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(54) Deviation device of webs to a lap winder on a spinning line

Umleitungsvorrichtung von Bahnen auf einen Schleifenwickler auf einer Spinnanlage

Dispositif de déviation de bandes pour enrouleur de nappe sur une ligne de filage

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Description

[0001] The present invention relates to a deviation device of webs on a spinning line and in particular a deviation device of webs to a lap winder.

[0002] On a spinning line, the webs coming from the carding machines are drawn, pieced and wound in laps in a lap-winder, to then be sent for subsequent processing in combing machines and, lastly, to the fly frames and spinning frames.

[0003] The web coming out of each carding or combing machine, is contained in a can; the cans, transported next to the lap-winder, are arranged in islands. The web is extracted from each can and feeds the lap-winder after being appropriately deviated by a deviation device.

[0004] One embodiment example of a deviation device is described in documents EP-A1-0679740 and EP-A1-0679741.

[0005] However, the deviation devices known of today have some disadvantages. In particular, it has been found that the entrance angles of the webs into the drawing group of the lap-winder negatively influence the quality of the processing performed by said drawing group.

[0006] The purpose of the present invention is to make a deviation device which satisfies the aforesaid requirements.

[0007] Such purpose is achieved by a deviation device according to claim 1.

[0008] The characteristics and advantages of the deviation device according to the present invention will be evident from the description given below made by way of a nonlimiting example with reference to the appended drawings, wherein:

[0009] - figure 1 shows a lap-winder apparatus comprising a creel, a deviation device according to the present invention and two drawing groups of a lap-winder;

[0010] - figure 2 shows a detail of the lap-winder apparatus in figure 1;

[0011] - figure 3 shows a final deviator of the deviation device applied to the drawing group in figure 1,

[0012] - figure 4 shows a cross-section of the final deviator and of the drawing group in figure 3;

[0013] - figure 5 shows a lap-winder apparatus according to a further embodiment of the present invention;

[0014] - figure 6a shows a final deviator of the lap-winder apparatus in figure 5;

[0015] - figure 6b shows a further view of the final deviator in figure 6a;

[0016] - figure 7 shows a cross-section of the final deviator and of the drawing group of the apparatus in figure 5;

[0017] - figure 8 shows a detail of the lap-winder apparatus according to a further embodiment of the present invention;

[0018] - figure 9 shows an auxiliary device attached to a drawing group of the apparatus in figure 8;

[0019] - figure 10 shows a front view of the auxiliary

deviator and of the drawing group in figure 9;

[0020] - figure 11 shows a roller group of the final deviator in figures 6a, 6b and 7;

[0021] - figure 12 shows a front view of the roller group in figure 11;

[0022] - figure 13 shows a cross-section view of the roller group in figure 11, according to the section plane XIII-XIII in figure 12.

[0023] With reference to the appended drawings, reference numeral 1 globally denotes a lap winder apparatus on a spinning line.

[0024] The spinning line further comprises blowroom machinery for treating the fibre in tufts, carding machines downstream of the blowroom machines and drawing machines downstream of the carding machines, for the formation of a web. Said lap-winder apparatus 1 is situated downstream of the carding machines and upstream of the combing machines, fly frames and spinning frames.

[0025] The apparatus 1 comprises at least one loading area for the parking of cans 2 containing the web to be processed; for example, the apparatus 1 comprises two loading areas 4, 6, distanced in a transversal direction X, and a lap-winder 8, positioned between said loading areas 4, 6.

[0026] The lap-winder 8 comprises a drawing device comprising a plurality of drawing groups in succession in a longitudinal direction Y, perpendicular to the transversal direction X.

[0027] For example, in the embodiment shown, the drawing device comprises a first drawing group 12' and a second drawing group 12'', downstream of the first drawing group 12'.

[0028] Each drawing group comprises a pair of introduction cylinders 14, consisting of a lower introduction cylinder 14a and an upper introduction cylinder 14b, in pressurised contact with the lower introduction cylinder 14a.

[0029] Preferably, at least one of the introduction cylinders 14a, 14b is motorised.

[0030] For the pair of introduction cylinders 14, an introduction reference plane Z is defined, coinciding with the tangent plane common to the outer surfaces in contact with the two introduction cylinders 14a, 14b.

[0031] Each drawing group further comprises, downstream of the pair of introduction cylinders 14, one drawing head comprising at least two pairs of drawing cylinders, driven so as to have different peripheral speeds; in particular, the pair of cylinders downstream has a greater peripheral speed than the pair of cylinders upstream, the drawing of the web, which passes between the two pairs of cylinders, is determined by the difference of the peripheral speeds.

[0032] In particular, according to the embodiment shown, the drawing head of the drawing group 12', 12'' comprises three pairs of drawing cylinders, that is a third 16a, a second 18a and a first 20a lower drawing cylinder, in pressurised contact with respective third 16a, second 18b and first 20b upper drawing cylinders.

[0033] In addition, the drawing group 12', 12" comprises a pairs of output cylinders 22, downstream of the drawing head, consisting of a lower output cylinder 22a and an upper output cylinder 22b, in pressurised contact with the lower output cylinder 22a.

[0034] Preferably, at least one of the output cylinders 22a, 22b is motorised.

[0035] An output reference plane K is defined for the pair of introduction cylinders 22, coinciding with the tangent plane common to the outer surfaces in contact with the two output cylinders 22a, 22b.

[0036] A working width defined as the extension and transversal dimensions, that is, in the direction of the rotation axes, of the drawing cylinders of the drawing head is defined for the drawing head.

[0037] Perpendicular to the transversal direction X, that is to the rotation axes of the drawing cylinders, a centreline plane M of the drawing head is defined passing midway through the working width.

[0038] In addition, the lap-winder comprises a lap-forming device (not shown), positioned downstream of the drawing groups, suitable for winding the web to form the lap, sent for subsequent processing to the combing machines, fly frames and spinning frames.

[0039] Embodiments of the lap-forming device are for example described in the document WO 2010/070608, in the name of the Applicant. The teaching relative to the embodiments of such forming device is incorporated for reference to the present description.

[0040] In addition, the drawing device comprises a body for the support of the components described and, preferably, a cover or casing 24 which covers the drawing group 12', 12", and in particular the drawing head.

[0041] Preferably, the cover 24 comprises mobile portions, for example rotating, to allow access by an operator to the inner components.

[0042] The cover 24 has an access aperture 26, placed upstream of the pair of introduction cylinders 14, to permit the access of the webs to the drawing group 12', 12", and an exit 28, preferably positioned at the point of the pair of output cylinders 22, for the exit of the webs.

[0043] In addition, the lap-winder 8 comprises at least one bench 30, positioned between one drawing group 12' and the next 12", extending in said longitudinal direction Y; the bench 30 between the first drawing group 12' and the second drawing group 12", extends under the drawing cylinders of the second drawing group 12", so that the webs processed and joined by the second drawing group 12" overlap the webs drawn and joined by the first drawing group 12', before arriving together at the lap-forming device.

[0044] The lap-winder apparatus 1 further comprises a deviation device suitable to support and deviate the web contained in the cans from said cans 2 to the relative drawing group 12', 12".

[0045] The deviation device comprises a creel 40 which at least partially surmounts the loading area 4, 6 and the lap winder, and in particular the drawing device

of the same, consisting of a frame 42 and of a plurality of cross-members, having a longitudinal extension above the loading areas 4, 6.

[0046] For example, the creel 40 comprises a first cross-member 44a, a second cross-member 44b and a third cross-member 44c positioned on the first loading area 4, and a first cross-member 46a, a second cross-member 46b and a third cross-member 46c positioned on the second loading area 6.

[0047] For example, each loading area 4, 6 houses six cans positioned in two longitudinal rows; each cross-member is associated with one of said rows of cans.

[0048] According to further embodiment variations, a plurality of cans positioned on at least one longitudinal row is envisaged.

[0049] In addition, the deviation device comprises a plurality of primary deviators 50 supported by the creel 40, and in particular by its cross-members, for example hanging from said cross-members, suitable for deviating the web from the cans towards the drawing device of the lap-winder.

[0050] Said primary deviators 50 are positioned along the first cross-member 44a, 46a, along the second cross-member 44b, 46b and along the third cross-member 44c, 46c.

[0051] The deviators associated with the same drawing group 12' are brought progressively longitudinally closer together by the cans 2 towards said drawing group, so as to draw the webs together and permit insertion in the drawing group, through the access aperture 26.

[0052] According to a preferred embodiment, the primary deviator comprises a non-motorised roller, hanging from the respective cross-member of the creel.

[0053] Preferably, the rotation axes of the non-motorised rollers are inclined in the longitudinal direction Y.

[0054] Moreover, the deviation device comprises a final deviator 60, positioned immediately upstream of the drawing group 12', 12", suitable to perform a deviation of the web, once only, before the pair of introduction cylinders 14 of the drawing group 12', 12".

[0055] The final deviator 60 comprises a plurality of deviation units 62, each suitable for deviating a single web, distributed for example, evenly, on the working width of the drawing group 12', 12".

