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(71) Applicant: **Brosiomeccanica S.r.l.**
22079 Villa Guardia (CO) (IT)

(72) Inventor: **Brosio, Pasquale**
22060, NOVEDRATE (CO) (IT)

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

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(54) **Machine for rolling pillows or other elongated soft products**

(57) The present invention describes a machine for rolling substantially soft and elongated products, comprising a base frame (3) that supports rotating means (4) for the support of a roll of plastic film (5), means for threading (15, 16, 35-37, 100-103, 111) said plastic film (5) around a motorised spindle (8, 100), pressure means (6,7) for favouring the rolling of said product (2) around said motorised spindle (8, 100), means for the cutting

(14, 17) of the plastic film (5) and means for the ejection (18, 29, 30, 32-37, 101-102) of the finished rolled product (2). Said ejection means (18, 29, 30, 32-37, 101-102) comprise a pneumatic system (32-37) suitable for generating an air cushion (51) between the spindle (8, 100) and the rolled product (2) on it so as to favour the sliding of said rolled product (2) on the spindle (8, 100) for its axial removal in the ejection phase.

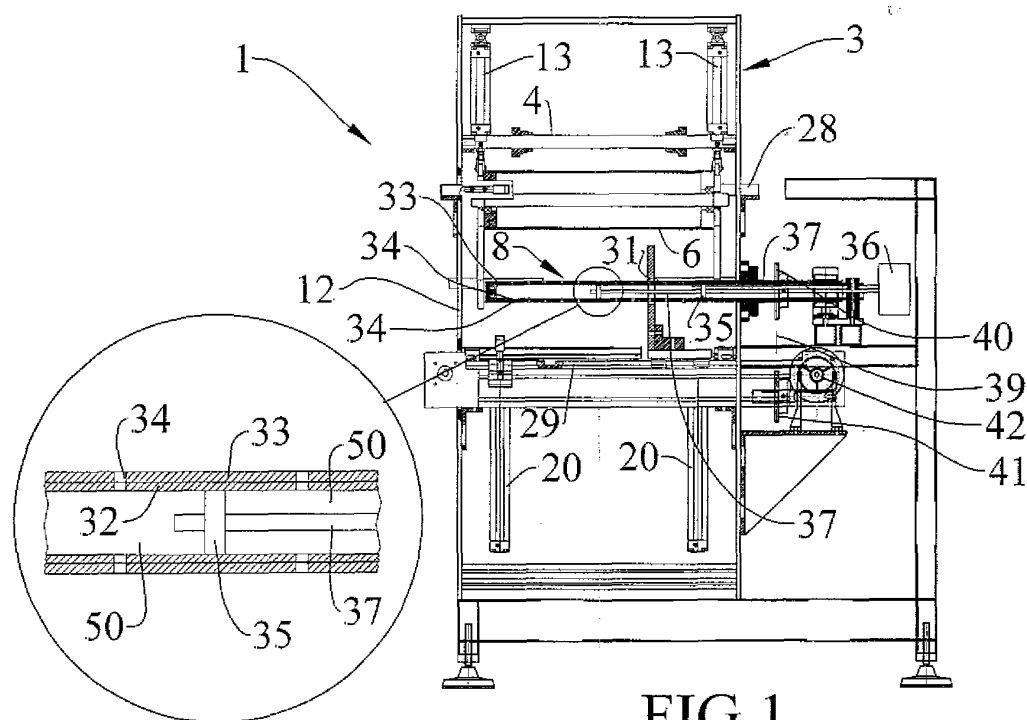


FIG.1

Description

[0001] The present invention herein concerns a machine for rolling pillows or other products.

[0002] A large number of substantially soft products, having a considerable thickness and an elongated shape, such as pillows, mattresses, sleeping bags, quilts, duvets, and similar, can be reduced to rolls to facilitate the transport.

[0003] Machines for rolling said products (hereinafter also called "manufactured products") are known which comprise a support cabin having an infeed zone for the product to be rolled fed by a conveyor belt, and an outfeed zone for the rolled product.

[0004] The cabin houses means for the support of a roll of plastic film (preferably polyethylene), which is first unwound and then wound with the product. This plastic film is useful for sealing the rolled product and for protecting the external surface of the product itself which following the rolling folds and slides on itself. In addition said cabin supports means for threading the plastic film onto a motorised spindle, pressure means for facilitating the winding of the product around said motorised spindle and means for the ejection of the finished rolled product.

[0005] Normally, before starting threading the film, that represents the preliminary phase of rolling the product, the operator has to position a hollow cylindrical core around the spindle, so that there is an intermediate body between said spindle and the rolled product.

[0006] Said core has to be mounted with minimum clearance, that is, such that the core rotates in one with the spindle during the winding and it can be pulled out of the spindle itself, with the rolled product, pushed by suitable ejection means.

[0007] In substance for each product to be rolled it is necessary for the operator to intervene to mount the cylindrical core on the motorised spindle or a complex machine has to be used which is arranged for the mounting of said core.

[0008] Without said intermediate core the product would firmly wind around the spindle and it would be difficult to pull it off without damaging the product itself. In addition the above-mentioned pressure means have the task of reducing to a minimum the space occupied by the finished rolled product, therefore the force with which the product would tighten around the spindle would be considerable.

[0009] The object of the present invention is to produce a machine for rolling substantially soft and elongated products such as pillows, mattresses, sleeping bags, quilts, duvets and similar, comprising a system that enables the ejection of the finished rolled product on the spindle without the interposition of any core between said spindle and said finished rolled product.

[0010] In accordance with the invention said object is achieved with a machine for rolling substantially soft and elongated products, comprising a base frame that supports rotating support means for a roll of plastic film,

means for threading said plastic film around a motorised spindle, pressure means intended to favour the rolling of said product around said motorised spindle, means for cutting the plastic film and means for ejecting the finished rolled product, characterised in that said ejection means comprise a pneumatic system suitable for generating an air cushion between the spindle and the rolled product on it so as to favour the sliding of said product on the spindle and its axial removal in the ejection phase.

[0011] The air cushion generated at the end of the rolling phase permits a minimum clearance between spindle and product at the time of ejection without moreover affecting the compactness of the rolled product.

