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(54) APPARATUS AND METHOD FOR SPLITTING AND SPREADING A CONTINUOUS WEB

VORRICHTUNG UND VERFAHREN ZUM SPALTEN UND AUSBREITEN EINER KONTINUIERLICHEN BAHN

APPAREIL ET PROCÉDÉ DE DIVISION ET D'ÉTALEMENT D'UNE BANDE CONTINUE

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Description

Field of the invention

[0001] The present invention relates to an apparatus for splitting and spreading a continuous web, particularly but not exclusively a web of plastic material.

[0002] According to a further aspect, the present invention further relates to a method for splitting and spreading a continuous web.

[0003] In the context of the present invention, the term continuous web is used to distinguish a flat web, as well as a flattened tubular web or a flat web having continuous longitudinal portions folded transversely on themselves.

[0004] Furthermore, the web can be a web of thermoplastic material, as well as of other materials, such as cellulose, material of plant origin, fabrics, non-woven fabrics, aluminium and still others.

[0005] Furthermore, the aforesaid web can comprise a structure formed by several layers adhered or otherwise integrally joined together.

[0006] For ease of presentation, the present disclosure is made, by way of non-limiting example, with particular reference to a continuous web of plastic material, a so-called film.

Background of the invention

[0007] Continuous webs of plastic material, whether they are a flat web or a flattened tubular, are transited in a web path defined by respective turning bars and the like immediately after their formation, so as to have time to cool, until they are wound in reels at appropriate winding rollers.

[0008] In particular, the web is wound on specific support tubes, otherwise called support cores, which laterally extend beyond the sides of the web.

[0009] The winding step is a critical operation as it is necessary to avoid the formation of wrinkles or folds and at the same time it is necessary to ensure the correct winding tension of the continuous web as the diameter of the reel increases.

[0010] Often there is a need to perform processing or treatments on the continuous web of a reel, for example rewinding operations in order to obtain reels of webs of shorter length. For this purpose, unwinding and rewinding lines of the continuous web are used.

[0011] It should be noted that there is very frequently a need to split a continuous web of a predetermined transverse width into two separate webs of smaller width, with each of the two webs wound around a respective support tube. Such a need can arise both for continuous webs already wound on a reel and for continuous webs just produced and not yet wound on a reel. An apparatus and a method for splitting a web are known from EP 2 671 829 A2.

[0012] As stressed above, it is good for the support tube to protrude laterally from the continuous web wound thereon, so that if it is necessary to split a reel of continuous web of a predetermined transverse width into two reels of continuous web of smaller transverse width, it is not a viable solution to only cut the starting reel into the two narrower reels, making it necessary to cut and remove a strip of reel between the two reels to be obtained.

[0013] Obviously, such a solution inevitably involves the waste of a strip of material, a strip which has a length equal to the length of each reel, which is why this solution involves a considerable waste of continuous web.

[0014] Alternatively, it is possible to include specific means for cutting and spreading the continuous web, capable of acting on a section of continuous web unwound from a reel to split it into two webs of smaller width to be subsequently rewound on two separate support tubes. In this case, before the first winding occurs in a reel or in a subsequent step during a process of unwinding and rewinding a continuous web, a special blade cuts a continuous web at a predetermined point of its transverse width. However, the problem lies in achieving a correct spreading, thus a transverse distancing, of the two webs separated from each other without affecting the winding mode, in particular without creating folds, wrinkles and the like in each web. Nowadays, to overcome such a problem, the use of independent spindles is envisaged with which to ensure the support and independent dragging in rotation of the two support tubes on which the reels of continuous web of smaller width will be formed, obviously in the face of an obvious complication in structural, operational and adjustment terms of the machine necessary to perform the winding on the aforesaid independent support tubes.

[0015] However, it should be noted that despite the use of two independent spindles, the transverse spreading of the two webs downstream of the cutting means operated by appropriate turning bars still imposes deformations on the two continuous webs even if the support tubes on which the two separate continuous webs are wound are moved by independent spindles, which is why the distance between the two webs is achieved not with an effective spreading, or not only with an effective spreading, but by removing an intermediate continuous strip of web between the two separate webs.

Summary of the invention

[0016] In view of the above, it is therefore evident that nowadays it is very felt the need to be able to transversely split a continuous web into two webs of a smaller width without having to discard a strip of continuous web material to be split, while ensuring a correct winding of the two separate webs with the correct winding tension envisaged and without ruining the flatness thereof.

[0017] The problem of the present invention is that of devising an apparatus for splitting and spreading a continuous web which has structural and functional features such as to meet the aforesaid needs, while remedying the problems referred to with reference to the background

art.

[0018] Such a problem is solved by an apparatus for splitting and spreading a continuous web in accordance with claim 1.

[0019] According to a further aspect, such a problem is also solved by a method for splitting and spreading a continuous web in accordance with claim 12.

Brief description of the figures

[0020] Further features and advantages of the present invention will emerge from the description given below of some of its preferred embodiments, given by way of non-limiting example, with reference to the accompanying figures, in which:

- figure 1 depicts a schematic plan view of an apparatus for splitting and spreading a continuous web in a configuration in which said apparatus does not act on the continuous web to split and spread it;
- figure 2 depicts the apparatus of figure 1 in a configuration in which it acts on the continuous web, cause it to split and spread;
- figure 3 depicts a sectional view according to the line of section III-III of figure 1;
- figure 4 depicts a sectional view according to the line of section IV-IV of figure 1;
- figures 5 and 6 show a perspective view of figure 2, in which the apparatus acts on the continuous web causing it to split and spread, according to two different points of view and
- figure 7 depicts an enlarged detail of figure 5 to better show the action of the accessory on one of the two parts in which the starting web is split.

Detailed description of the invention

[0021] With reference to the accompanying figures, 1 globally denotes an apparatus according to the invention for splitting and spreading a portion of continuous web.

[0022] In particular, the apparatus 1 comprises:

- supporting and guiding means for defining a web path P extending along a predetermined longitudinal direction X-X between an input zone and an output zone, in which said web path P is designed to be travelled by a continuous stretched web running in a predetermined feed direction A from said input zone toward said output zone and
- cutting means 2 located in a predetermined transverse position of said web path P to determine a cutting line L extending along said longitudinal direction X-X in a continuous web running along said path P.

[0023] A path section upstream of said cutting means 2 and a path section downstream of said cutting means 2 are defined in said web path P, said upstream and downstream sections being defined with reference to the feed direction A of a web along said web path.

[0024] The aforesaid cutting line L splits the aforesaid path section downstream of the cutting means 2 into two distinct longitudinal portions, in particular a first longitudinal portion I and a second longitudinal portion II.

[0025] The aforesaid supporting and guiding means comprise two respective pairs 3,4 of turning bars located at the downstream path section of the cutting means 2, in particular:

- a first pair of turning bars 3 extending transversely to said first longitudinal portion I of the web path P and starting from said cutting line L and
- a second pair of turning bars 4 extending transversely to said second longitudinal portion II of the web path P and starting from said cutting line L,

so that said first pair of turning bars 3 and said second pair of turning bars 4 extend on opposite sides of said cutting line L.

[0026] The aforesaid two respective pairs 3,4 of turning bars extend transverse to the aforesaid cutting line L according to an angle α other than 90°, preferably according to an angle α comprised between 25° and 65.

[0027] It should be noted that the aforesaid first pair of turning bars 3 and the aforesaid second pair of turning bars 4 are inclined with respect to the cutting line L so as to diverge from each other when running along the aforesaid feed direction A along the longitudinal direction X-X.

[0028] Each respective pair 3,4 of turning bars comprises a first turning bar 5 and a second turning bar 6 which are designed to contact, with a respective contact portion 7,8, a first side and, respectively, an opposite second side of a web running along the web path P, so that said web path P will pass between the first turning bar 5 and the second turning bar 6 of each pair 3,4 of turning bars.

[0029] Advantageously:

- the first turning bar 5 and the second turning bar 6 of each respective pair 3,4 of turning bars are offset in said longitudinal direction X-X so as not to overlap each other along an orthogonal direction Z-Z perpendicular to the plane passing through said web path P, said first turning bar 5 being closer to the aforesaid cutting means 2 than the second turning bar 6 and
- the first turning bar 5 and the second turning bar 6 of each respective pair 3,4 of turning bars are supported so as to be reversibly adjusted relative to each other in said orthogonal direction Z-Z until said second turning bar 6 is moved past said first turning bar 5 to pass:

  - from a coplanar configuration in which said contact portion 8 of said second turning bar 6 is substantially coplanar with said contact portion 7

of said first turning bar 5 and said web path P passing between said first turning bar 5 and said second turning bar 6 extends straight between the first turning bar 5 and the second turning bar 6 of each respective pair 3,4 to

- an offset configuration in which said contact portion 8 of said second turning bar 6 extends in said orthogonal direction Z-Z beyond said contact portion 7 of said first turning bar 5 and said web path P has a section at the exit of each respective pair 3,4 of turning bars offset in said orthogonal direction Z-Z from the section of said web path P at the entry of each respective pair 3,4 of turning bars.

[0030] Preferably, in the aforesaid offset configuration in which the contact portion 8 of the second turning bar 6, i.e., the one farthest back from the cutting means 2, extends in the orthogonal direction Z-Z beyond the contact portion 7 of said first turning bar 5, the web path P, when crossing each pair of turning bars 3,4, follows a substantially "S-shaped" offset trajectory in said orthogonal direction Z-Z.

[0031] Preferably, in each respective pair 3,4 of turning bars, said second turning bar 6, i.e., the one farthest back from the cutting means 2, is movable and adjustable in positioning in said orthogonal direction Z-Z with respect to said first turning bar 5 which is fixed in said orthogonal direction Z-Z.

[0032] Preferably, the apparatus 1 comprises actuating means for causing displacement/adjustment in said orthogonal direction Z-Z of the second turning bar 6 with respect to the respective first turning bar 5 of each respective pair 3,4 of turning bars.

[0033] Preferably, the aforesaid first pair of turning bars 3 and the aforesaid second pair of turning bars 4 are offset from each other in the longitudinal direction X-X to avoid any mutual interference thereof at said cutting line L, this allows, for example, to have an arrangement in which both the first turning bar 5 and the second turning bar 6 of each respective pair of turning bars 3,4 extend beyond the cutting line L by a predetermined limited amount (see figures 1 and 2).

