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(54) A DEVICE FOR MANUFACTURING MULTI-SEGMENT ROD-LIKE ARTICLES

VORRICHTUNG ZUR HERSTELLUNG VON STABFÖRMIGEN ARTIKELN MIT MEHREREN SEGMENTEN

DISPOSITIF DE FABRICATION D'ARTICLES EN FORME DE TIGE À SEGMENTS MULTIPLES

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(56) References cited:
EP-A1- 2 767 177
WO-A1-2014/199284
DE-A1- 2 547 920
US-B2- 8 992 400

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Description

TECHNICAL FIELD

[0001] The present disclosure relates to a device for manufacturing multi-segment rod-like articles.

BACKGROUND

[0002] In tobacco industry, cigarettes comprising filters are manufactured, wherein the filters may be formed from one type of material or may be formed from various materials having different physical and filtering properties. Filtering material in a continuous form, for example acetate in a form of fibers, is cut into rods and is applied to cigarettes. In the currently manufactured cigarettes it is more and more common to use filters which comprise multiple segments formed from different materials. There are known machines for manufacturing multi-segment filter rods, wherein the multi-segment filter rods comprise segments formed from various types of the filtering material, as well as segments having a non-filtering function, which separate the filter segments or form only a through channel for tobacco smoke or for heated air comprising volatile substances. The machines arrange the segments formed by cutting rods of various materials. The rods are fed from multiple feeding devices, wherein the segments are formed by cutting filter rods, transferred for example on a drum conveyor, by means of a cutting head equipped with disc knives. Depending on the device, the individual segments are arranged side by side on a drum conveyor or one after another on a linear transporter to finally form a continuous multi-segment rod transferred linearly, which is cut into individual multi-segment rods. During further stages of the cigarettes production process, the multi-segment rods are cut into individual multi-segment mouthpieces which are applied into individual cigarettes. The arrangement of segments linearly and longitudinally one after another takes place on a conveyor belt, on which a wrapper tape is transferred. A very important factor that determined the quality of the manufactured rods is the coaxial arrangement of the segments on the belt conveyor immediately after the segments are placed on the conveyor. This is particularly important in relation to thin-walled tube segments, because a misaligned positioning of the segments may result in a defective connection that will not be automatically eliminated before being wrapped into the wrapper. The currently used feeding units comprise a feeding wheel, which places groups of segments onto the transporter.

[0003] EP2767177 discloses a mechanism for a momentary compression of a filter material used in the tobacco industry, wrapped into a wrapper and glued with an adhesive delivered from an adhesive applying apparatus, adapted to being placed on a machine for manufacturing filter rods before the adhesive applying apparatus, which comprises at least one rotary compressing member for pressing the filter material linearly moving underneath it.

SUMMARY

[0004] The aim of the present invention is to provide an improved device, which provides a correct, i.e. axial alignment of the segments on the transporter belt, in particular of the thin-walled segments and long segments. In relation to the front surfaces of the segments this task may also be defined as positioning the neighboring segments such, that the misaligned positioning of the front surfaces of the segments with respect to each other is reduced.

[0005] The invention is related to a device for manufacturing multi-segment rod-like articles according to the appended claims.

BRIEF DESCRIPTION OF FIGURES

[0006] The object of the invention is presented in details by means of example embodiments on a drawing, wherein:

- Fig. 1 shows a correctly manufactured continuous rod;
- Fig. 2 shows a defectively manufactured continuous rod;
- Fig. 3 shows a fragment of the rod from Fig. 2 in an enlarged view;
- Fig. 4 shows a device for manufacturing multi-segment rods in a first embodiment;
- Fig. 5 shows a fragment of the device from Fig. 4, according to an embodiment which is not covered by the subject-matter of the claims;
- Fig. 6 shows a fragment of the device in a second embodiment which is not covered by the subject-matter of the claims;
- Fig. 7 shows a top view of rotary pressing elements presented in Fig. 6;
- Figs. 8 and 9 show a rotary pressing element in a first embodiment which is not covered by the subject-matter of the claims;
- Fig. 10 shows a rotary pressing element in a second embodiment;
- Fig. 11 shows a rotary pressing element in a third embodiment;
- Fig. 12 shows a fragment of the device in a third embodiment which is not covered by the subject-matter of the claims;
- Fig. 13 shows a fragment of the device in a fourth embodiment.

DETAILED DESCRIPTION

[0007] Fig. 1 shows a continuous multi-segment rod CR manufactured on a device for manufacturing multi-segment rods. The continuous multi-segment rod CR is formed from a train of segments S1, S2, S3 in a repetitive

sequence, wherein the train of segments is wrapped in a continuous wrapper.

[0008] Fig. 2 shows a continuous multi-segment rod CR', wherein a segment S1 is misaligned with respect to neighboring segments S2 and S3, wherein the segment S3 has a form of a thin-walled tube. As presented in an enlarged view A, a front surface S3-F of the segment S3 is dislocated with respect to a front surface S1-F of the segment S1, i.e. the front surface S3-F and the front surface S1-F are positioned non-concentrically, it means that segment 3 and segment 1 are not coaxial with each other. Moreover, a front surface S1-F' of the segment S1 is misaligned with respect to a front surface S2-F of the segment S2, i.e. the front surface S1-F' and the front surface S2-F are also positioned non-concentrically, it means that segment 3 and segment 2 are arranged not coaxially. Due to the fact that the segment S3 has a form of a thin-walled tube, the edge of the segment S1 may enter into the segment S3. This results in gripping of the segment S3 on the segment S1, wherein the segments have some elastic resiliency, therefore such connection also has some elastic properties and during further transferring of such connected segments they may still remain connected to each other and may not be separated.

[0009] Fig. 4 shows a device for manufacturing multi-segment rods in a simplified manner. The device comprises feeding modules 1, 2, 3, to which rods A1, A2, A3 are fed from feeding units, not shown in the drawing. The rods A1, A2, A3 are cut into segments, respectively S1, S2, S3, which are fed onto a transporter 4. The machine comprises a feeding module 5, which receives the segments S1, S2, S3 which are fed by the transporter 4 from the feeding modules 1, 2, 3 in a form of a train ST1, wherein the segments S1, S2, S3 are transferred on the transporter 4 wherein spaces are maintained between the segments. The feeding unit 5 is equipped with three wheels 6, 7, 8, wherein the wheel 6 receives the segments S1, S2, S3 from the transporter 4 and forms groups G of segments, which are transferred onto the wheel 7 and 8. The wheel 8 feeds the segments S1, S2, S3 onto a belt transporter 9, wherein a wrapper 10 is fed on a belt 13 of the belt transporter 9 and the segments S1, S2, S3 are transferred onto the moving wrapper 10 at a point A. The linear velocity v2 of the belt 13 is lower than the tangential velocity v1 of the feeding wheel 8, which results in that the gaps between the consecutive groups G of the segments S1, S2, S3 decrease or are completely eliminated. The segments S1, S2, S3 transferred on the belt transporter 9 form a train ST2, wherein in the presented embodiment the segments are arranged such that the neighboring segments are in contact which each other. The train ST2 of the segments S1 and S2 is wrapped by the wrapper 10, and a glue is fed by means of a glue applicator 19, wherein the gluing of the tape of the wrapper 10 and forming of the continuous rod CR is conducted in a forming unit 11. The continuous rod CR thus formed is transferred further and is cut by means of a cutting head 12 into individual multi-segment rods R. Nevertheless some neighbouring segments 1, 2, 3 may be arranged not axially as described in relation to Fig. 2 and 3. Non axial arrangement of segments may be maintained and faulty rods R may be manufactured.