[0056] Said deviation unit 62 forms an upper abutment for the deviated web suitable to limit the trajectory of the web in transit from said units 62 towards the pair of introduction cylinders above the introduction reference plane.

[0057] In other words, said deviation units 62 are suitable for deviating the web coming from the primary deviators 50 so that the trajectory between said deviation units 62 and the pair of introduction cylinders 14 is contained on the introduction reference plane Z or at most below it, that is in such a way that the web must proceed at most upwards to introduce itself into the pair of introduction cylinders 14.

[0058] According to one embodiment, said final devi-

ator 60 comprises at least one plate 70a, 70b, attached upstream of the pair of introduction cylinders 14, provided with a plurality of holes 72 which form said deviation units. [0059] Preferably, two plates are envisaged 70a and 70b, for example positioned opposite the introduction aperture 26 of the casing 24, diverging in the direction of advancement of the web.

[0060] Preferably, said plate 70a, 70b, is attached so as to rotate around a vertical axis, for example to the cover 24 or the body of the machine, so as to be able to modify and fix the inclination on the horizontal plane.

[0061] Preferably, the holes 72 are equidistant from each other.

[0062] According to a further embodiment, said final deviator 60 comprises a plurality of deviation rollers 80, which the webs to be deviated pass over, rotating freely around respective rotation axes J.

[0063] The rollers 80 are positioned along two branches 82a, 82b, diverging in the direction of advancement of the webs and converging, for example joined, in an apical zone 84. Preferably, the branches 82a, 82b and the apical area 84 are made from a profile.

[0064] In addition, preferably, the final deviator 60 comprises a support bar 86, which extends from the apical area 84 towards the opposite ends of the branches 82a, 82b, for example in an arched shape.

[0065] Preferably, the branches 82a, 82b and the support bar 86 are connected to the body of the drawing device or cover 24, so that the deviation rollers 80 are positioned opposite the access aperture 26.

[0066] Preferably, the position of the rollers 80 is adjustable. In other words, the position of the rotation axis J of each roller 80 is adjustable, to optimise the position of the roller in relation to the incoming and outgoing web.

[0067] According to a preferred embodiment, the final deviator 60 comprises a roller group 150, comprising said roller 80, rotating around the rotation axis J, support bearings 150, for the support of the roller 80 in rotation, and a pin 154, which supports the roller 80 by means of said bearings 152.

[0068] The pin 154 comprises, at the end opposite the end engaging with the roller 80, a spherical head 156.

[0069] The roller group 150 further comprises a connector 160 for the connection, for example by threading, to the branches 82a, 82b of the deviator 60; the connector 160 presents, on the side opposite that used for connection to the branches 82a, 82b, a compartment 162, the walls of which delimit it annularly and are shaped so as to form a support surface 164.

[0070] In addition, the roller group 150 comprises elastic elements 164, such as cup springs, housed in the compartment 162.

[0071] Lastly, the roller group 150 comprises a sealing bush 170, screwable to the connector 160, to close the compartment 162.

[0072] The closure bush 170 is fitted with a bottom 172 provided with a through aperture towards the compartment 162; the walls which annularly delimit the aperture

are shaped so as to form a further abutment surface 174.

[0073] The head 56 of the pin 154 is partially housed in the compartment 162 of the container 160 and projects partially, blocked however by the bush 170.

5 [0074] The spherical head 156 rests on the support surface 164 of the connector 160 and abuts with the abutment surface 174 of the bush 170, adequately pre-loaded by the cup spring 164.

[0075] To adjust the position of the rotation axis J of 10 the roller 80, it is sufficient to partially unscrew the bush 170, perform the adjustment and screw up the bush again: the friction between the head 156 of the pin 154 and the contact surfaces 164, 174 keep the roller in the desired position.

15 [0076] According to a further embodiment, the deviation device comprises an auxiliary deviator 90, positioned downstream of the primary deviators and upstream of the drawing group 12', 12".

[0077] Preferably, the auxiliary deviator 90 comprises 20 a plurality of auxiliary rollers 92, fitted so as to freely rotate around their rotation axis W, sub-divided into two groups 92a, 92b externally to the working width of the drawing group 12', 12", that is at the sides of it.

[0078] Preferably, the auxiliary rollers 92 of each group 25 vertically overlap, for example on two vertical rows, for example longitudinally alongside, for each side of the lap-winder. A front row 92a' and a back row 92a" are thereby identified for the first group 92a and a front row 92b' and a back row 92b" for the second group 92b, with reference 30 to the direction of advancement of the webs.

[0079] Preferably, in addition, the auxiliary rollers 92 overlap in pairs.

[0080] Preferably, in addition, the spatial position of the rotation axis W of the auxiliary rollers 92 is adjustable, 35 for example using the roller group 150 illustrated above.

[0081] Preferably, the auxiliary deviator 90 comprises a column 100 for each group of rollers, extending vertically to which the auxiliary rollers 92 are fitted.

[0082] Preferably, the column 100 consists of a "U" 40 shaped profile, having a base and two side walls to which the two rows of auxiliary columns are 92a', 92a" are fitted; said lateral walls are vertically sub-divided into independent portions, for example by means of suitable cuts, bendable at a variable inclination so as to determine different inclinations of the rotation axes of the overlapping auxiliary rollers 92.

[0083] Preferably, in addition, the attachment points of the auxiliary rollers 92a' of the same row to the respective lateral wall of the column 100 are aligned along a vertical.

50 [0084] According to one embodiment variation, (not shown), said attachment points are progressively shifted further inward than the drawing head.

[0085] During the normal functioning of the lap-winder apparatus according to the present invention, the webs are extracted from each can and, supported by the primary deviator 50 of the creel 40, are brought to the side of the lap-winder 8.

[0086] In the embodiments with a final deviator 60, the

webs are made to converge towards the final deviator 60 and deviated again once only towards the drawing group 12', 12", in particular towards the opening between the introduction cylinders 14a, 14b.

[0087] Advantageously, the incoming webs, travelling at most along an uphill tract of the final deviator towards the introduction cylinder facilitate the operator during the operations of threading the web.

[0088] In the embodiments with auxiliary deviator 90, the webs are brought as close as possible alongside the working width while remaining outside it, and so as to surmount the introduction cylinders.

[0089] According to a further embodiment, the lap-winder apparatus comprises both an auxiliary deviator 90 and a final deviator 60, according to the variants described above.

[0090] A person skilled in the art may make modifications to the lap-winder apparatus described above so as to satisfy contingent requirements while remaining within the sphere of protection as defined by the following claims.

Claims

1. Lap-winder apparatus (1) for a spinning preparation line, comprising:

- a loading area (4, 6) for the parking of cans (2) suitable to contain a web to be processed;
- a lap-winder (8) positioned so as to receive the webs extracted from the cans (2), comprising at least one drawing group (12', 12") having a pair of introduction cylinders (14) defining an introduction reference plane (Z) and a drawing head having a predefined working width;
- a deviation device suitable to support and deviate the web contained in the cans (2) to the drawing group (12', 12"), comprising a final deviator (60), positioned immediately upstream of the drawing group (12', 12"), suitable to perform a deviation of the web, once only, before the pair of introduction cylinders (14), wherein

the final deviator (60) comprises at least one deviation unit (62) suitable to deviate a single web and positioned on the working width of the drawing head, which forms an upper abutment for the deviated web suitable to limit the trajectory of the deviated web above the introduction reference plane (Z).

2. Apparatus according to claim 1, wherein the final deviator (60) comprises a plurality of deviation units (62), distributed over the working width.
3. Apparatus according to claim 2, wherein the deviation units (62) are divided into two groups positioned

on separate branches (82a, 82b), arranged on both sides of a centreline plane (M) of the drawing head.

4. Apparatus according to any of the previous claims, wherein the final deviator (60) comprises at least one plate (70a, 70b) provided with a plurality of holes (72) which form said deviation unit.
5. Apparatus according to claim 4, wherein two plates (70a, 70b) are provided, diverging in the direction of advancement of the web.
6. Apparatus according to claim 4 or 5, wherein said plate (70a, 70b) is attached so as to rotate around a vertical axis and adjustable in position.
7. Apparatus according to any of the claims from 1 to 3, wherein said final deviator (60) comprises a plurality of deviation rollers (80), rotating freely around respective rotation axes (J).
8. Apparatus according to claim 7, wherein the rollers (80) are positioned along the two branches (82a, 82b), diverging in the direction of advancement of the webs.
9. Apparatus according to claim 7 or 8, wherein the position of the rotation axis (J) of said rollers (80) is adjustable.
10. Apparatus according to any of the previous claims, comprising an auxiliary deviator (90), positioned upstream of the final deviator (60), comprising a plurality of auxiliary rollers (92), rotating freely around their rotation axis (W), sub-divided into two groups (92a, 92b) externally to the working width of the drawing head, wherein the auxiliary rollers (92) of each group vertically overlap.
11. Apparatus according to claim 10, wherein the position of the rotation axis (W) of said auxiliary rollers (92) is adjustable.

