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(54) **PACKAGING MACHINE FOR LONG PASTA OR SIMILAR PRODUCTS**

VERPACKUNGSMASCHINE FÜR LANGE PASTA ODER DERGLEICHEN

MACHINE D'EMBALLAGE POUR PÂTES LONGUES, OU AUTRES,

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(73) Proprietor: **Altopack S.P.A.**
55011 Altopascio (LU) (IT)

(72) Inventor: **PIAZZAROLI, Massimo**
55033 Castelnuovo Di Garfagnana (LU) (IT)

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

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Description

[0001] The present invention relates to a group for compressing bags in formation for long pasta or similar products.

[0002] Packaging machines for long pasta are known, such as EP 0 860 359 A1, in which the pasta is inserted horizontally inside a casing in formation, consisting of a plastic material film fed along a horizontal path, wherein after having received a dose of pasta, its side flaps are gradually folded downwards and then arranged next to one another under the pasta to form a closed casing about the pasta itself. The closing of the casing is made permanent by a reciprocal longitudinal welding of the two flaps performed at the end of the operation of folding and side-by-side arranging.

[0003] The welding may be performed by means of welding groups which use the heat generated by a current which crosses opposite electric wires (named "welding electrodes") on two parts of the welding group through which the flaps of the film arranged side-by-side are passed.

[0004] Ultrasound welding is another technique, in which an ultrasound generator connected to an electrode named "sonotrode" which cooperates with a fixed locator named "anvil" is used; the ultrasound generator is activated so as to generate a vibration of the sonotrode which causes the welding of two flaps arranged side-by-side to close the bottom of the tubular casing.

[0005] The tubular casing thus formed is then further closed and cut frontally of and behind the dose of pasta by means of a transversal welding and cutting group, which performs a first and a second transversal welding using the heat generated by a current, by ultrasounds or other.

[0006] However, the bags of pasta thus closed have a given amount of air inside, which cannot be removed. The effects of the air that remains inside the bags are known: there will be a decreased capacity of maintaining the organoleptic properties of the product, in this case, long pasta or similar products, and furthermore the bags which are obtained have large dimensions because they are bulkier.

[0007] Given the prior art, it is the object of the present invention to pack long pasta or similar products in bags reducing the amount of air which remains inside the bags.

[0008] According to the present invention, said object is reached by means of a group for compressing bags in formation for long pasta or similar products in a packaging machine, said packaging machine comprising at least one feeder belt of a succession of doses of pasta, at least one longitudinal welding group for the formation of a tubular casing which is further closed and cut, before and after the introduction of the dose of pasta, by at least one transversal welding group, said group being characterized by comprising:

- a conveyor belt, which is moved in the feed direction

of the succession of doses of pasta, suitable to receive the bags in formation downstream of said transversal welding group,

- a first curved plate, which is moved vertically by first moving means fixed to a "U"-shaped support frame which is, in turn, fixed above said conveyor belt, said first moving means being configured to compress the bags in formation against the conveyor belt by means of the first curved plate,
- a second curved plate, which is moved horizontally by second moving means which are fixed on said first curved plate, said second moving means being configured to translate the second curved plate along a direction opposite to the direction of movement of the conveyor belt.

[0009] The features and the advantages of the present invention will be apparent from the following detailed description of a practical embodiment thereof, illustrated by way of non-limitative example in the accompanying drawings, in which:

figure 1 shows a perspective view of a group, according to the present invention, for compressing bags in formation for long pasta or similar products in a first working position;

figure 2 shows a further perspective view of the group in said first working position;

figure 3 shows a perspective view of the group in said second working position;

figure 4 shows a further perspective view of the group in said second working position;

figure 5 is a top view of a packaging machine for long pasta or similar products comprising the group in figures 1-5;

figures 6-14 show different steps of operation of the compression group.

[0010] Figure 1 shows a group 1, according to the present invention, for compressing bags 200 in formation of long pasta or similar products in a packaging machine 100.

[0011] The packaging machine 100 comprises a base frame 2 along which a horizontal path for a tubular casing 3 develops, which tubular casing is formed by folding downwards and reciprocally arranging side-by-side the side flaps of a plastic material film initially fed in flat form and then transformed into tubular form by a longitudinal welding group (not shown in the drawings).

[0012] A feeder belt 4 (Fig. 5) longitudinally introduces a succession of doses of long pasta 5 (or similar products) into the aforesaid tubular casing 3.

[0013] Downstream of the longitudinal welding group there is a transversal welding group 7 adapted to transversally weld and cut said tubular casing 3 for separating it into a succession of closed bags 200 separated from one another.

[0014] Figures 6, 9a, 9b, 12 diagrammatically show,

by way of example, a circular movement transversal welding group 7, comprising a pair of welding jaws 8, which turn on two mutually parallel axes 9. The tubular casing 3 is welded and cut when the two welding jaws 8 face each other at the same time.

[0015] The group 1 for compressing the tubular casing 3 comprises a conveyor belt 10 arranged downstream of said transversal welding group 7, said conveyor belt 10 being moved in the direction of advancement of the doses 5 of long pasta, and being adapted to receive bags 200 in formation. In particular, the conveyor belt 10 is configured to receive the tubular casing 3 containing one of the doses 5 of pasta coming from the feeder belt 4 in the range between two transversal welds (and cut) of the tubular casing 3 itself, during the formation of the head and of the tail of the bag 200.

[0016] The group 1 then comprises a first curved plate 11, which is moved vertically by first moving means 12 fixed to a "U"-shaped support frame 13, which is, in turn, fixed above said conveyor belt 10. The first moving means 12 are configured to push said curved plate 11 so as to compress the tubular casing 3 against the conveyor belt 10 in the interval of time between the transversal welding (and cutting) of the head and that of the tail of the bag 200. More in particular, the moving means 12 are adapted to move the first curved plate 11 vertically between a rest position, in which the first curved plate 11 is located at a first height H1 from the surface of the conveyor belt 10, and a position of maximum extension, in which the first curved plate 11 is located at a second height H2 (in contact with the upper surface of the bag 200), said second height H2 being lower than the first height H1.

[0017] The first curved plate 11 (Figs. 7, 10, 13) has a rectangular shape surface with the curvature on the small side 14 of the rectangle, said small side 14 being arranged transversally with respect to said direction of movement of the conveyor belt 10, so as to follow the curved profile of the upper surface of the bag 200. Instead, the length of greater side 15 of the rectangle is comparable to that of a typical bag 200 of long pasta and is arranged longitudinally with respect to the direction of movement.

[0018] For example, said first moving means 12 (Figs. 3-4) comprise a pneumatic piston, in turn substantially comprising a body 16 with at least one rectified cylindrical hole, inside which a piston 17 slides due to the pressure exerted by the introduced air. The body 16 of the pneumatic piston 12 is fixed to the "U"-shaped support frame 13 by means of a "L"-shaped perforated plate 18 and screw means; instead, at one end the piston 17 has a plaque 19 fixed, again by means of screw means, to a further plate 20, which is integral with said first curved plate 11 and positioned superiorly and centrally with respect thereto.

[0019] The group 1 (Figs. 1-4) further comprises a second curved plate 21 horizontally moved by second moving means 22 fixed on said first curved plate 11. The

second moving means 22 are adapted to translate the second curved plate 21 longitudinally with respect to the movement direction of the conveyor belt 10, between a rest position, in which the second curved plate 21 is located entirely above the first curved plate 11, and a position of maximum extension, in which the second curved plate 21 constitutes a longitudinal extension of the first curved plate 11.

[0020] Also in this case, said second moving means 22 (Figs. 3-4) comprise a pneumatic piston, in turn, comprising at least one piston 23 which slides inside a body 24 due to the pressure exerted by the introduced air.

[0021] The body 24 of the pneumatic piston 22 is fixed to the first curved plate 11 by means of said further plate 20 and screw means; instead, the piston 23 has a plaque 25 which is fixed, again by means of screw means, to said second curved plate 21 with a perforated flap 26, which branches at right angles therefrom.

[0022] In operation, a succession of doses 5 of long pasta advances on a packaging film, carried by the feeder belt 4 towards the welding units 6, 7 (Figs. 6-8). Taking in consideration a single dose 5 of pasta of the succession, said dose 5 of pasta is enclosed within a tubular casing 3 formed by folding the side flaps of the film, which is then welded by the longitudinal welding group.

[0023] At this point, the tubular casing 3 containing the dose 5 of pasta undergoes a first sealing (and cutting) by a transversal welding group, which separates the bag 200 in formation from the one previously formed. In particular, the first welding (and the cutting) occurs in the moment in which the welding jaws 8, by turning about the respective axes 9, face each other at the same time. The head of the bag 200 in formation is thus formed.