[0010] As shown in Fig. 5, the transporter 9 comprises a belt 13 and a guide 14, wherein the belt 13 is run between a roller 15 at an inlet side 16 and a roller 17 at an outlet side 18. The guide 14 having a form of a bar supports the belt 13, wherein the bar at the inlet side 16 is substantially flat and changes into a centrally rounded guide channel 38 towards the outlet 18 the flat support, adapted in shape to the movement of the belt 13. At the inlet part 14-I of the guide 14 the wrapper may be positioned flat. Due to the varying shape of the guide 14 the wrapper is folded from a horizontal generally flat configuration to a round configuration. The feeding wheel 8 of the feeding unit 5 is located above the guide 14, namely located above the inlet part 14-I of the guide 14, at the inlet side of the transporter 9 and is adapted to feed the segments S1, S2, S3 in groups separated by means of pushers 20. The segments S1, S2, S3 are transferred in a train ST2 on the transporter 9 to the outlet 18 and further to the cutting head 12 in a form of the continuous rod CR. At the moment of placing the segments S1, S2, S3 onto the wrapper 10 the segments S1, S2, S3 are not arranged coaxially. Above the guide 14 of the transporter 9 there is located a rotary pushing element 21 having a form of a roller with a cylindrical pushing surface 22. The segments S1, S2, S3 are positioned onto the wrapper 10 on the belt 13, wherein at the moment of feeding of the segment, the segment which is being fed is not held, and may rebound up from the surface of the wrapper 10, i.e. in a direction Z. The pressing of the segments towards the wrapper 10 and the belt 13 is particularly important in case of long segments S3, because they more easily lose stability in a linear motion and may disturb the flow of the segments. The separation of the segment from the wrapper surface would cause breaking the continuity of the ST2 train, resulting in forming of the continuous rod CR, which is not correctly filled and after cutting of such faulty continuous rod, the rods are formed which are further rejected from production, causing decrease of production efficiency. The rotary pressing element 21 is intended to press the segment towards the wrapper 10 and to guide the segment from its top during transferring on the transporter 9. In case of the long segments S3 it is advantageous to use two rotary pressing elements 21 arranged directly one after the other. The rotary pressing element 21 may be provided with a cylindrical or concave lateral pressing surface.

[0011] Fig. 6 shows a fragment of the device for manufacturing multi-segment rods in a second embodiment, wherein two types of rotary pressing elements are used. In addition to the rotary pressing element 21 with the cylindrical pressing surface 22, a second rotary pressing element 23 with a concave pressing surface 24 is used, as also shown in Fig. 8, wherein the curvature of the cross-section of the pressing surface 24 is defined by a

radius R. Fig. 7 presents the first rotary pressing element 21 and the second rotary pressing element 23 in a top view. The first rotary pressing element 21 is mounted on a bearing in a body 25 and rotates about an axis m, the second rotary pressing element 23 is mounted on a bearing in the body 26 and rotates about an axis n. Under the first rotary pressing element 21 the segment S2 is visible, which is pressed in a vertical direction, i.e. in a direction Z, wherein the segment S2 is positioned non-axially with respect to the neighboring segments S1 and S1' (which indicates that the transporter allows non-axial alignment of segments with respect to their neighboring segments). Under the second rotary pressing element 23 the segment S3 is visible, that was previously pressed in the Z direction by the first rotary pressing element 21, and subsequently it was positioned axially with respect to the preceding segments S1" and S2', therefore it was positioned axially with respect to the continuous rod CR. During transferring of the segment S3 under the second rotary pressing element 23, the segment S3 is guided by three points L1, L2, L3, in other words the second pressing element 23 and the belt 13 of the transporter 9 form a three-point passage for the segments. The point L3 is located on the bottom of the channel for the train S2 and the wrapper 10, wherein the channel 38 at the inlet 16 has a form of a small longitudinal recess passing under the train ST2, wherein the rotary pressing element 23 presses the segment S3, wherein the wrapper 10 is sunk in the recess. The points L1 and L2 located at edges 24A and 24B are pressing the segment S3 such that the segment S3 is positioned centrally between the points L1 and L2. The first rotary pressing element 21 provides correct positioning of the segment S3 in the direction Z. The second rotary pressing element 23 provides correct positioning of the segment S3 in the direction Y. In case only the first rotary pressing element 21 is used, the segment is positioned in Y direction after the train ST2 is wrapped by the wrapper 10. The first rotary pressing element 21 prevents the segments against breaking away from the wrapper 10 and sets the position of the segment in Z direction. It is possible to use only the second rotary pressing element 23 with concave pressing surface 24 that will position the segments in both directions Z and Y. It should be noticed that in case of using a single rotary pressing element with concave pressing surface having a radius greater than presented on Fig. 8 it is possible to initially position the segments in Y direction over the inlet part 14-I of the guide 14 and the wrapper 10 arranged horizontally and further the segments may be positioned by means of successive pressing elements.

[0012] Fig. 9 shows the positioning of the segment S3 before coming into contact with the second rotary pressing element 23. There is visible a dislocation of the segment to the right in the Y direction such that the segment will firstly come into contact with the edge 24A and will be moved (in Fig. 9) to the left in the Y direction until it comes into contact with the edge 24B.

[0013] Fig. 10 shows an embodiment of the second rotary pressing element 27, which comprises two rollers 28 and 29 having concave peripheral pressing surface 30 and 31 defined by the radius R analogously to the rotary pressing element 23. Fig. 11 shows an embodiment of the second rotary pressing element 32 comprising two rollers 33 and 34 having peripheral conical pressing surfaces 35 and 36. In figs. 10 and 11, similarly as in the embodiment presented in Fig. 8, are depicted points L1, L2 and L3 forming the three-point passage for the segments. The actual positioning of the points in which the segments come into contact with the wrapper 10 and the rotary pressing element 27, 32 depend on the diameter of the manufactured segments and on possible segments shape errors.

[0014] As it is presented in Fig. 8 to 11 the rotary pressing elements 21, 23, 27, 32 are located above the inlet part 14-I of the guide 14.

[0015] Fig. 12 shows a fragment of the device for manufacturing multi-segment rods in a third embodiment. The device comprises two first rotary pressing elements 21 and three second rotary pressing elements 23. The second rotary pressing elements may be arranged consecutively at a smaller and smaller distance from the transporter 9, owing to which the positioning process of the segments in Y direction may be conducted not only by means of one rotary pressing element 23, but consecutively by means of two or three rotary pressing elements 23.