Patentansprüche

1. Schleifenwicklervorrichtung (1) für die Spinnvorberarbeitungsanlage, die umfasst:

- einen Ladebereich (4, 6) zum Abstellen von Tonnen (2), die geeignet sind, eine zu verarbeitende Bahn zu enthalten;
- einen Schleifenwickler (8), der derart positioniert ist, dass er die aus den Tonnen (2) entnommenen Bahnen aufnimmt, der wenigstens eine Zuggruppe (12', 12") mit einem Paar von Einführungszylinern (14), die eine Einführungsbezugsebene (Z) bilden, und einen Zugkopf mit

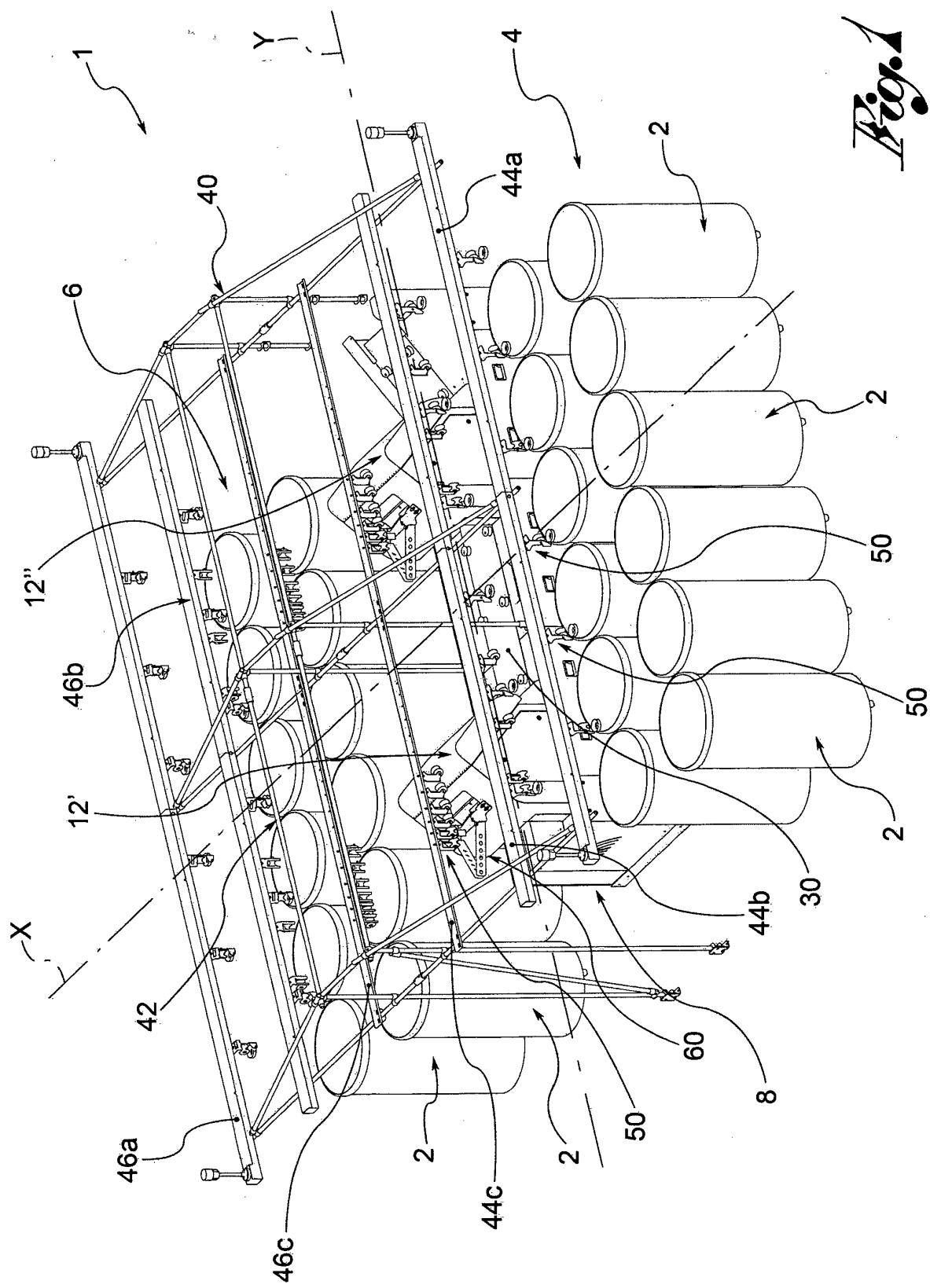
- einer vordefinierten Arbeitsbreite umfasst;
 - eine Umlenkvorrichtung, die geeignet ist, die in den Dosen enthaltene Bahn aus den Dosen (2) zu der Zuggruppe (12', 12") umzulenken, die eine abschließende Umlenkeinrichtung umfasst, die unmittelbar laufaufwärtig von der Zuggruppe (12', 12") positioniert ist, die geeignet ist, nur einmal eine Umlenkung der Bahn vor dem Paar von Einführungszylinern (14) durchzuführen, wobei die abschließende Umlenkeinrichtung (60) wenigstens eine Umlenkeinheit (62) umfasst, die geeignet ist, eine einzige Bahn abzulenken, und die auf der Arbeitsbreite des Zugkopfs positioniert ist, der einen oberen Anschlag für die umgeleitete Bahn bildet, um die Bewegungsbahn der umgelenkten Bahn über der Einführungsbezugsebene (Z) zu begrenzen.
2. Vorrichtung nach Anspruch 1, wobei die abschließende Umlenkeinrichtung (60) mehrere Umlenkeinheiten (62) umfasst, die über die Arbeitsbreite verteilt sind. 20
3. Vorrichtung nach Anspruch 2, wobei die Umlenkeinheiten (62) in zwei Gruppen geteilt sind, die auf getrennten Zweigen (82a, 82b) positioniert sind, welche auf beiden Seiten einer Ebene (M) durch die Mittellinie des Zugkopfs angeordnet sind. 25
4. Vorrichtung nach einem der vorhergehenden Ansprüche, wobei die abschließende Umlenkeinrichtung (60) wenigstens eine Platte (70a, 70b) umfasst, die mit einer Vielzahl von Löchern (72) versehen ist, die die Umlenkeinheit bilden. 30
5. Vorrichtung nach Anspruch 4, wobei zwei Platten (70a, 70b) bereitgestellt sind, die in die Vorschubrichtung der Bahn auseinandergehen. 35
6. Vorrichtung nach Anspruch 4 oder 5, wobei die Platte (70a, 70b) derart befestigt ist, dass sie um eine vertikale Achse rotiert und in der Position einstellbar ist. 40
7. Vorrichtung nach einem der Ansprüche 1 bis 3, wobei die abschließende Umlenkeinrichtung (60) eine Vielzahl an Umlenkrollen (80) umfasst, die frei um jeweilige Drehachsen (J) rotieren. 45
8. Vorrichtung nach Anspruch 7, wobei die Rollen (80) entlang zwei Verzweigungen (82a, 82b) positioniert sind, die in der Vorschubrichtung der Bahnen auseinandergehen. 50
9. Vorrichtung nach Anspruch 7 oder 8, wobei die Position der Drehachse (J) der Rollen (80) einstellbar ist. 55
10. Vorrichtung nach einem der vorhergehenden Ansprüche, die eine Hilfsumlenkeinrichtung (90) umfasst, die laufaufwärtig von der abschließenden Umlenkeinrichtung (60) positioniert ist, die eine Vielzahl von Hilfsrollen (92) umfasst, die frei um ihre Drehachse (W) rotieren, welche in zwei Gruppen (92a, 92b) außerhalb der Arbeitsbreite des Zugkopfs unterteilt sind, wobei die Hilfsrollen (92) jeder Gruppe sich vertikal überlappen.
11. Vorrichtung nach Anspruch 10, wobei die Position der Drehachse (W) der Hilfsrollen (92) einstellbar ist.
- 15 Revendications**
1. Appareil enrouleur de nappe (1) pour une ligne de préparation de filage, comprenant :
- une zone de chargement (4, 6) pour la mise en attente des pots de carte (2) appropriés pour contenir un voile à traiter ;
 un enrouleur de nappe (8) positionné afin de recevoir les voiles extraits des pots de carte (2), comprenant au moins un groupe d'étirage (12', 12") ayant une paire de cylindres d'introduction (14) définissant un plan de référence d'introduction (Z) et une tête d'étirage ayant une largeur de travail prédéfinie ;
 un dispositif de déviation approprié pour supporter et dévier le voile contenu dans les pots de carte desdits pots de carte (2) vers le groupe d'étirage (12', 12"), comprenant un déviateur final (60) positionné immédiatement en amont du groupe d'étirage (12', 12"), approprié pour réaliser une déviation du voile, une seule fois, avant la paire de cylindres d'introduction (14), dans lequel :
- le déviateur final (60) comprend au moins une unité de déviation (62) appropriée pour dévier un seul voile et positionnée sur la largeur de travail de la tête d'étirage, qui forme une butée supérieure pour le voile dévié, appropriée pour limiter la trajectoire du voile dévié au-dessus du plan de référence d'introduction (Z).
2. Appareil selon la revendication 1, dans lequel le déviateur final (60) comprend une pluralité d'unités de déviation (62) réparties sur la largeur de travail.
 3. Appareil selon la revendication 2, dans lequel les unités de déviation (62) sont divisées en deux groupes positionnés sur des branches séparées (82a, 82b) agencées des deux côtés d'un plan central (M) de la tête d'étirage.