[0034] Preferably, the aforesaid turning bars have a low friction surface so as not to obstruct the sliding of a continuous web in contact therewith. For example, according to a non-exhaustive list, the aforesaid turning bars can be turning bars with air cushions, turning bars with a lapped surface and/or turning bars coated with low-adhesion material.

[0035] Preferably, the aforesaid supporting and guiding means for defining a web path P further comprise at least one reversing roller 9:

- having a high-friction surface and
- located downstream of said pairs 3,4 of turning bars to contact an extended web running in said predetermined feed direction A along said web path P, preferably to contact the two distinct longitudinal web portions downstream of the cutting means 2 and running along the first longitudinal portion I and the second longitudinal portion II.

[0036] Such at least one reversing roller 9 has the function of fixing the transverse displacement of the longitudinal portions of continuous web which are spread/moved apart as they move past said respective pairs 3,4 of turning bars in their offset configuration, so as to prevent the two aforesaid longitudinal portions of spread/moved apart continuous web from approaching each other again in juxtaposition.

[0037] In addition to what has been described above, the apparatus 1 can comprise further turning bars known per se and arranged for guiding and supporting a continuous web or two continuous webs spread out along said web path P.

[0038] With regard to the aforesaid cutting means 2, it should be noted that, in accordance with the illustrated embodiment, they are movable and adjustable to reversibly move:

- from a position away from said web path P, to avoid interference thereof with a continuous web running in said web path P (see figures 1 and 3)
- to a working position in which they interfere with said web path P to form a longitudinal cut in a continuous web running along said web path P (see Figures 2, 4, 5, 6 and 7).

[0039] Preferably, in accordance with the embodiment illustrated:

- the aforesaid turning bars extend along horizontal planes;
- in each pair 3, 4 of turning bars, said first turning bar 5 and said second turning bar 6 are designed to contact, by a respective contact portion 7,8, a top side and, respectively, an opposed top side of a web running along said web path P and
- in said offset configuration, said contact portion 8 of said second turning bar 6 vertically extends upwards in said orthogonal direction Z-Z (by a distance "D" as shown in figure 7) beyond said contact portion 7 of said first turning bar 5, so that said web path P will have a section at the exit of each respective pair 3,4 of turning bars upwardly offset in said orthogonal direction Z-Z from the section of said web path P at the entry of each respective pair 3,4 of turning bars.

[0040] According to the invention, the method for splitting and spreading a continuous web into two continuous longitudinal portions, comprises the steps of:

- arranging a web path P extending along a predetermined longitudinal direction X-X between an input zone and an output zone in which an extended

continuous web will be supported and guided by supporting and guiding means;

- running a continuous web along said web path P with a feed direction A from an input zone to an output zone;
- arranging cutting means 2 located in a predetermined transverse position of said web path P to form a cutting line L extending along said longitudinal direction X-X;
- cutting said continuous web running in the feed direction along said path P by said cutting means 2 to split, downstream of said cutting means 2, said continuous web into a first longitudinal portion I and a second longitudinal portion II;
- arranging a first pair of turning bars 3 and a second pair of turning bars 4 positioned:

  - downstream of said cutting means 2 with reference to the feed direction A of said web and

  - extending transverse to said web path P at an angle α other than 90°, preferably at an angle α comprised between 25° and 65 from said cutting line L, so that said first pair of turning bars 3 and said second pair of turning bars 4 will extend on opposite sides from said cutting line L, such that said first pair of turning bars 3 and said second pair of turning bars 4 will only be run along by said first longitudinal portion and, respectively, only by said second longitudinal portion II;

in which each respective pair 3,4 of turning bars comprises a first turning bar 5 and a second turning bar 6 which are designed to contact, with a respective contact portion 7,8, a first side and, respectively, an opposite second side of a web running along said web path P, so that said web path P will pass between the first turning bar 5 and the second turning bar 6 of each pair 3,4 of turning bars;
in which:

- the first turning bar 5 and the second turning bar 6 of each respective pair 3,4 of turning bars are offset in said longitudinal direction X-X so as not to overlap each other along an orthogonal direction Z-Z perpendicular to the plane passing through said web path P, said first turning bar 5 being closer to cutting means 2 with respect to said second turning bar;
- the first turning bar 5 and the second turning bar 6 of each respective pair 3,4 of turning bars can be offset in said orthogonal direction Z-Z so as to assume an offset configuration in which said contact portion 8 of said second turning bar 6 extends beyond said contact portion 7 of said first turning bar 5 in said orthogonal direction Z-Z and said web path P has a section at the exit of each respective pair 3,4 of turning bars offset in said orthogonal direction Z-Z from the section of said web path P at the entry of each respective pair 3,4 of turning bars and
- said method comprises the step of causing said first longitudinal portion of the cut web to run along said first pair 3 of turning bars and of causing said second longitudinal portion of said cut web to run along said second pair 3 of turning bars, whereas the second turning bar 6 of each respective pair 3,4 of turning bars is offset in said orthogonal direction Z-Z beyond the first turning bar 5,

so as to cause said web path P and said longitudinal portions of cut web to assume a pattern having a section at the exit of each respective pair 3,4 of turning bars which is offset in said orthogonal direction Z-Z with respect to the section of said web path P at the entry of each respective pair 3,4 of turning bars.

[0041] Such a method therefore makes it possible to interrupt the longitudinal continuity of the initially continuous web, dividing it into two continuous webs of smaller width, the sum of the widths of the two continuous longitudinal webs of smaller width being equal to the transverse width of the starting web.

[0042] When the second turning bar 6 of each pair 3, 4 of turning bars is positioned to overlap the first turning bar 5 closest to the cutting means in the aforesaid orthogonal direction Z-Z, an offset is obtained in the orthogonal direction Z-Z of the section of the two longitudinal webs in output from each pair 3, 4 of turning bars with respect to the inlet section, which, combined with the aforesaid transverse inclination referred to above of the turning bars 5,6 of the aforesaid pairs 3, 4 of turning bars, also causes a simultaneous movement therebetween and away from said cutting line L of the first longitudinal portion and the second longitudinal portion of the continuous webs obtained in passing through the respective pair 3,4 of turning bars.

[0043] Subsequently, the aforesaid transverse movement of the first longitudinal portion and the second longitudinal portion of the continuous webs away from each other and from said cutting line L is fixed by causing the two aforesaid longitudinal portions of the web to run on a reversing roller (9) having a high friction surface.

[0044] Preferably, the aforesaid method is performed by means of an apparatus 1 as described above.

[0045] As can be appreciated from what has been described, the apparatus according to the present invention for splitting and spreading a continuous web, as well as the method according to the present invention for splitting and spreading a continuous web, make it possible to meet the aforesaid needs and at the same time to overcome the drawbacks referred to in the introductory part of the present description with reference to the prior art. In fact, the aforesaid pairs of turning webs allow the

two longitudinal portions cut from the starting continuous web to be moved away from each other without having to remove any portion of the initial continuous web.

[0046] Advantageously, it is possible to adjust the distance between the two longitudinal portions cut from the starting continuous web by varying:

- the inclination with respect to the cutting line of the first turning bar and the second turning bar of each of the aforesaid pairs of turning bars and/or
- how much the second turning bar of each of the aforesaid pairs of turning bars exceeds beyond the first turning bar.

[0047] Indicatively, for an inclination of the turning bars of about 45° with respect to the longitudinal cutting line L, the distance between the two longitudinal portions cut from the starting continuous web varies substantially proportionally to the increase of the offset of the second turning bar with respect to the first turning bar.

Claims

1. **An apparatus (1) for splitting and spreading a continuous web,** comprising:

   - supporting and guiding means for defining a web path (P) extending along a predetermined longitudinal axis (X-X) between an input zone and an output zone, wherein said web path (P) is designed to be traveled by a continuous web running in a predetermined feed direction (A) from said input zone toward said output zone and
   - cutting means (2) located in a predetermined transverse position of said web path (P) to form a cutting line (L) extending along said longitudinal axis (X-X) in a continuous web running along said path (P);

   wherein:

   - said web path (P) has a path section upstream of said cutting means (2) and a path section downstream of said cutting means (2), defined therein with reference to the feed direction (A) of a web along said web path;
   - said cutting line (L) splits said path section downstream of said cutting means (2) into two distinct longitudinal portions, namely a first longitudinal portion (I) and a second longitudinal portion (II);
   - said supporting and guiding means comprise two respective pairs (3, 4) of turning bars located at said path portion downstream of said cutting means (2);
   - a first pair of turning bars (3) extends transverse to said first longitudinal portion (I) of said web path (P) from said cutting line (L);
   - a second pair of turning bars (4) extends transverse to said second longitudinal portion (II) of said web path (P) from said cutting line (L), so that said first pair of turning bars (3) and said second pair of turning bars (4) extend on opposite sides from said cutting line (L);
   - said first pair of turning bars (3) and said second pair of turning bars (4) extend transverse to said cutting line (L) at an angle (α) other than 90°, preferably an angle (α) of 25° to 65;
   - said first pair of turning bars (3) and said second pair of turning bars (4) are inclined with respect to said cutting line (L) to diverge from each other when feeding along said longitudinal direction (X-X) in said feed direction (A) and
   - each respective pair (3,4) of turning bars comprises a first turning bar (5) and a second turning bar (6) which are designed to contact, by a respective contact portion (7,8), a first side and an opposite second side of a web running along said web path (P), so that said web path (P) will move between the first turning bar (5) and the second turning bar (6) of each pair (3, 4) of turning bars;

   characterized in that:

   - the first turning bar (5) and the second turning bar (6) of each respective pair (3,4) of turning bars are offset in said longitudinal direction (X-X) so that they will not overlap in an orthogonal direction (Z-Z) perpendicular to the plane that passes through said web path (P), said first turning bar (5) being closer to said cutting means (2) than said second turning bar (6) and
   - the first turning bar (5) and the second turning bar (6) of each respective pair (3,4) of turning bars are supported to be reversibly adjusted relative to each other in said orthogonal direction (Z-Z) until said second turning bar (6) is moved past said first turning bar (5) to move:

     • from a coplanar configuration in which said contact portion (8) of said second turning bar (6) is substantially coplanar with said contact portion (7) of said first turning bar (5) and said web path (P) passing between said first turning bar (5) and said second turning bar (6) extends straight between the first turning bar (5) and the second turning bar (6) of each respective pair (3, 4) to
     • an offset configuration in which said contact portion (8) of said second turning bar (6) extends in said orthogonal direction (Z-Z) beyond said contact portion (7) of said first turning bar (5) and said web path (P) has a

section at the exit of each respective pair (3, 4) of turning bars offset in said orthogonal direction (Z-Z) from the section of said web path (P) at the entry of each respective pair (3, 4) of turning bars.

