

(22) Date de dépôt/Filing Date: 2002/12/11

(41) Mise à la disp. pub./Open to Public Insp.: 2003/06/19

(45) Date de délivrance/Issue Date: 2011/02/15

(62) Demande originale/Original Application: 2 470 101

(30) **Priorités/Priorities:** 2001/12/12 (DE101 61 073.4);
2001/12/21 (DE101 63 554.0);
2002/01/15 (DE102 01 410.8);
2002/02/18 (DE102 06 575.6)

(51) Cl.Int./Int.Cl. *B65H 19/26* (2006.01),
B65H 19/28 (2006.01)

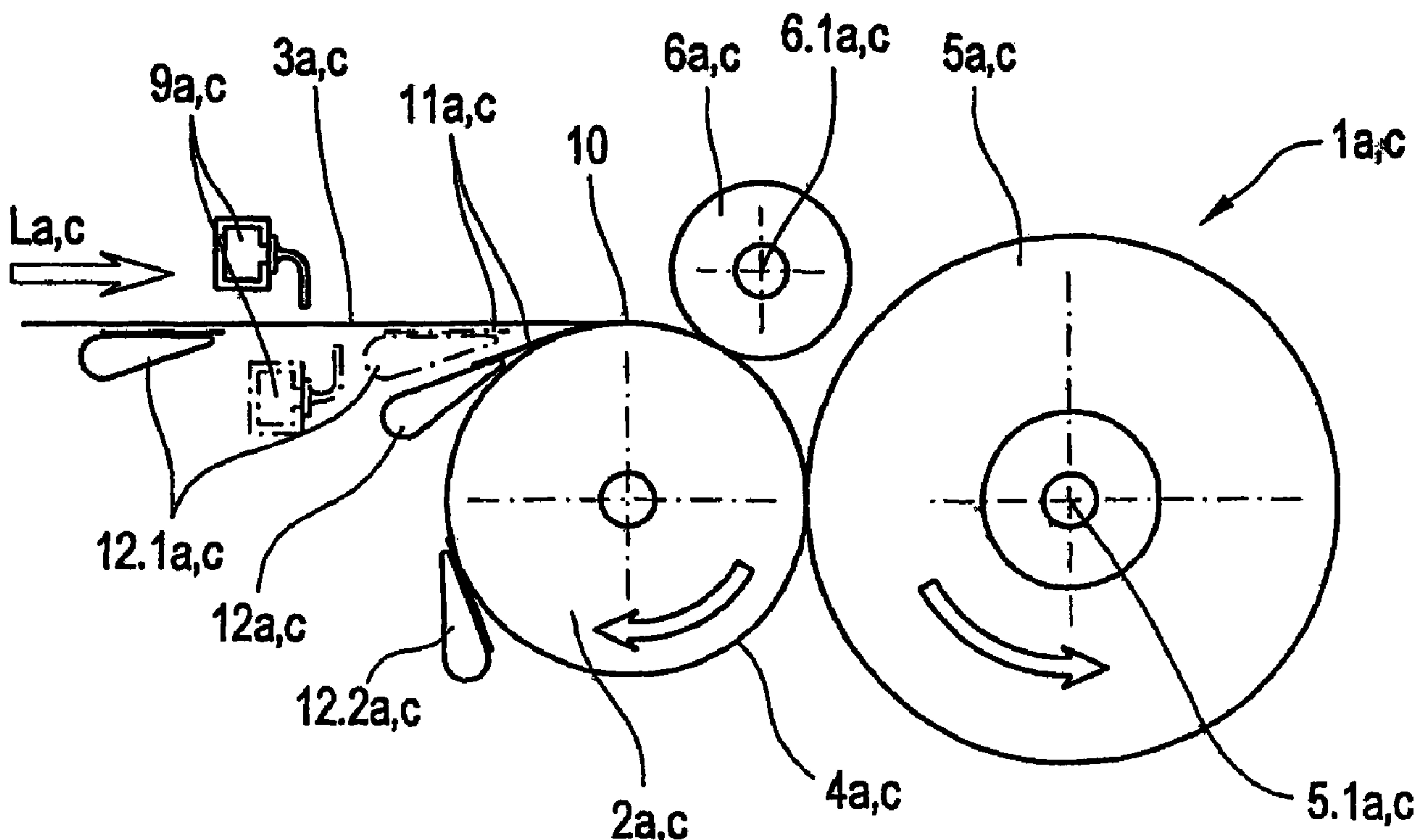
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(54) Titre : PROCEDE DE TRANSFERT D'UNE BANDE DE MATIERE EN DEPLACEMENT SUR UN MANDRIN D'ENROULEMENT ET DISPOSITIF POUR LA MISE EN OEUVRE DUDIT PROCEDE