4. Appareil selon l'une quelconque des revendications précédentes, dans lequel le déviateur final (60) comprend au moins une plaque (70a, 70b) prévue avec une pluralité de trous (72) qui forment ladite unité de déviation. 5
5. Appareil selon la revendication 4, dans lequel on prévoit deux plaques (70a, 70b) divergeant dans la direction de l'avancement du voile. 10
6. Appareil selon la revendication 4 ou 5, dans lequel ladite plaque (70a, 70b) est fixée afin de tourner autour d'un axe vertical et ajustable en position.
7. Appareil selon l'une quelconque des revendications 1 à 3, dans lequel ledit déviateur final (60) comprend une pluralité de rouleaux de déviation (80), tournant librement autour des axes de rotation (J) respectifs. 15
8. Appareil selon la revendication 7, dans lequel les rouleaux (80) sont positionnés le long des deux branches (82a, 82b), divergeant dans la direction d'avancement des voiles. 20
9. Appareil selon la revendication 7 ou 8, dans lequel la position de l'axe de rotation (J) desdits rouleaux (80) est ajustable. 25
10. Appareil selon l'une quelconque des revendications précédentes, comprenant un déviateur auxiliaire (90), positionné en amont du déviateur final (60) comprenant une pluralité de rouleaux auxiliaires (92), tournant librement autour de leur axe de rotation (W), divisés en deux groupes (92a, 92b) hors de la largeur de travail de la tête d'étirage, dans lequel les rouleaux auxiliaires (92) de chaque groupe se chevauchent verticalement. 30
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11. Appareil selon la revendication 10, dans lequel la position de l'axe de rotation (W) desdits rouleaux auxiliaires (92) est réglable. 40

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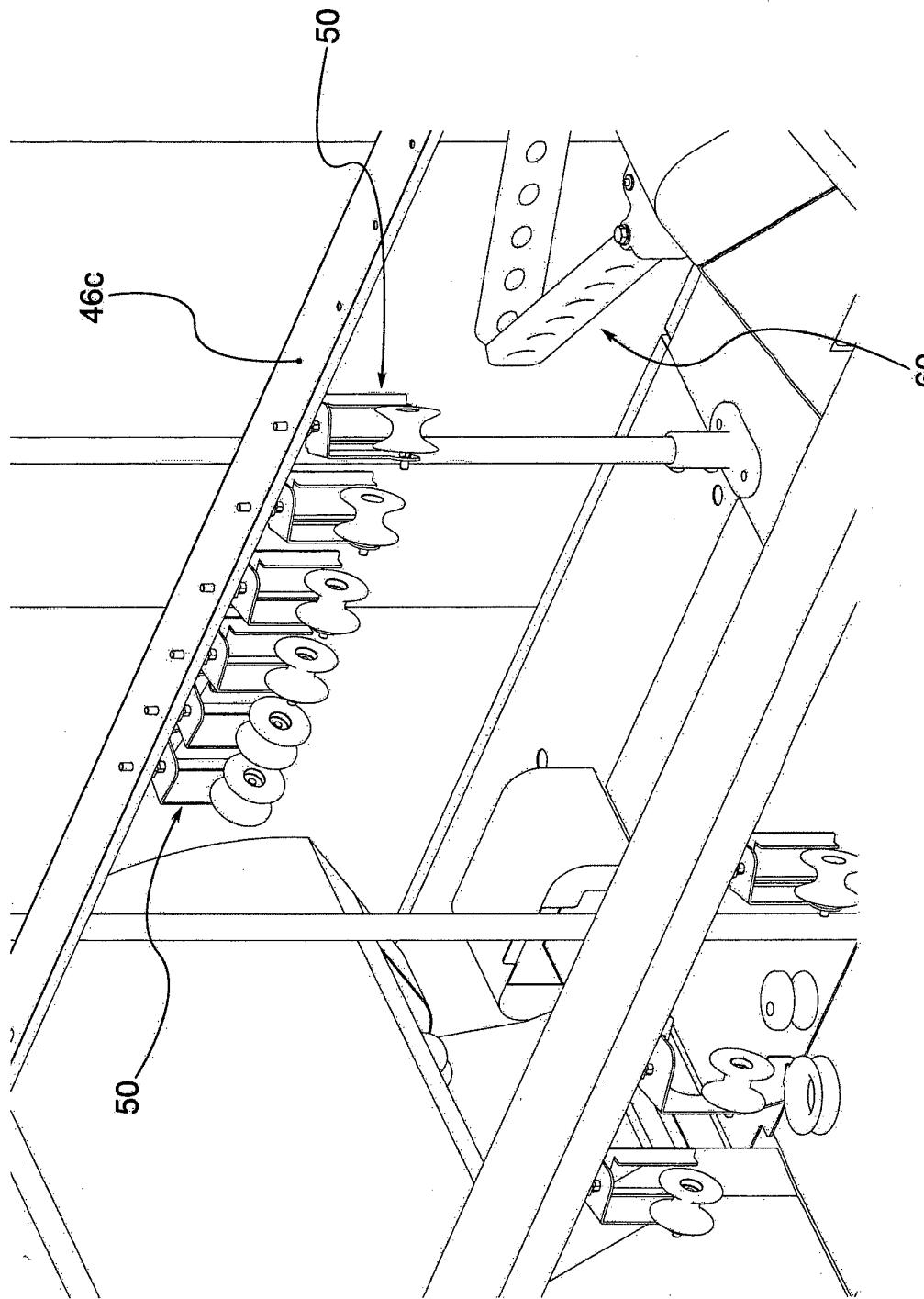