[0012] These and other characteristics of the present invention will be made more evident by the following detailed description of an embodiment thereof illustrated as non-limiting example in the attached drawings in which:

Figure 1 shows a frontal section view of the machine according to the present invention, one part of a first type spindle being enlarged;

Figure 2 shows a side section view of the machine in the initial position;

Figure 3 shows a side section view of the machine in a position successive to that of Figure 2, that is with the plastic film pulled by the threading means towards the motorised spindle;

Figure 4 shows a side section view of the machine in a position successive to that of Figure 3, that is with the plastic film partially wound around the motorised spindle;

Figure 5 shows a side section view of the machine in a position successive to that of Figure 4, that is with the plastic film wound around the motorised spindle;

Figure 6 shows a side section view of the machine in a position successive to that of Figure 5, that is with the product pressed for facilitating the rolling around the motorised spindle;

Figure 7 shows a side section view of the machine in a position successive to that of Figure 6, that is with the product completely wound around the motorised spindle;

Figure 8 shows a side section view of the machine in a position successive to that of Figure 7, that is after the cutting of the plastic film with the finished rolled product ready to be ejected from the machine; Figure 9 shows an enlarged section view of a detail of Figure 8;

Figure 10 shows a side section view of the machine contrary to the views of Figures 2-8;

Figure 11 shows a lateral view of a second type spindle in a single piece;

Figure 12 shows a sectional view according to line XII-XII of figure 11;

Figure 13 shows a lateral view of said second type spindle in a modular arrangement;

Figure 14 shows an axial sectional view of the spindle

of figure 13 with an enlarged portion;

Figure 15 shows a lateral sectional view of the machine in a first threading position with said second type spindle;

Figure 16 shows a lateral sectional view of the machine in a threading position successive to that of figure 15.

[0013] The Figures show a machine 1 for rolling pillows or manufactured products 2 comprising a cabin 3 that supports a rotating shaft 4 of support for a roll of plastic film 5 (preferably polyethylene), a pressure cylinder 6 controlled by a regulation unit 7 comprising pneumatically-controlled cylinders 13, and a motorised horizontal spindle 8 around the plastic film 5 and the pillow 2 are wound.

[0014] The cabin 3 has an infeed zone 9 for the pillow 2 to be rolled, fed by a conveyor belt 10 supported by a steel structure 11 adjacent to the cabin 3, and an outfeed zone 12 for the rolled pillow 2.

[0015] In addition the cabin 3 supports fixed side grippers 14 to block the film 5 during the cutting, mobile grippers 15 for unwinding the roll of plastic film 5, and a threading unit 16 for favouring the winding of the plastic film 5 around the spindle 8, a cutter 17 for cutting the plastic film 5 at the end of the winding and permitting a motorised pusher 18 to eject the rolled pillow 2.

[0016] The mobile grippers 15 are in one with a rod 19 of a pneumatic cylinder 20.

[0017] The threading unit 16 comprises a controlled mobile arm 21 with end wheel 22 that slides along a guide 23 that can be inclined by means of a pneumatic piston 24 and a hinge 25.

[0018] The cutter 17 comprises a blade 26 in one with a mobile trolley 27 that slides along a horizontal guide 28, in particular a cylinder without stem.

[0019] The motorised pusher 18 has a hole 31 intended to engage with the spindle 8, and slides along a guide 29 by means of wheels 30, said guide 29 including timing drive belts that are not shown.

[0020] The motorised spindle 8 comprises an internal hollow cylinder 32 in one with the cabin 3 and a rotatable hollow external cylinder 33 coaxial to said first cylinder 32. Both the cylinders 32-33 have peripheral holes 34. The clearance between the cylinders 32-33 is minimum so as to guarantee the rotation of the external cylinder 33 on the internal cylinder 32.

[0021] The internal cylinder 32 is subdivided into hermetically sealed compartments 50 by separators 35.

[0022] An electronically controlled pneumatic device 36, supplies compressed air to each hermetically sealed compartment 50 through feeding tubes 37.

[0023] The spindle 8 rotates thanks to a chain transmission 38 (Figure 9) constituted by a chain 39 drawn between a driven pinion 40 fitted on the spindle 8 and a driving pinion 41 moved by a motor 42.

[0024] Figures 11-14 show a second type of a motorized spindle 100, comprising a single hollow cylinder 101

with a series of holes 102 arranged according to a straight line parallel to the axis of the spindle 100. In particular figures 11-12 show a spindle 100 in a single piece (simple spindle 100), thus with a single hermetically sealed compartment 50; figures 13-14 show a spindle 100 composed with more than one interconnected modules 103 (modular spindle 100), each module individuating a hermetically sealed compartment 50.

[0025] The modular spindle 100 shown in figures 12-13 allows to vary the length of the spindle 100 according to the dimensions of the product to be rolled.

[0026] From the enlargement of figure 14, it is possible to note the separator 35 with holes 111 for the passage of tubes 37 for feeding/suction of air. The not engaged holes 111 are hermetically stopped.

[0027] The operating of the machine 1 described above can be understood by observing the Figures 2-8.

[0028] Initially (Figure 2) the pillow 2 is placed on the conveyor belt 10 and the preliminary threading phase of the plastic film 5 around the spindle 8 is started.

[0029] The mobile grippers 15 grip the ends of the plastic film 5 pulling it until it reaches the spindle 8 (Figure 3) where the threading unit 16 starts favouring the winding of the plastic film 5 around the spindle 8 (still immobile). In Figure 4 it is possible to observe the lengthening of the inclined arm 21 following the movement of the piston 24.

[0030] If on the machine 1 is mounted the spindle 100 with a single hollow cylinder 101, it isn't necessary the presence of the threading unit 16. In fact the grippers 15 drag the plastic film 5 close to the spindle 100 (figure 15), positioned so that the series of holes 102 is in front of the plastic film 5. The device 36, by the tubes 37, useful also during the ejection operation, sucks air making the plastic film 5 adherent to the spindle 100 (figure 16).

[0031] The spindle 8, 100 then starts to rotate first pulling the plastic film 5, then the pillow 2. In fact the latter is brought to the spindle 8 by means of the conveyor belt 10, and the pressure cylinder 6 compresses the pillow 2 reducing its thickness and thus favouring its rolling (Figure 6). In the meantime the plastic film 5 continues winding up thus supplying a protection to the surface of the pillow 2, which in this manner does not slide on itself in consequence of the rolling.

[0032] The rolling of the pillow 2 and the winding of the plastic film 5 having finished, the spindle 8 is blocked, the cutter 17 cuts the plastic film 5 blocked by the fixed grippers 14 and the pressure cylinder 6 is taken away (Figures 7-8).

[0033] The rolled pillow 2 is ready to be ejected.

[0034] The ejection phase consists of first an air cushion 51 (Figure 9) being generated between spindle 8 and pillow 2, then the pusher 18 activates to pull out said pillow 2 from the spindle 8.

[0035] For the air cushion to be generated the device 36 has to supply compressed air into the hermetically sealed compartments 50 separated by the separators 35 by means of the tubes 37. The air flows through the in-

terstices between the cylinder 32-33. The subdivision into hermetically sealed compartments 50 serves to limit the loss of pressure that could make the air cushion non-homogeneous.

[0036] Once the air cushion has been created the pusher 38 pushes the rolled pillow 2 out of the machine without meeting any particular resistance.

[0037] The cycle is thus terminated and the machine is ready to start with a new pillow.

[0038] The machine 1 according to the present invention is thus capable of ejecting the rolled pillow 2 without the use of cylindrical cores between the spindle 8 and the pillow 2. The machine can operate within a manufacturing chain without operator.

[0039] In addition an interface operator panel is provided for. The electric panel is complete with control system.

[0040] Instead of the pillow 2, mattresses, sleeping bags, quilts, duvets and similar can also be rolled (manufactured products in general).