[0024] In the interval of time which elapses between the welding and the formation of the head and of the tail of the bag 200, the tubular casing 3 with the dose 5 of pasta inside is received by the feeder belt 10 and carried to the group 1 for compressing the bag in formation 200.

[0025] At this point, the first curved plate 11 (Figs. 9a-11) descends under the bias of the pneumatic piston 12 starting from said first height H1 towards said second height H2, exerting a pressure on the bag 200 in formation which in the meantime runs underneath the first curved plate 11 carried by the conveyor belt 10. At the same time, the second curved plate 21 is translated by the second pneumatic piston 22, starting from its rest position, in direction opposite to the direction of movement of the conveyor belt 10, thus facilitating the release of air from the tail (which is still open) of the bag 200 in formation.

[0026] Once the second curved plate 21 has reached its maximum extension position, the pneumatic piston is then actuated 22 to return to rest position so as to allow the welding jaws 8 to continue their rotation without interfering with their movement (Figs. 12-14). At this point, the first curved plate 11 is returned to rest position (at height H1) by the pneumatic piston 12 and the successive dose 5 of pasta may be packed.

[0027] With such a group 1, according to the present invention, for compressing the bags 200 in formation during the step of welding, the air which remains inside the finished bag 200 will be considerably reduced, thus maintaining the organoleptic properties of the product, in this case long pasta or similar products, for a longer time; furthermore, the bags which are obtained will have minimum dimensions.

Claims

1. Group (1) for compressing bags (200) in formation, in a packaging machine (100) for long pasta or similar products, said packaging machine (100) comprising at least one feeder belt (4) of a succession of doses (5) of pasta, at least one longitudinal welding group for the formation of a tubular casing (3) which is further closed and cut, before and after the introduction of the dose (5) of pasta, by at least one transversal welding group (7), said group (1) being **characterized by** comprising:

- a conveyor belt (10), moved in the feed direction of the succession of doses (5) of pasta, suitable to receive the bags (200) in formation downstream of said transversal welding group (7),
- a first curved plate (11), which is moved vertically by first moving means (12) fixed to a "U"-shaped support frame (13) which is in its turn fixed above said conveyor belt (10), said first moving means (12) being configured to compress the bags (200) in formation against the conveyor belt (10) by means of the first curved plate (11),
- a second curved plate (21) horizontally moved by second moving means (22) which are fixed on said first curved plate (11), said second moving means (22) being configured to translate the second curved plate (21) along a direction opposite to the direction of movement of the conveyor belt (10).

2. Group (1) according to claim 1, **characterized in that** said first moving means (12) are configured to vertically move the first curved plate (11) between a rest position, in which the first curved plate (11) is located at a first height (H1) from the surface of the conveyor belt (10), and a position of maximum extension, in which the first curved plate (11) is located at a second height (H2) (in contact with the upper surface the bag (200)), said second height (H2) being lower than the first height (H1).

3. Group (1) according to claims 1 or 3, **characterized in that** said first moving means (12) comprise a pneumatic piston in turn comprising a body (16) with at least one rectified cylindrical hole, inside which a

piston (17) slides due to the pressure exerted by the air introduced, said body (16) being fixed to the "U"-shaped support frame (13) by means of a "L"-shaped perforated plate (18), at one end said piston (17) having a plaque (19) fixed to a further plate (20) which is integral with said first curved plate (11) and positioned superiorly and centrally with respect to the latter.

4. Group (1) according to claim 1, **characterized in that** said second moving means (22) are configured to translate the second curved plate (21) longitudinally with respect to the movement direction of the conveyor belt (10), between a rest position, in which the second curved plate (21) is located entirely above the first curved plate (11), and a position of maximum extension, in which the second curved plate (21) is a longitudinal extension of the first curved plate (11).

5. Group (1) according to claims 1 or 4, **characterized in that** said second moving means (22) comprise a pneumatic piston in turn comprising at least one piston (23) which slides inside a body (24) due to the pressure exerted by the air introduced, said body (24) being fixed to the first curved plate (11) by means of said further plate (20), at one end said piston (23) having a plaque (25) fixed to said second curved plate (21) with a perforated flap (26) which branches at right angles from the latter.

6. Packaging machine (100) for packaging long pasta, or similar products, comprising a group (1) for compressing bags (200) in formation as claimed in claims 1 to 5.

Patentansprüche

1. Gruppe (1) zum Zusammenpressen von Beuteln (200) während ihrer Ausbildung in einer Verpackungsmaschine (100) für lange Pasta oder ähnliche Produkte, wobei die Verpackungsmaschine (100) wenigstens ein Zuführband (4) einer Folge von Portionen (5) von Pasta und wenigstens eine Längsschweißgruppe für die Ausbildung einer rohrförmigen Hülle (3), die vor und nach der Einfügung der Portion (5) von Pasta weiterhin durch wenigstens eine Querschweißgruppe (7) geschlossen und abgeschnitten wird, aufweist, wobei die Gruppe (1) **dadurch gekennzeichnet ist, dass** sie folgendes aufweist:

- ein Förderband (10), das in der Zufuhrrichtung der Folge von Portionen (5) von Pasta bewegt wird und das dazu geeignet ist, die Beutel (200) während ihrer Ausbildung stromab von der Querschweißgruppe (7) aufzunehmen,

- eine erste gekrümmte Platte (11), die durch eine erste Bewegungseinrichtung (12) vertikal bewegt wird, die an einem "U"-förmigen Stützrahmen (13) fixiert ist, der wiederum über dem Förderband (10) fixiert ist, wobei die erste Bewegungseinrichtung (12) konfiguriert ist, um die Beutel (200) während ihrer Ausbildung mittels der ersten gekrümmten Platte (11) gegen das Förderband (10) zu pressen,
 - eine zweite gekrümmte Platte (21), die durch eine zweite Bewegungseinrichtung (22) horizontal bewegt wird, die an der ersten gekrümmten Platte (11) fixiert ist, wobei die zweite Bewegungseinrichtung (22) konfiguriert ist, um die zweite gekrümmte Platte (21) entlang einer Richtung entgegengesetzt zur Bewegungsrichtung des Förderbands (10) zu versetzen.
2. Gruppe (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die erste Bewegungseinrichtung (12) konfiguriert ist, um die erste gekrümmte Platte (11) zwischen einer Ruheposition, bei welcher die erste gekrümmte Platte (11) auf einer ersten Höhe (H1) von der Oberfläche des Förderbands (10) aus lokalisiert ist, und einer Position einer maximalen Erweiterung, bei welcher die erste gekrümmte Platte (11) auf einer zweiten Höhe (H2), die niedriger als die erste Höhe (H1) ist, lokalisiert ist, vertikal zu bewegen.
 3. Gruppe (1) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die erste Bewegungseinrichtung (12) einen pneumatischen Kolben aufweist, der wiederum einen Körper (16) mit wenigstens einem gleichgerichteten zylindrischen Loch aufweist, innerhalb von welchem ein Kolben (17) aufgrund des durch die eingeführte Luft ausgeübten Drucks gleitet, wobei der Körper (16) an dem "U"-förmigen Stützrahmen (13) mittels einer "L"-förmigen perforierten Platte (18) fixiert ist, wobei der Kolben (17) an einem Ende ein Schild (19) hat, das an einer weiteren Platte (20) fixiert ist, die aus einem Stück mit der ersten gekrümmten Platte (11) ist und höher und zentral in Bezug auf die letztere positioniert ist.
 4. Gruppe (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** die zweite Bewegungseinrichtung (22) konfiguriert ist, um die zweite gekrümmte Platte (21) in Längsrichtung in Bezug auf die Bewegungsrichtung des Förderbands (10) zwischen einer Ruheposition, in welcher die zweite gekrümmte Platte (21) gänzlich über der ersten gekrümmten Platte (11) lokalisiert ist, und einer Position einer maximalen Erweiterung, in welcher die zweite gekrümmte Platte (21) eine Längserweiterung der ersten gekrümmten Platte (11) ist, zu versetzen.
 5. Gruppe (1) nach Anspruch 1 oder 4, **dadurch ge-**

kennzeichnet, dass die zweite Bewegungseinrichtung (22) einen pneumatischen Kolben aufweist, der wiederum wenigstens einen Kolben (23) aufweist, der aufgrund des durch die eingeführte Luft ausgeübten Drucks innerhalb eines Körpers (24) gleitet, wobei der Körper (24) an der ersten gekrümmten Platte (11) mittels der weiteren Platte (20) fixiert ist, wobei der Kolben (23) an einem Ende ein Schild (25) hat, das an der zweiten gekrümmten Platte (21) mit einer perforierten Lasche (26) fixiert ist, die unter rechten Winkeln von der letzteren abzweigt.