Fig. 2

Fig. 3

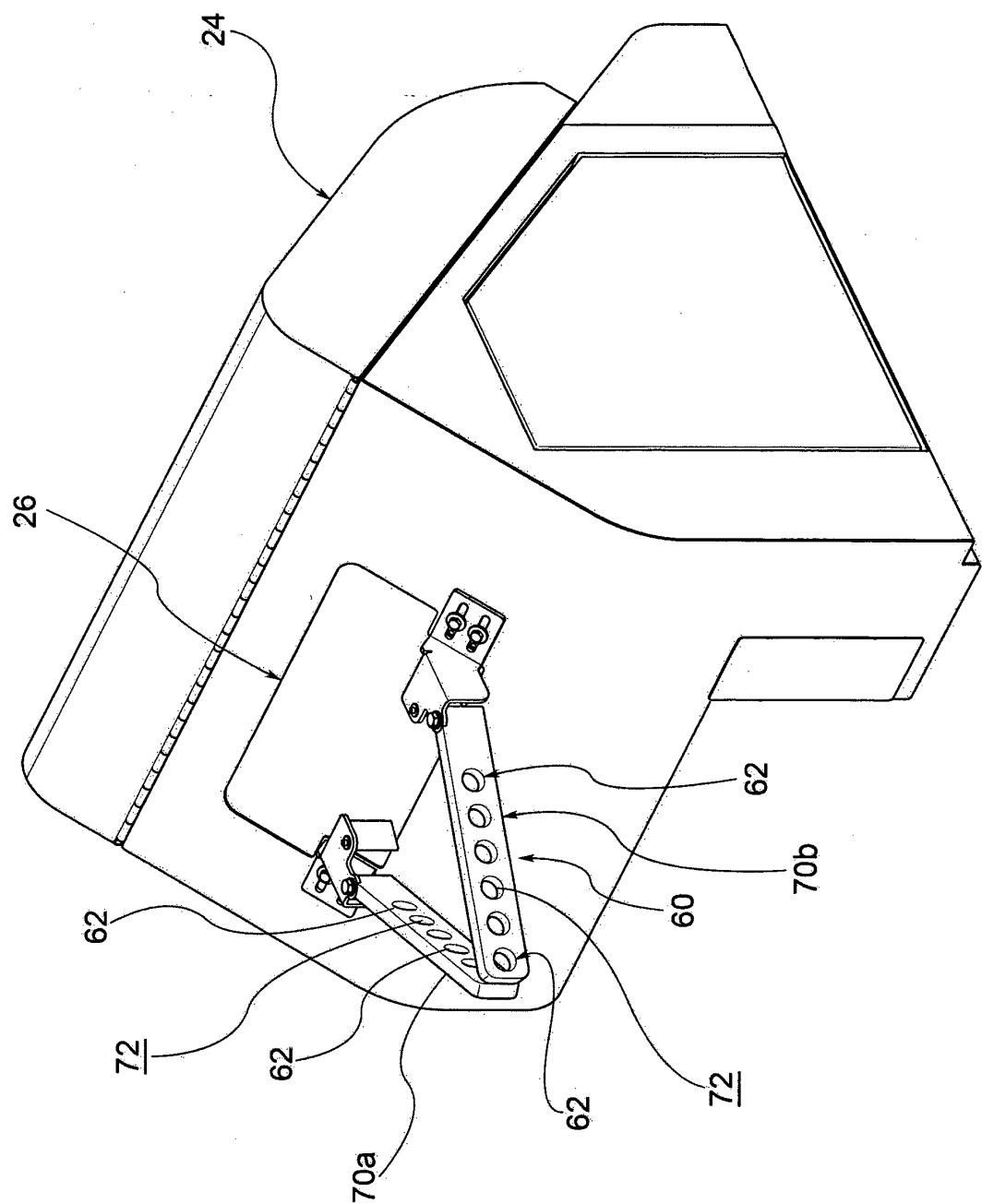


Fig. 4

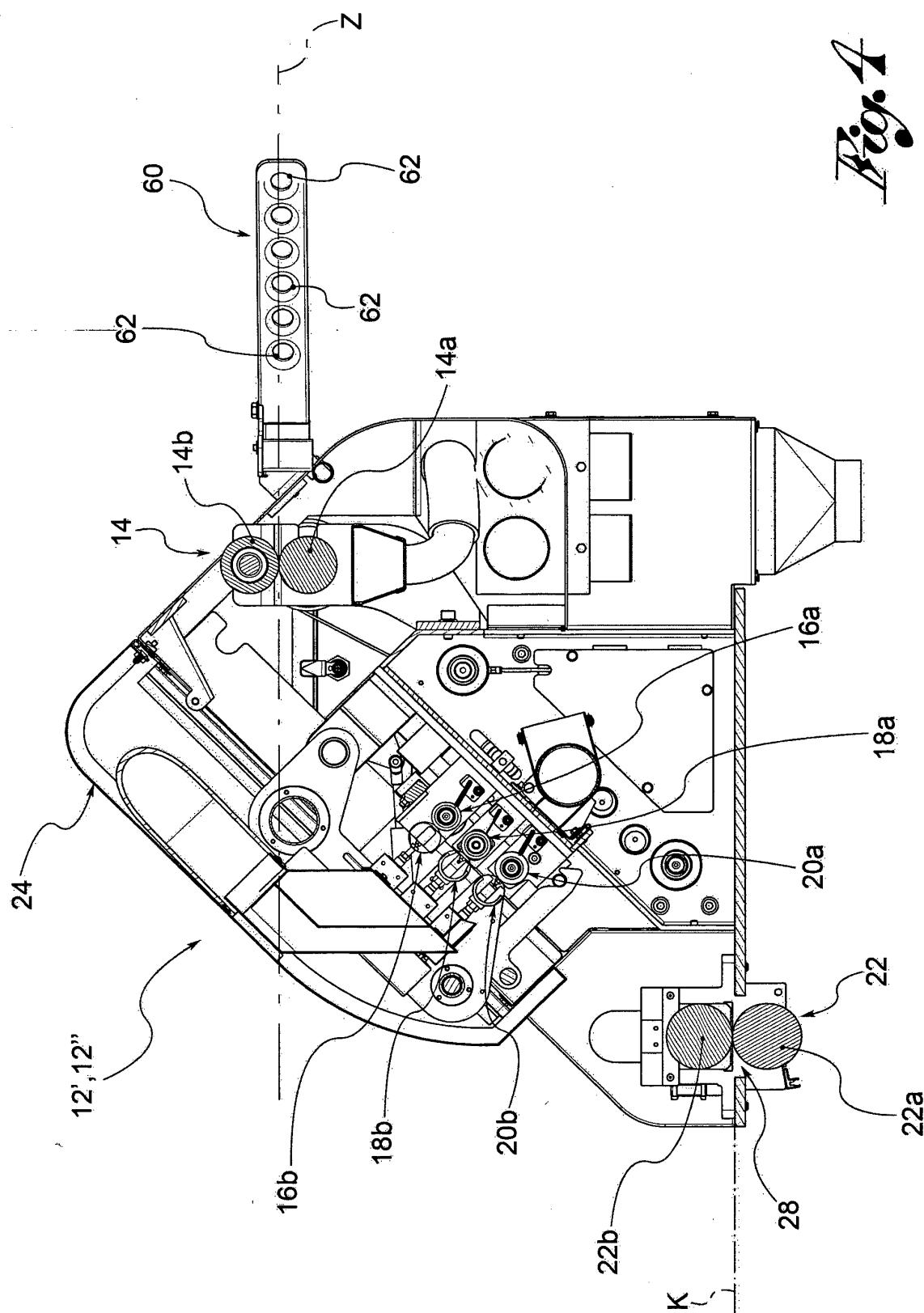


Fig. 5

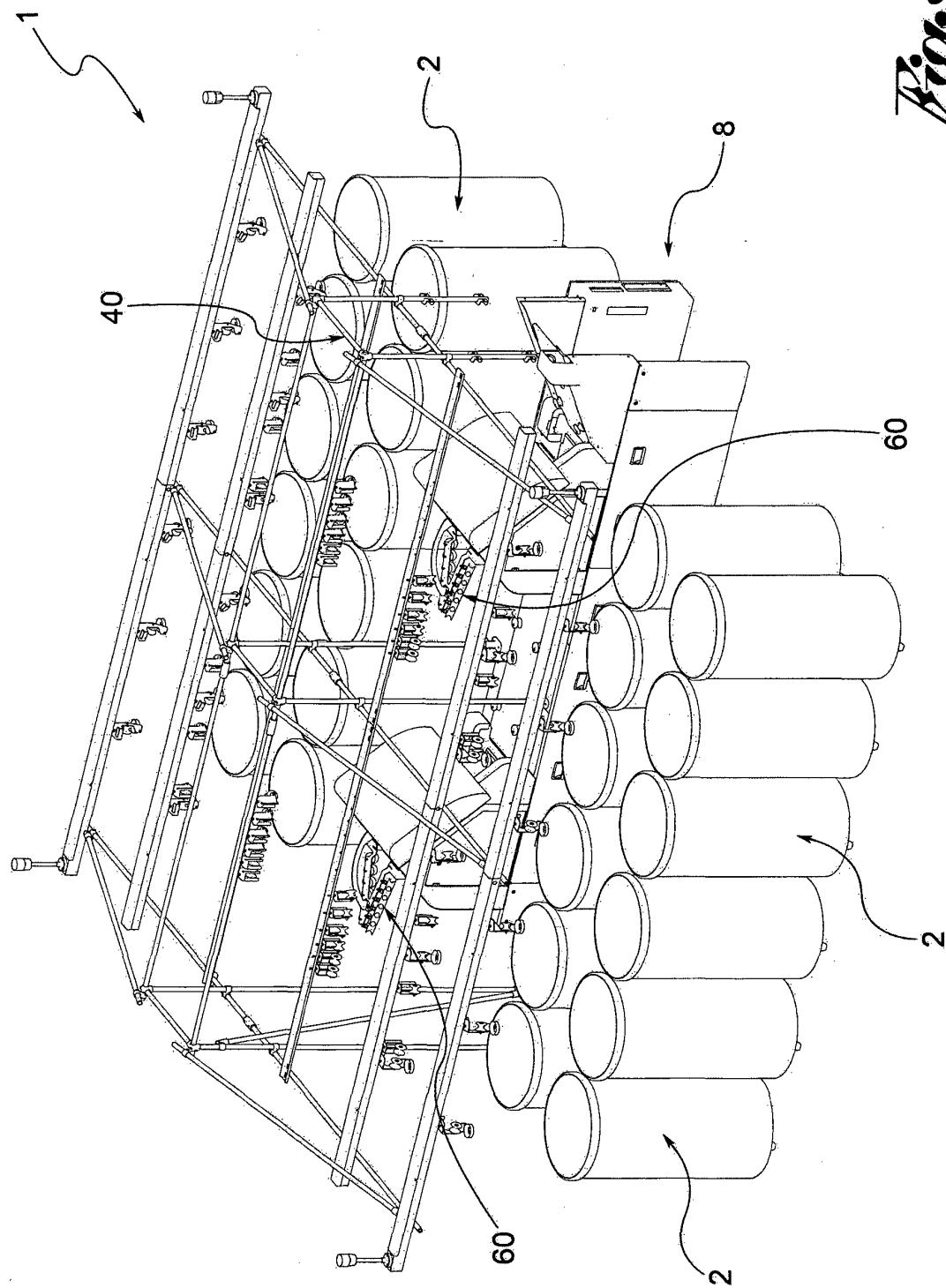
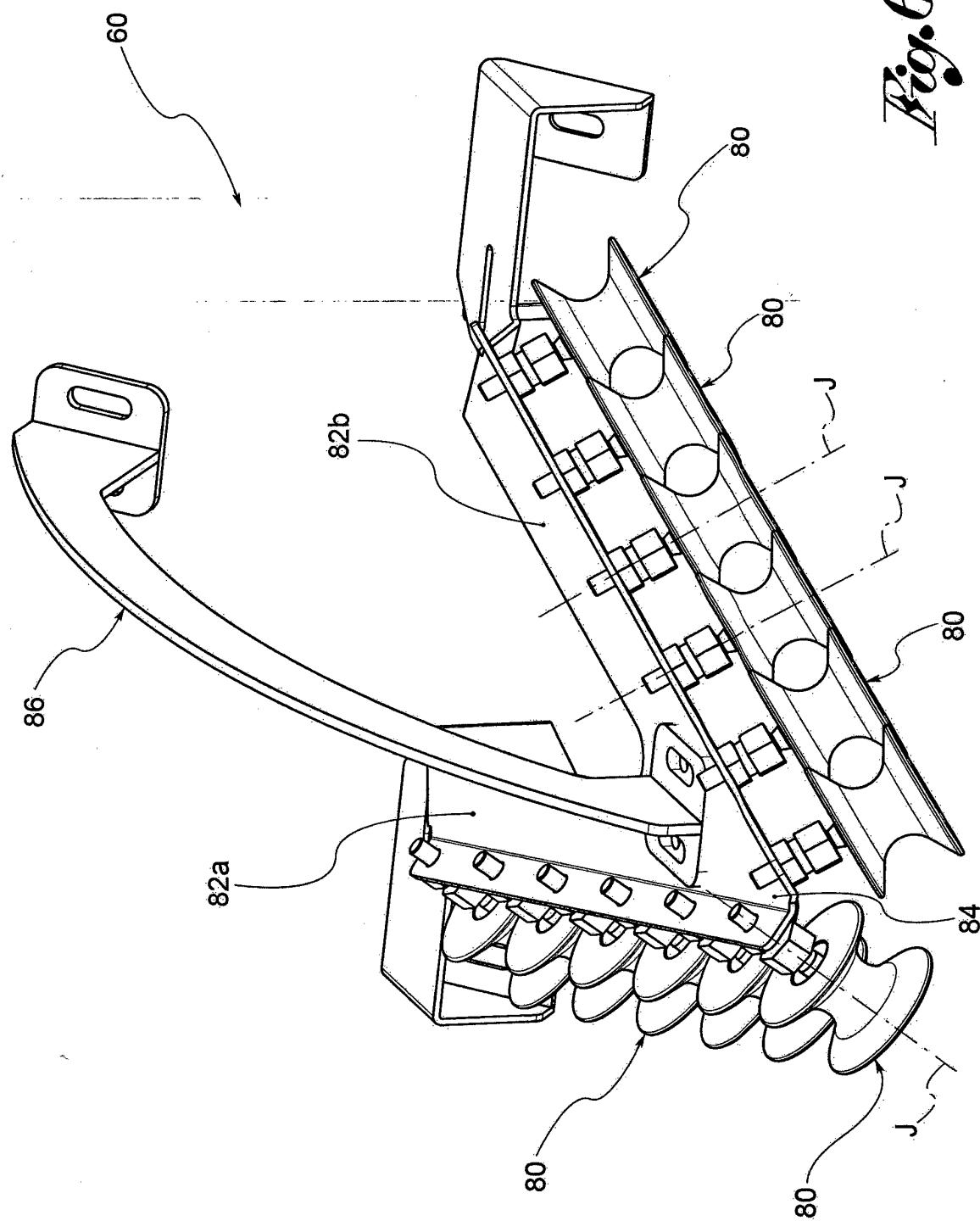