(54) Title: METHOD OF TRANSFERRING A MOVING WEB TO A CORE AND APPARATUS FOR IMPLEMENTING THE METHOD



(57) **Abrégé/Abstract:**

A method of transferring a moving web (3), in particular a paper or board web, to a new core (6) and a winder for implanting the method. At least one initial cutting piece (11, 11.1) is introduced between the web (3) and a winding roll (2) in such a way that a region (11.2) of the initial cutting piece (11, 11.1) introduced is not covered by the web (3). After reaching a nip (N2) formed by the winding roll (2) and the new core (6), the initial cutting piece (11, 11.1) is connected to the new core (6), at least temporarily, in the

(57) **Abrégé(suite)/Abstract(continued):**

uncovered region (11.2). At least at the point (Q) at which the web (3) runs off the new core (6), cutting of the web (3) by the initial cutting piece (11, 11.1) is effected and/or made possible, as a result of which a new web start, bonded to the initial cutting piece (11, 11.1) and the new core (6), is formed.

Abstract

A method of transferring a moving web (3), in particular a paper or board web, to a new core (6) and a winder for implanting the method. At least one initial cutting piece (11, 11.1) is introduced between the web (3) and a winding roll (2) in such a way that a region (11.2) of the initial cutting piece (11, 11.1) introduced is not covered by the web (3). After reaching a nip (N2) formed by the winding roll (2) and the new core (6), the initial cutting piece (11, 11.1) is connected to the new core (6), at least temporarily, in the uncovered region (11.2). At least at the point (Q) at which the web (3) runs off the new core (6), cutting of the web (3) by the initial cutting piece (11, 11.1) is effected and/or made possible, as a result of which a new web start, bonded to the initial cutting piece (11, 11.1) and the new core (6), is formed.

**Method of transferring a moving web to a core and
apparatus for implementing the method**

5 The invention, according to a first and a second aspect, relates to a method of transferring a web, in particular a paper or board web, preferably running over a subregion of a winding roll, to a new core.

10 This application is a divisional of copending Canadian Patent Application No. 2,470,101 filed December 11, 2002.

15 According to a third aspect, the invention relates to a method of transferring a web, preferably running over a subregion of a winding roll, in particular a paper or board web, to a new core forming a nip with the winding roll, in particular an empty spool, at least one transverse strip preferably being formed in at least one edge region of the web by means of at least one
20 cutting device, preferably a transverse cutting device, arranged upstream of the nip in the running direction of the web. The invention additionally relates to an apparatus for implementing such a method with at least one cutting device, preferably a transverse cutting
25 device.

The invention additionally relates to a respective winder for implementing such methods.

30 Such methods of transferring a web are applied, for example, in the region of a reel-up of a machine for producing paper or board, a coating machine, a slitter-rewinder or an equivalent machine, in order to wind up the web onto a plurality of empty cores one after the
35 other, which are also referred to as empty spools, without interrupting the production process, that is to say without stopping the paper or board machine, or in order to wind up the web onto a preferably empty core sporadically, that is to say following a break in the

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paper or board web or after starting up the paper or board machine.

5 In the process, it must be ensured that the web start produced by cutting the web is supplied to the new core, in order to form a new wound reel on the latter.

German laid-open specification DE 42 08 746 A1 discloses a method of changing spools in which a web
10 supplied continuously to a winding roll is transferred to a new spool (empty spool) which is in contact with the winding roll.

