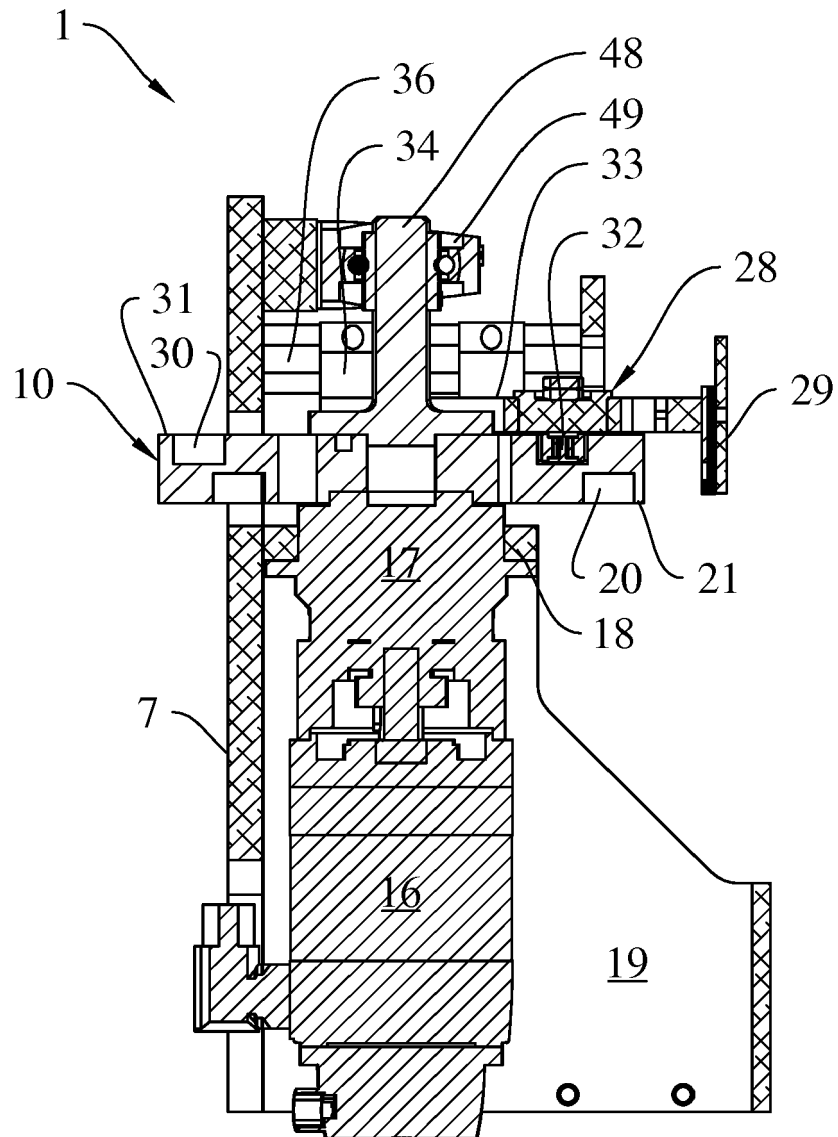


FIG.8

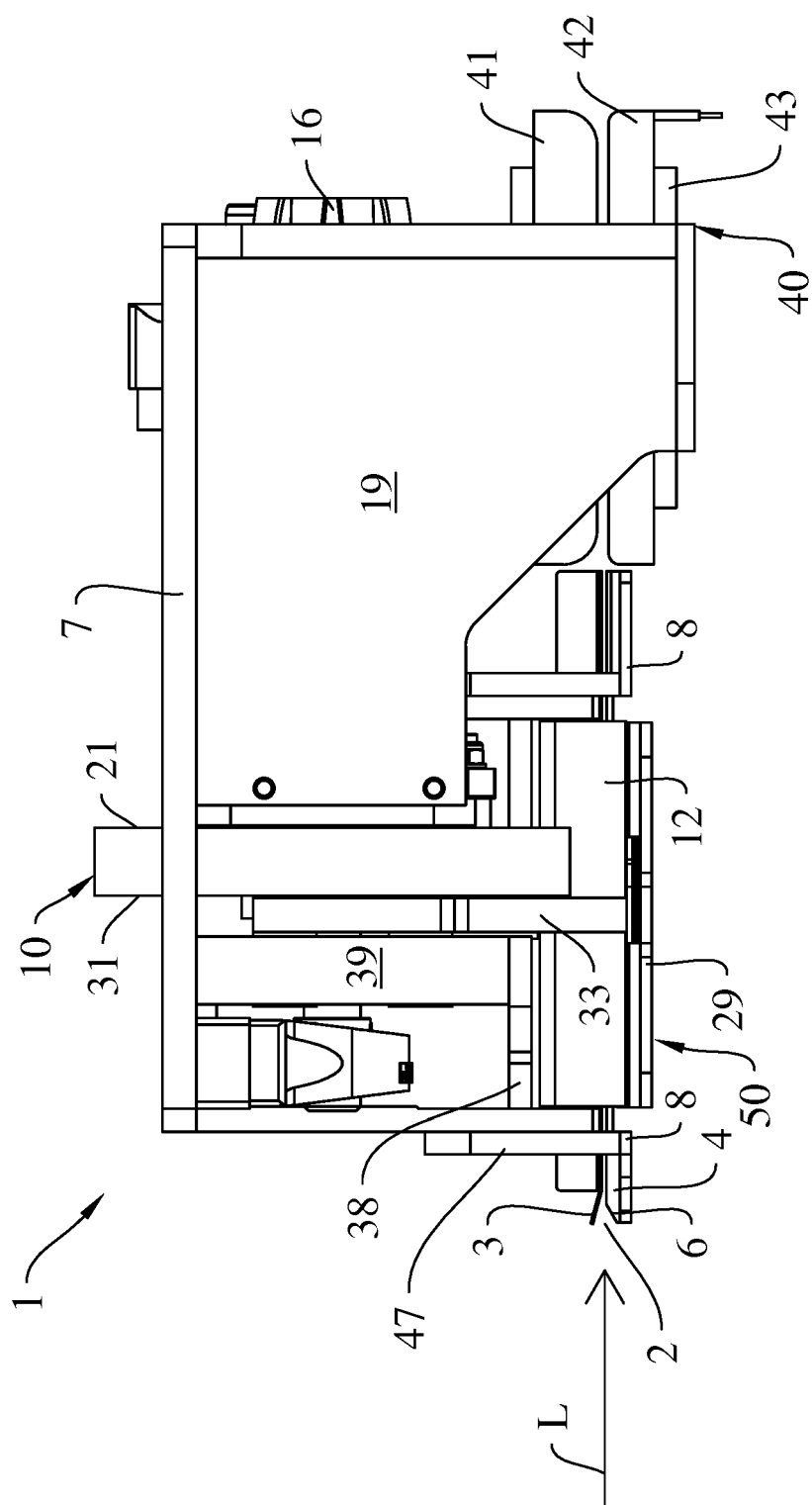


FIG. 9

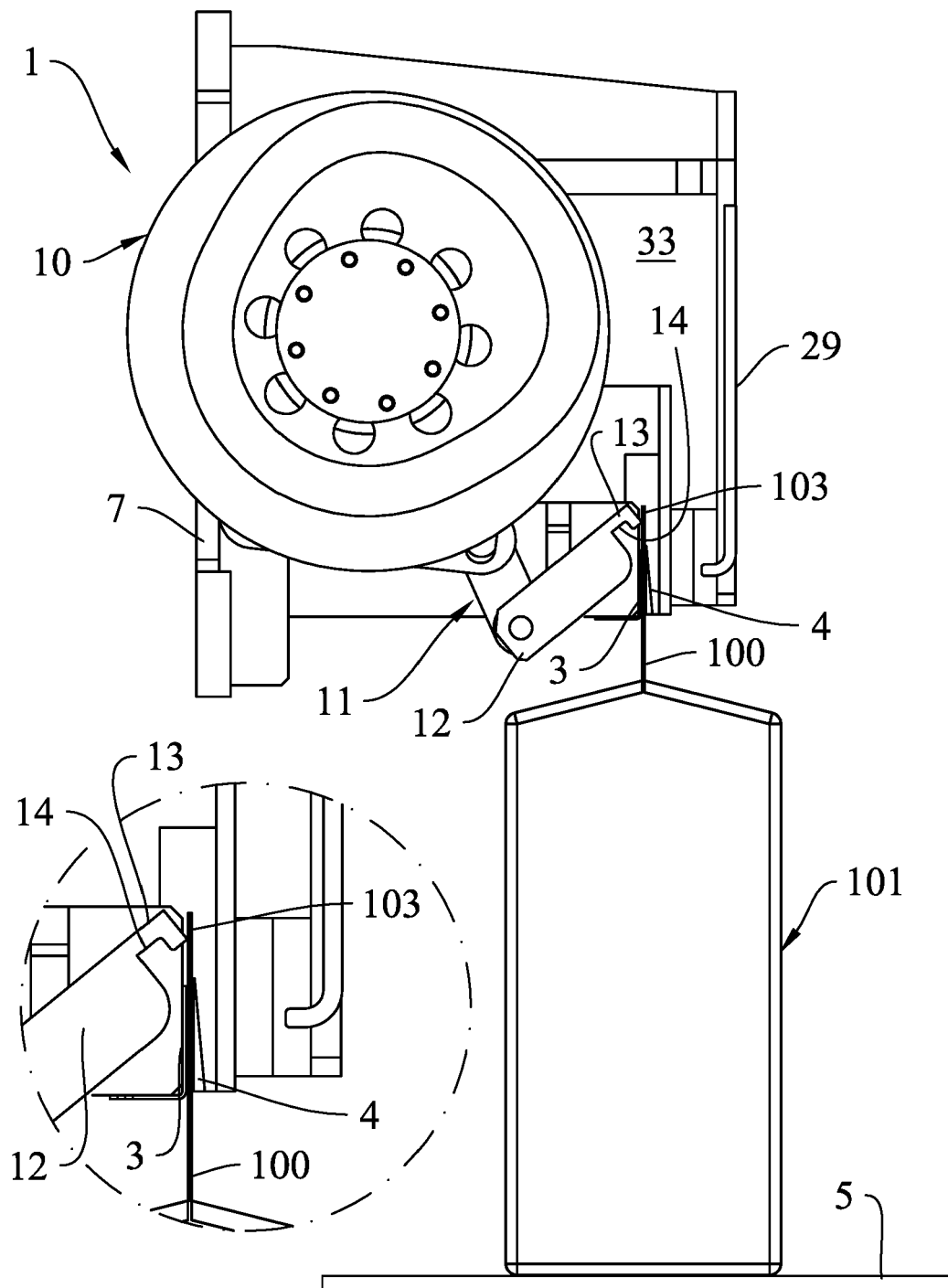


FIG.10

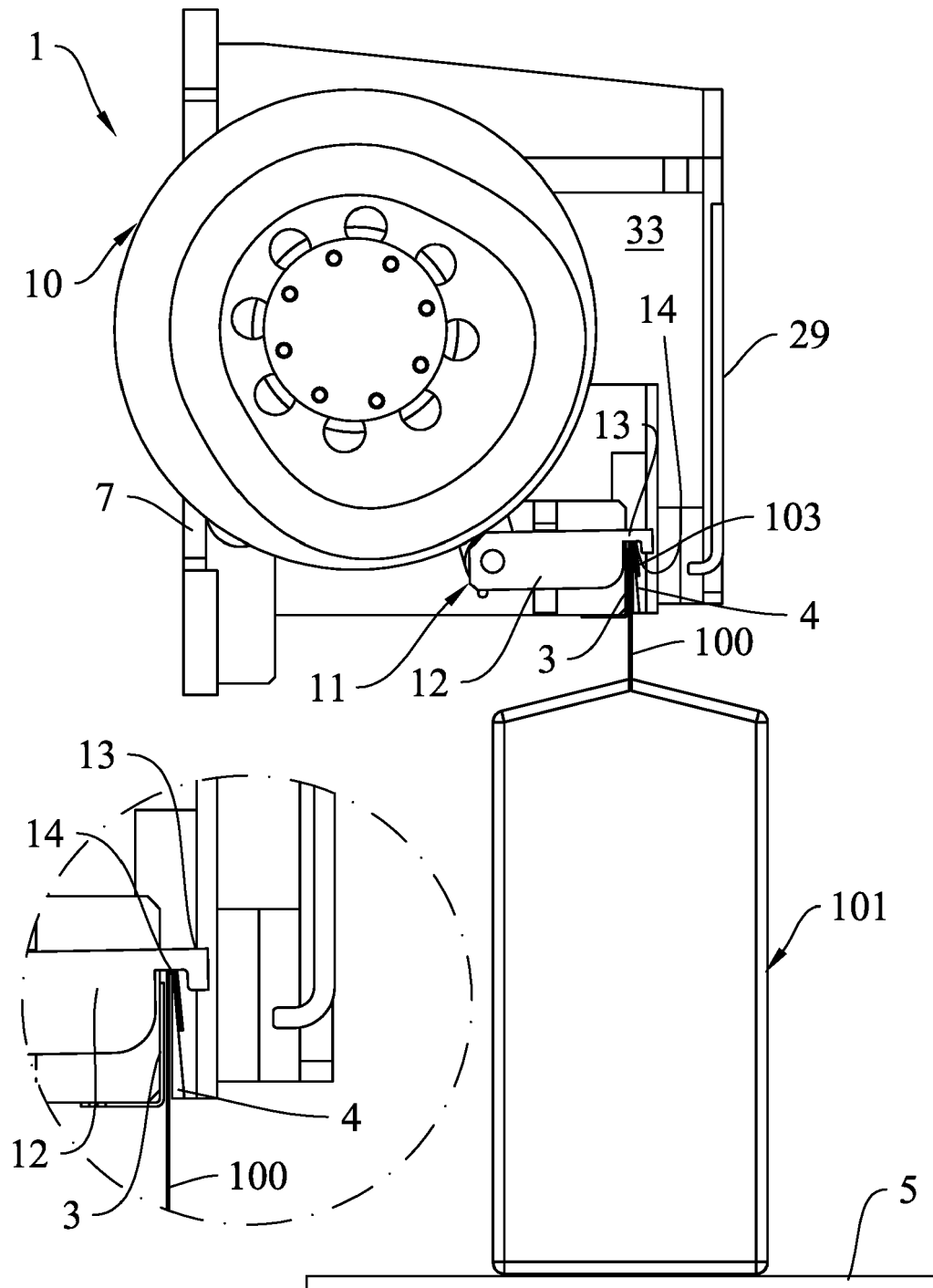


FIG.11