[0016] Fig. 13 shows a fragment of the device for manufacturing multi-segment rods in a fourth embodiment. The device comprises two first rotary pressing elements 21 and three second rotary pressing elements 27 or 32. Moreover the device comprises a stationary pressing element 37, which passes along the transporter 9 between the rollers 28 and 29 or respectively between the rollers 33 and 34. The stationary pressing element 37 has a form of a flat bar. Using three different pressing elements allows to gradually press and guide the segments. The segments are guided by means of rotary surfaces and further are stabilized and guided by means of stationary pressing element.

Claims

1. A device for manufacturing multi-segment rod-like articles (R), the device comprising:

   - a feeding unit (5) for feeding a train of segments (S1, S2, S3), the feeding unit (5) comprising a feeding wheel (8),
   - a transporter (9) for transporting a wrapper (10) having a form of a tape and the segments (S1, S2, S3) on a belt (13) along a guide (14) provided with an inlet part (14-I),
   - a forming unit (11) for forming a continuous rod (CR) from the segments (S1, S2, S3),
   - a cutting head (12) for cutting the continuous

rod (CR) into individual multi-segment rod-like articles (R),
- wherein the feeding wheel (8) is located above the inlet part (14-I) of the guide (14),
- rotary pressing elements (21, 27, 32), each having a peripheral pressing surface (22, 30, 31, 35, 36), that are positioned above the inlet part (14-I) of the guide (14), downstream the feeding wheel (8) and before the forming unit (11) in a direction of movement of the belt (13), wherein the rotary pressing elements (21, 27, 32) are configured to adjust an axial alignment of the segments (S1, S2, S3), wherein
- the rotary pressing elements (21, 27, 32) comprise:

- at least one first rotary pressing element (21) with a cylindrical pressing surface (22), **characterized in that** the rotary pressing elements (21, 27, 32) further comprise:

- at least one second rotary pressing element (27, 32) with two coaxial rollers (28, 29), each having a concave pressing surface (30, 31), or with two coaxial rollers (33, 34), each having a conical pressing surface (35, 36)

2. The device according to claim 1, wherein the first rotary pressing element (21) has a form of a roller with a cylindrical pressing surface (22).

3. The device according to claim 1, wherein the second rotary pressing element (27) has a form of two rollers (28, 29), wherein each roller (28, 29) has a concave pressing surface (30, 31).

4. The device according to claim 1, wherein the second rotary pressing element (32) has a form of two rollers (33, 34), wherein each roller (33, 34) has a conical pressing surface (35, 36).

5. The device according to claim 3 or 4 wherein the first rotary pressing element (21) has a diameter smaller than the second rotary pressing element (27, 32).

6. The device according to claim 5, comprising two first rotary pressing elements (21) and three second rotary pressing elements (27, 32).

7. The device according to claim 6, comprising a longitudinal stationary pressing element (37) located in parallel to the direction of movement of the belt (13) of the belt transporter (9) between the rollers (28, 29; 33, 34) of the second rotary pressing element (27, 32).

8. The device according to any of claims 1-7 wherein the feeding wheel (8) of the feeding unit (5) is located above an inlet section (16) of the transporter (9).

9. The device according to any of claims 1-8 wherein the rotary pressing element (21, 27, 32) is located above the inlet section (16) of the transporter (9).

Patentansprüche

1. Vorrichtung zur Herstellung von stabförmigen Artikeln (R) mit mehreren Segmenten, wobei die Vorrichtung Folgendes umfasst:

- eine Zuführeinheit (5) zum Zuführen eines Zugs von Segmenten (S1, S2, S3), wobei die Zuführeinheit (5) ein Zuführrad (8) umfasst,
- einen Transporter (9) zum Transportieren eines Einwicklers (10), der eine Form eines Bands aufweist, und der Segmente (S1, S2, S3) auf einem Gurt (13) entlang einer Führung (14), die mit einem Einlassteil (14-I) versehen ist,
- eine Bildungseinheit (11) zum Bilden eines Endlosstabs (CR) aus den Segmenten (S1, S2, S3),
- einen Schneidkopf (12) zum Schneiden des Endlosstabs (CR) in einzelne stabförmige Artikel (R) mit mehreren Segmenten,
- wobei das Zuführrad (8) über dem Einlassteil (14-I) der Führung (14) liegt,
- rotierende Presselemente (21, 27, 32), von denen jedes eine periphere Pressoberfläche (22, 30, 31, 35, 36) aufweist, die über dem Einlassteil (14-I) der Führung (14) stromabwärts des Zuführrads (8) und vor der Bildungseinheit (11) in einer Bewegungsrichtung des Gurts (13) positioniert sind, wobei die rotierenden Presselemente (21, 27, 32) dazu konfiguriert sind, eine axiale Ausrichtung der Segmente (S1, S2, S3) einzustellen,
wobei
- die rotierenden Presselemente (21, 27, 32) Folgendes umfassen:

- mindestens ein erstes rotierendes Presselement (21) mit einer zylindrischen Pressoberfläche (22), **dadurch gekennzeichnet, dass** die rotierenden Presselemente (21, 27, 32) ferner Folgendes umfassen:

- mindestens ein zweites rotierendes Presselement (27, 32) mit zwei koaxialen Walzen (28, 29), von denen jede eine konkave Pressoberfläche (30, 31) aufweist, oder mit zwei koaxialen Walzen (33, 34), von denen jede eine konische Pressoberfläche (35, 36) aufweist.

2. Vorrichtung nach Anspruch 1, wobei das erste rotierende Presselement (21) eine Form einer Walze mit einer zylindrischen Pressoberfläche (22) aufweist.

3. Vorrichtung nach Anspruch 1, wobei das zweite rotierende Presselement (27) eine Form von zwei Walzen (28, 29) aufweist, wobei jede Walze (28, 29) eine konkave Pressoberfläche (30, 31) aufweist.

4. Vorrichtung nach Anspruch 1, wobei das zweite rotierende Presselement (32) eine Form von zwei Walzen (33, 34) aufweist, wobei jede Walze (33, 34) eine konische Pressoberfläche (35, 36) aufweist.

5. Vorrichtung nach Anspruch 3 oder 4, wobei das erste rotierende Presselement (21) einen kleineren Durchmesser als das zweite rotierende Presselement (27, 32) aufweist.

6. Vorrichtung nach Anspruch 5, umfassend zwei erste rotierende Presselemente (21) und drei zweite rotierende Presselemente (27, 32).

7. Vorrichtung nach Anspruch 6, umfassend ein stationäres Längspresselement (37), das parallel zu der Bewegungsrichtung des Gurts (13) des Gurttransporters (9) zwischen den Walzen (28, 29; 33, 34) des zweiten rotierenden Presselements (27, 32) liegt.