2. An apparatus (1) as claimed in claim 1, wherein in said offset configuration in which said contact portion (8) of said second turning bar (6) extends in said orthogonal direction (Z-Z) beyond said contact portion (7) of said first turning bar (5), said web path (P), when moving past each pair (3,4) of turning bars follows a substantially "S-shaped" offset trajectory in said orthogonal direction (Z-Z).

3. An apparatus (1) as claimed in claim 1 or 2, wherein, in each respective pair (3,4) of turning bars, said second turning bar (6) is movable and adjustable in its position in said orthogonal direction (Z-Z) with respect to said first turning bar (5) which is fixed in said orthogonal direction (Z-Z).

4. An apparatus (1) as claimed in any of claims 1 to 3, comprising actuating means for causing displacement/adjustment in said orthogonal direction (Z-Z) of the second turning bar (6) with respect to the respective first turning bar (5) of each respective pair (3,4) of turning bars.

5. An apparatus (1) as claimed in any of claims 1 to 4, wherein said first pair of turning bars (3) and said second pair of turning bars (4) are offset from each other in said longitudinal direction (X-X) to avoid any mutual interference thereof at said cutting line (L).

6. An apparatus (1) as claimed in any of claims 1 to 5, wherein the first turning bar (5) and the second turning bar (6) of each respective pair (3,4) of turning bars extend beyond said cutting line (L) by a predetermined limited extent.

7. An apparatus (1) as claimed in any of claims 1 to 6, wherein said turning bars have a low friction surface so that the sliding movement of a continuous web in contact therewith will not be inhibited, preferably said turning bars are turning bars with air cushions, turning bars with a lapped surface and/or turning bars coated with low-adhesion material.

8. An apparatus (1) as claimed in any of claims 1 to 7, wherein said supporting and guiding means for defining a web path (P) comprise at least one idler roller (9):

- having a high-friction surface and
- located downstream of said pairs (3,4) of turning bars to contact an extended web running in said predetermined feed direction (A) along said web path (P),

to fix the transverse displacement of longitudinal portions of the continuous web that are spread/-moved apart as they move past said respective pairs (3,4) of turning bars in their offset configuration.

9. An apparatus (1) as claimed in any of claims 1 to 8, comprising additional turning bars arranged to guide and support a continuous web or two continuous webs spread apart in said web path (P).

10. An apparatus (1) as claimed in any of claims 1 to 9, wherein said cutting means (2) are movable and adjustable to reversibly move:

- from a position away from said web path (P), to avoid interference thereof with a continuous running in said web path (P)
- to a working position in which they interfere with said web path (P) to form a longitudinal cut in a continuous web running along said web path (P).

11. An apparatus (1) as claimed in any of claims 1 to 10, wherein:
said turning bars extend along horizontal planes,

- in each pair (3, 4) of turning bars, said first turning bar (5) and said second turning bar (6) are designed to contact, by a respective contact portion (7, 8), a top side and, on the other hand, an opposed top side of a web running along said web path (P) and
- in said offset configuration, said contact portion (8) of said second turning bar (6) vertically extends upwards in said orthogonal direction (Z-Z) beyond said contact portion (7) of said first turning bar (5) so that said web path (P) will have a section at the exit of each respective pair (3, 4) of turning bars upwardly offset in said orthogonal direction (Z-Z) from the section of said web path (P) at the entry of each respective pair (3, 4) of turning bars.

12. A method of splitting and spreading a continuous web into two continuous longitudinal portions, comprising the steps of:

- arranging a web path (P) extending along a predetermined longitudinal axis (X-X) between an input zone and an output zone in which an extended continuous web will be supported and guided by supporting and guiding means;
- feeding a continuous web along said web path (P) in a feed direction (A) from an input zone to an output zone;
- arranging cutting means (2) located in a pre-

determined transverse position of said web path (P) to form a cutting line (L) extending along said longitudinal axis (X-X);
- cutting said continuous web running in the feed direction along said path (P) by said cutting means (2), to split said continuous web, downstream of said cutting means (2), into a first longitudinal portion and a second longitudinal portion;
- arranging a first pair of turning bars (3) and a second pair of turning bars (4) so that they will be:

• downstream of said cutting means (2) with reference to the feed direction (A) of said web and
• extending transverse to said web path (P) at an angle (α) other than 90°, preferably an angle (α) of 25° to 65 from said cutting line (L), so that said first pair of turning bars (3) and said second pair of turning bars (4) will extend on opposite sides from said cutting line (L), such that said first pair of turning bars (3) and said second pair of turning bars (4) will be run along only by said first longitudinal portion and only by said second longitudinal portion respectively;

wherein which each respective pair (3,4) of turning bars comprises a first turning bar (5) and a second turning bar (6) which are designed to contact, by a respective contact portion (7,8), a first side and an opposite second side of a web running along said web path (P), so that said web path (P) will move between the first turning bar (5) and the second turning bar (6) of each pair (3, 4) of turning bars;
characterized in that:

- the first turning bar (5) and the second turning bar (6) of each respective pair (3,4) of turning bars are offset in said longitudinal direction (X-X) so that they will not overlap in an orthogonal direction (Z-Z) perpendicular to the plane that passes through said web path (P), said first turning bar (5) being closer to said cutting means (2) than said second turning bar;
- the first turning bar (5) and the second turning bar (6) of each respective pair (3, 4) of turning bars are designed to be offset in said orthogonal direction (Z-Z) to assume an offset configuration in which said contact portion (8) of said second turning bar (6) extends in said orthogonal direction (Z-Z) beyond said contact portion (7) of said first turning bar (5) and said web path (P) has a section at the exit of each respective pair (3, 4) of turning bars offset in said orthogonal direction (Z-Z) from the section of said web path (P) at the entry of each respective pair (3, 4) of turning bars, and
- said method comprises the step of causing said first longitudinal portion of the cut web to run along said first pair (3) of turning bars and of causing said second longitudinal portion of said cut web to run along said second pair (3) of turning bars, whereas the second turning bar (6) of each respective pair (3,4) of turning bars is offset in said orthogonal direction (Z-Z) beyond said first turning bar (5) and of causing said web path (P) and said first longitudinal portion and said second longitudinal portion of the web to assume a pattern having a section at the exit of each respective pair (3, 4) of turning bars offset in said orthogonal direction (Z-Z) from the section of said first longitudinal portion and said second longitudinal portion of the web at the entry of each respective pair (3,4) of turning bars,

to cause said first longitudinal portion (I) and said second longitudinal portion (II) to move apart from each other and from said cutting line (L) as they run along the respective pair (3, 4) of turning bars.

13. A method of splitting and spreading a continuous web as claimed in claim 12, wherein said method is carried out by means of an apparatus (1) as claimed in any of claims 1 to 11.

14. A method of splitting and spreading a continuous web as claimed in claim 12 or 13, wherein said transverse movement of the first longitudinal portion and of the second longitudinal portion of the continuous webs away from each other and from said cutting line (L) is fixed by causing said two longitudinal portions of the web to run on a reversing roller (9) having a high friction surface.

Patentansprüche

1. **Vorrichtung (1) zum Aufteilen und Ausbreiten einer durchgehenden Bahn,** umfassend:

- Stütz- und Führungsmittel zum Definieren eines Bahnpweges (P), der sich entlang einer vorbestimmten Längsachse (X-X) zwischen einer Eingangszone und einer Ausgangszone erstreckt, wobei der Bahnpfad (P) ausgebildet ist, von einer durchgehenden Bahn durchlaufen zu werden, die sich in einer vorbestimmten Vorschubrichtung (A) von der Eingangszone zur Ausgangszone erstreckt, und

- Schneidmittel (2), die in einer vorbestimmten Querposition des Bahnweges (P) angeordnet ist, um eine Schnittlinie (L) zu bilden, die sich entlang der Längsachse (X-X) in einer durchgehenden Bahn erstreckt, die sich entlang des Weges (P) erstreckt;

wobei:

- der Bahnweg (P) einen Bahnabschnitt stromaufwärts der Schneidmittel (2) und einen Bahnabschnitt stromabwärts der Schneidmittel (2) aufweist, die darin in Bezug auf die Vorschubrichtung (A) einer Bahn entlang des Bahnwegs definiert sind;
- die Schneidlinie (L) den Bahnabschnitt stromabwärts der Schneidmittel (2) in zwei unterschiedliche Längsabschnitte teilt, nämlich einen ersten Längsabschnitt (I) und einen zweiten Längsabschnitt (II);
- die Stütz- und Führungsmittel zwei entsprechende Paare (3, 4) von Drehstangen umfassen, die sich an dem Wegabschnitt stromabwärts der Schneidmittel (2) befinden;
- ein erstes Paar von Drehstangen (3) sich quer zu dem ersten Längsabschnitt (I) des Bahnweges (P) von der Schnittlinie (L) erstreckt;
- ein zweites Paar von Drehstangen (4) sich quer zu dem zweiten Längsabschnitt (II) des Bahnweges (P) von der Schnittlinie (L) erstreckt, so dass das erste Paar von Drehstangen (3) und das zweite Paar von Drehstangen (4) sich auf gegenüberliegenden Seiten von der Schnittlinie (L) erstrecken;
- das erste Paar Drehstangen (3) und das zweite Paar von Drehstangen (4) sich quer zur Schnittlinie (L) in einem anderen Winkel (α) als 90°, vorzugsweise in einem Winkel (α) von 25° bis 65°, erstrecken;
- das erste Paar von Drehstangen (3) und das zweite Paar von Drehstangen (4) in Bezug auf die Schnittlinie (L) so geneigt sind, dass sie beim Vorschub entlang der Längsrichtung (X-X) in der Vorschubrichtung (A) voneinander abweichen, und
- jedes jeweilige Paar (3, 4) von Drehstangen eine erste Drehstange (5) und eine zweite Drehstange(6) umfasst, die ausgebildet sind, durch einen jeweiligen Kontaktabschnitt (7, 8) eine erste Seite und eine gegenüberliegende zweite Seite einer entlang des Bahnpfades (P) laufenden Bahn zu berühren, so dass sich der Bahnweg (P) zwischen der ersten Drehstange(5) und der zweiten Drehstange (6) jedes Paares (3, 4) von Wendestangen bewegt;

dadurch gekennzeichnet, dass:

- die erste Drehstange (5) und die zweite Drehstange (6) jedes jeweiligen Paares (3, 4) Drehstangen in der Längsrichtung (X-X) versetzt sind, so dass sie sich in einer orthogonalen Richtung (Z-Z) senkrecht zu der Ebene, die durch den Bahnweg (P) durchgeht, nicht überlappen, wobei die erste Drehstange (5) näher an den Schneidmitteln (2) als die zweite Drehstange (6) ist und
- die erste Drehstange (5) und die zweite Drehstange (6) jedes jeweiligen Paares (3, 4) von Drehstangen so gestützt sind, dass sie relativ zueinander in der orthogonalen Richtung (Z-Z) reversibel eingestellt werden können, bis die zweite Drehstange (6) an der ersten Drehstange (5) vorbeibewegt wird, um sich zu bewegen:

  • von einer koplanaren Konfiguration, in der der Kontaktabschnitt (8) der zweiten Drehstange (6) im Wesentlichen koplanar mit dem Kontaktabschnitt (7) der ersten Drehstange (5) ist und der zwischen der ersten Drehstange (5) und der zweiten Drehstange (6) durchgehende Bahnweg (P) sich gerade zwischen der ersten Drehstange (5) und der zweiten Drehstange (6) jedes jeweiligen Paares (3, 4) erstreckt, zu
  • einer versetzten Konfiguration, in der sich der Kontaktabschnitt (8) der zweiten Drehstange (6) in der orthogonalen Richtung (Z-Z) über den Kontaktabschnitt (7) der ersten Drehstange (5) erstreckt und der Bahnweg (P) einen Abschnitt am Ausgang jedes jeweiligen Paares (3, 4) von Drehstangen aufweist, der in der orthogonalen Richtung (Z-Z) gegenüber dem Abschnitt des Bahnweges (P) am Eingang jedes jeweiligen Paares (3, 4) von Drehstangen versetzt ist.

2. Vorrichtung (1) nach Anspruch 1, wobei in der versetzten Konfiguration, in der sich der Kontaktabschnitt (8) der zweiten Drehstange (6) in der orthogonalen Richtung (Z-Z) über den Kontaktabschnitt (7) der ersten Drehstange (5) erstreckt, der Bahnweg (P), wenn er sich an jedem Paar (3, 4) von Drehstangen vorbeibewegt, einer im Wesentlichen "S-förmigen" versetzten Trajektorie in der orthogonalen Richtung (Z-Z) folgt.

3. Vorrichtung (1) nach Anspruch 1 oder 2, wobei in jedem jeweiligen Paar (3, 4) von Drehstange die zweite Drehstange (6) beweglich ist und in ihrer Position in der orthogonalen Richtung (Z-Z) in Bezug auf die erste Drehstange (5), die in der orthogonalen Richtung (Z-Z) fest ist, einstellbar ist.

4. Vorrichtung (1) nach einem der Ansprüche 1 bis 3, umfassend Betätigungsmittel zum Bewirken einer

Verschiebung/Einstellung in der orthogonalen Richtung (Z-Z) der zweiten Drehstange (6) in Bezug auf die jeweilige erste Drehstange (5) jedes jeweiligen Paares (3, 4) von Drehstangen.

5. Vorrichtung (1) nach einem der Ansprüche 1 bis 4, wobei das erste Paar von Drehstangen (3) und das zweite Paar von Drehstangen (4) in der Längsrichtung (X-X) gegeneinander versetzt sind, um eine gegenseitige Störung an der Schnittlinie (L) zu vermeiden.

6. Vorrichtung (1) nach einem der Ansprüche 1 bis 5, wobei sich die erste Drehstange (5) und die zweite Drehstange (6) jedes jeweiligen Paares (3, 4) von Drehstangen um ein vorbestimmtes begrenztes Maß über die Schnittlinie (L) erstrecken.

7. Vorrichtung (1) nach einem der Ansprüche 1 bis 6, wobei die Drehstangen eine Oberfläche mit geringer Reibung aufweisen, so dass die Gleitbewegung einer durchgehenden Bahn, die mit ihnen in Kontakt ist, nicht behindert wird, wobei die Drehstangen vorzugsweise Drehstangen mit Luftkissen, Drehstangen mit einer geläppten Oberfläche und/oder Drehstangen sind, die mit einem Material mit geringer Haftung beschichtet sind.

8. Vorrichtung (1) nach einem der Ansprüche 1 bis 7, wobei die Stütz- und Führungsmittel zum Definieren eines Bahnweges (P) mindestens eine Umlenkrolle (9):

- mit einer hochreibenden Oberfläche und
- die stromabwärts der Paare (3, 4) von Wendestangen angeordnet ist, um eine ausgedehnte Bahn zu berühren, die sich in der vorbestimmten Vorschubrichtung (A) entlang des Bahnweges (P) erstreckt, umfassen,

um die Querverschiebung von Längsabschnitten der durchgehenden Bahn zu fixieren, die gespreizt/ auseinander bewegt werden, wenn sie sich an den jeweiligen Paaren (3, 4) von Drehstangen in ihrer versetzten Konfiguration vorbeibewegen.

9. Vorrichtung (1) nach einem der Ansprüche 1 bis 8, umfassend zusätzlichen Drehstangen, die angeordnet sind, eine kontinuierliche Bahn oder zwei kontinuierliche Bahnen, die in dem Bahnpfad (P) ausgebreitet sind, zu führen und zu stützen.

10. Vorrichtung (1) nach einem der Ansprüche 1 bis 9, wobei die Schneidmittel (2) beweglich und einstellbar sind, um sich reversibel:

- von einer von der Bahn (P) entfernten Position aus, um eine Störung beim durchgehenden Verlaufen in dem Bahnweg (P) zu vermeiden
- in eine Arbeitsposition, in der sie in den Bahnweg (P) eingreifen, um einen Längsschnitt in einer durchgehenden Bahn zu bilden, die isch entlang des Bahnwegs (P) erstreckt, zu bewegen.

11. Vorrichtung (1) nach einem der Ansprüche 1 bis 10, wobei:
Die Drehstangen sich entlang horizontaler Ebenen erstrecken,

- in jedem Paar (3, 4) von Drehstangen die erste Drestange (5) und die zweite Drestange (6) ausgebildet sind, mit einem jeweiligen Kontaktabschnitt (7, 8) eine Oberseite und andererseits eine gegenüberliegende Oberseite einer entlang des Bahnweges (P) laufenden Bahn zu berühren, und
- in der versetzten Konfiguration der Kontaktabschnitt (8) der zweiten Drehstange (6) sich vertikal nach oben in der orthogonalen Richtung (Z-Z) über den Kontaktabschnitt (7) der ersten Drehstange (5) erstreckt, so dass der Bahnweg (P) einen Abschnitt am Ausgang jedes jeweiligen Paars (3, 4) von Drehstangen aufweist, der in der orthogonalen Richtung (Z-Z) gegenüber dem Abschnitt des Bahnwegs (P) am Eingang jedes jeweiligen Paars (3, 4) von Drehstangen nach oben versetzt ist.

12. Verfahren zum Aufteilen und Ausbreiten einer durchgehenden Bahn in zwei durchgehende Längsabschnitte, umfassend die folgenden Schritte:

- Anordnen eines Bahnweges (P), der sich entlang einer vorbestimmten Längsachse (X X) zwischen einer Eingangszone und einer Ausgangszone erstreckt, in der eine ausgedehnte durchgehende Bahn durch Stütz- und Führungsmittel gestützt und geführt wird;
- Vorwärtsbewegen einer durchgehenden Bahn entlang des Bahnweges (P) in einer Vorschubrichtung (A) von einer Eingangszone zu einer Ausgangszone;
- Anordnen Schneidmitteln (2), die sich in einer vorbestimmten Querposition des Bahnweges (P) befinden, um eine Schnittlinie (L) zu bilden, die sich entlang der Längsachse (X-X) erstreckt;
- Schneiden der durchgehenden Bahn, die in der Vorschubrichtung entlang des Pfades (P) verläuft, durch die Schneidmittel (2), um die durchgehende Bahn stromabwärts der Schneidmittel (2) in einen ersten Längsabschnitt und einen zweiten Längsabschnitt zu teilen;
- Anordnen eines ersten Paares von Drehstangen (3) und eines zweiten Paares von Dreh-

stangen (4), so dass sie sich:

• stromabwärts der Schneidmittel (2) in Bezug auf die Vorschubrichtung (A) der Bahn befinden und
• die sich quer zu dem Bahnweg (P) in einem anderen Winkel (α) als 90°, vorzugsweise in einem Winkel (α) von 25° bis 65°, von der Schnittlinie (L) erstrecken, so dass sich das erste Paar von Drestangen (3) und das zweite Paar von Drehstangen (4) auf gegenüberliegenden Seiten von der Schnittlinie (L) erstrecken, so dass das erste Paar von Drehstangen (3) und das zweite Paar von Drehstangen (4) nur von dem ersten Längsabschnitt bzw. nur von dem zweiten Längsabschnitt entlanggeführt werden;

wobei jedes jeweilige Paar (3, 4) von Drehstangen eine erste Drehstange (5) und eine zweite Drestange (6) umfasst, die ausgebildet sind, durch einen jeweiligen Kontaktabschnitt (7, 8) eine erste Seite und eine gegenüberliegende zweite Seite einer entlang des Bahnpfades (P) laufenden Bahn zu berühren, so dass sich der Bahnweg (P) zwischen der ersten Drehstange (5) und der zweiten Drehstange (6) jedes Paares (3, 4) von Drehstangen bewegt;
dadurch gekennzeichnet, dass:

- die erste Drehstange (5) und die zweite Drehstange (6) jedes jeweiligen Paares (3, 4) von Drehstangen in der Längsrichtung (X-X) versetzt sind, so dass sie sich in einer orthogonalen Richtung (Z-Z) senkrecht zu der Ebene, die durch den Bahnweg (P) verläuft, nicht überlappen, wobei die erste Drehstange (5) näher an der Schneidmittel (2) als die zweite Drehstange ist;
- die erste Drehstange (5) und die zweite Drehstange (6) jedes jeweiligen Paares (3, 4) von Drehstangen ausgebildet sind, in der orthogonalen Richtung (Z-Z) versetzt zu werden, um eine versetzte Konfiguration anzunehmen, in der sich der Kontaktabschnitt (8) der zweiten Drehstange (6) in der orthogonalen Richtung (Z-Z) über den Kontaktabschnitt (7) der ersten Drehstange (5) erstreckt und der Bahnweg (P) einen Abschnitt am Ausgang jedes jeweiligen Paares (3, 4) von Drehstangen aufweist, der in der orthogonalen Richtung (Z-Z) gegenüber dem Abschnitt des Bahnweges (P) am Eingang jedes jeweiligen Paares (3, 4) von Drehstangen versetzt ist, und
- das Verfahren den folgenden Schritt umfasst, Bewirken, den ersten Längsabschnitt der geschnitteten Bahn entlang des ersten Paares (3) von Drehstangen verlaufen zu lassen und den zweiten Längsabschnitt der geschnittenen Bahn entlang des zweiten Paares (3) von Drehstangen verlaufen zu lassen, während die zweite Drehstange (6) jedes entsprechenden Paares (3,4) von Drehstangen in der orthogonalen Richtung (Z-Z) über die erste Drehstange (5)versetzt ist, und zu bewirken, dass der Bahnweg (P) und der erste Längsabschnitt und der zweite Längsabschnitt der Bahn ein Muster annehmen, das einen Abschnitt am Ausgang jedes jeweiligen Paares (3, 4) von Drehstangen aufweist, der in der orthogonalen Richtung (Z-Z) gegenüber dem Abschnitt des ersten Längsabschnitts und des zweiten Längsabschnitts der Bahn am Eingang jedes jeweiligen Paares (3, 4) von Drehstangen versetzt ist,

um zu bewirken, dass sich der erste Längsabschnitt (I) und der zweite Längsabschnitt (II) voneinander und von der Schnittlinie (L) weg bewegen, wenn sie sich entlang des jeweiligen Paares (3, 4) von Drehstangen erstrecken.

13. Verfahren zum Aufteilen und Ausbreiten einer durchgehenden Bahn nach Anspruch 12, wobei das Verfahren mittels einer Vorrichtung (1) nach einem der Ansprüche 1 bis 11 durchgeführt wird.

14. Verfahren zum Aufteilen und Ausbreiten einer durchgehenden Bahn nach Anspruch 12 oder 13, wobei die Querbewegung des ersten Längsabschnitts und des zweiten Längsabschnitts der durchgehenden Bahn voneinander und von der Schnittlinie (L) weg fixiert wird, so dass die beiden Längsabschnitte der Bahn auf einer Umlenkrolle (9) mit einer hohen Reibungsfläche laufen.

Revendications

1. Appareil (1) de division et d'étalement d'une bande continue, comprenant :

- des moyens de support et de guidage pour définir un chemin de bande (P) s'étendant le long d'un axe longitudinal prédéterminé (X-X) entre une zone d'entrée et une zone de sortie, dans lequel ledit chemin de bande (P) est conçu pour être parcouru par une bande continue se déplaçant dans une direction d'alimentation prédéterminée (A) depuis ladite zone d'entrée vers ladite zone de sortie et
- des moyens de coupe (2) situés dans une position transversale prédéterminée dudit chemin de bande (P) pour former une ligne de coupe

(L) s'étendant le long dudit axe longitudinal (X-X) dans une bande continue s'étendant le long dudit chemin (P) ;

dans lequel :

- ledit chemin de bande (P) comporte une section de chemin en amont dudit moyen de coupe (2) et une section de chemin en aval dudit moyen de coupe (2), définies en référence à la direction d'alimentation (A) d'une bande le long dudit chemin de bande ;
- ladite ligne de coupe (L) divise ladite section de chemin en aval dudit moyen de coupe (2) en deux parties longitudinales distinctes, à savoir une première partie longitudinale (I) et une seconde partie longitudinale (II) ;
- lesdits moyens de support et de guidage comprennent deux paires respectives (3, 4) de barres de retournement situées sur ladite partie de chemin en aval dudit moyen de coupe (2) ;
- une première paire de barres de retournement (3) s'étend transversalement à ladite première partie longitudinale (I) dudit chemin de bande (P) à partir de ladite ligne de coupe (L) ;
- une seconde paire de barres de retournement (4) s'étend transversalement à ladite seconde partie longitudinale (II) dudit chemin de bande (P) à partir de ladite ligne de coupe (L), de sorte que ladite première paire de barres de retournement (3) et ladite seconde paire de barres de retournement (4) s'étendent sur des côtés opposés à partir de ladite ligne de coupe (L) ;
- ladite première paire de barres de retournement (3) et ladite seconde paire de barres de retournement (4) s'étendent transversalement à ladite ligne de coupe (L) à un angle (α) autre que 90°, de préférence un angle (α) de 25° à 65° ;
- ladite première paire de barres de retournement (3) et ladite seconde paire de barres de retournement (4) sont inclinées par rapport à ladite ligne de coupe (L) pour diverger l'une de l'autre lors de l'alimentation le long de ladite direction longitudinale (X-X) dans ladite direction d'alimentation (A) et
- chaque paire respective (3, 4) de barres de retournement comprend une première barre de retournement (5) et une seconde barre de retournement (6) qui sont conçues pour entrer en contact, par une partie de contact respective (7, 8), avec un premier côté et un second côté opposé d'une bande s'étendant le long dudit chemin de bande (P), de sorte que ledit chemin de bande (P) se déplace entre la première barre de retournement (5) et la seconde barre de retournement (6) de chaque paire (3, 4) de barres de retournement ;

caractérisé en ce que :

- la première barre de retournement (5) et la seconde barre de retournement (6) de chaque paire respective (3,4) de barres de retournement sont décalées dans ladite direction longitudinale (X-X) de manière à ne pas se chevaucher dans une direction orthogonale (Z-Z) perpendiculaire au plan qui passe par ledit chemin de bande (P), ladite première barre de retournement (5) étant plus proche dudit moyen de coupe (2) que ladite seconde barre de retournement (6) et
- la première barre de retournement (5) et la seconde barre de retournement (6) de chaque paire respective (3,4) de barres de retournement sont supportées pour être ajustées de manière réversible l'une par rapport à l'autre dans ladite direction orthogonale (Z-Z) jusqu'à ce que ladite seconde barre de retournement (6) soit déplacée au-delà de ladite première barre de retournement (5) pour se déplacer :

  • d'une configuration coplanaire dans laquelle ladite partie de contact (8) de ladite seconde barre de retournement (6) est sensiblement coplanaire avec ladite partie de contact (7) de ladite première barre de retournement (5) et ledit chemin de bande (P) passant entre ladite première barre de retournement (5) et ladite seconde barre de retournement (6) s'étend en ligne droite entre la première barre de retournement (5) et la seconde barre de retournement (6) de chaque paire respective (3, 4) jusqu'à
  • une configuration décalée dans laquelle ladite partie de contact (8) de ladite seconde barre de retournement (6) s'étend dans ladite direction orthogonale (Z-Z) au-delà de ladite partie de contact (7) de ladite première barre de retournement (5) et ledit chemin de bande (P) a une section à la sortie de chaque paire respective (3, 4) de barres de retournement décalée dans ladite direction orthogonale (Z-Z) par rapport à la section dudit chemin de bande (P) à l'entrée de chaque paire respective (3, 4) de barres de retournement.

2. Appareil (1) selon la revendication 1, dans lequel, dans ladite configuration décalée dans laquelle ladite partie de contact (8) de ladite seconde barre de retournement (6) s'étend dans ladite direction orthogonale (Z-Z) au-delà de ladite partie de contact (7) de ladite première barre de retournement (5), ledit chemin de la bande (P), lorsqu'il passe devant chaque paire (3, 4) de barres de retournement, suit un chemin décalé sensiblement en forme de « S » dans

ladite direction orthogonale (Z-Z).

3. Appareil (1) selon la revendication 1 ou 2, dans lequel, dans chaque paire respective (3,4) de barres de retournement, ladite seconde barre de retournement (6) est mobile et réglable dans sa position dans ladite direction orthogonale (Z-Z) par rapport à ladite première barre de retournement (5) qui est fixe dans ladite direction orthogonale (Z-Z).

4. Appareil (1) selon l'une quelconque des revendications 1 à 3, comprenant des moyens d'actionnement pour provoquer un déplacement/ajustement dans ladite direction orthogonale (Z-Z) de la seconde barre de retournement (6) par rapport à la première barre de retournement respective (5) de chaque paire respective (3, 4) de barres de retournement.

5. Appareil (1) selon l'une quelconque des revendications 1 à 4, dans lequel ladite première paire de barres de retournement (3) et ladite seconde paire de barres de retournement (4) sont décalées l'une par rapport à l'autre dans ladite direction longitudinale (X-X) afin d'éviter toute interférence mutuelle au niveau de ladite ligne de coupe (L).

6. Appareil (1) selon l'une quelconque des revendications 1 à 5, dans lequel la première barre de retournement (5) et la seconde barre de retournement (6) de chaque paire respective (3, 4) de barres de retournement s'étendent au-delà de ladite ligne de coupe (L) dans une mesure limitée prédéterminée.

7. Appareil (1) selon l'une quelconque des revendications 1 à 6, dans lequel lesdites barres de retournement ont une surface à faible frottement de sorte que le mouvement de glissement d'une bande continue en contact avec elles ne sera pas inhibé, de préférence lesdites barres de retournement sont des barres de retournement avec des coussins d'air, des barres de retournement avec une surface rodée et/ou des barres de retournement revêtues d'un matériau à faible adhérence.

8. Appareil (1) selon l'une quelconque des revendications 1 à 7, dans lequel lesdits moyens de support et de guidage pour définir un chemin de bande (P) comprennent au moins un rouleau libre (9) :

- ayant une surface de frottement élevée et
- situé en aval desdites paires (3, 4) de barres de retournement pour entrer en contact avec une bande étendue se déplaçant dans ladite direction d'alimentation prédéterminée (A) le long dudit chemin de bande (P),

pour fixer le déplacement transversal des parties longitudinales de la bande continue qui sont écartées/éloignées lorsqu'elles passent devant lesdites paires respectives (3, 4) de barres de retournement dans leur configuration décalée.