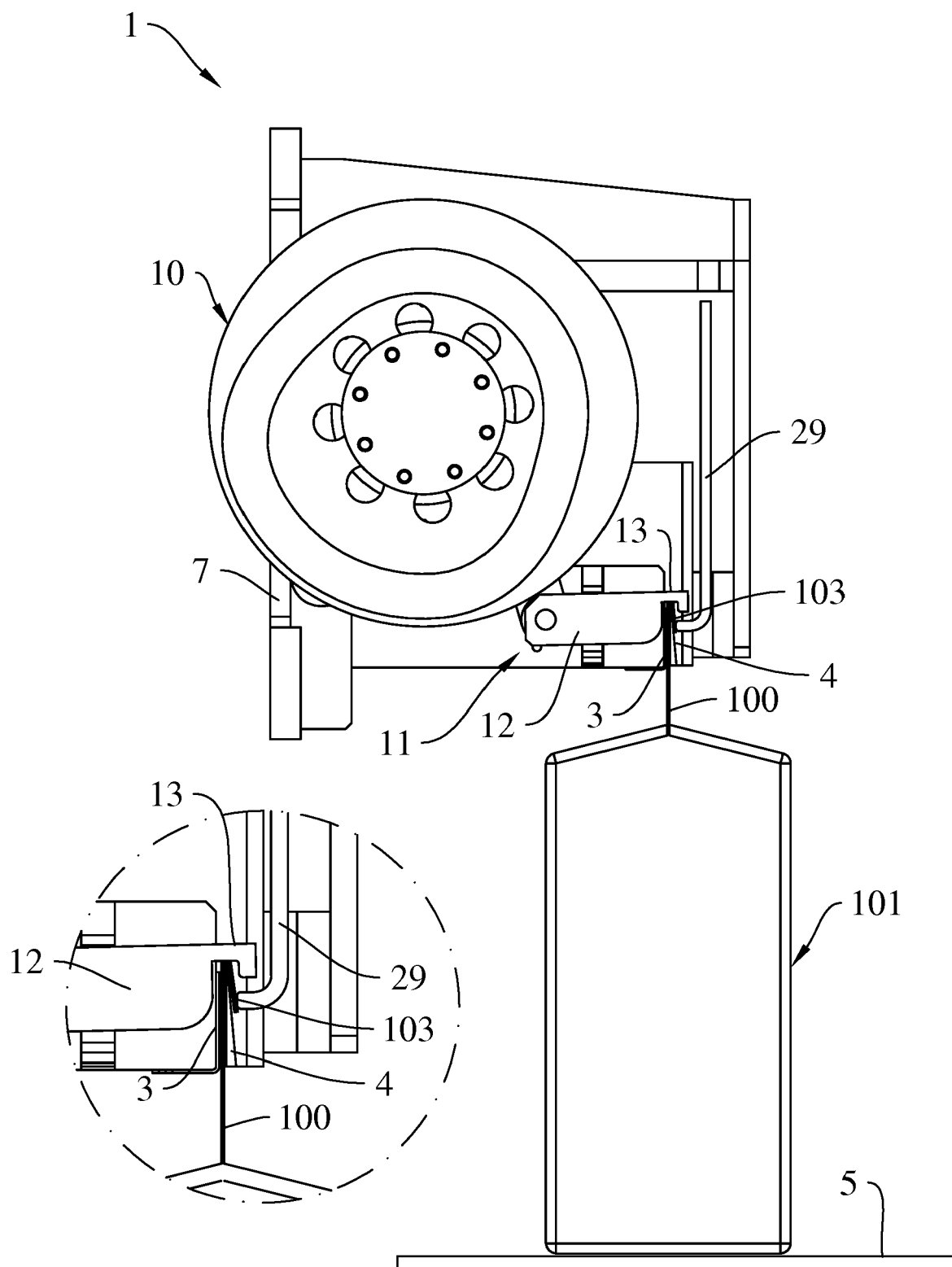


FIG.12

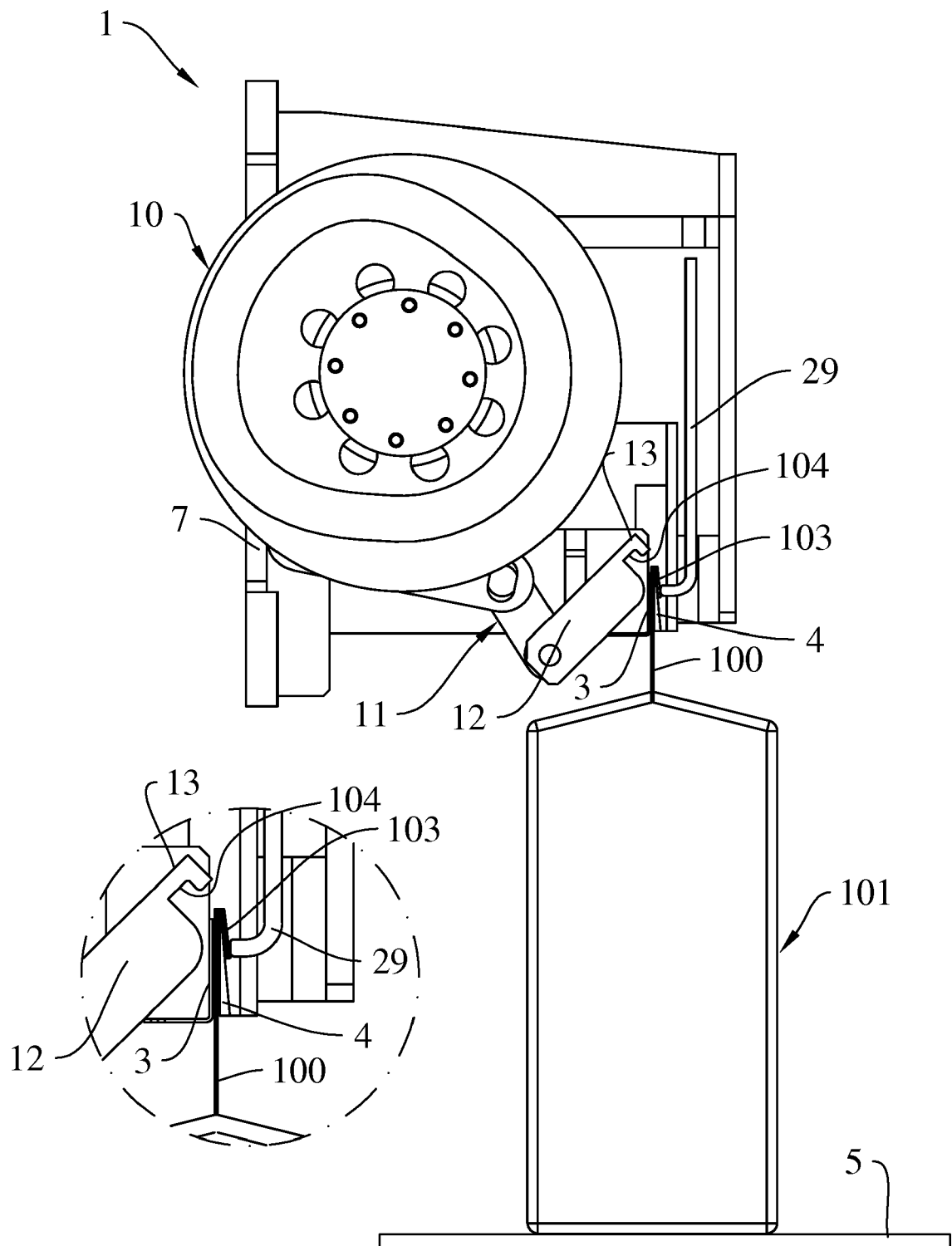


FIG.13

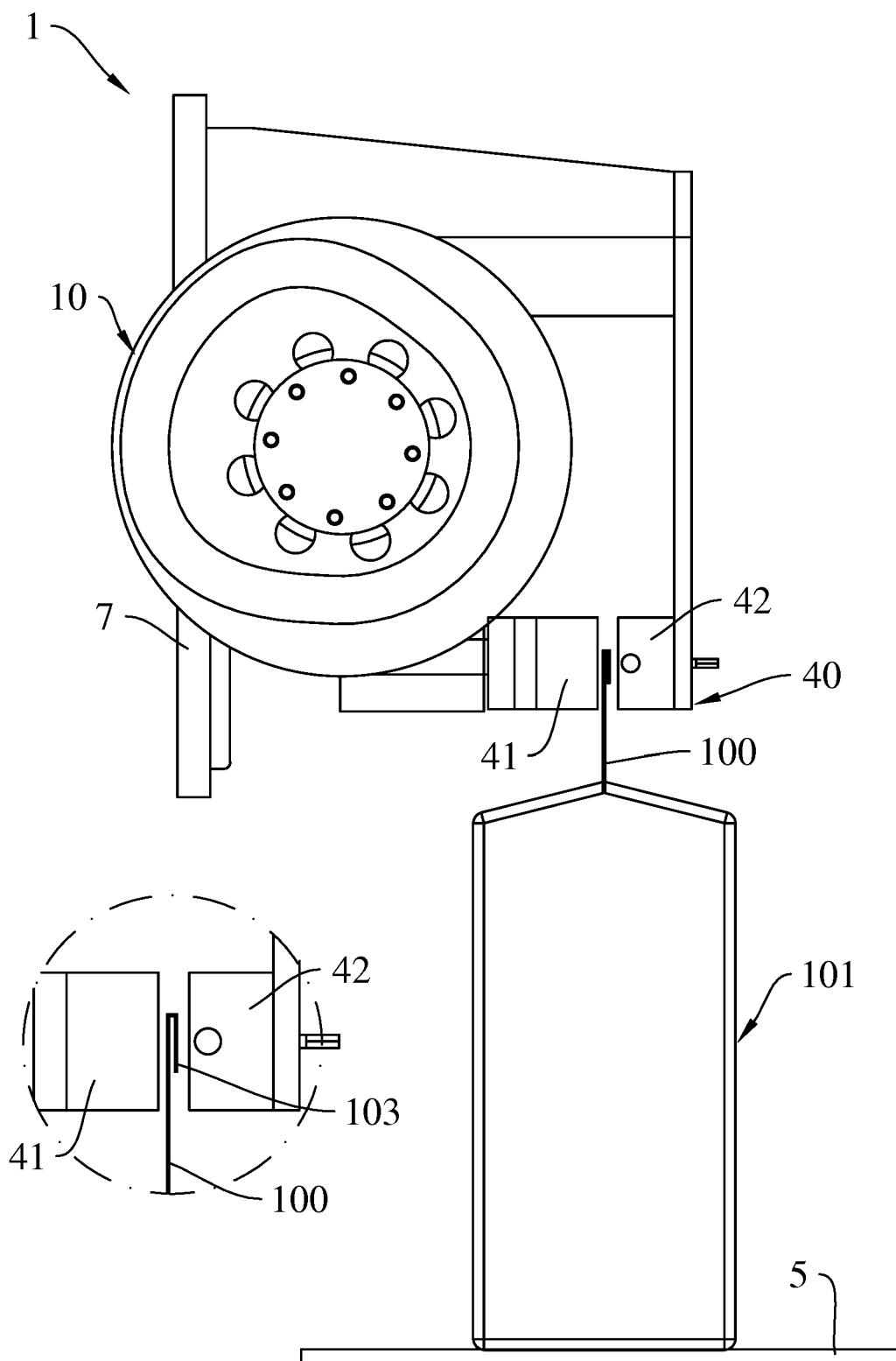


FIG.14

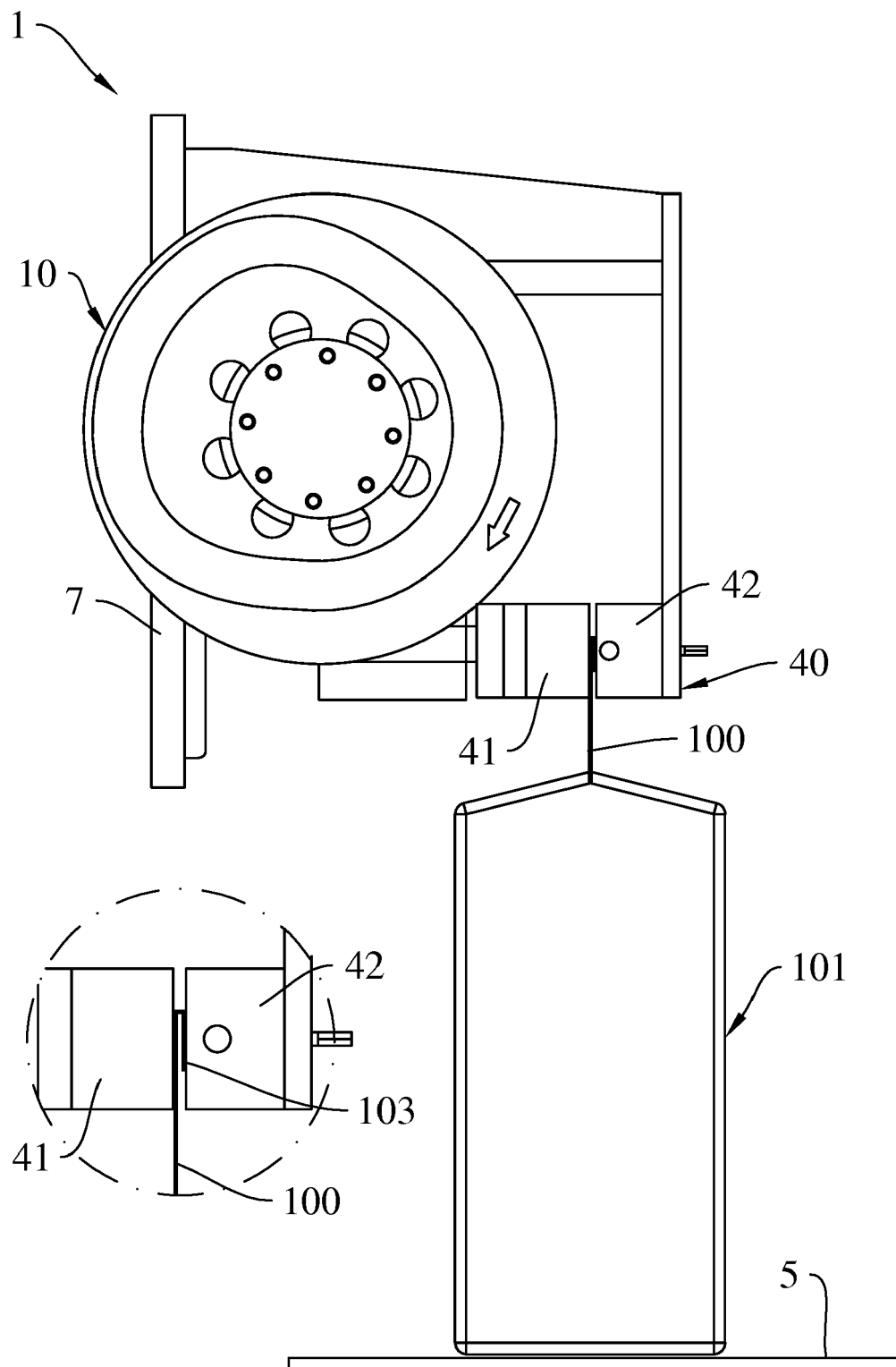


FIG.15



EUROPEAN SEARCH REPORT

Application Number