Fig. 6a



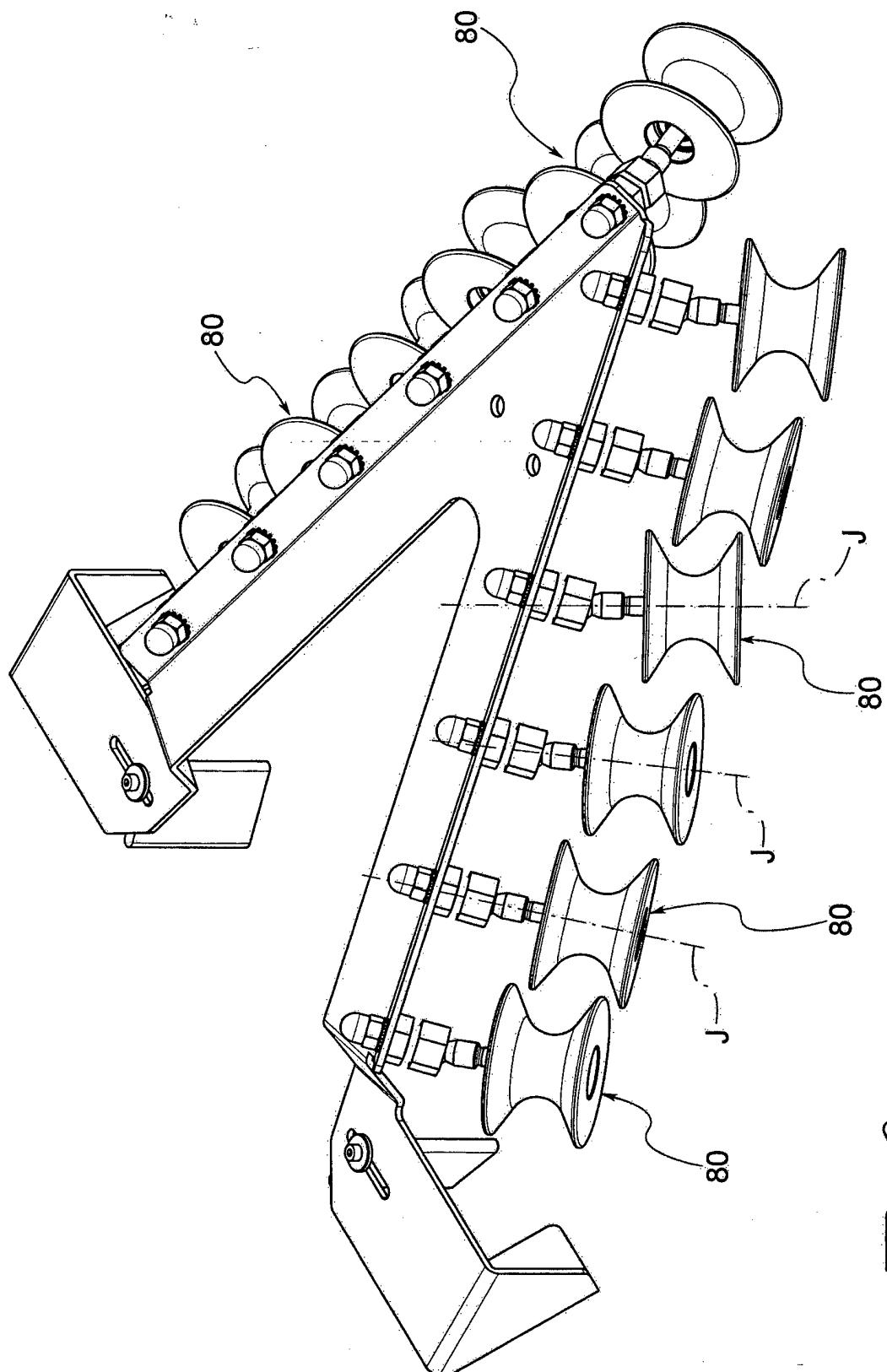


Fig. 6b

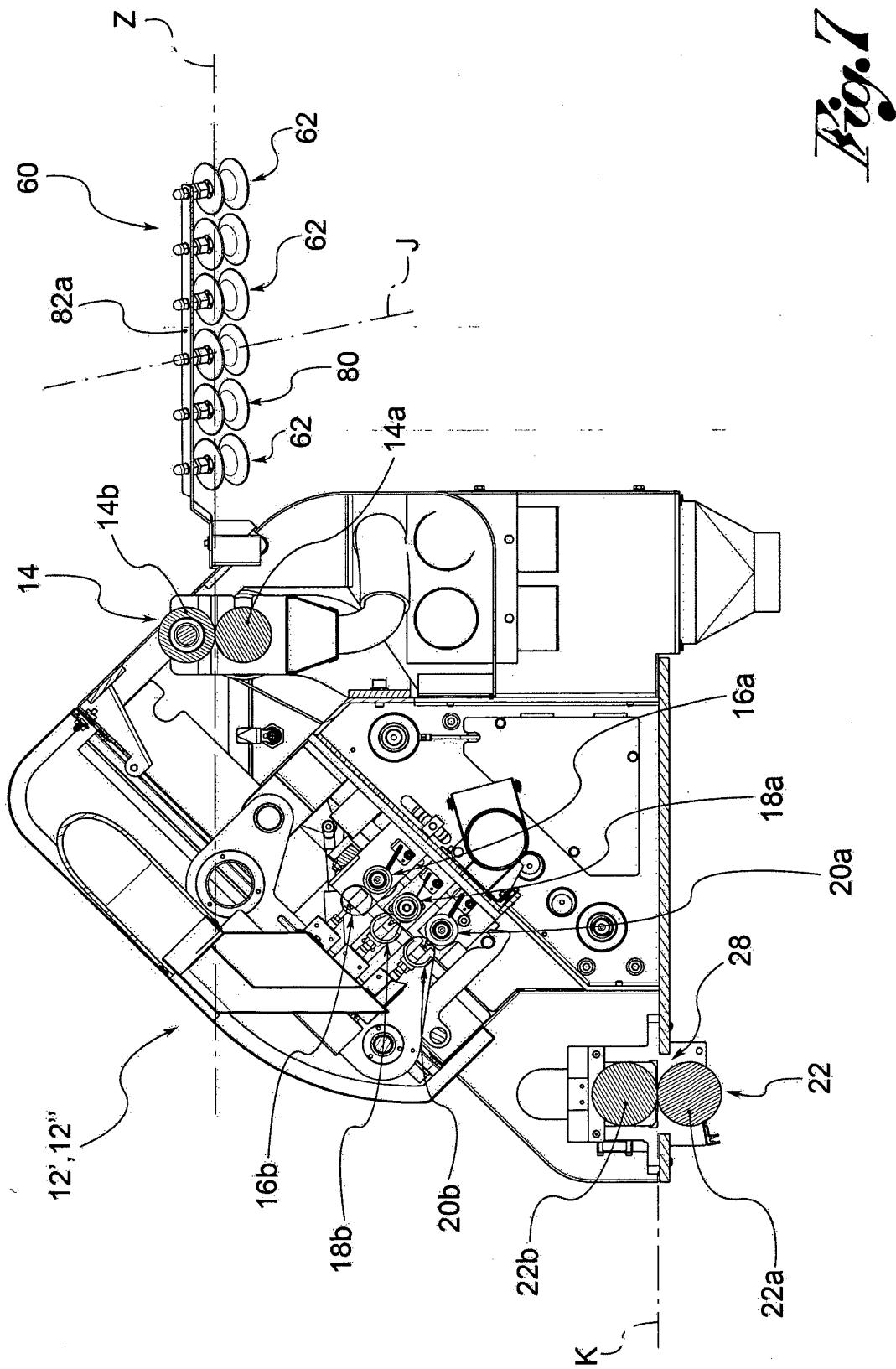