9. Appareil (1) selon l'une quelconque des revendications 1 à 8, comprenant des barres de retournement supplémentaires disposées pour guider et soutenir une bande continue ou deux bandes continues écartées dans ledit chemin de bande (P).

10. Appareil (1) selon l'une quelconque des revendications 1 à 9, dans lequel ledit moyen de coupe (2) est mobile et réglable pour se déplacer de manière réversible :

- à partir d'une position éloignée dudit chemin de bande (P), afin d'éviter toute interférence avec un fonctionnement continu dans ledit chemin de bande (P)
- à une position de travail dans laquelle ils interfèrent avec ledit chemin de bande (P) pour former une coupe longitudinale dans une bande continue s'étendant le long dudit chemin de bande (P).

11. Appareil (1) selon l'une quelconque des revendications 1 à 10, dans lequel :
lesdites barres de retournement s'étendent le long de plans horizontaux,

- dans chaque paire (3, 4) de barres de retournement, ladite première barre de retournement (5) et ladite seconde barre de retournement (6) sont conçues pour entrer en contact, par une partie de contact respective (7, 8), avec un côté supérieur et, d'autre part, avec un côté supérieur opposé d'une bande s'étendant le long dudit chemin de bande (P) et
- dans ladite configuration décalée, ladite partie de contact (8) de ladite seconde barre de retournement (6) s'étend verticalement vers le haut dans ladite direction orthogonale (Z-Z) au-delà de ladite partie de contact (7) de ladite première barre de retournement (5) de sorte que ledit chemin de bande (P) aura une section à la sortie de chaque paire respective (3, 4) de barres de retournement décalée vers le haut dans ladite direction orthogonale (Z-Z) par rapport à la section dudit chemin de bande (P) à l'entrée de chaque paire respective (3, 4) de barres de retournement.

12. Procédé de division et d'étalement d'une bande continue en deux parties longitudinales continues, comprenant les étapes suivantes :

- organiser un chemin de bande (P) s'étendant le long d'un axe longitudinal prédéterminé (X X)

entre une zone d'entrée et une zone de sortie dans laquelle une bande continue étendue sera supportée et guidée par des moyens de support et de guidage ;

- alimenter une bande continue le long dudit chemin de bande (P) dans une direction d'alimentation (A) d'une zone d'entrée à une zone de sortie ;
- disposer un moyen de coupe (2) situé dans une position transversale prédéterminée dudit chemin de bande (P) pour former une ligne de coupe (L) s'étendant le long dudit axe longitudinal (X-X) ;
- couper ladite bande continue circulant dans le sens de l'alimentation le long dudit chemin (P) par ledit moyen de coupe (2), afin de diviser ladite bande continue, en aval dudit moyen de coupe (2), en une première partie longitudinale et une seconde partie longitudinale ;
- disposer une première paire de barres de retournement (3) et une seconde paire de barres de retournement (4) de manière à ce qu'elles soient :

  • en aval dudit moyen de coupe (2) par rapport à la direction d'alimentation (A) de ladite bande et
  • s'étendre transversalement audit chemin de bande (P) à un angle (α) autre que 90°, de préférence un angle (α) de 25° à 65° par rapport à ladite ligne de coupe (L), de sorte que ladite première paire de barres de retournement (3) et ladite seconde paire de barres de retournement (4) s'étendent sur des côtés opposés de ladite ligne de coupe (L), de sorte que ladite première paire de barres de retournement (3) et ladite seconde paire de barres de retournement (4) sont longées seulement par ladite première partie longitudinale et que par ladite seconde partie longitudinale, respectivement ;

dans lequel chaque paire respective (3, 4) de barres de retournement comprend une première barre de retournement (5) et une seconde barre de retournement (6) qui sont conçues pour entrer en contact, par une partie de contact respective (7, 8), avec un premier côté et un second côté opposé d'une bande s'étendant le long dudit chemin de bande (P), de sorte que ledit chemin de bande (P) se déplace entre la première barre de retournement (5) et la seconde barre de retournement (6) de chaque paire (3, 4) de barres de retournement ;
caractérisé en ce que :

- la première barre de retournement (5) et la seconde barre de retournement (6) de chaque paire respective (3,4) de barres de retournement sont décalées dans ladite direction longitudinale (X-X) de manière à ne pas se chevaucher dans une direction orthogonale (Z-Z) perpendiculaire au plan qui passe par ledit chemin de bande (P), ladite première barre de retournement (5) étant plus proche dudit moyen de coupe (2) que ladite seconde barre de retournement ;
- la première barre de retournement (5) et la seconde barre de retournement (6) de chaque paire respective (3, 4) de barres de retournement sont conçues pour être décalées dans ladite direction orthogonale (Z-Z) afin d'adopter une configuration décalée dans laquelle ladite partie de contact (8) de ladite seconde barre de retournement (6) s'étend dans ladite direction orthogonale (Z-Z) au-delà de ladite partie de contact (7) de ladite première barre de retournement (5) et ledit chemin de bande (P) a une section à la sortie de chaque paire respective (3, 4) de barres de retournement décalée dans ladite direction orthogonale (Z-Z) par rapport à la section dudit chemin de bande (P) à l'entrée de chaque paire respective (3, 4) de barres de retournement, et
- ledit procédé comprend l'étape consistant à faire passer ladite première partie longitudinale de la bande coupée le long de ladite première paire (3) de barres de retournement et à faire passer ladite seconde partie longitudinale de ladite bande coupée le long de ladite seconde paire (3) de barres de retournement, tandis que la seconde barre de retournement (6) de chaque paire respective (3,4) de barres de retournement est décalée dans ladite direction orthogonale (Z-Z) au-delà de ladite première barre de retournement (5) et de faire en sorte que ledit chemin de bande (P) et ladite première partie longitudinale et ladite seconde partie longitudinale de la bande prennent un modèle ayant une section à la sortie de chaque paire respective (3, 4) de barres de retournement décalée dans ladite direction orthogonale (Z-Z) par rapport à la section de ladite première partie longitudinale et de ladite seconde partie longitudinale de la bande à l'entrée de chaque paire respective (3, 4) de barres de retournement,

pour faire en sorte que ladite première partie longitudinale (I) et ladite seconde partie longitudinale (II) s'écartent l'une de l'autre et de ladite ligne de coupe (L) lorsqu'elles se déplacent le

long de la paire respective (3, 4) de barres de retournement.

13. Procédé de division et d'étalement d'une bande continue selon la revendication 12, dans lequel ledit procédé est mis en œuvre au moyen d'un appareil (1) selon l'une quelconque des revendications 1 à 11.

14. Procédé de division et d'étalement d'une bande continue selon la revendication 12 ou 13, dans lequel ledit mouvement transversal de la première partie longitudinale et de la seconde partie longitudinale des bandes continues, éloignées l'une de l'autre et de ladite ligne de coupe (L), est fixé en faisant passer lesdites deux parties longitudinales de la bande sur un rouleau d'inversion (9) ayant une surface de frottement élevée.