[0041] The use of the spindle 100 entails appreciable advantages about encumbrance (there isn't the threading unit 16, the spindle 100 being used also for the threading operation) and about work time (the threading operation is easier). Also, the spindle 100 is constructively easier than the spindle 8.

[0042] The spindle 100 can be used with the threading unit 16 too.

Claims

1. Machine for rolling substantially soft and elongated products, comprising a base frame (3) that supports rotating means (4) of support for a roll of plastic film (5), means for threading (15, 16, 35-37, 100-103, 111) said plastic film (5) around a motorised spindle (8, 100), pressure means (6, 7) intended to favour the rolling of said product (2) around said motorised spindle (8, 100), means for the cutting (14, 17) of the plastic film (5) and means for the ejection (18, 29, 30, 32-37, 101-102) of the finished rolled product (2), **characterised in that** said ejection means (18, 29, 30, 32-37, 101-102) comprise a pneumatic system (32-37) suitable for generating an air cushion (51) between the spindle (8, 100) and the rolled product (2) on it so as to favour the sliding of said rolled product (2) on the spindle (8, 100) for the axial removal of it in the ejection phase.
2. Machine according to claim 1, **characterised in that** said spindle (8) consists of an internal hollow cylinder (32) in one with the frame and an external hollow cylinder (33), coaxial, substantially with minimum clearance, to the internal cylinder (32) and that rotates on it (32).
3. Machine according to claim 2, **characterised in that**

said internal hollow cylinder (32) is subdivided into hermetically sealed compartments (50).

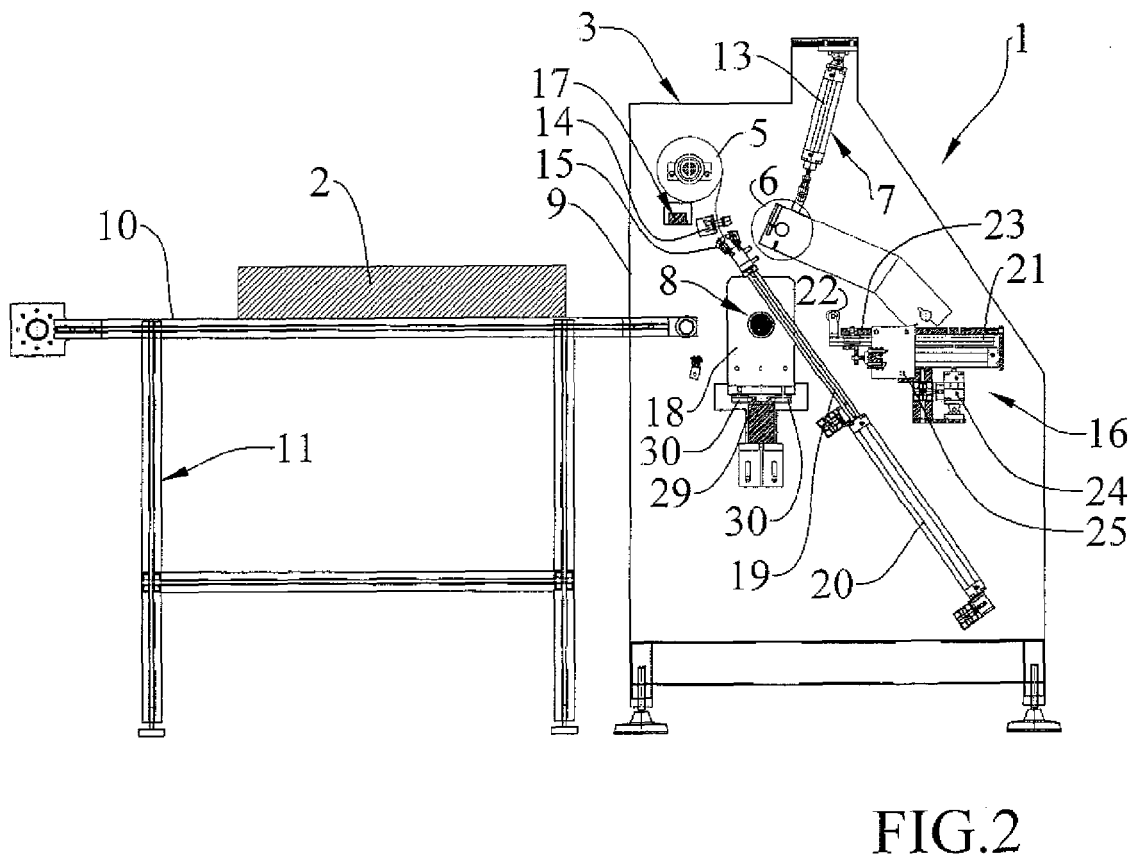
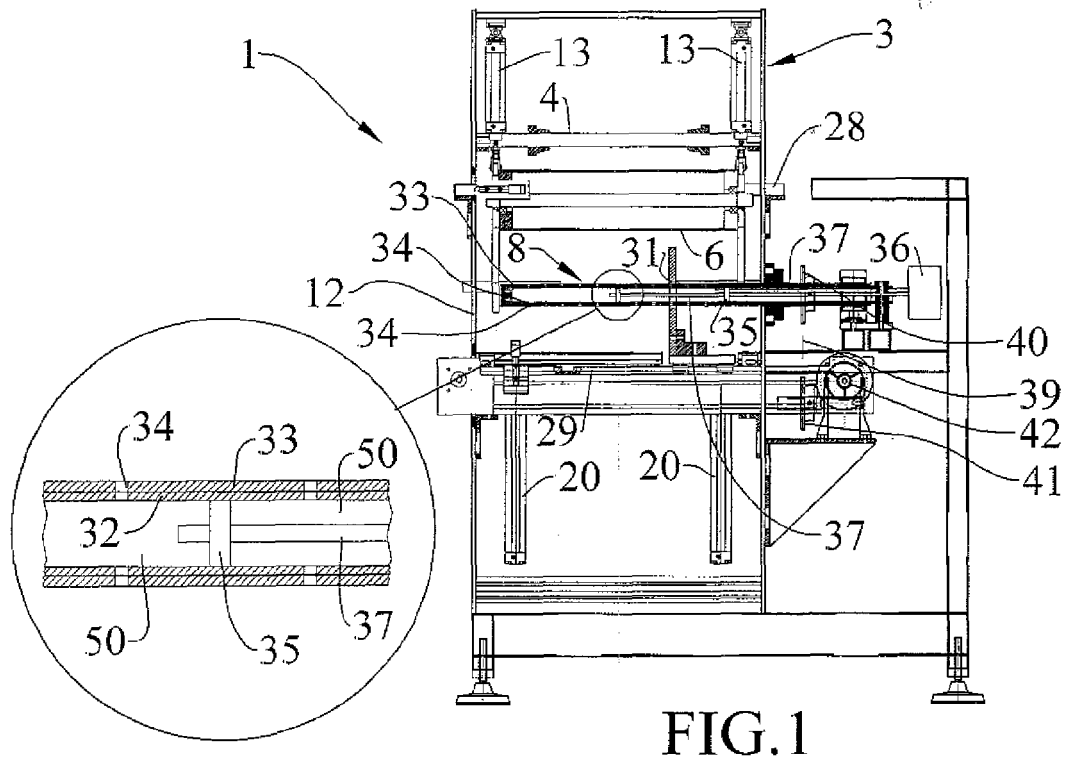
4. Machine according to any of the claims 2 and 3, **characterised in that** said hollow coaxial cylinders (32-33) comprise holes (34).
5. Machine according to any of the claims 2-4, **characterised in that** said pneumatic system comprises at least one delivery tube (37) of the compressed air in the internal hollow cylinder (32).
6. Machine according to any of the claims 2-4, **characterised in that** said pneumatic system comprises a delivery tube (37) of the compressed air for each hermetically sealed compartment (50).
7. Machine according to any of the previous claims, **characterised in that** said means for threading the plastic film (5) around the spindle (8, 100) comprise fixed grippers (14), mobile grippers (15) suitable for unrolling the plastic film (5), and a threading unit (16) for engaging the free end of the plastic film (5) with the spindle (8, 100).
8. Machine according to claim 7, **characterised in that** said threading unit (16) comprises a mobile arm (21), with end threading wheel (22), along a guide (23) that can be inclined by means of a pneumatic piston (24).
9. Machine according to claim 7, **characterised in that** said mobile grippers (15) are in one with a mobile rod (19) of a pneumatic cylinder (20) in one with the frame (3).
10. Machine according to any of the previous claims, **characterised in that** said pressure means (6, 7) comprise a pressure cylinder (6) controlled by a regulation unit (7).
11. Machine according to claim 10, **characterised in that** said regulation unit comprises pneumatic cylinders (13).
12. Machine according to any of the previous claims, **characterised in that** said product (2) to be rolled is fed by dragging means comprising a conveyor belt (10).
13. Machine according to any of the previous claims, **characterised in that** said cutting means comprise a cutter (17) constituted by a blade (26) linked to a mobile trolley (27) along a horizontal guide (28) supported by the frame (3).
14. Machine according to any of the previous claims, **characterised in that** said motorised pusher (18)