In this case, a central part of the web, what is known
15 as a transfer strip, is cut by two cutting apparatuses at a point which is located above the winding roll in the running direction of the web. The transfer strip is provided with an adhesive medium on the top side, that is to say on the side facing the empty spool, by
20 means of an adhesive supply apparatus and is stuck to the surface of the empty spool. The transfer operation is completed by the movement of the two cutting devices in the direction of the respective web edge.

25 In this method, it is therefore assumed that the adhesive medium has the capacity of tearing through the transfer strip completely and reliably at the latest as it leaves the nip.

30 Unfortunately, in practice this assumption is confirmed only in the rarest cases. This has also been recognized by the inventors of the aforementioned specification and, in order to divide the transfer strip (cutting the web between the cutting lines), a separate strip
35 dividing device was proposed. Thus, in this embodiment, the method already disclosed by US 4,445,646 A is used to its full extent, which has been expanded by the supply of adhesive medium to the top side of the transfer strip.

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In this method, the outlay on construction and the exceedingly large number of components and subassemblies are disadvantageous. In addition, 5 chronological synchronization and reproducibility of the individual method steps constitute an uncertainty factor in the transfer of paper webs. Furthermore, the method is absolutely unsuitable for transferring paper webs with a high tearing strength, such as plastic webs 10 and board.

The use of adhesives for the simultaneous cutting and transfer of the transfer strip to the empty spool is also in the foreground in the method disclosed by the 15 published PCT specification WO 97/48632 A1. In addition to the already disclosed double-sided adhesive tape or label, the use of adhesives in the form of hot-melt and the like is also proposed here.

20 Furthermore, not only the application of the adhesives to the top side of the web but also the application of the adhesives to the circumferential surface of the empty spool is provided. This is a further possible way of supplying adhesive, but can have a decisive 25 influence on increasing the reliability of the method.

On the other hand, one difference with respect to the German laid-open specification cited at the beginning is to be found here in the arrangement and selection of 30 the cutting apparatuses. Here, the use of mechanical circular knives which, in practice, are associated with many disadvantages, is dispensed with, and instead a water jet is provided as the cutting medium, with which the web can be cut both upstream of and directly on the 35 winding roll.

The restriction to cutting the web with water jet at a point at which it is already guided over a part of the winding roll and supported is not absolutely necessary

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for process reasons. However, since a water-jet cutting apparatus upstream of the winding roll has already been disclosed by the German laid-open specification DE 42 08 746 A1 already cited, in particular column 5, line 32, this restriction is nevertheless understandable. In addition, in this method the main disadvantage is to be seen in the fact that it is absolutely unsuitable for transferring paper webs with a high tearing strength.

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Another idea with regard to the cutting of the transfer strip is disclosed in European patent application EP 0 543 788 A1. Although the separate strip dividing device is arranged downstream of the nip, as opposed to the two specifications already cited, DE 42 08 746 A1 and US 4,445,646 A, it is not arranged on the top side of the web. The severing of the transverse strip, for example by an air jet aimed at the web and empty spool, can then be configured relatively reliably in many webs. In order to implement this, however, the contact between the winding roll and the full roll must be canceled, at least briefly, which represents a critical disadvantage in a continuous winding process. In most cases, specific winding methods are required for this purpose which, amongst other things, include center drives and elements forming substitute nips. Methods and apparatuses of this kind are described, for example, in the two European patents EP 0 483 092 B1 and EP 0 788 991 B1, the PCT published specification WO 98/52858 A1 and the German laid-open specification DE 198 07 897 A1. However, these necessitate higher investment and operating costs. In addition, because of their operating mechanisms, they can lead to damage to the surface of the web.

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A further disadvantage of these methods is represented by the rather random transfer of the web start to the empty spool. Although blowing on with an air jet is disclosed, in truth in this case trust is placed on

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what is known as self-threading of the web start onto the new core. In practice, this method can be used only conditionally: webs with a high grammage or stiffness, for example, such as board, cannot be transferred at all in this way. In addition, as a result of the lack of a connection between the web start and empty spool, no clean winding start can be ensured.