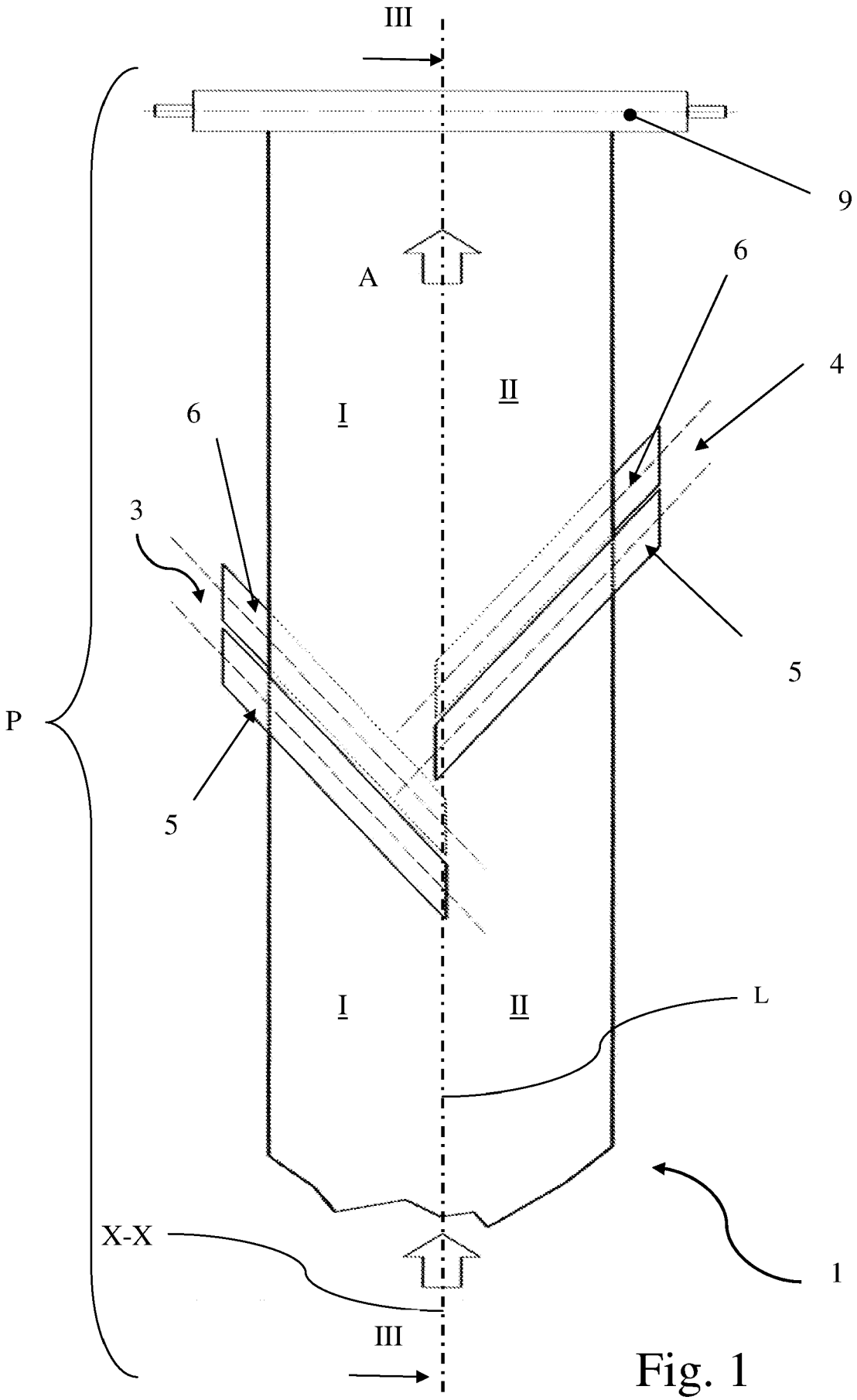

Fig. 1

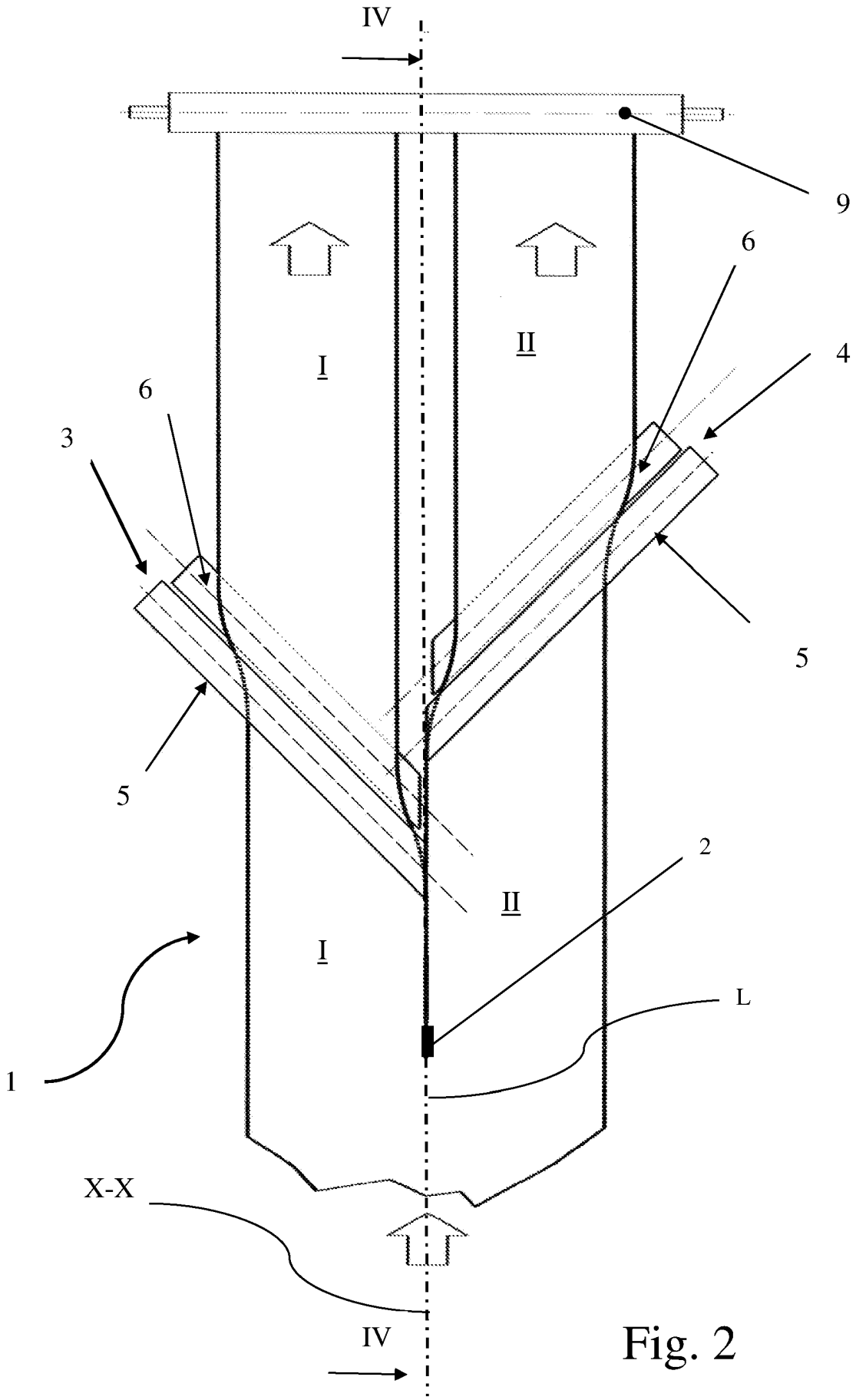

Fig. 2

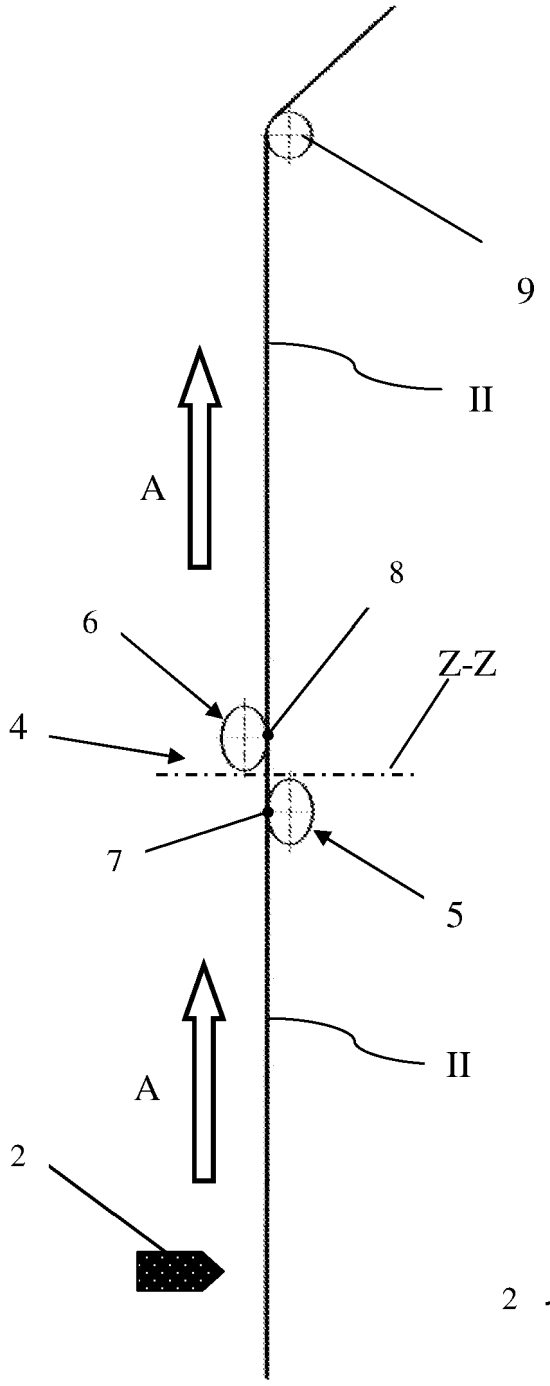

Fig. 3

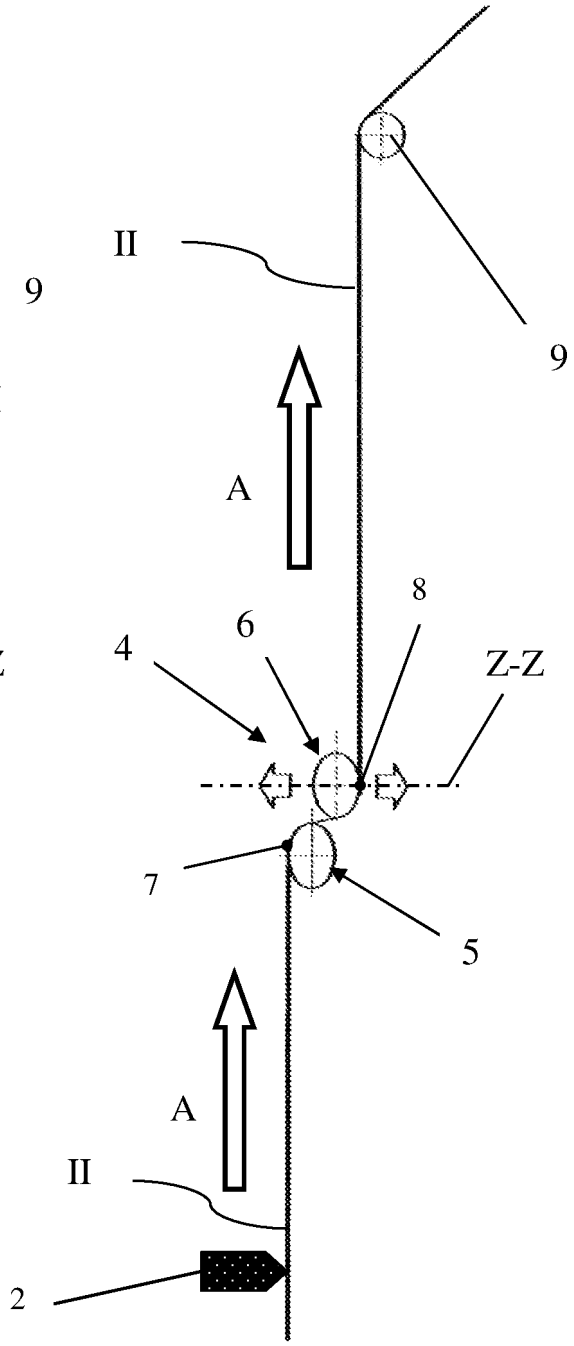

Fig. 4

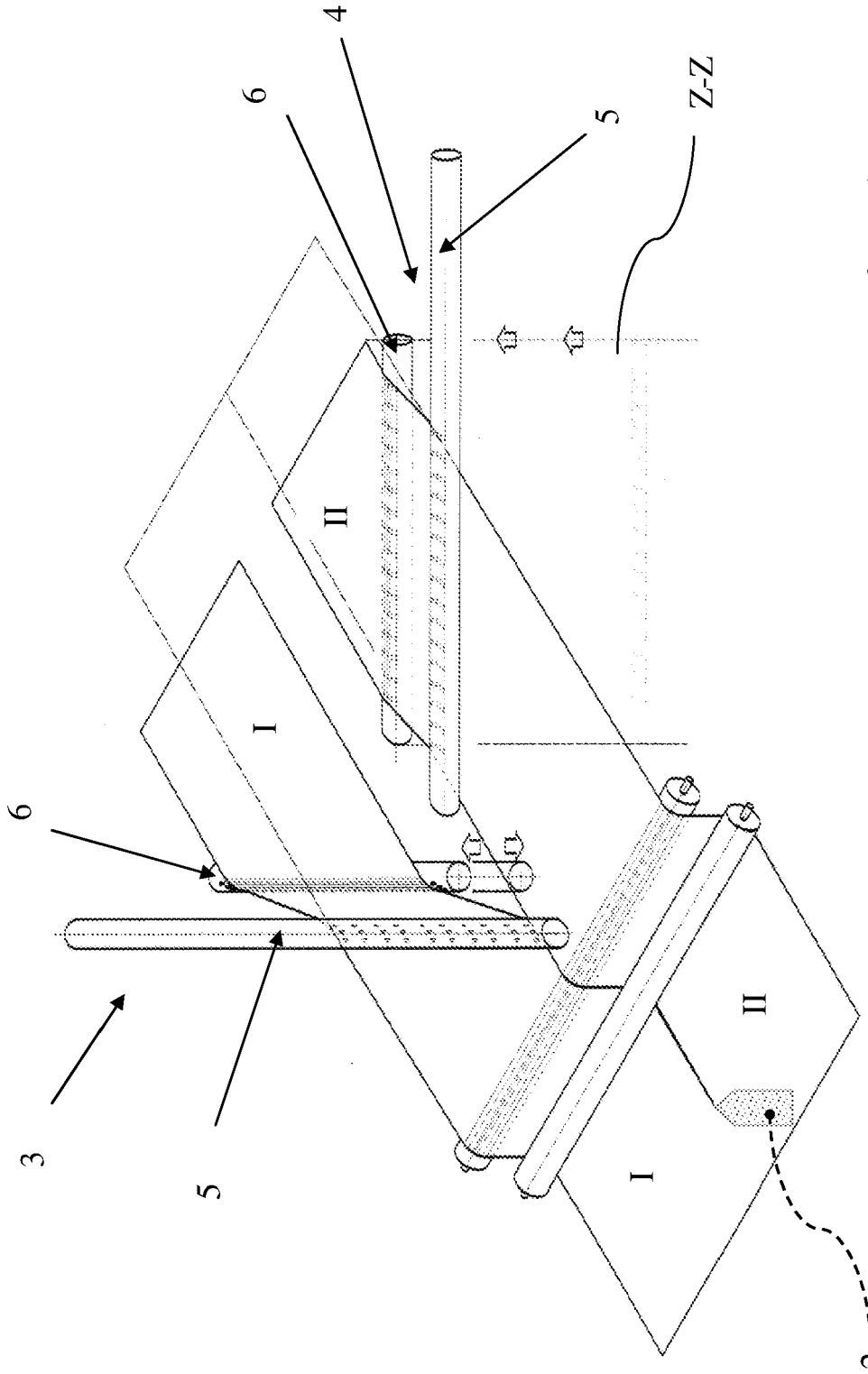