is mobile along a horizontal guide (29).

15. Machine according to any of the previous claims, **characterised in that** it comprises a motorized spindle (100) having a hollow cylinder (101) with holes (102). 5
16. Machine according to claim 15, **characterised in that** said holes (102) are lined up with a straight line parallel with the axis of said hollow cylinder (101). 10
17. Machine according to any of the claims 15-16, **characterised in that** said hollow cylinder (101) is composed by interconnected hermetically sealed modules (103) separated by separators (35). 15
18. Machine according to any of the previous claims, **characterised in that** the threading means comprise the spindle (100) and air suction means (36-37) from the hollow cylinder (101). 20
19. Process for rolling a substantially soft and elongated product, comprising the operations of:
- Threading plastic film (5) onto a motorised spindle (8, 100); 25
 - simultaneously winding the plastic film (5) and rolling the product (2) after pressing the product itself (2) at the beginning of the rolling of the latter around the spindle; 30
 - cutting the plastic film (5);
 - ejection of the finished rolled product (2);
- characterised in that** said ejection comprises the pumping of compressed air to create an air cushion (51) between the spindle (8, 100) and the finished rolled product (2) so as to permit the sliding of the finished rolled product (2) on the spindle (8, 100) for its axial removal from the same spindle (8, 100). 35 40
20. Process according to claim 19, **characterised in that** said threading comprises the positioning of the plastic film (5) by grippers (15) and the suction of air from the spindle (100). 45

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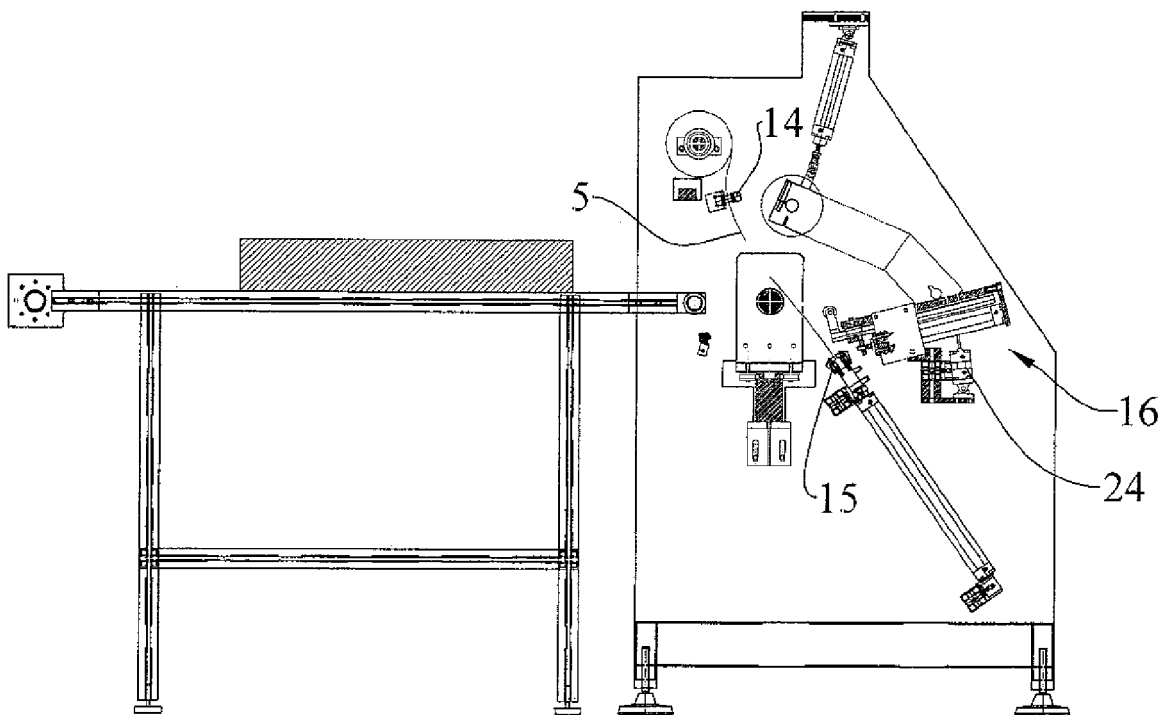