EP 17 20 8675

5

10

15

20

25

30

35

40

45

50

55

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	DE 12 65 643 B (MAHLKUCH GREIF WERK ERNST) 4 April 1968 (1968-04-04) * column 2, line 44 - column 4, line 19; figures 1-3 *	1-9	INV. B65B7/08 B65B51/14 B65B51/30
A	US 2001/005969 A1 (FOCKE HEINZ [DE] ET AL) 5 July 2001 (2001-07-05) * paragraphs [0018] - [0029]; figures 1,2 *	1-9	
A	US 2 266 946 A (ALLISON CHARLES F) 23 December 1941 (1941-12-23) * page 2, line 44 - page 3, line 21; figures 3-12,16,17 *	1-9	
A	GB 640 936 A (CONS PACKAGING MACHINERY CORP) 2 August 1950 (1950-08-02) * page 3, lines 75-115 * * page 5, line 93 - page 6, line 11; figures 5,6,10-12 *	1-9	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 2 March 2018	Examiner Kulhanek, Peter
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

 1
EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 20 8675

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

02-03-2018

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 1265643 B	04-04-1968	NONE	
US 2001005969 A1	05-07-2001	DE 10000052 A1 EP 1112937 A2 US 2001005969 A1	05-07-2001 04-07-2001 05-07-2001
US 2266946 A	23-12-1941	NONE	
GB 640936 A	02-08-1950	NONE	

15

20

25

30

35

40

45

50

55

EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 1633633 A [0003]
- DE 1265643 [0005]