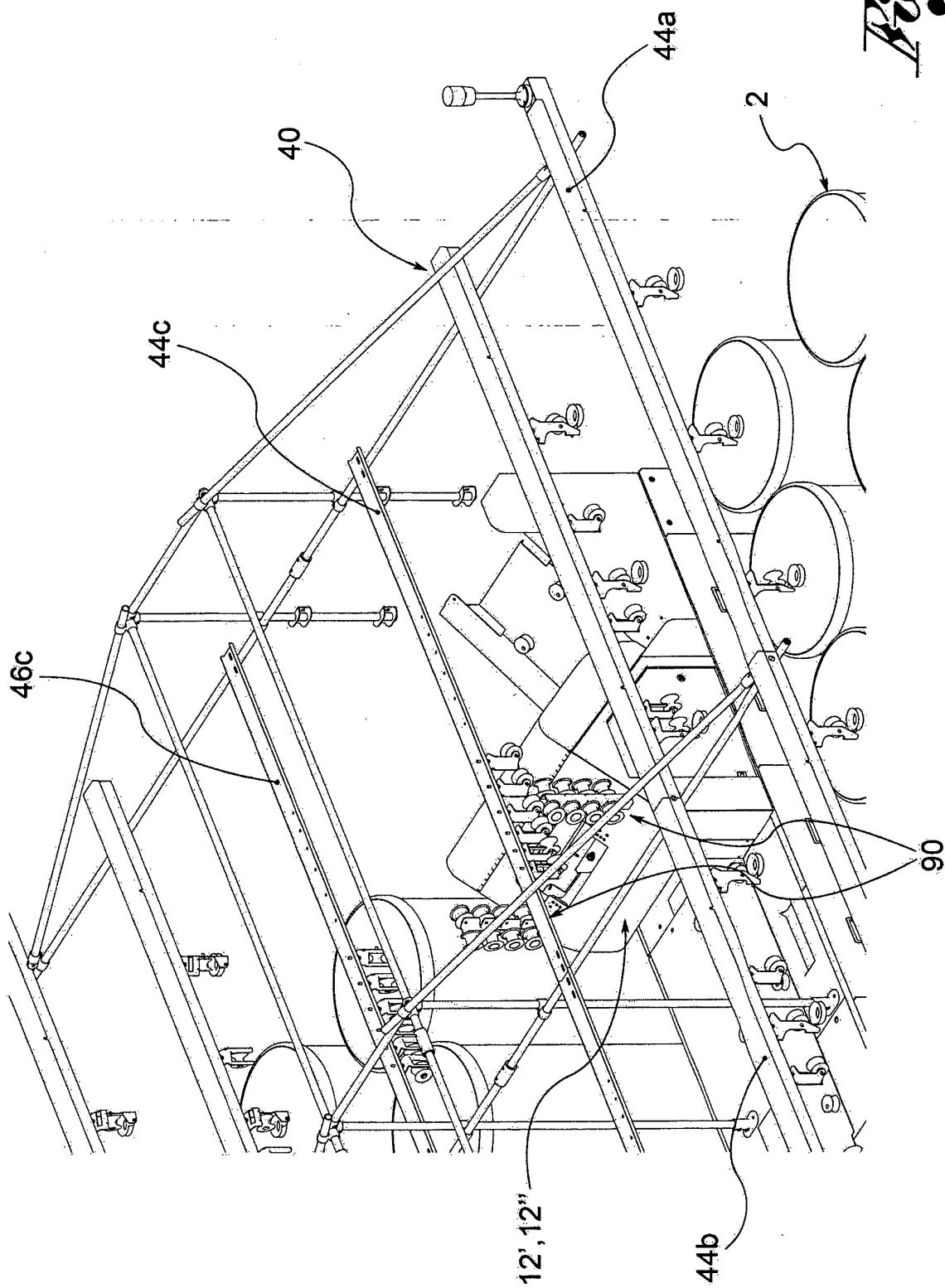
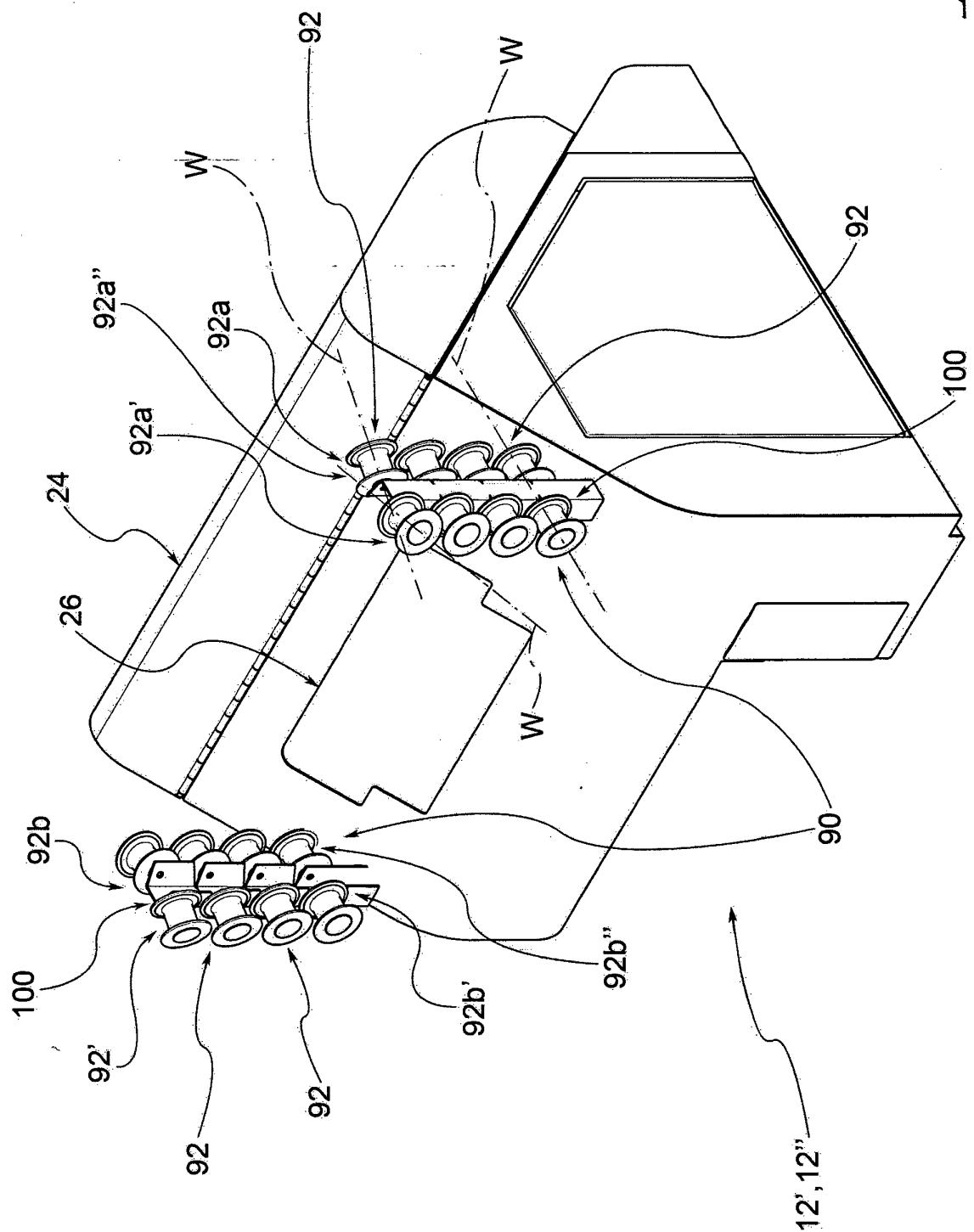
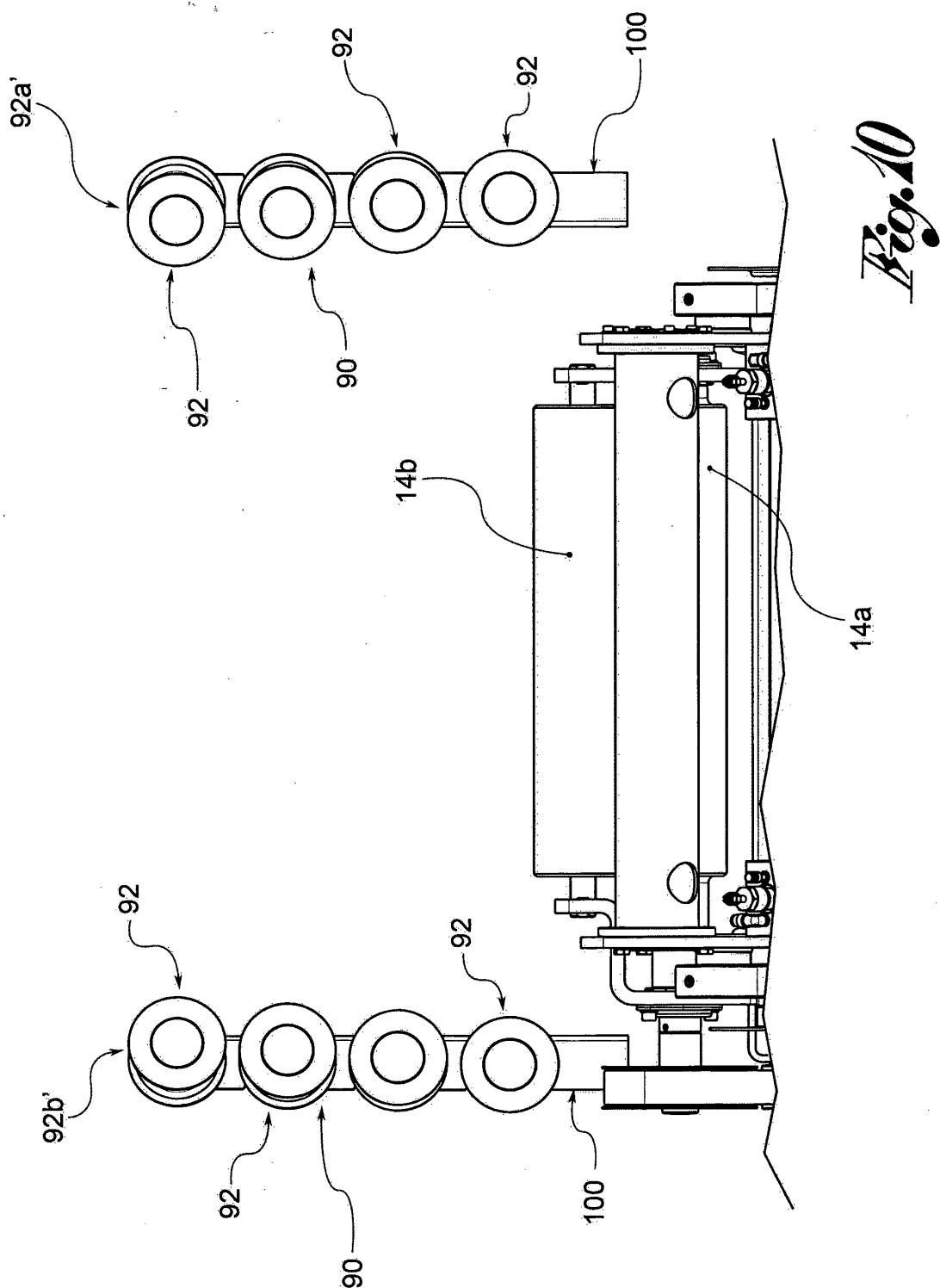