FIG. 3

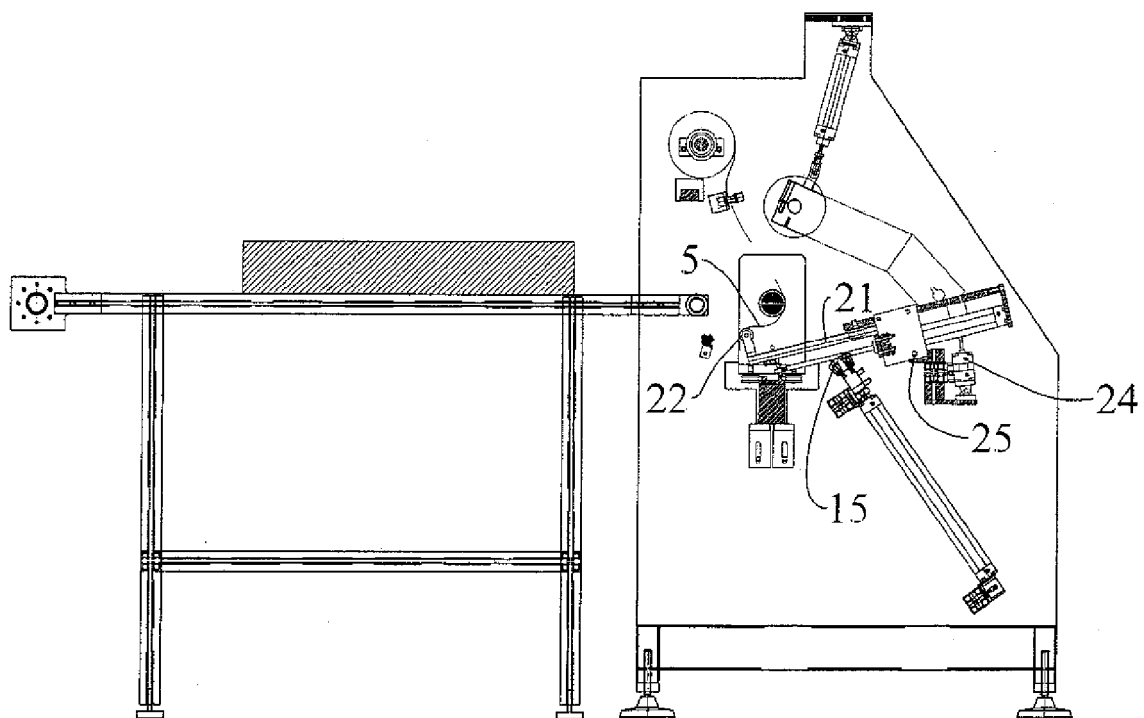


FIG. 4

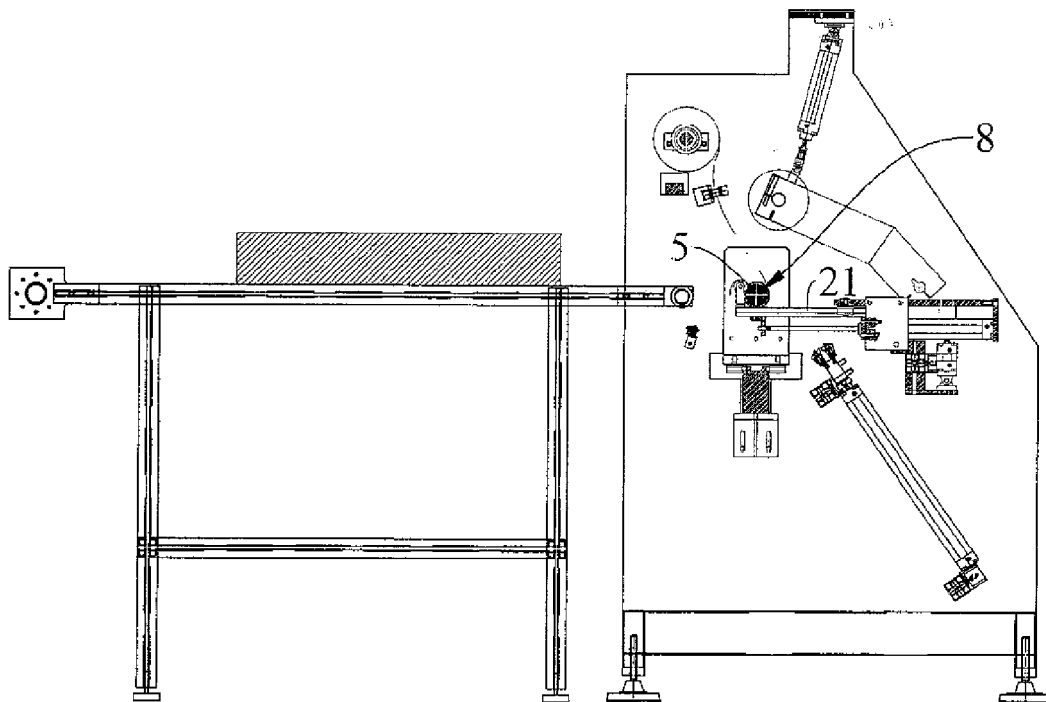


FIG. 5

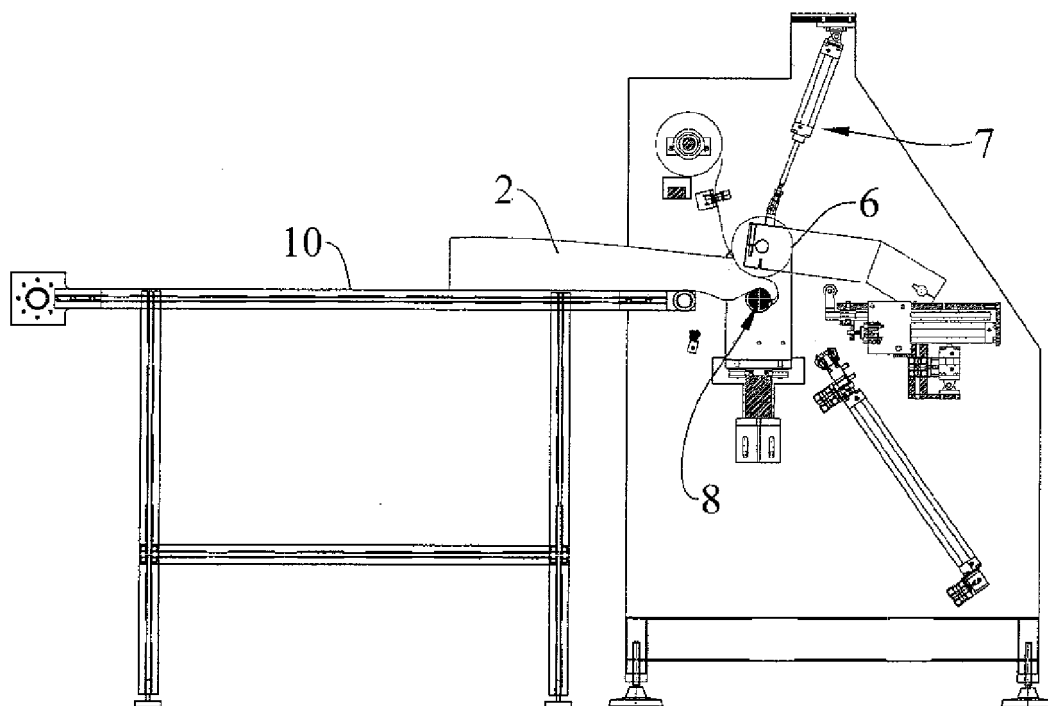


FIG. 6

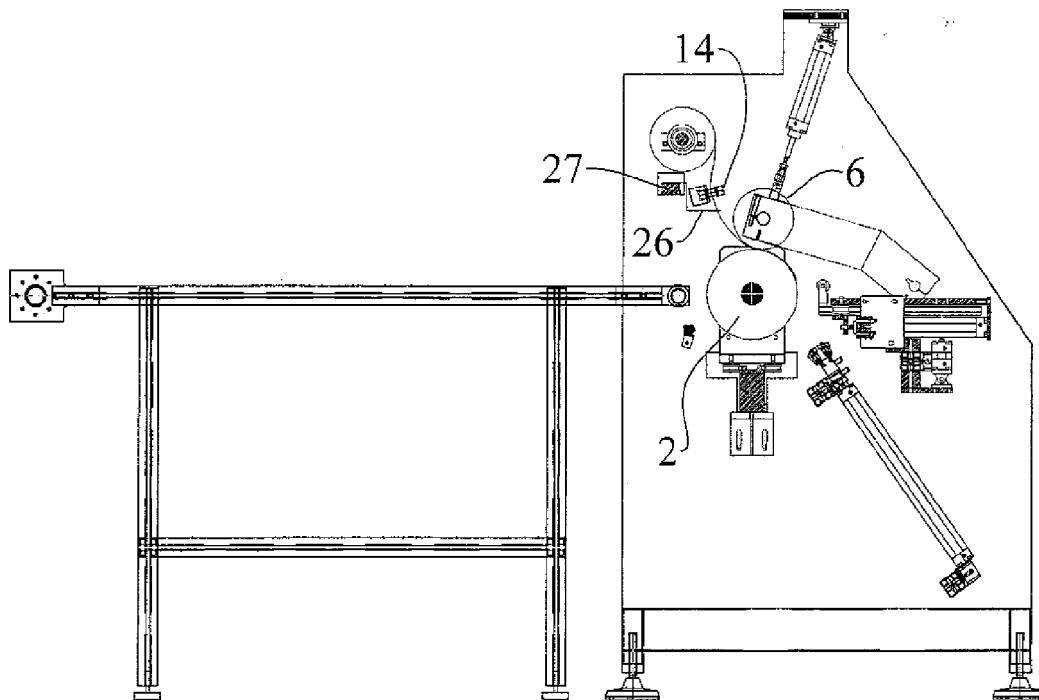


FIG. 7

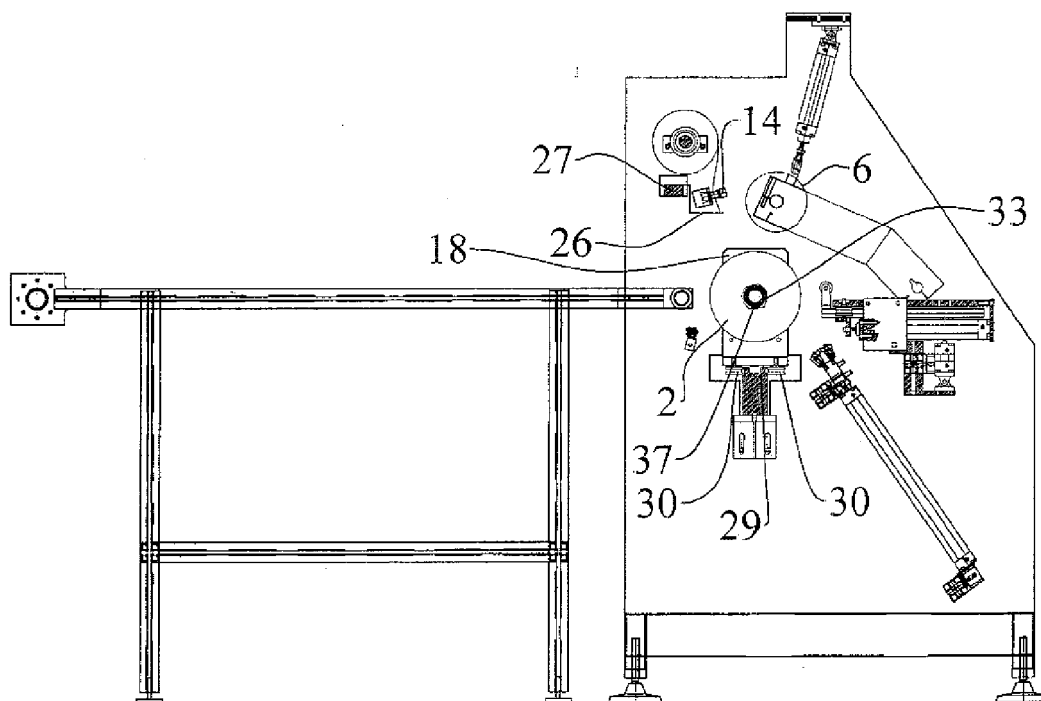


FIG. 8

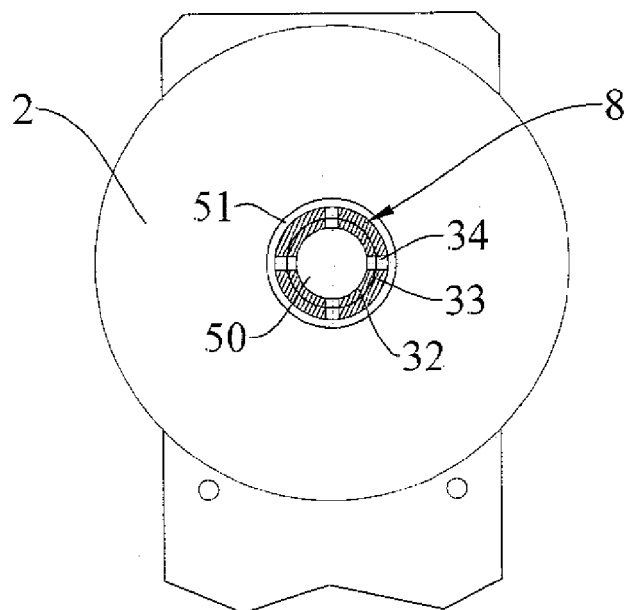


FIG. 9

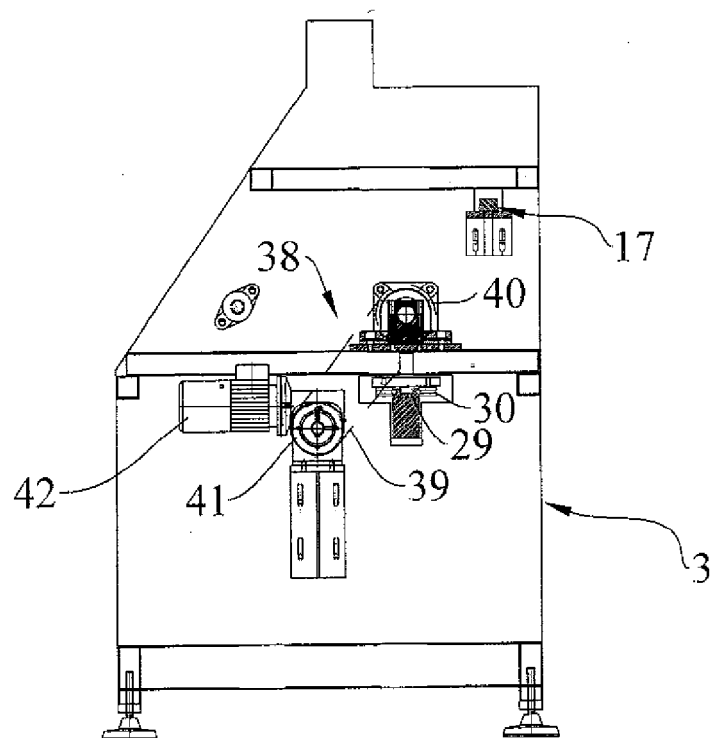


FIG. 10

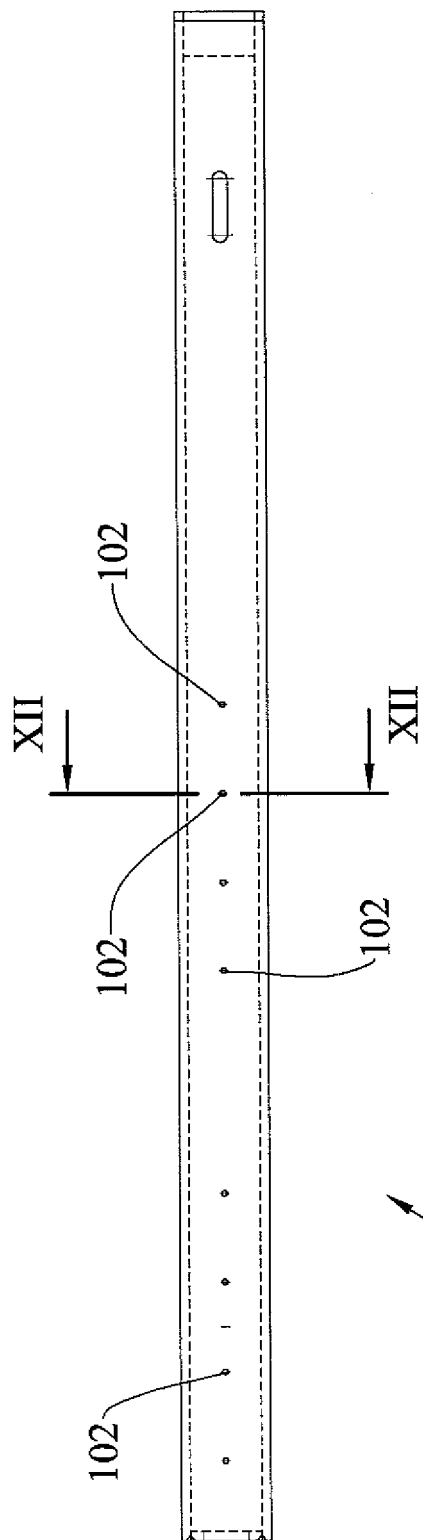


FIG. 11

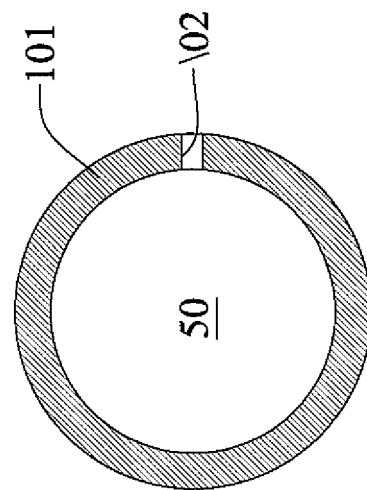


FIG. 12