Furthermore, US 5,954,290 A also discloses an apparatus for transferring a moving paper web to a new core. In this case, provision is made that, in an edge region of the paper web, a high-strength dividing tape, whose length is a multiple of the web width, can be introduced directly into the nip in such a way that its start is connected to the new core. After that, the dividing strip is wound spirally onto the new core, simultaneously tearing through the entire web and transferring it to the new core.

Although this method, which has been known for decades and is common, in particular in the paper industry, has been improved continuously and developed further over the course of time, until now its principal disadvantage could not be eliminated. This consists in the fact that, after the spool change, the dividing tape remaining on the surface of the core, whose thickness cannot be arbitrarily small, for process reasons, always produces pressure points in the web which lead to the production of a considerable quantity of broke in the core area of the roll, which has a highly detrimental effect on the efficiency of the overall production process. A further system-induced disadvantage of this method is to be seen in the necessity for the dividing tape to have to be introduced directly into the nip, which means that the position of the nip virtually cannot be changed. Furthermore, the dividing tape used for tearing the web represents a great danger of injury and fatality, and

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not just potentially, to the operating personnel. In addition, the question of environmentally suitable disposal of the dividing tape, used as a disposable product, is increasingly gaining importance.

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Still further methods and apparatuses for transferring a moving web are known from various other publications, but are all afflicted with more or less severe disadvantages.

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For example, US 4,444,362 A discloses a method in which, in principle, there is no transfer strip at all, since the web start is already formed completely upstream of the winding roll by means of the transverse

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cutting devices. As a result of arranging the transverse cutting devices downstream of the nip, as compared with this, a far more reliable method is produced, which likewise dispenses with the formation of transfer strips. However, this method, disclosed by European patent application EP 0 997 417 A1, can be used only on a reel-up which is equipped with a center drive and elements forming a substitute nip.

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Furthermore, German patent DE 35 15 519 C2 describes a method in which, although a transfer strip is formed, its connection to the preceding web is already completely broken upstream of the nip. However, in the same way as in US 4,444,362 A, the question also arises here as to how the web start "not bonded to anything" can be transported to the nip and led reliably on to the new core.

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The present invention is direct towards the provision of a method and a winder of the type mentioned at the beginning which permit optimum transfer of a moving web to a new core with high process reliability, process efficiency and beneficial investment and process costs

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and which entirely avoids the disadvantages of the known prior art. Furthermore, the method should be capable of being applied as far as possible to the same extent to all known types of reel-ups and a broad range
5 of webs.

According to the first aspect of the invention, there is provided a method of transferring a moving web, in particular a paper or board web, to a new core, wherein
10 (a) at least one initial cutting piece is introduced between the web and a winding roll in such a way that a region of the initial cutting piece introduced is not covered by the web, (b) after reaching a nip formed by the winding roll and the new core, the initial cutting
15 piece is connected to the new core, at least temporarily, in the uncovered region, and (c) at the latest at the point at which the web runs off the new core, at least cutting of the web by the initial cutting piece is effected and/or made possible, as a
20 result of which a new web start, bonded to the initial cutting piece and the new core, is formed.

As a result of the specific introduction of at least one initial cutting piece between the web and the
25 winding roll, which piece, after reaching the nip, is connected to the new core in the region not covered by the web, and the defined cutting of the web by the initial cutting piece, forming a new web start bonded to the initial cutting piece and the new core, the
30 known disadvantages of the prior art are entirely avoided.

In particular, as a result of the defined and safe formation of a new, connected web start, an absolutely
35 clean winding start is ensured, which constitutes the most important precondition for an optimum winding structure and a low quantity of broke. At the same time, with the method comprising only a few method steps, the highest reproducibility and therefore

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associated reliability when transferring moving webs is achieved with extremely beneficial investment and method costs.

5 In a particular refinement according to the invention of the method, provision is made for at least one initial cutting piece to be introduced at least into one edge region of the web. And for a region of the respectively introduced initial cutting piece not to be
10 covered by the web, for the initial cutting piece, after reaching the nip, to be connected to the new core, at the latest at the point where the web runs off the new core, for the web to be substantially completely severed by the respective initial cutting
15 piece, a new web start bonded to the initial cutting piece and the new core being formed by the initial cutting piece. The width of the web start transferred to the new core is preferably enlarged by means of the cutting device in such a way that the entire web is
20 transferred to the new core.