6. Verpackungsmaschine (100) zum Verpacken von langen Pasta oder ähnlichen Produkten mit einer Gruppe (1) zum Zusammenpressen von Beuteln (200) während ihrer Ausbildung, wie es in den Ansprüchen 1 bis 5 beansprucht ist.

Revendications

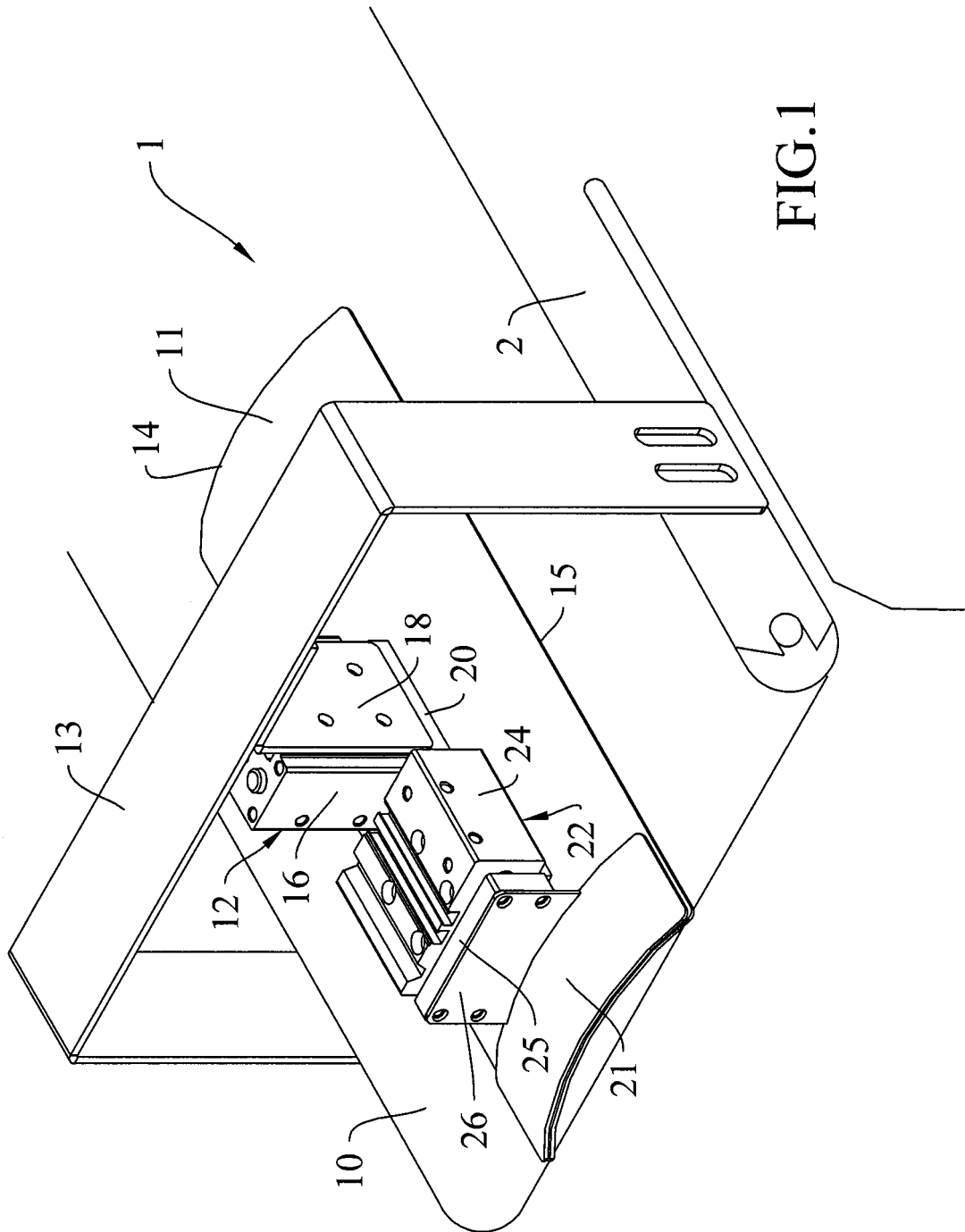
1. Groupe (1) destiné à compresser des sacs (200) en formation, dans une machine de conditionnement (100) de pâtes longues ou de produits similaires, ladite machine de conditionnement (100) comprenant au moins une bande d'alimentation (4) d'une succession de doses (5) de pâtes, au moins un groupe de soudage longitudinal destiné à la formation d'une enveloppe tubulaire (3) qui est en outre fermée et coupée, avant et après l'introduction de la dose (5) de pâtes, par au moins un groupe de soudage transversal (7), ledit groupe (1) étant **caractérisé en ce qu'il comprend** :

- un convoyeur à bande (10), mû dans le sens d'alimentation de la succession de doses (5) de pâtes, approprié pour recevoir les sacs (200) en formation en aval dudit groupe de soudage transversal (7),
- une première plaque courbée (11), qui est mue verticalement par des premiers moyens de déplacement (12) fixés à un bâti de support en forme de « U » (13) qui est à son tour fixé au-dessus dudit convoyeur à bande (10), lesdits premiers moyens de déplacement (12) étant conçus pour compresser les sacs (200) en formation contre le convoyeur à bande (10) au moyen de la première plaque courbée (11),
- une seconde plaque courbée (21) mue horizontalement par des seconds moyens de déplacement (22) qui sont fixés à ladite première plaque courbée (11), lesdits seconds moyens de déplacement (22) étant conçus pour assurer la translation de la seconde plaque courbée (21) dans un sens contraire au sens de déplacement du convoyeur à bande (10).

2. Groupe (1) selon la revendication 1, **caractérisé en**

ce que lesdits premiers moyens de déplacement (12) sont conçus pour déplacer verticalement la première plaque courbée (11) entre une position de repos, dans laquelle la première plaque courbée (11) est située à une première hauteur (H1) de la surface du convoyeur à bande (10), et une seconde position de déploiement maximal, dans laquelle la première plaque courbée (11) est située à une seconde hauteur (H2) (en contact avec la surface supérieure du sac (200)), ladite seconde hauteur (H2) étant inférieure à la première hauteur (H1).

3. Groupe (1) selon la revendication 1 ou 3, **caractérisé en ce que** lesdits premiers moyens de déplacement (12) comprennent un piston pneumatique comprenant à son tour un corps (16) doté d'au moins un trou cylindrique rectifié, à l'intérieur duquel un piston (17) coulisse en raison de la pression exercée par l'air introduit, ledit corps (16) étant fixé au bâti de support en forme de « U » (13) au moyen d'une plaque perforée en forme de « L » (18), au niveau d'une extrémité ledit piston (17) comportant une plaque (19) fixée à une autre plaque (20) qui est formée d'un seul tenant avec ladite première plaque courbée (11) et disposée de façon supérieure et centrale par rapport à cette dernière.
4. Groupe (1) selon la revendication 1, **caractérisé en ce que** lesdits seconds moyens de déplacement (22) sont conçus pour assurer la translation de la seconde plaque courbée (21) longitudinalement par rapport au sens de déplacement du convoyeur à bande (10), entre une position de repos, dans laquelle la seconde plaque courbée (21) est intégralement située au-dessus de la première plaque courbée (11), et une position de déploiement maximal, dans laquelle la seconde plaque courbée (21) constitue un prolongement longitudinal de la première plaque courbée (11).
5. Groupe (1) selon la revendication 1 ou 4, **caractérisé en ce que** lesdits seconds moyens de déplacement (22) comprennent un piston pneumatique comprenant à son tour au moins un piston (23) qui coulisse à l'intérieur d'un corps (24) en raison de la pression exercée par l'air introduit, ledit corps (24) étant fixé à la première plaque courbée (11) au moyen de ladite autre plaque (20), au niveau d'une extrémité ledit piston (23) comportant une plaque (25) fixée à ladite seconde plaque courbée (21) dotée d'une tablette latérale perforée (26) qui forme une dérivation à angle droit par rapport à cette dernière.
6. Machine de conditionnement (100) destinée à conditionner des pâtes longues, ou des produits similaires, comprenant un groupe (1) destiné à compresser des sacs (200) en formation selon les revendications 1 à 5.