Fig. 5

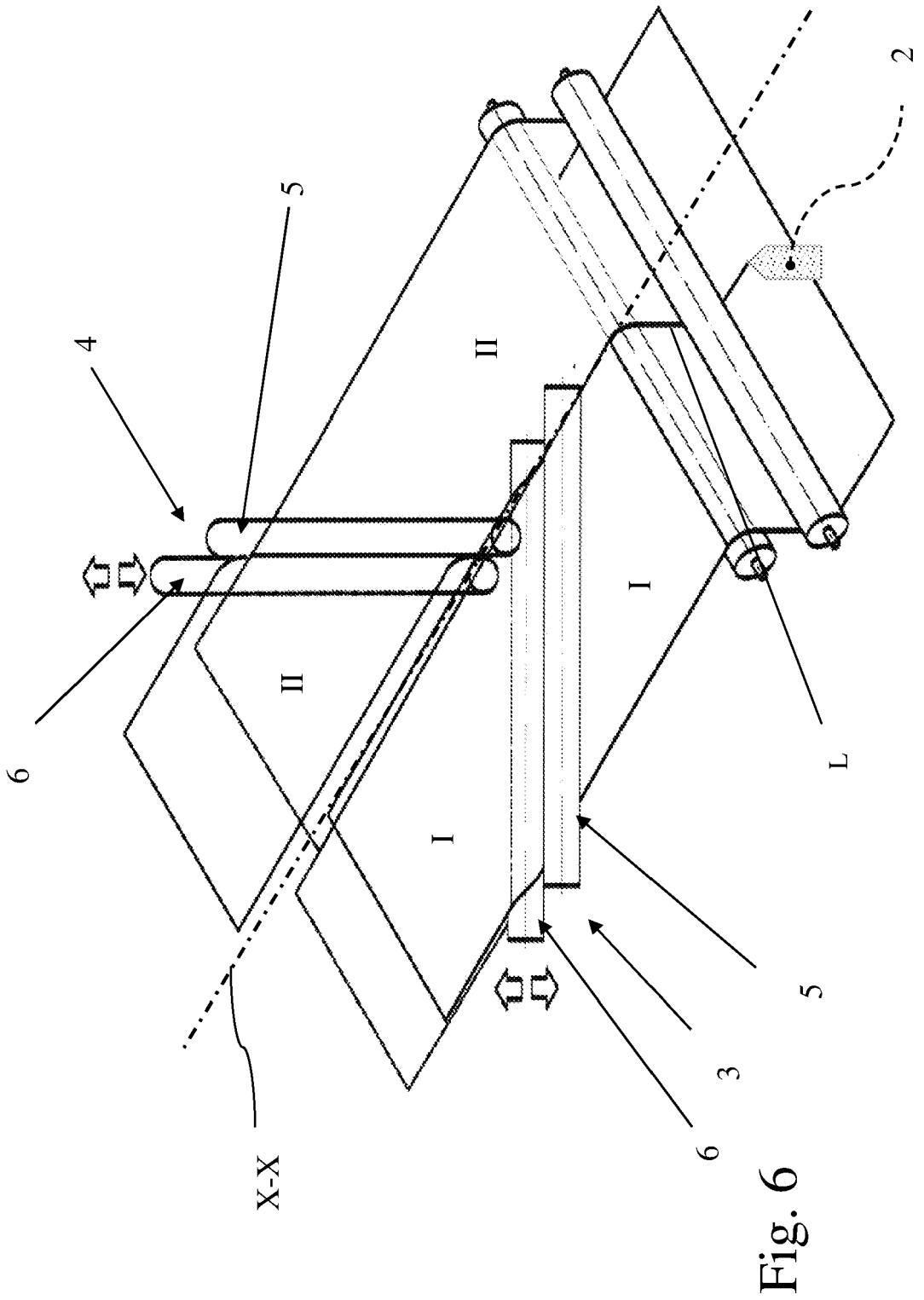

Fig. 6

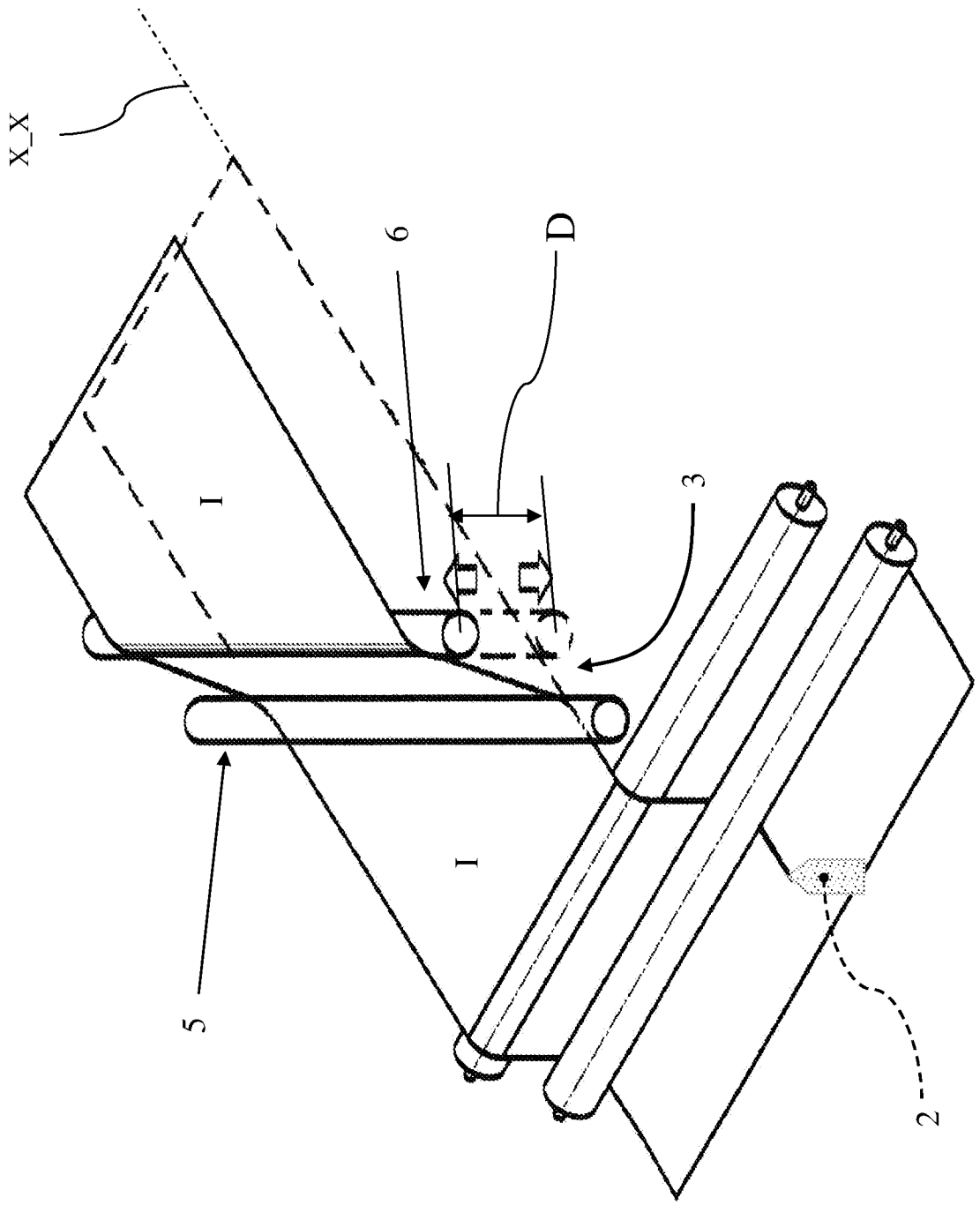

Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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