8. Vorrichtung nach einem der Ansprüche 1-7, wobei das Zuführrad (8) der Zuführeinheit (5) über einem Einlassabschnitt (16) des Transporters (9) liegt.

9. Vorrichtung nach einem der Ansprüche 1-8, wobei das rotierende Presselement (21, 27, 32) über dem Einlassabschnitt (16) des Transporters (9) liegt.

Revendications

1. Dispositif destiné à la fabrication d'articles en forme de tige à segments multiples (R), le dispositif comprenant :

   - une unité d'alimentation (5) destinée à l'alimentation d'un train de segments (S1, S2, S3), l'unité d'alimentation (5) comprenant une roue d'alimentation (8),
   - un transporteur (9) destiné à transporter une enveloppe (10) comportant une forme d'une bande et les segments (S1, S2, S3) sur une courroie (13) le long d'un guide (14) doté d'une partie d'entrée (14-l),
   - une unité de formation (11) destinée à former une tige continue (CR) à partir des segments (S1, S2, S3),
   - une tête de coupe (12) destinée à couper la tige continue (CR) en articles individuels en forme de tige à segments multiples (R),
   - ladite roue d'alimentation (8) étant située au-dessus de la partie d'entrée (14-l) du guide (14),
   - des éléments de pressage rotatifs (21, 27, 32), comportant chacun une surface de pressage périphérique (22, 30, 31, 35, 36), qui sont positionnés au-dessus de la partie d'entrée (14-l) du guide (14), en aval de la roue d'alimentation (8) et avant l'unité de formation (11) dans une direction de mouvement de la courroie (13), lesdits éléments de pressage rotatifs (21, 27, 32) étant configurés pour régler un alignement axial des segments (S1, S2, S3),
   - lesdits éléments de pressage rotatifs (21, 27, 32) comprenant :

     - au moins un premier élément de pressage rotatif (21) avec une surface de pressage cylindrique (22), **caractérisé en ce que** les éléments de pressage rotatif (21, 27, 32) comprennent en outre :
     - au moins un second élément de pressage rotatif (27, 32) avec deux rouleaux coaxiaux (28, 29) comportant chacun une surface de pressage concave (30, 31) ou avec deux rouleaux coaxiaux (33, 34) comportant chacun une surface de pressage conique (35, 36).

2. Dispositif selon la revendication 1, ledit premier élément de pressage rotatif (21) comportant une forme d'un rouleau avec une surface de pressage cylindrique (22).

3. Dispositif selon la revendication 1, ledit second élément de pressage rotatif (27) comportant une forme de deux rouleaux (28, 29), chaque rouleau (28, 29) comportant une surface de pressage concave (30, 31).

4. Dispositif selon la revendication 1, ledit second élément de pressage rotatif (32) comportant une forme de deux rouleaux (33, 34), chaque rouleau (33, 34) comportant une surface de pressage conique (35, 36).

5. Dispositif selon la revendication 3 ou 4, ledit premier élément de pressage rotatif (21) comportant un diamètre plus petit que le second élément de pressage rotatif (27, 32).

6. Dispositif selon la revendication 5, comprenant deux premiers éléments de pressage rotatifs (21) et trois seconds éléments de pressage rotatifs (27, 32).

7. Dispositif selon la revendication 6, comprenant un

élément de pressage stationnaire longitudinal

(37) situé parallèlement à la direction de déplacement de la courroie (13) du transporteur à courroie (9) entre les rouleaux (28, 29 ; 33, 34) du second élément de pressage rotatif (27, 32).

8. Dispositif selon l'une quelconque des revendications 1 à 7, ladite roue d'alimentation (8) de l'unité d'alimentation (5) étant située au-dessus d'une section d'entrée (16) du transporteur (9).

9. Dispositif selon l'une quelconque des revendications 1 à 8, ledit élément de pressage rotatif (21, 27, 32) étant situé au-dessus de la section d'entrée (16) du transporteur (9).