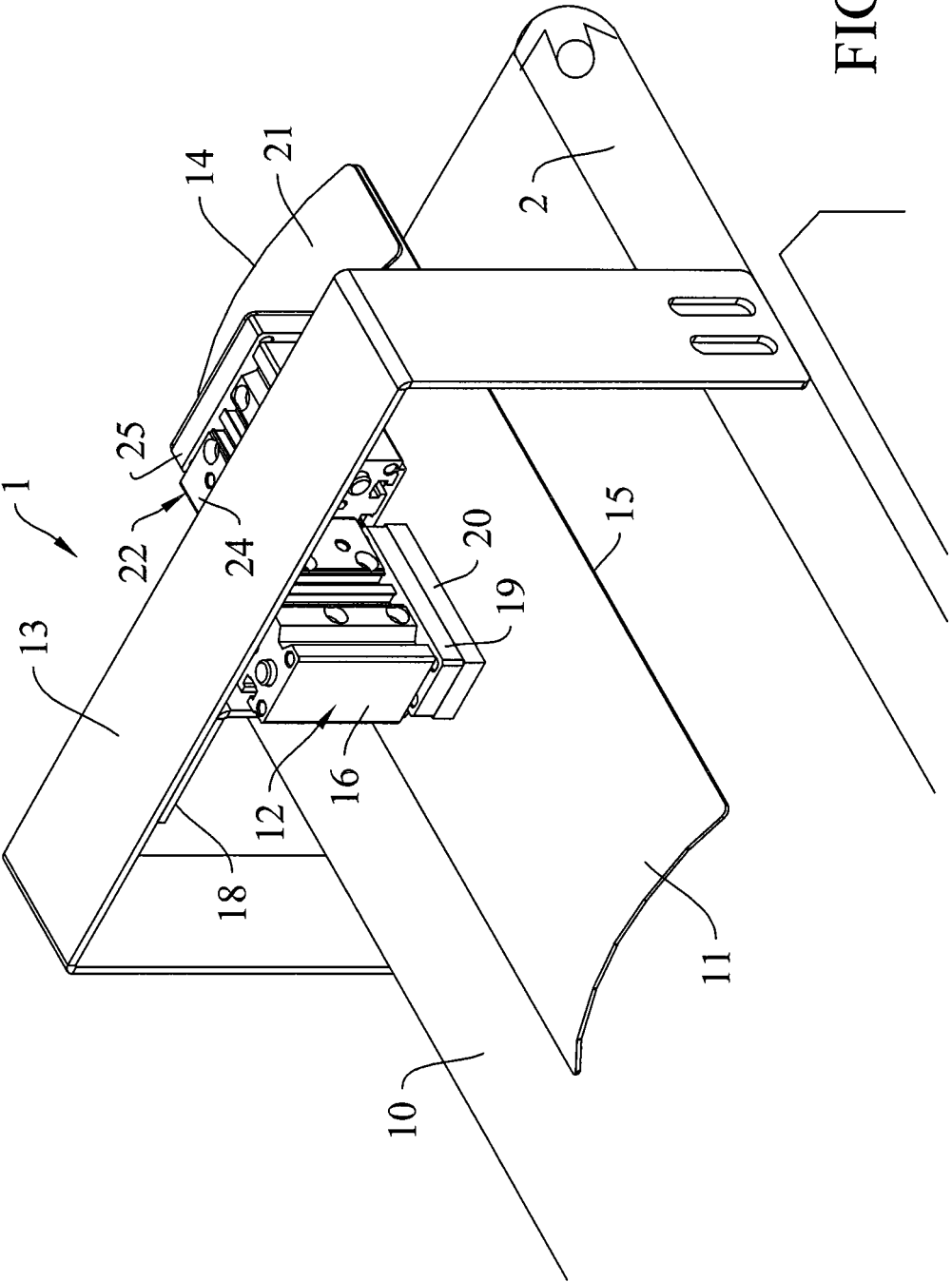


FIG. 2

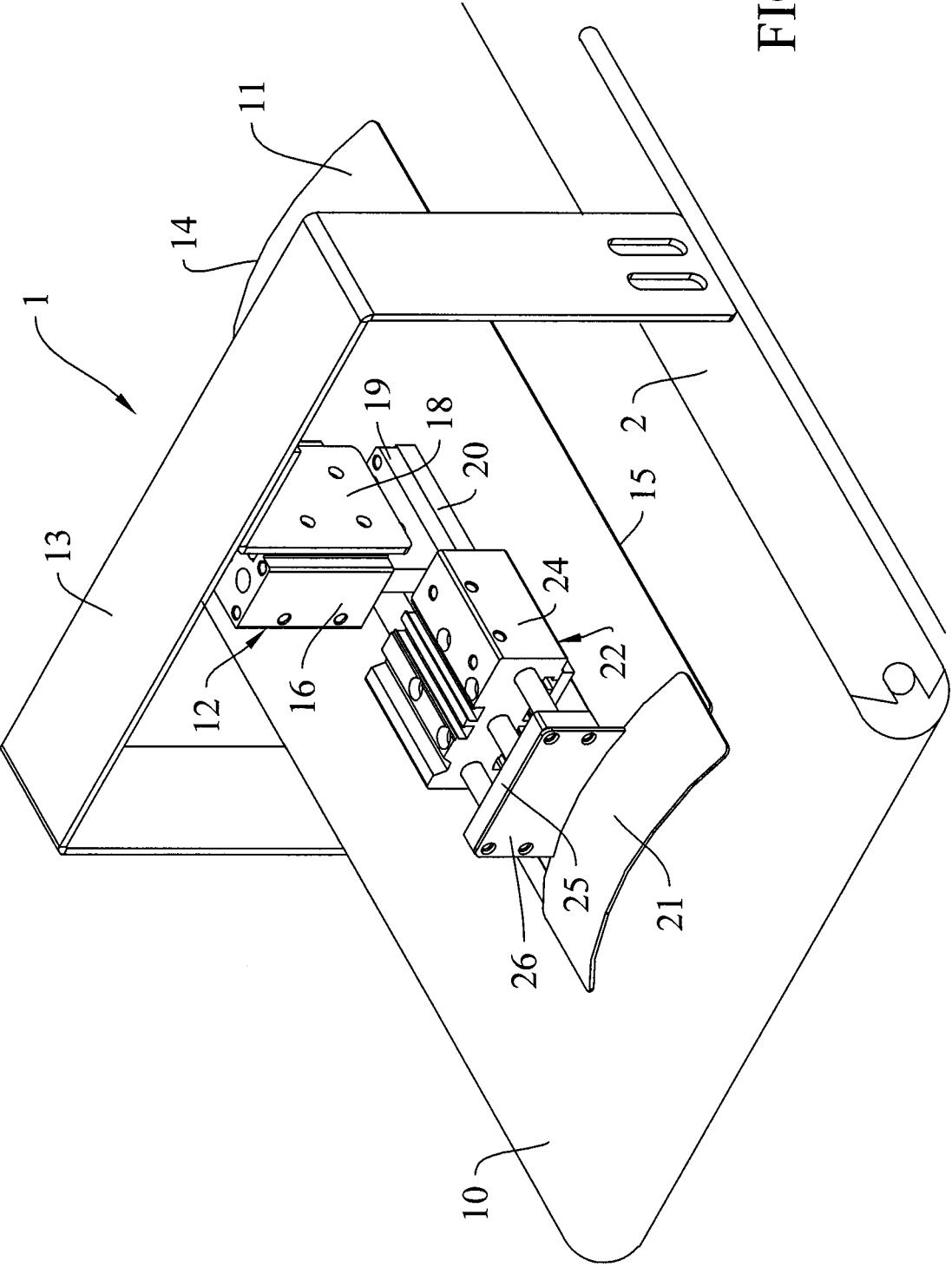
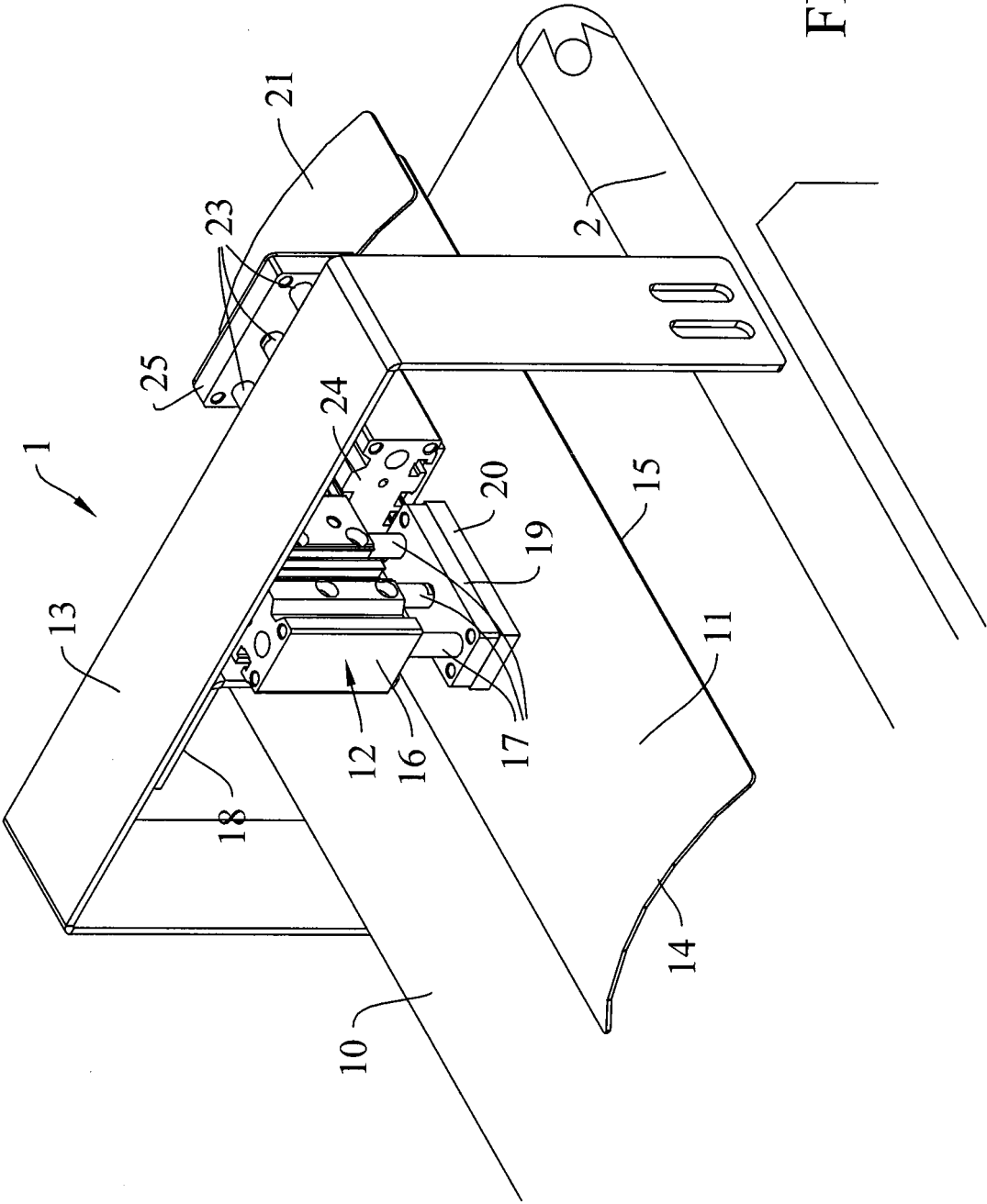