By means of this refinement, a short time period for the transfer of the web is achieved, which reduces the quantity of broke which necessarily accumulates in the
25 process. As a result of the symmetry provided at the winding start, a generally undesired conical winding structure is also avoided. Furthermore, there is the possibility here of configuring the formation of the two web starts in time in such a way that the second,
30 new, connected web start is formed only if the web transfer by means of the formation of the first new web start has not been carried out successfully.

However, in a further embodiment of the invention, the
35 at least one initial cutting piece according to the invention can also be introduced in any desired region of the web to be transferred to a new core. The introduction of the initial cutting piece is therefore not restricted to the at least one edge region. A

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further region can be located, for example, in the center of the web, it being necessary for the web preferably to be processed appropriately in advance.

5 According to the first aspect of the invention, the object is achieved in a winder in that at least one dispensing device for introducing at least one initial cutting piece between the web and the winding roll is arranged in such a way that the initial cutting piece
10 can be introduced substantially directly or indirectly between the web and the winding roll. In this case, the advantages already indicated for the method according to the invention are achieved.

15 In a particular refinement according to the invention of the winder, it is proposed that, in at least one edge region of the web, there be at least one dispensing device, by means of which at least one initial cutting piece can be introduced between the web
20 and the winding roll, in that the initial cutting piece, after reaching the nip, can then be connected to the new winding core in its region not covered by the web, in that the material web can then be severed by the initial cutting piece, forming a new web start
25 bonded to the initial cutting piece and the new core, and in that the width of the respective new web start be capable of being varied by means of the cutting device in such a way that the entire web can be transferred to the new core.

30 This variant is advantageous in particular in the case of relatively wide or thick webs, for example board webs. In this way, the tendency to form a conical roll, which is generally undesired, is minimized. On
35 account of the fact that the respective cutting devices and dispensing devices can also be used independently of one another for transferring the web, this refinement of the winder provides system-induced

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redundancy and, resulting from this, optimum process safety.

The arrangement of the at least one dispensing device according to the invention for introducing at least one initial cutting piece between the web and the winding roll is, however, not just restricted to the at least one edge region of the web. In a further embodiment of the invention, however, the dispensing device can also be introduced in any desired region of the web to be transferred to a new core. The introduction of the initial cutting piece is therefore not just restricted to the at least one edge region. A further region can be located, for example, in the center of the web, it being necessary for the web preferably to be processed appropriately in advance.

According to the second aspect of invention, the object stated previously is achieved in a method in that at least one opening, in particular a slit or an introduction area, is produced in the region of the web, preferably by means of a first cutting device, in that, in the region of the introduction area, at least one initial cutting piece is introduced between the web and a winding roll in such a way that a region of the initial cutting piece introduced is not covered by the web, in that, after reaching a nip formed by the winding roll and the new core, the initial cutting piece is connected to the new core, at least temporarily, in the uncovered region, and in that, at the latest at the point at which the web runs off the new core, cutting of the web by the initial cutting piece is effected and/or made possible, as a result of which at least two new web starts bonded to the initial cutting piece and the new core are formed.

Both by means of the production of at least one opening, in particular a slit or an introduction area, in the region of the web, preferably by means of a

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first cutting device, and also by means of the specific introduction of at least one initial cutting piece between the web and winding roll which piece, after reaching the nip, is connected to the new core in the region not covered by the web, and the defined cutting of the web by the initial cutting piece, forming at least two new web starts bonded to the initial cutting piece and the new core, the known disadvantages of the prior art are entirely avoided.

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In particular, as a result of the defined and secure formation of at least two new, connected web starts, an absolutely clean winding start is ensured, which constitutes one of the most important precondition for an optimum winding structure and a low quantity of broke. At the same time, with the method comprising only a few method steps, the highest reproducibility and therefore associated reliability when transferring moving webs to new cores is achieved with extremely beneficial investment and method costs.