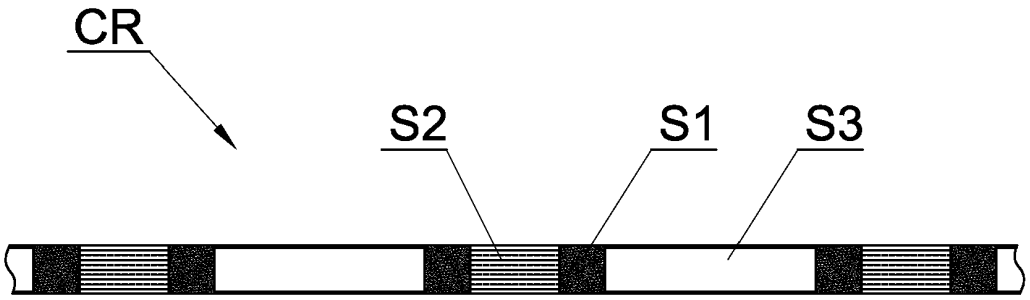


Fig. 1

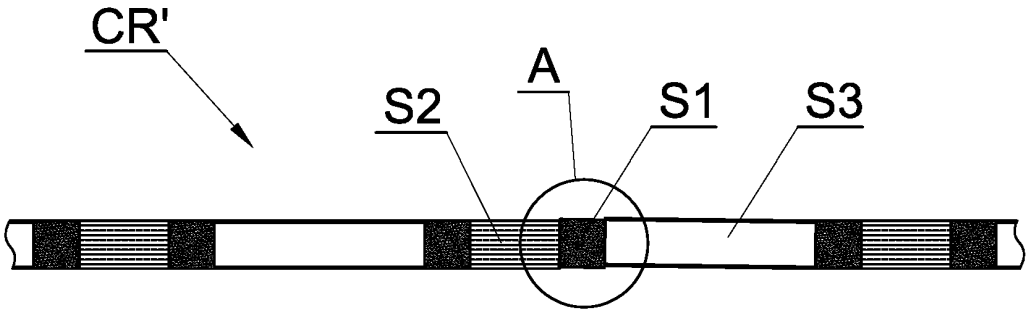


Fig. 2

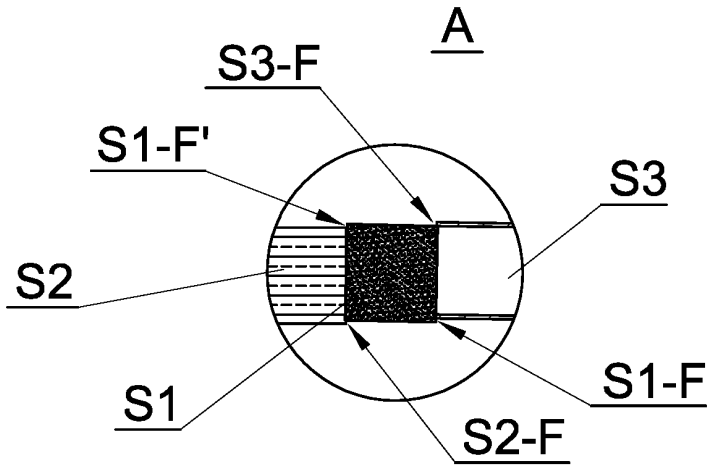


Fig. 3

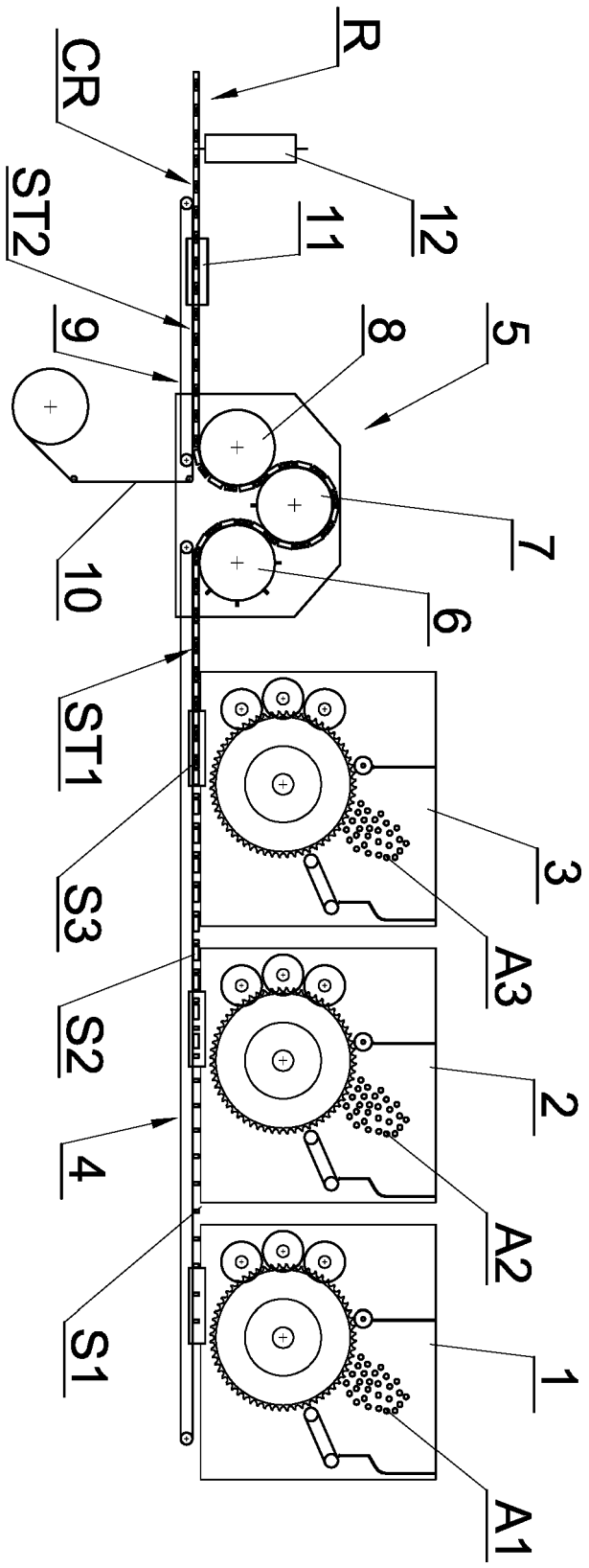
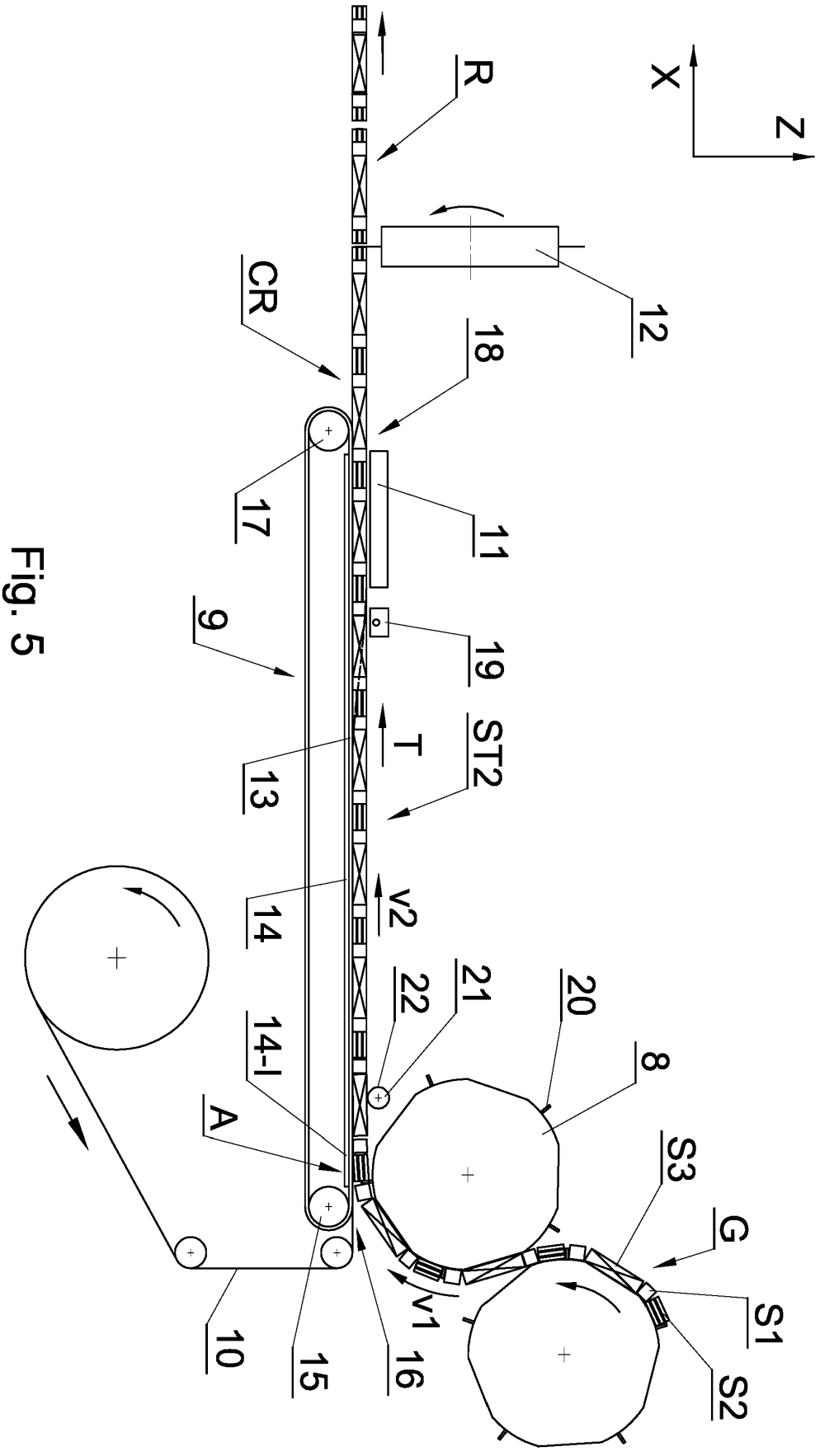