FIG.3



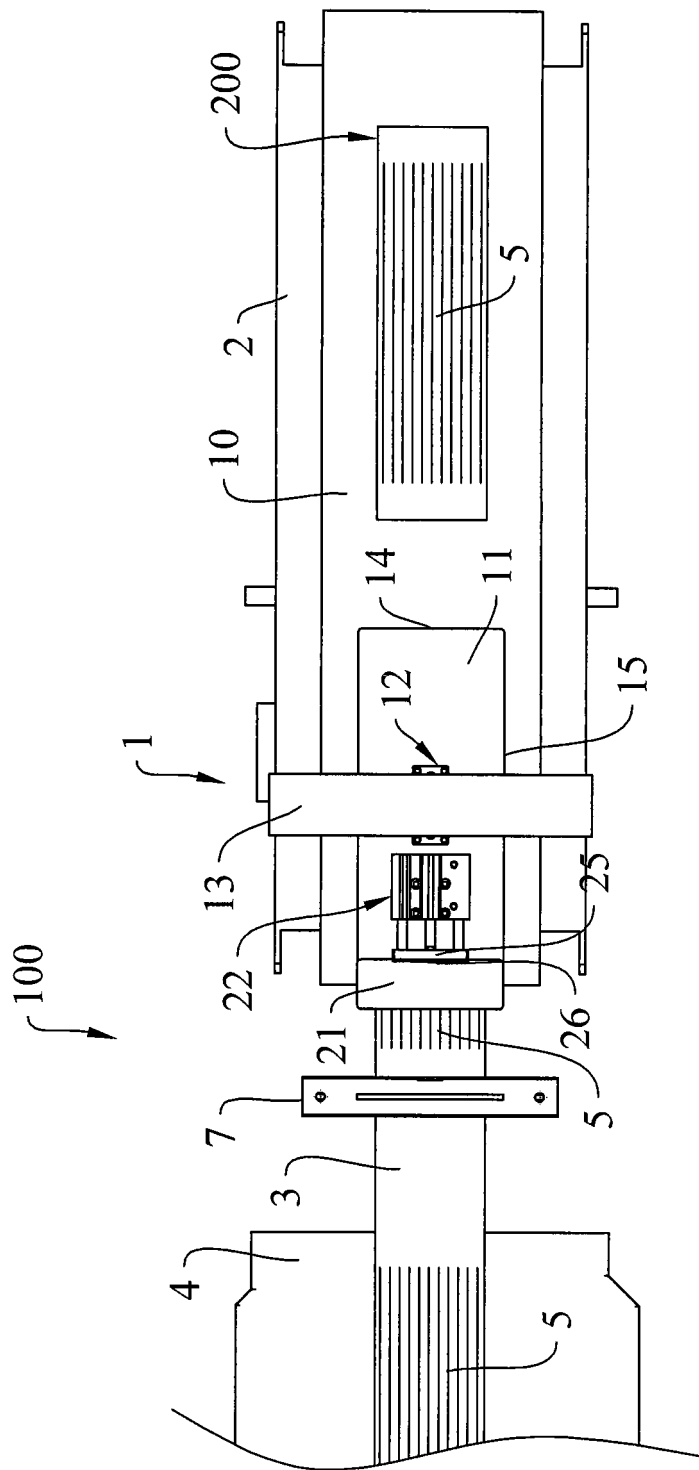


FIG. 5

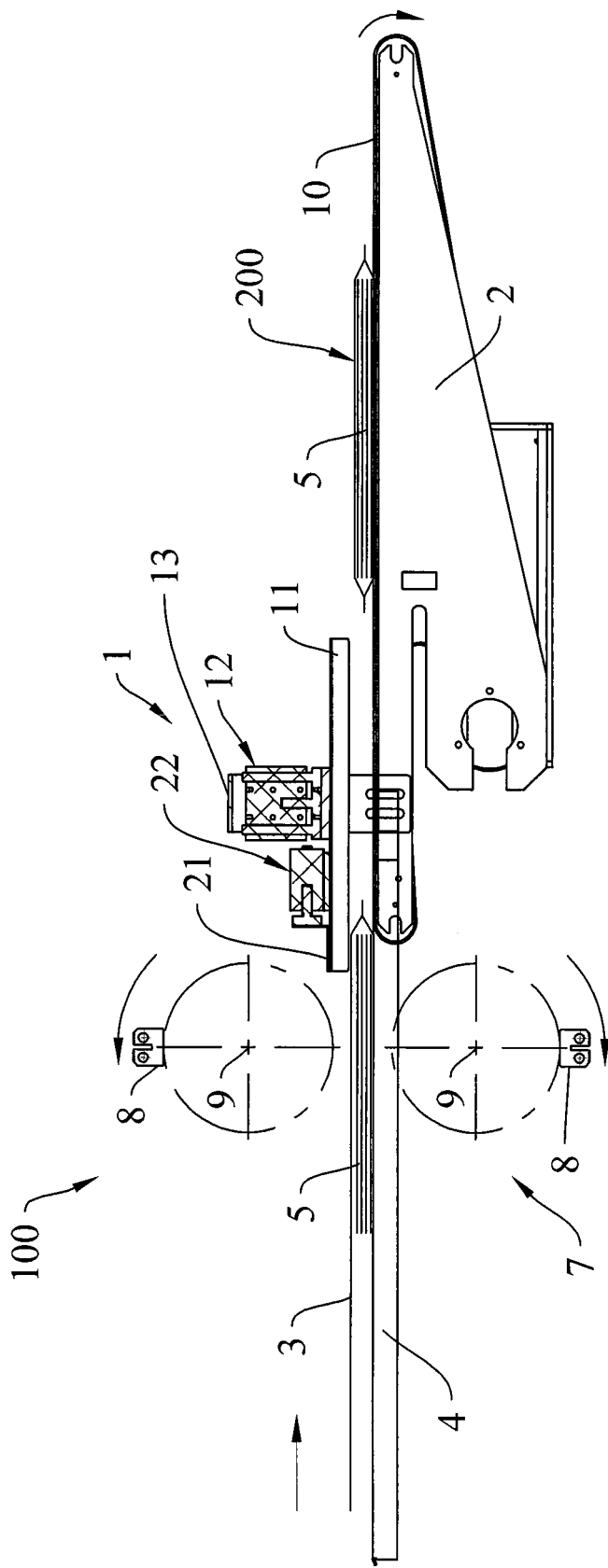


FIG.6

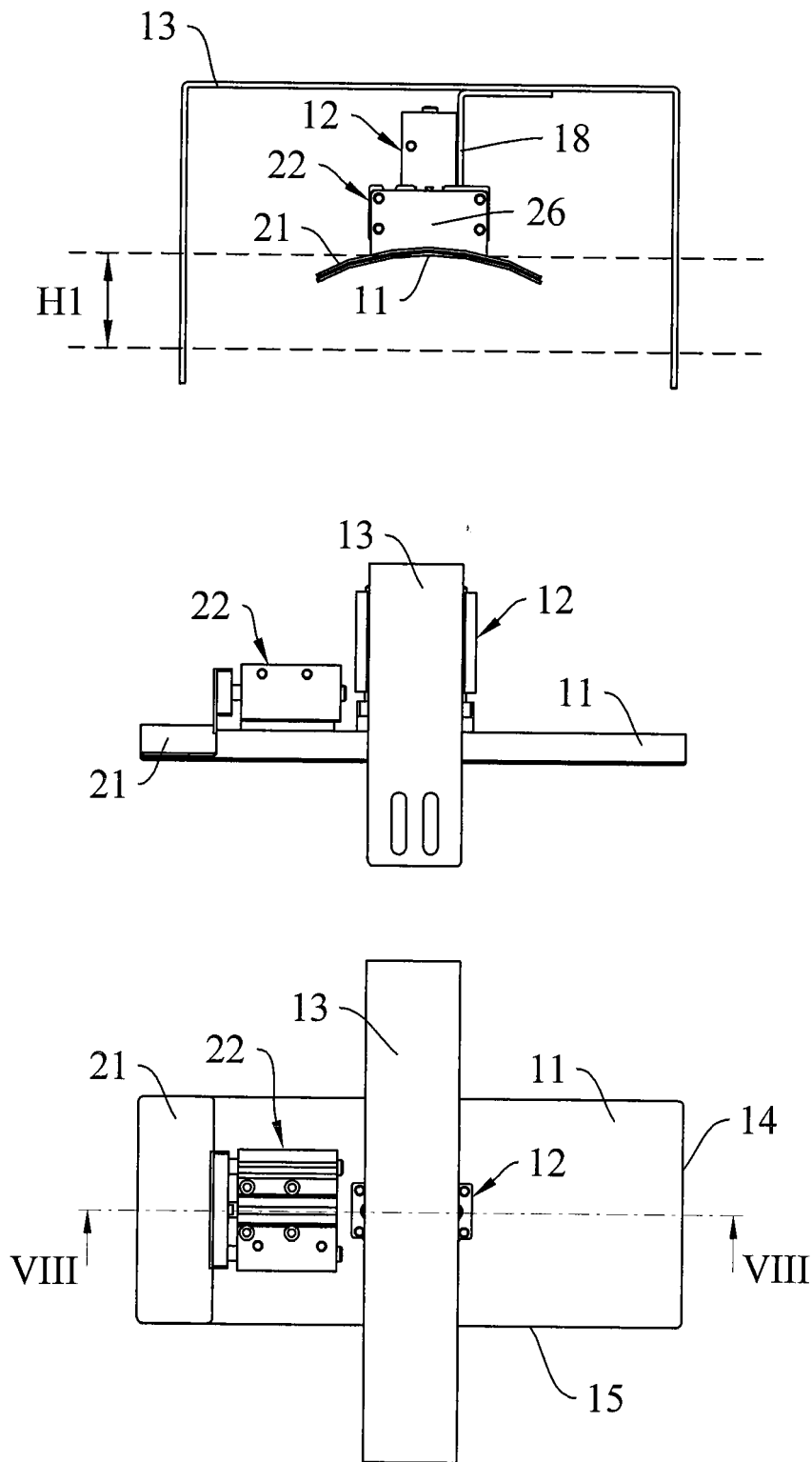