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In a first refinement according to the invention of the method, provision is made for the introduction area in the region of the web to be produced preferably by means of a first cutting device by producing at least one removal strip. Producing such an introduction area gives rise, amongst other things, to the technological advantage that the initial cutting piece can be transferred better and more safely to the new core, because of the greater area.

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In further refinements according to the invention, it is proposed that the introduction area be produced in the center of the web and/or that at least one introduction area be produced in the central region of the web, located between the two edge regions, and/or that at least one introduction area, preferably two introduction areas, be produced in the two edge regions of the web. The production of the at least one

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introduction area depends in principle on the respective application, but each individual configuration is associated with specific advantages, such as the avoidance of what is known as a "winding
5 carrot" (German: Wickelkarotte).

Advantageously, the at least one removal strip, having a strip width in the range from 10 mm to 250 mm, in particular from 25 mm to 100 mm, is produced by means
10 of a first cutting device, such as a cutting element. tried and tested in practice, the strip width again depending on the respective application.

With regard both to the runability and the process
15 safety of the method, it is beneficial if the removal strip is removed directly after its production by means of at least one removal device having a vacuum of 0.01 bar to 0.2 bar, preferably of 0.05 bar to 0.1 bar. As a result, it can no longer have a detrimental effect on
20 or even prevent the introduction of the initial cutting piece.

In a further embodiment of the invention, use is made of an initial cutting piece which, in the region not
25 covered by the web, is provided with means with which, at the latest when reaching the nip formed by the winding roll and the new core, an at least temporary, sufficiently strong connection between the initial cutting piece and the new core is produced by the
30 initial cutting piece. Using these means according to the invention, for example, an adhesive, vulcanization, touch-and-close, suction stud, form-fitting, frictional-fitting or welded connection or a magnetic or electrostatic connection to the new core is
35 produced. The factor common to all these means is that they are distinguished by a good cost-benefit ratio and, furthermore, also exhibit above-average process safety.

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Furthermore, use is made of an initial cutting piece which, in the region covered by the web, has at least one adhesive region in order to produce at least a temporary connection between the web or between the new web start and the initial cutting piece.

In order not to achieve any noticeable increase in diameter, use is preferably made of an initial cutting piece with a thickness in the range from 0.5 mm to 0.05 mm, preferably in the range from 0.25 mm to 0.1 mm. This thickness ensures that no markings in the web are produced on account of the initial cutting piece.

Furthermore, use is made of an initial cutting piece formed as a molding which consists of a plastic, a metal, a textile material, a tear-resistant fibrous material, in particular paper, or at least one material combination. This molding makes the handling of the initial cutting piece substantially easier but without having any detrimental influence on the transfer of the moving web to a new core.

In addition, the initial cutting piece can be formed as a preferably easily detachable part of a carrier.

Alternatively, before being introduced between the web and winding roll, the initial cutting piece can be fitted to at least one carrier by means of a relatively easily detachable connection, the at least one carrier, after leaving the nip, ideally being carried along neither with the new web start nor with the new core.

In order that two new web starts can preferably be formed in a defined manner, the initial cutting piece is provided with means for punching, cutting, perforating or embossing the web, with which, at the latest at the point where the web runs off the new

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core, the web is weakened or even severed in such a way.

5 In a further embodiment of the invention, the initial cutting piece is introduced substantially directly between the web and the winding roll by means of a dispensing device.

10 Here, in the case of a winding roll around which the web does not wrap, the initial cutting piece is introduced substantially directly into the nip by means of at least one dispensing device or is introduced indirectly between the web and the winding roll by means of at least one dispensing device, or it is
15 initially applied to the underside of the web and is then introduced between the web and the winding roll by means of the web or, in the case of a temporary connection, it is initially applied to the circumferential surface of the winding roll and is then
20 introduced between the web and the winding roll by means of the winding roll, a temporary connection being produced by means of at least one adhesive area, by means of electrostatic forces, by means of magnetic forces, by means of applying vacuum to the winding
25 roll, by means of a touch-and-close fastener or by means of at least one suction stud coupling.