Fig. 4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CR
18
17
11
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13
v2
14
22
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G
S1
v1
10
15
16
S2

Fig. 5

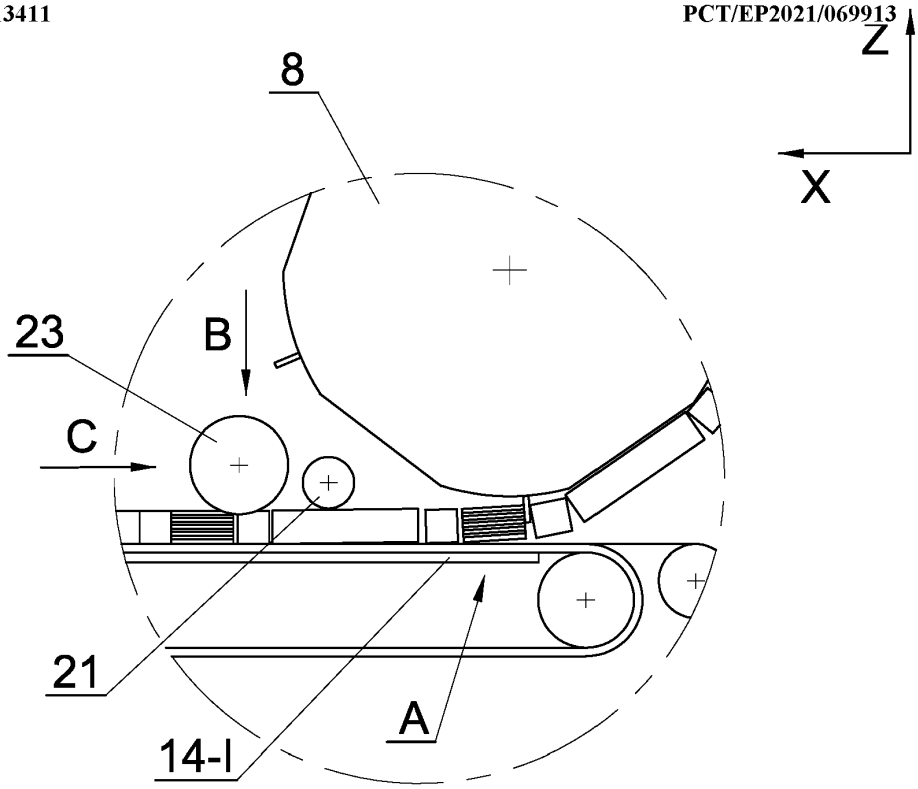


Fig. 6

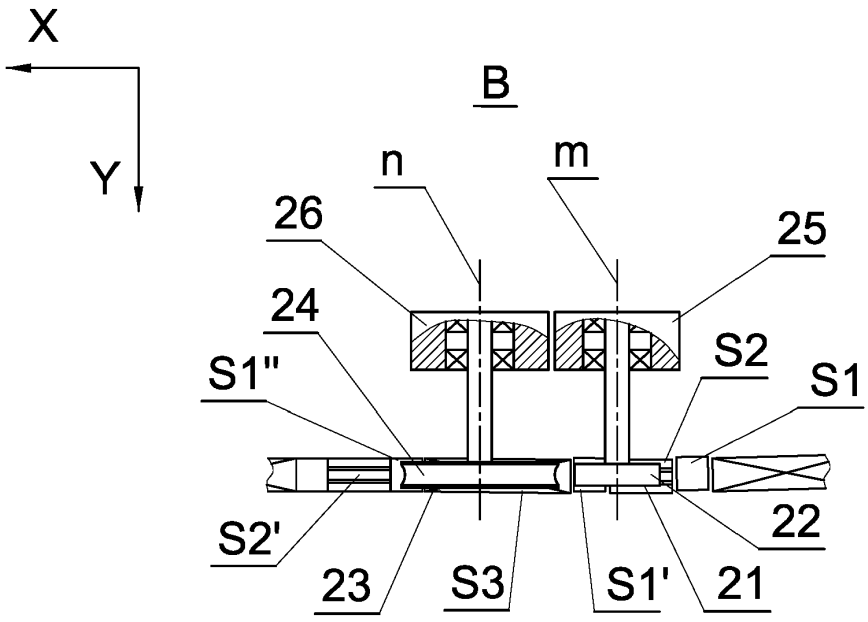


Fig. 7

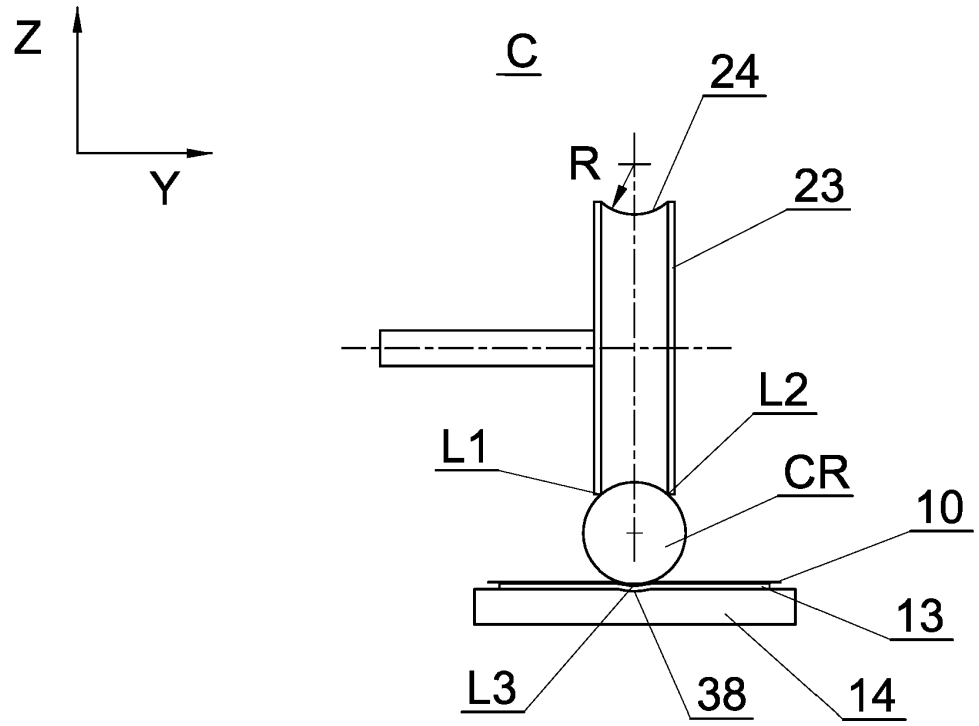


Fig. 8