FIG.7

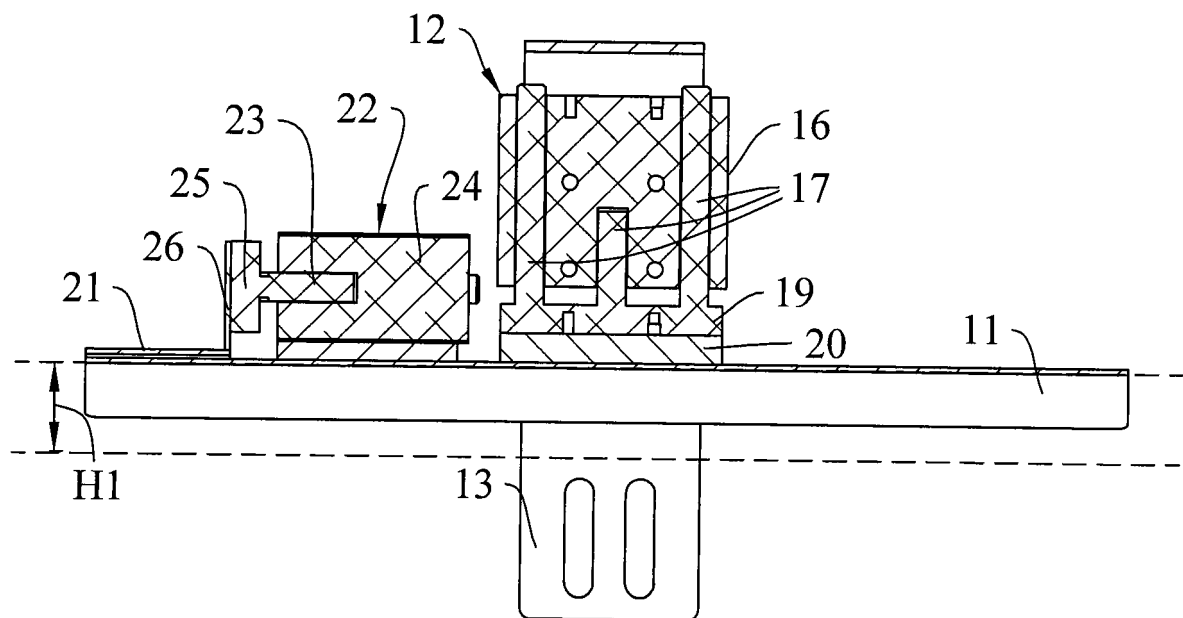
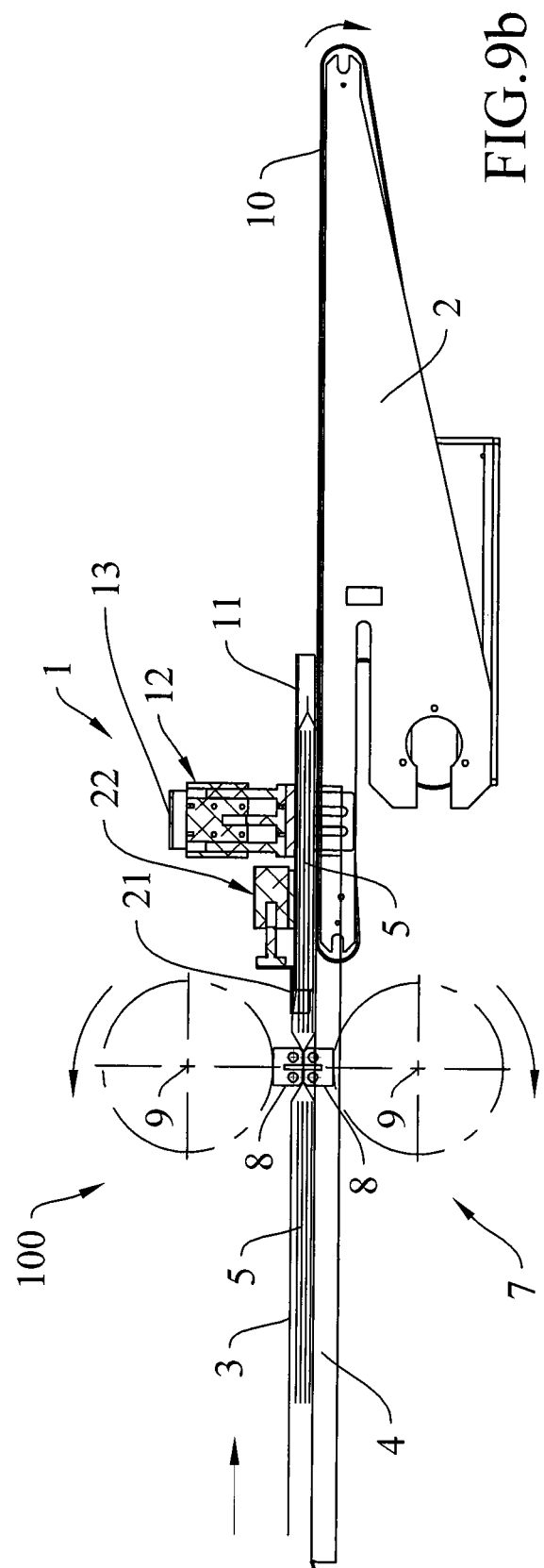
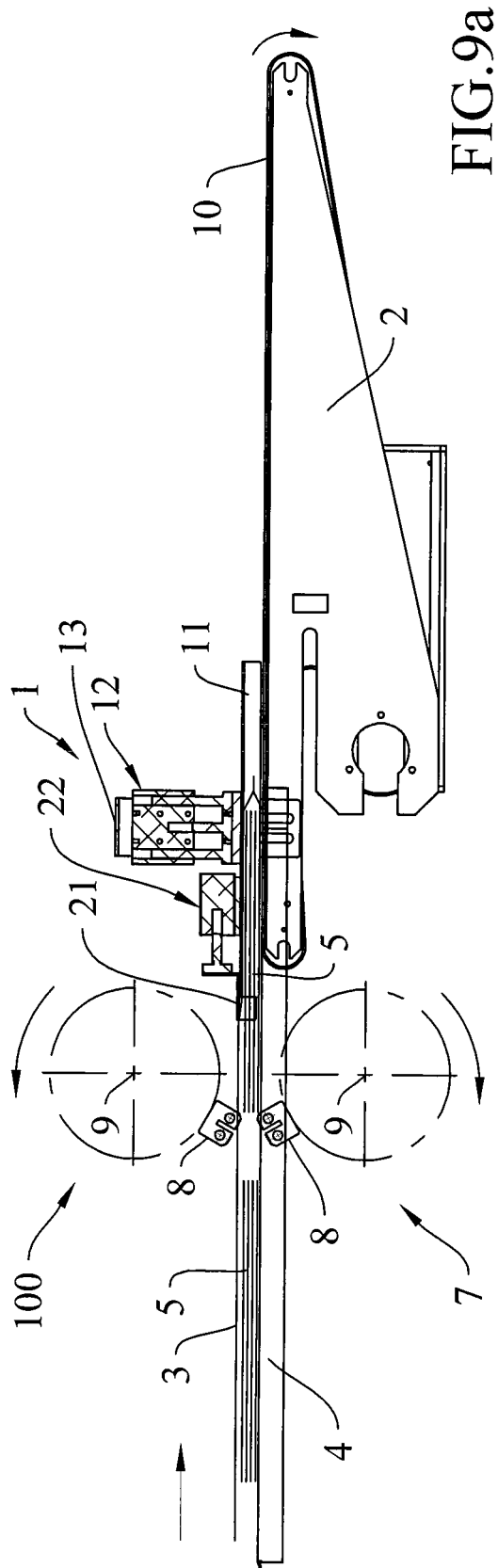