Fig. 8



Rig. 9



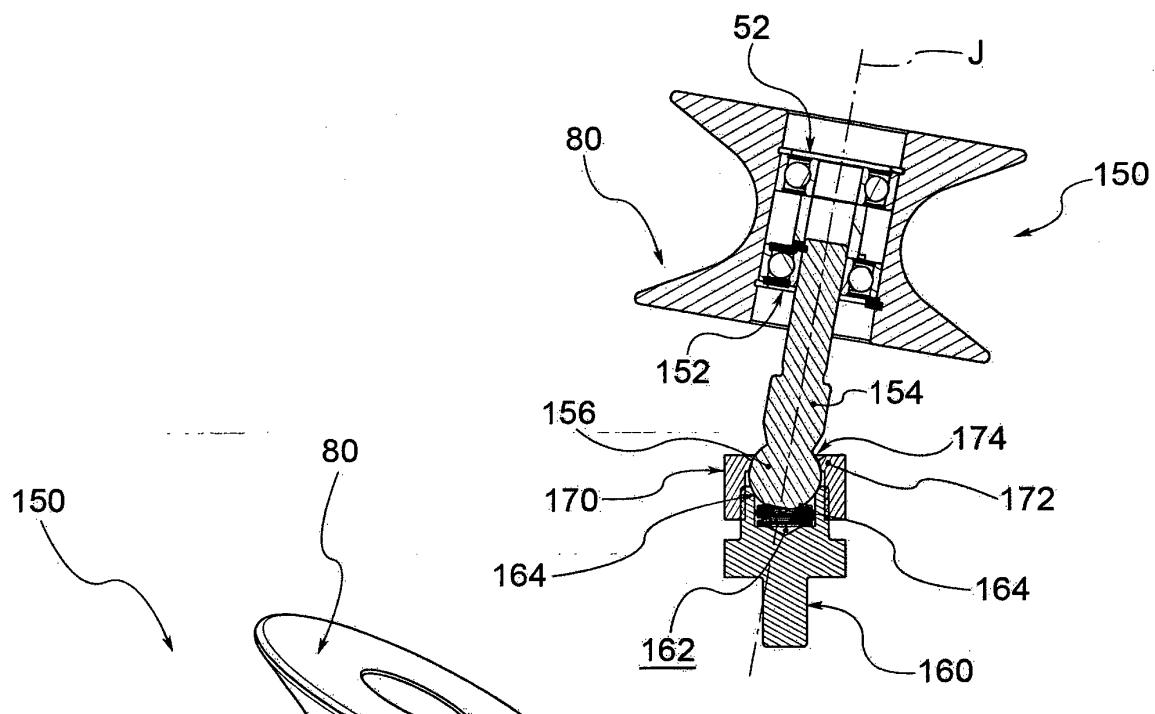


Fig.13

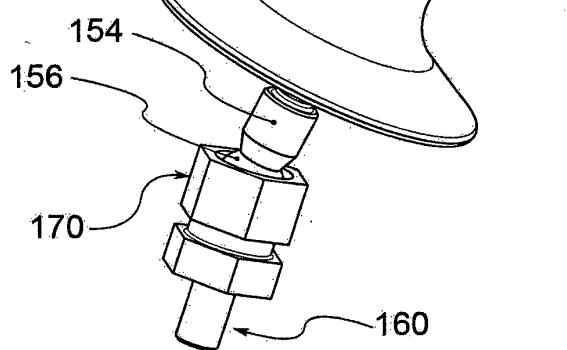


Fig.11

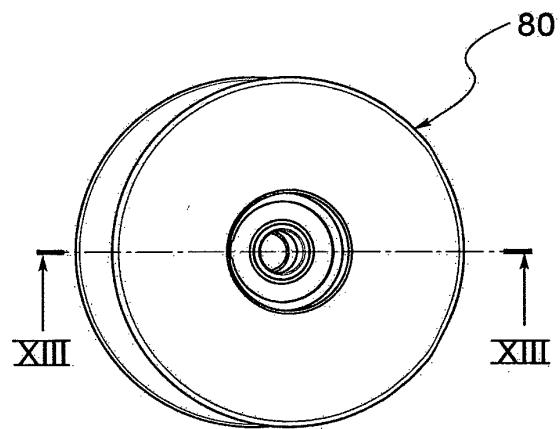


Fig.12

REFERENCES CITED IN THE DESCRIPTION

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