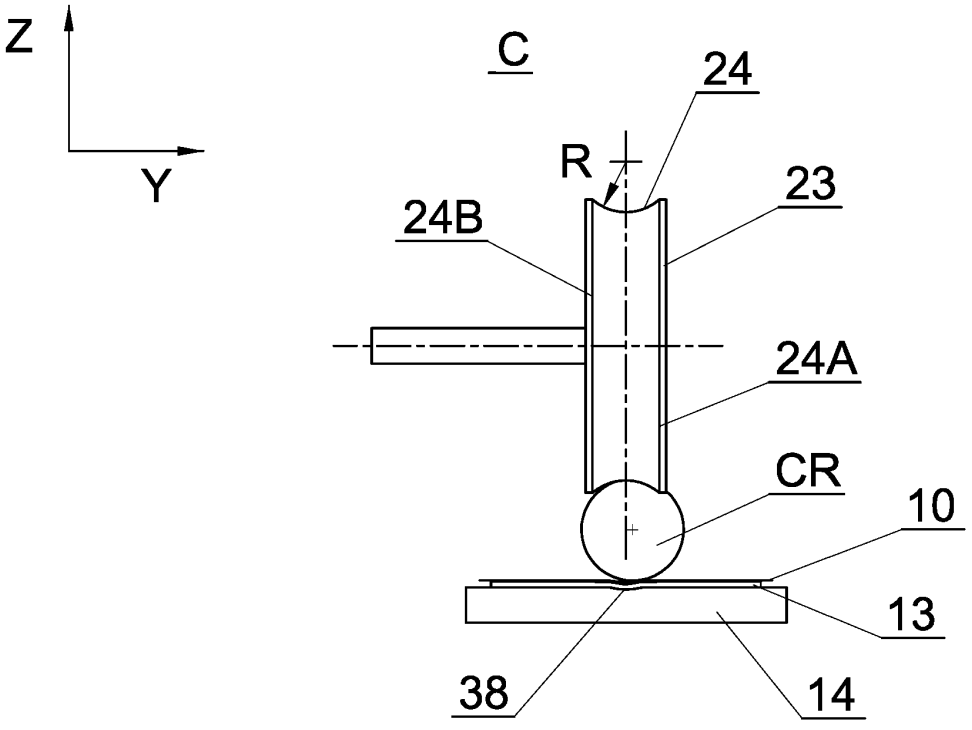
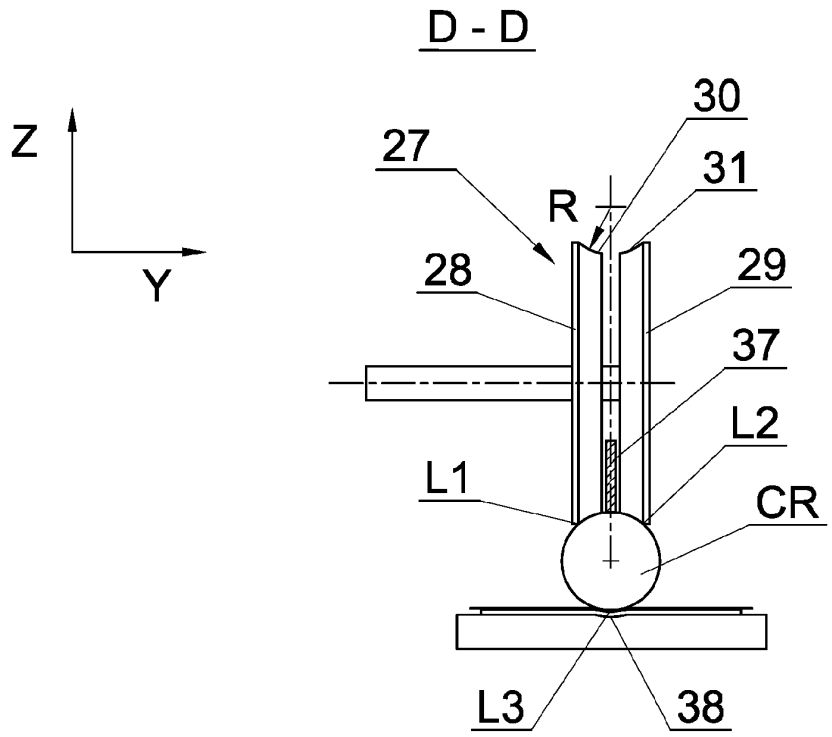


Fig. 9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31
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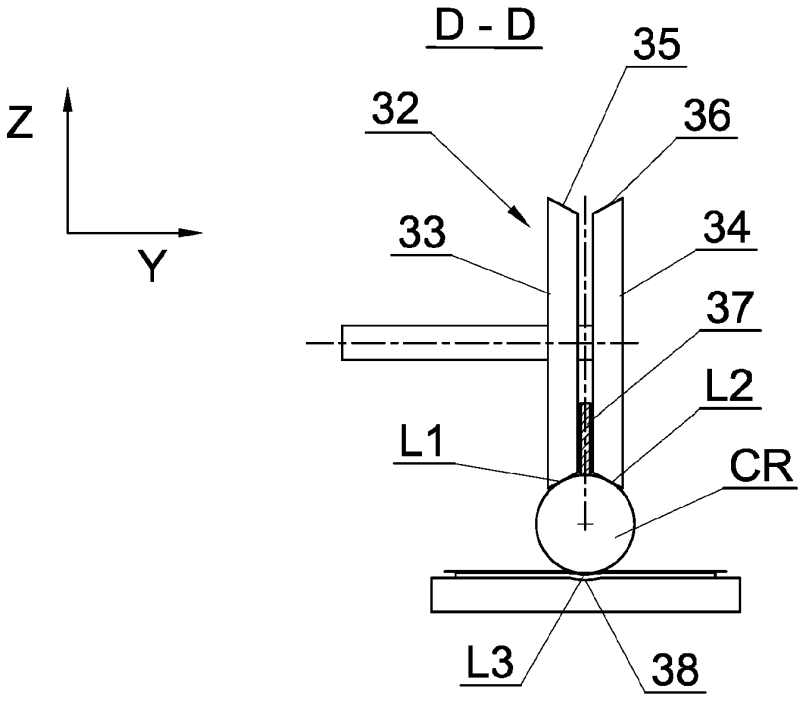
28
29
37
L2
L1
CR
L3
38

Fig. 10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L2
L1
CR
L3
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Fig. 11