FIG.8



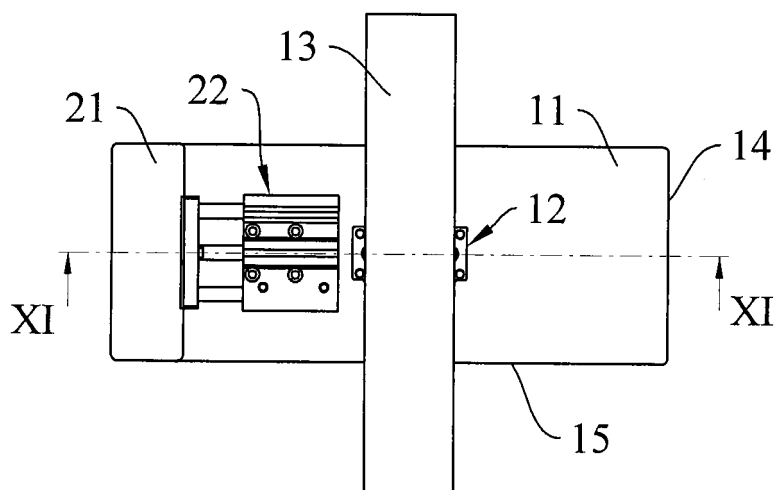
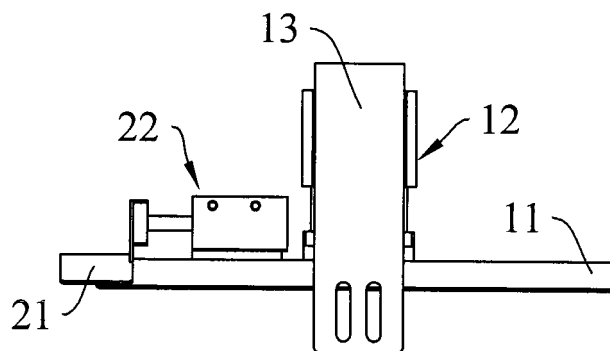
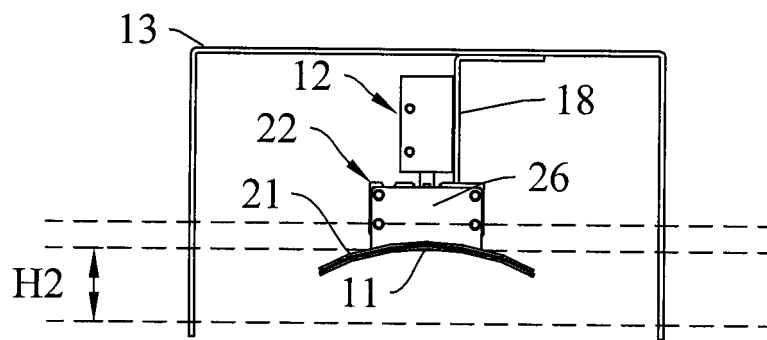