All these aforementioned introduction locations and possibilities have the object of the most rapid and
30 process-secure transfer of the moving web to a new core.

In an advantageous way, the width of the web starts transferred to the new core are enlarged by means of a
35 second cutting device in such a way that the entire web is transferred to the new core. In this case, the second cutting device is moved relative to the web in a plane approximately parallel to the web, preferably at least substantially perpendicular to the running

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direction of the web, such that oblique cutting lines are produced. By means of these configurations, a shortened time period for the transfer of a moving web to a new core is achieved, as a result of which the quantity of broke which necessarily accumulates is reduced. By means of the symmetry provided at the winding start, a generally undesired conical winding structure is also avoided.

10 With regard to a rapid and process-secure transfer of the moving web to a new core, at the latest at the point at which the web runs off the new core, at least part of the web is substantially completely severed by the initial cutting piece. In this case, preferably at
15 the latest at the point at which the web runs off the new core, at least part of the web is substantially completely severed along a cutting contour predefined by the initial cutting piece.

20 According to the second aspect of the invention, the object is achieved in a winder in that a first cutting device for producing at least one opening, in particular a slit or an introduction area, is arranged in the region of the web, and in that at least one
25 dispensing device for introducing at least one initial cutting piece between the web and the winding roll is arranged in such a way that the initial cutting piece can be introduced substantially directly or indirectly between the web and the winding roll.

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In this case, the advantages already indicated for the method according to the invention are achieved.

In further refinements of the invention, the dispensing
35 devices are arranged in such a way that the initial cutting piece is initially applied to the underside of the web and can then be introduced between the web and the winding roll by means of the web, or that, in the case of a temporary connection, the initial cutting

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piece is initially applied to the circumferential surface of the winding roll and can then be introduced between the web and the winding roll by means of the winding roll. These configurations permit adaptation
5 of the winder to every conceivable application with higher process safety and a good cost-benefit ratio.

In an advantageous embodiment, the initial cutting piece has at least one adhesive region in the region
10 covered by the web and also in the region not covered by the web. This provides the possibility of the initial cutting piece entering into an ideal connection both with the web and with the circumferential surface of the new core.

15 In the region covered by the web, the initial cutting piece has at least one cutting contour which is preferably formed neither in the running direction nor transversely with respect to the running direction of
20 the web. This cutting contour benefits the actual cutting operation and thus increases the process safety for the transfer of the moving web to a new core.

Furthermore, the initial cutting piece ideally has a
25 thickness in the range from 0.5 mm to 0.05 mm, preferably in the range from 0.25 mm to 0.1 mm, is formed as a molding made of a plastic, a metal, a textile material, a tear-resistant fibrous material, in particular paper, or of at least one material
30 combination, is formed as a part of a carrier and/or, before being introduced between the web and the winding roll, is applied to at least one carrier by means of a relatively easily detachable connection. These
aforementioned possible properties of the initial
35 cutting piece also benefit the actual cutting operation and thus increase the process safety for the transfer of the moving web to a new core

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According to the invention, the first and/or the second cutting device are arranged in the region of the winding roll and/or upstream of the winding roll in the running direction of the web, in the region of a free running path, and/or in the running direction of the web in a region in which the web touches at least one rolls mounted upstream of the winding roll.

Furthermore, the first and/or the second cutting device are arranged on the top side and/or the underside of the web and they are arranged in a common subassembly having preferably common components.

In addition, the refinements with regard to the arrangements of the first and the second cutting device permit adaptation of the winder to every conceivable application with high process safety and a good cost-benefit ratio.

With regard to short transfer times of the moving web to a new core, the second cutting device is arranged in the regions of the web which are not a constituent part of the web starts and are to be separated.

Generally, the cutting device provided is at least two preferably mutually independent cutting elements having a respective jet or beam with a high power density, in particular a water-jet or laser-beam cutting element. Cutting elements of this type have already been tried and tested many times from many points of view in practice.

From process technological points of view, the initial cutting piece forms the last device and/or the last element - as viewed in the running direction of the web - for cutting and/or for transferring the web to the new core.