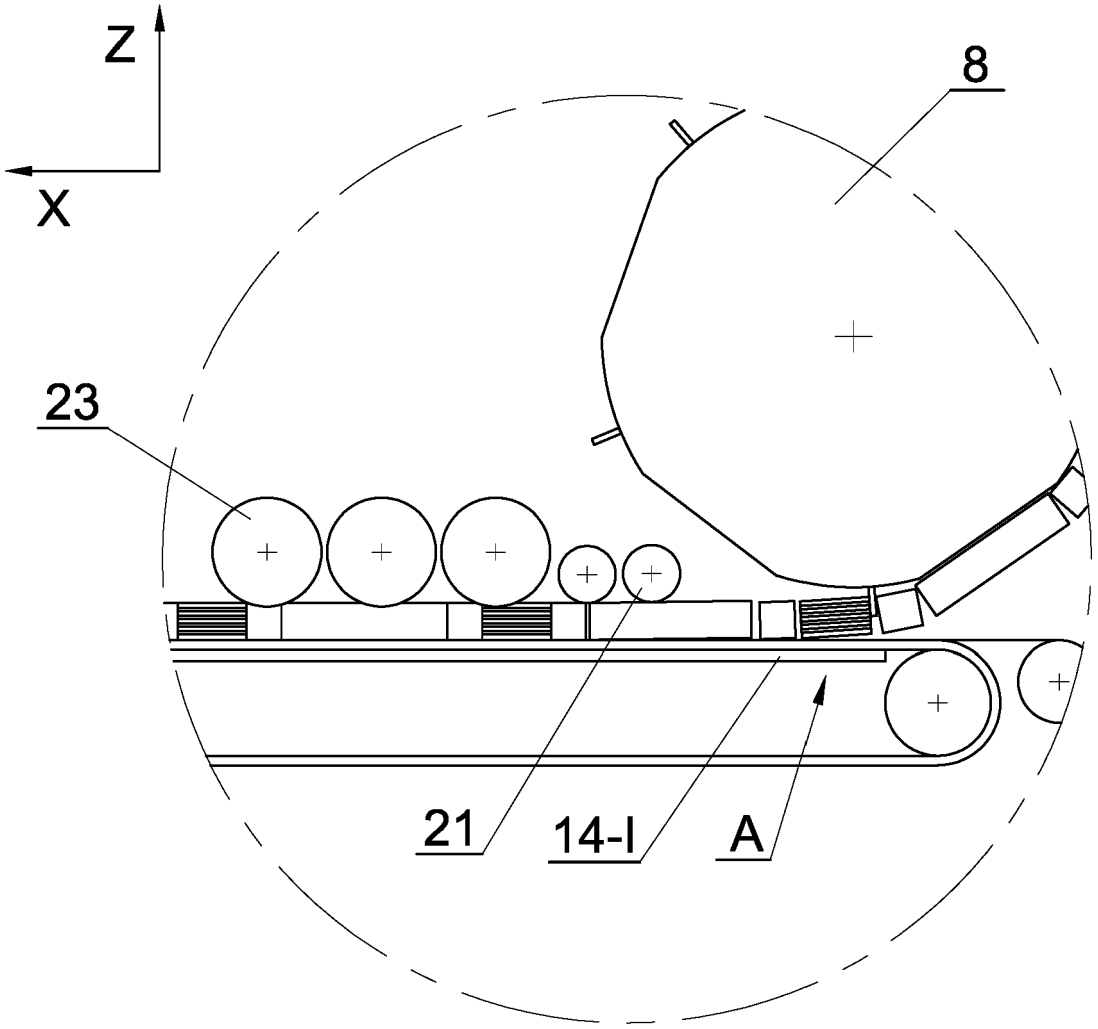

Fig. 12

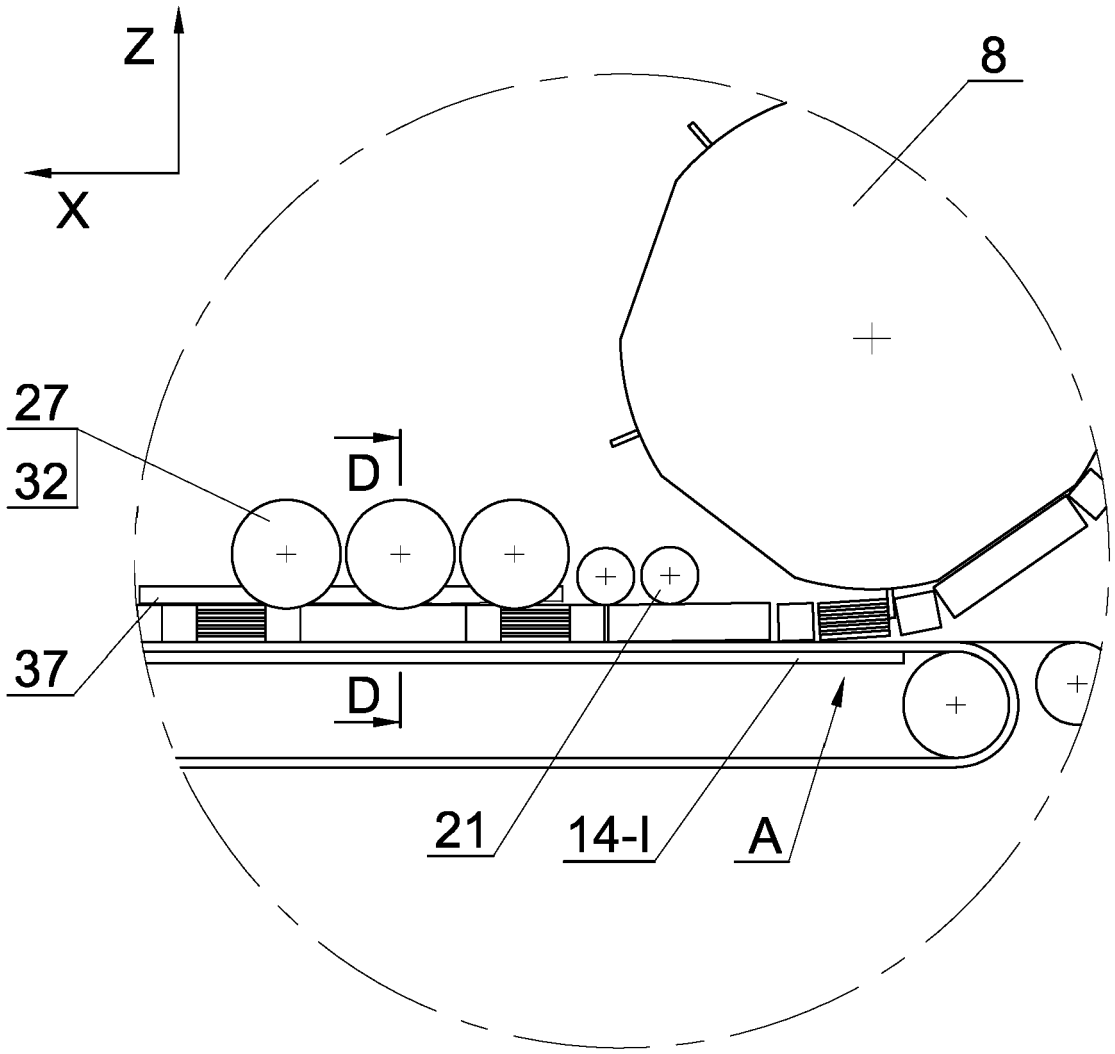

Fig. 13

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 2767177 A **[0003]**