FIG.10

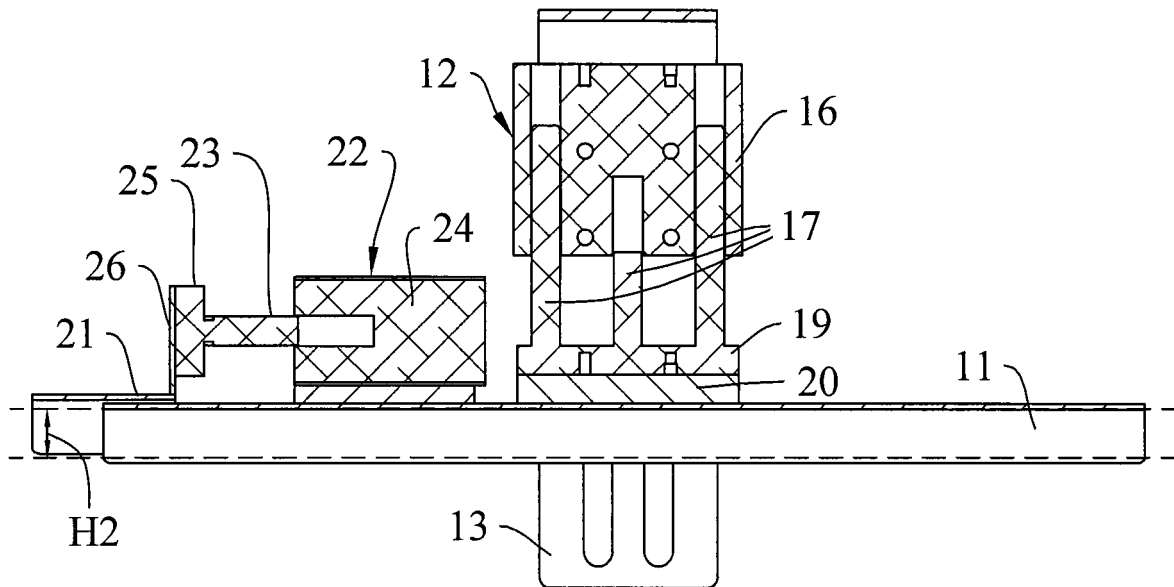


FIG.11

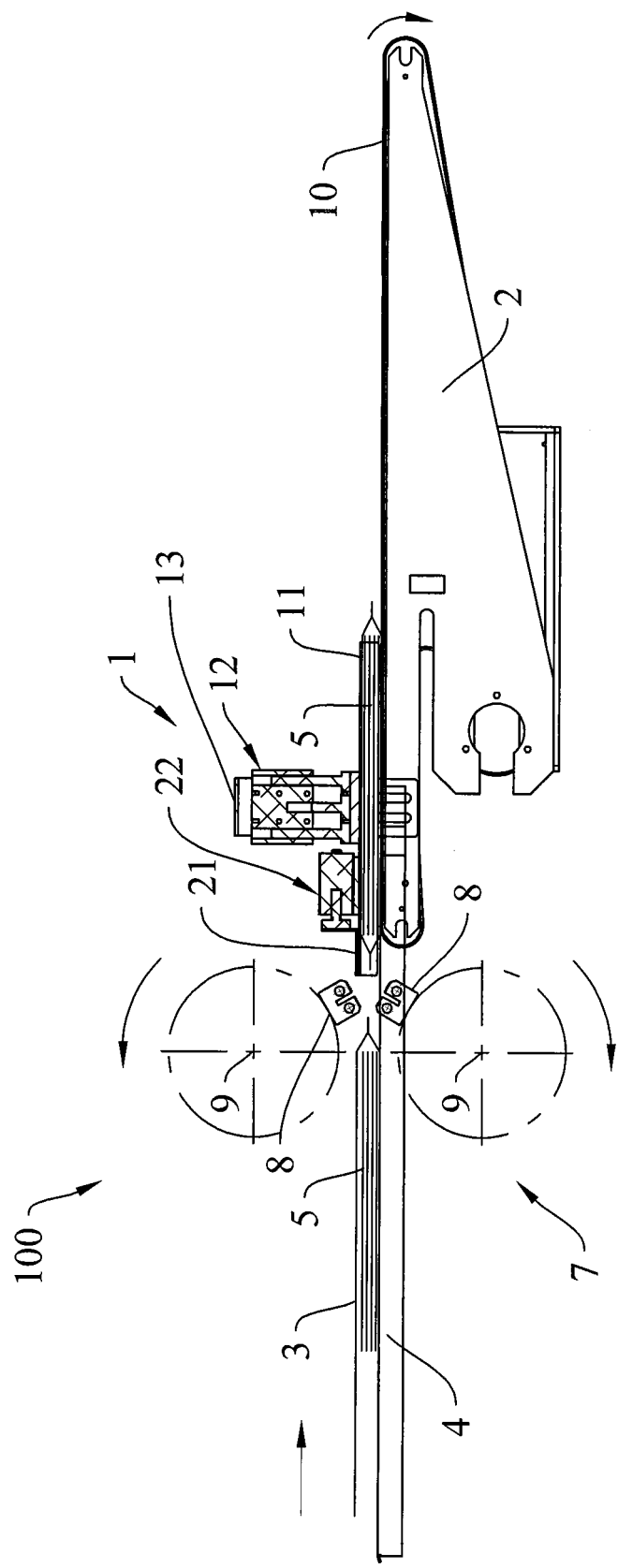


FIG.12

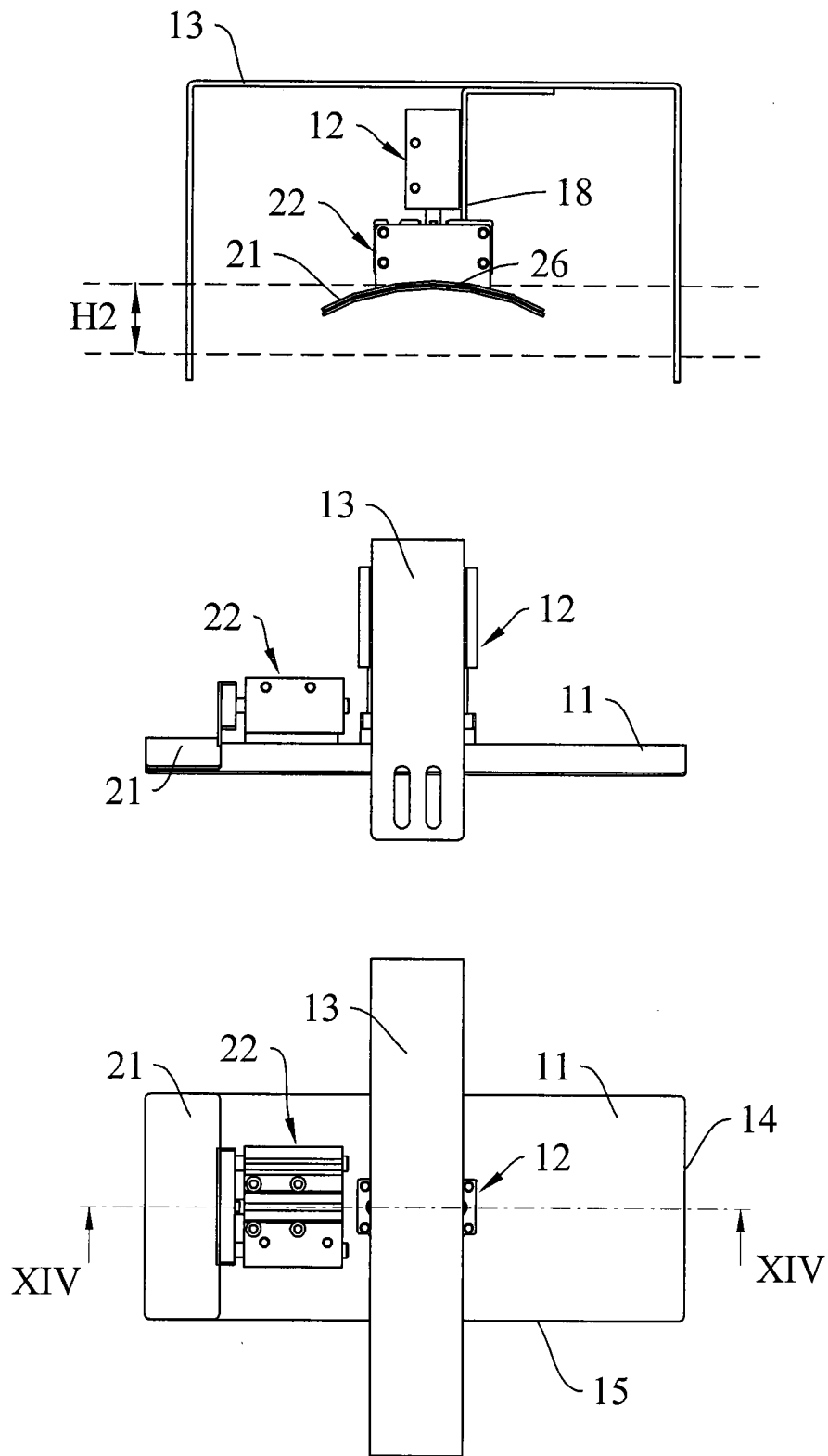


FIG.13

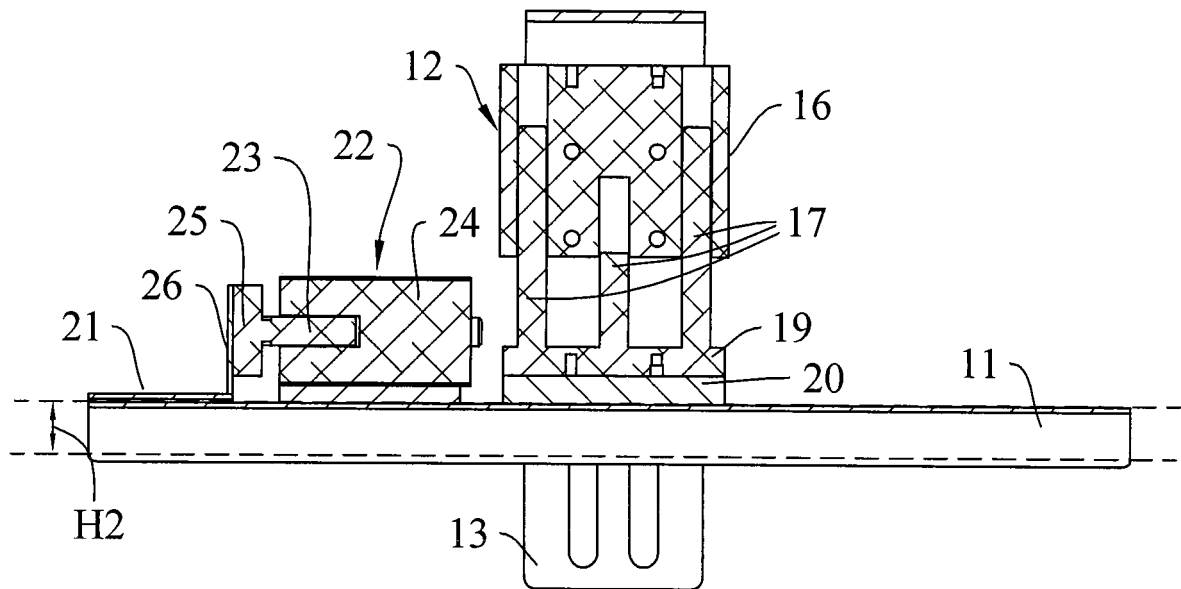


FIG.14

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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