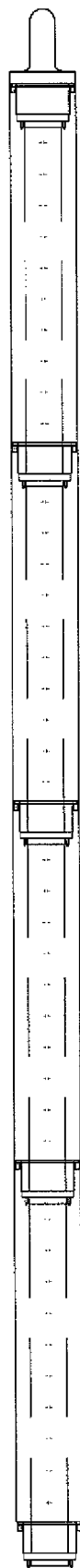


FIG. 13

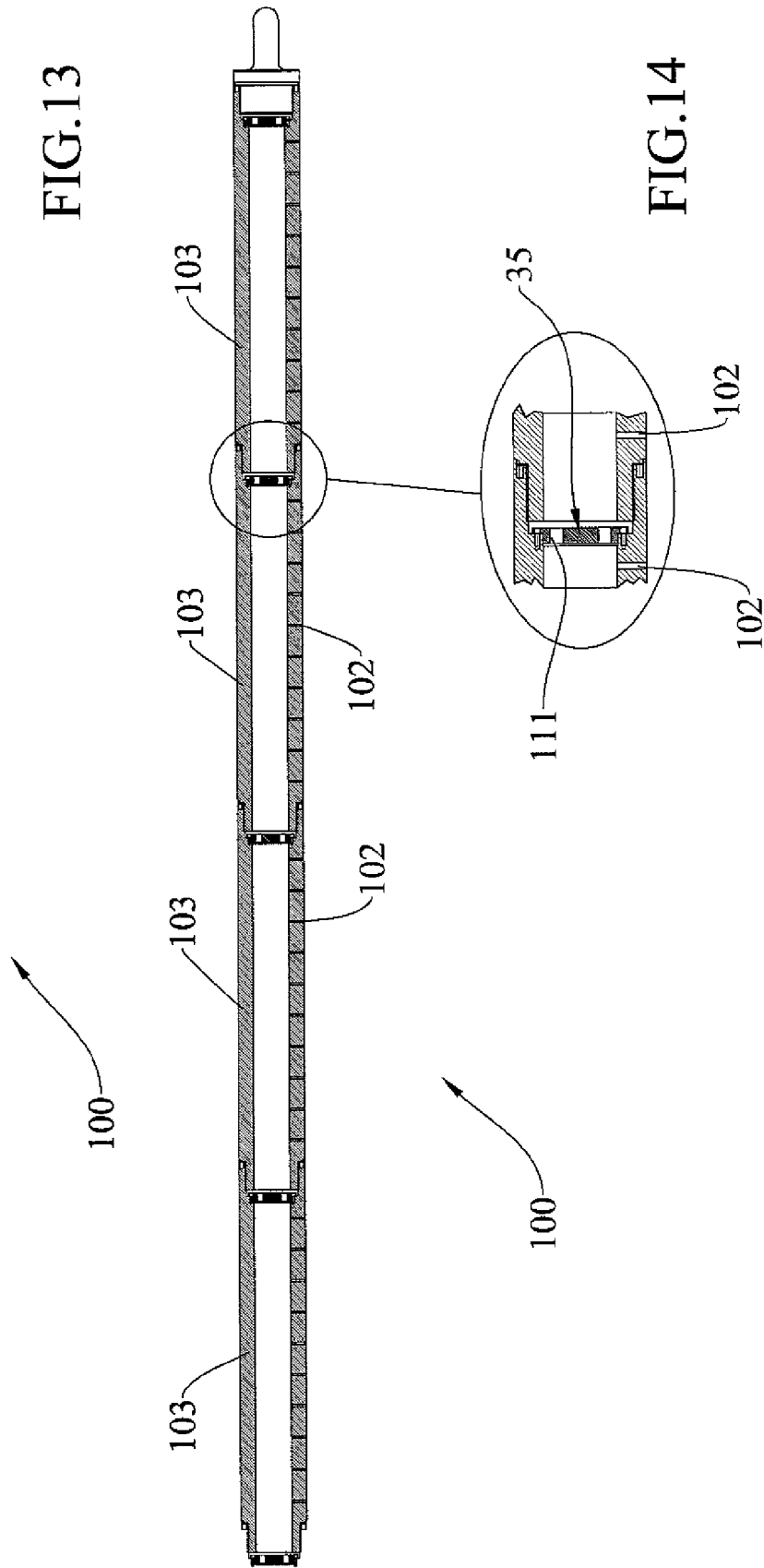


FIG. 14

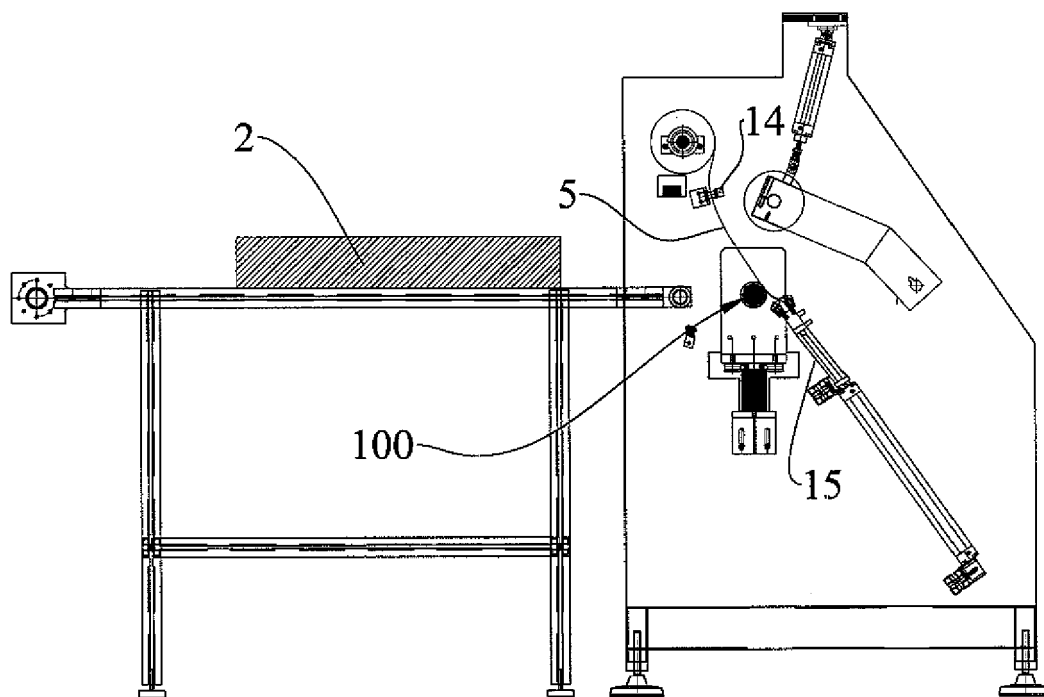


FIG.15

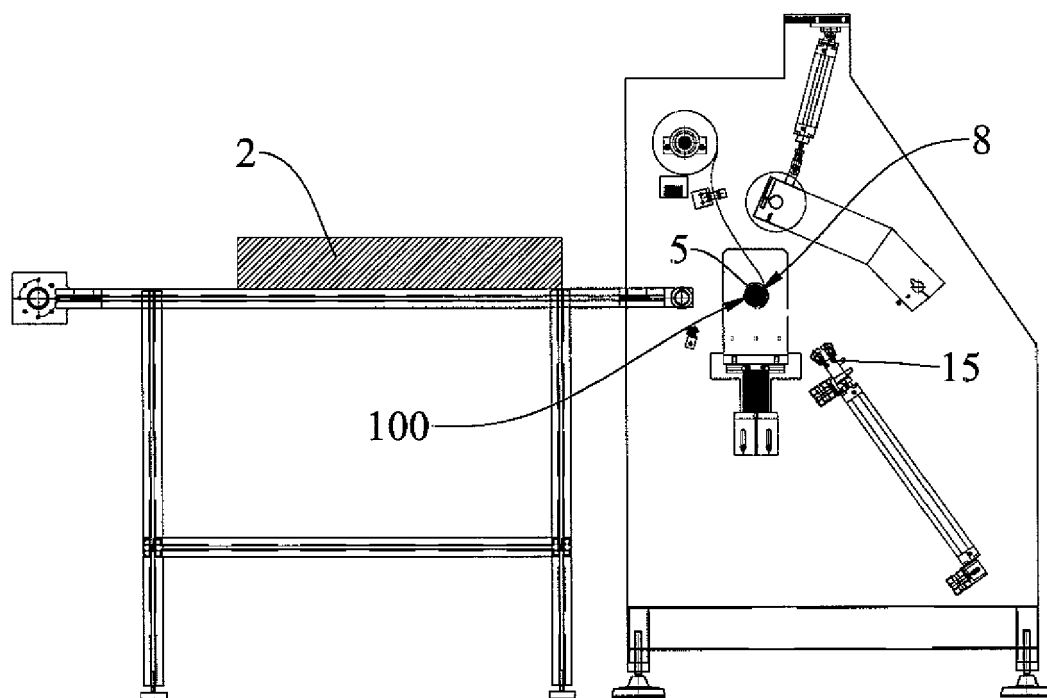


FIG.16



European Patent
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EUROPEAN SEARCH REPORT

Application Number
EP 06 12 5944

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	EP 0 195 755 A2 (MAGNI GIULIANO [IT]; MAGNI DINO FRANCO [IT]) 24 September 1986 (1986-09-24) * the whole document *	1,15,16, 18,19	INV. B65B63/02
A	WO 03/035482 A (L & P PROPERTY MANAGEMENT CO [US]) 1 May 2003 (2003-05-01) * claim 1; figures 1,3,5-8 *	1,19	
A	DE 22 44 190 A1 (LARSSON) 14 March 1974 (1974-03-14) * claim 1; figures 1-3 *	1,15,16, 18,19	
			TECHNICAL FIELDS SEARCHED (IPC)
			B65B B65H
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 16 April 2007	Examiner Grentzius, Wim
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EPO FORM 1503 03.82 (P04C01)

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

EP 06 12 5944

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16-04-2007

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0195755	A2	24-09-1986	DE 3677032 D1	28-02-1991
			ES 296263 U	16-01-1988
			ES 8704835 A1	01-07-1987
			GR 860733 A1	22-07-1986
			IT 1201258 B	27-01-1989

WO 03035482	A	01-05-2003	CN 1608018 A	20-04-2005
			EP 1438232 A1	21-07-2004

DE 2244190	A1	14-03-1974	NONE	