According to the third aspect of the invention, the object is achieved in a method in that at least one

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initial cutting piece is introduced directly or indirectly between the at least one transfer strip and the winding roll by means of at least one dispensing device in such a way that a region of the initial cutting piece introduced is not covered by the transfer strip, in that the initial cutting piece, after reaching the nip formed by the winding roll and the new core, is connected to the new core, at least temporarily, in the uncovered region, and in that, at the latest at the point at which the web runs off the new core, at least cutting of the transfer strip by the initial cutting piece is effected and/or made possible, as a result of which a new web start bonded to the initial cutting piece and the new core is formed.

As a result of the specific introduction of at least one initial cutting piece between the at least one transfer strip and the winding roll, which piece, after reaching the nip, is connected to the new core in the region not covered by the transfer strip of the web, and the defined cutting of the transfer strip by the initial cutting piece, forming a new web start bonded to the initial cutting piece and the new core, the known disadvantages of the prior art are entirely avoided.

In particular, as a result of the defined and safe formation of a new, connected web start, an absolutely clean winding start is ensured, which constitutes one of the most important precondition for an optimum winding structure and a low quantity of broke. At the same time, with the method comprising only a few method steps, the highest reproducibility and therefore associated reliability when transferring moving webs is achieved with extremely beneficial investment and method costs.

In a particular refinement according to the invention of the method, the invention provides that, in both

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edge regions of the web, in each case a transfer strip is formed by means of at least one cutting device, preferably a transverse cutting device, known from the prior art and arranged upstream of the nip in the running direction of the web, that, for each transfer strip, an initial cutting piece is introduced directly or indirectly between the transfer strip and the winding roll by means of a dispensing device in each case in such a way that a region of the initial cutting piece respectively introduced is not covered by the transfer strip, that, after reaching the nip, the initial cutting pieces are connected to the new core, that, at the latest at the point at which the web runs off the new core, the transfer strips are substantially completely severed by the respective initial cutting pieces, as a result of which, for each initial cutting piece, a new web start bonded to the initial cutting piece and the new winding core is formed, and that the width of the web start respectively transferred to the new core is enlarged by means of the cutting device in such a way that the entire web is transferred to the new core.

By means of this refinement, a short time period for the transfer of the web is achieved, as a result of which the quantity of broke which necessarily accumulates in the process is reduced. As a result of the symmetry provided at the winding start, a generally undesired conical winding structure is also avoided. Furthermore, there is here the possibility of configuring the formation of the two web starts in time, for example, in such a way that the second, new, connected web start is only formed if the web transfer by means of the formation of the first new web start has not been carried out successfully.

According to the third aspect of the invention, the object is achieved in a winder in that at least one initial cutting piece can be introduced between the at

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least one transfer strip and the winding roll by means of at least one dispensing device, in that the respective initial cutting piece, after reaching the nip, can then be connected to the new core in its region not covered by the transfer strip, in that the respective transfer strip can be severed by the initial cutting piece, forming a new web start bonded to the initial cutting piece and the new core, and in that the width of the at least one new web start can be varied by means of the cutting device in such a way that the entire web can be transferred to the new core.

In this case, the advantages already indicated for the method according to the invention are achieved.

In a particular refinement according to the invention of the winder, the invention proposes that, in both edge regions of the web, in each case a transfer strip can be formed by means of at least one cutting device, preferably a transverse cutting device, arranged upstream of the nip in the running direction of the web, in that, for both transfer strips, in each case there is a dispensing device by means of which at least one initial cutting piece can be introduced between the respective transfer strip and the winding roll, in that the respective initial cutting piece, after reaching the nip, can then be connected to the new core in its region not covered by the transfer strip, in that the respective transfer strip can be severed by the initial cutting piece, forming a new web start bonded to the initial cutting piece and the new core, and in that the width of the respective new web start can be varied by means of the cutting device in such a way that the entire web can be transferred to the new winding core.

This variant with two transfer strips is advantageous in particular in the case of relatively wide or thick webs, for example board webs. In this way, the tendency to form a conical reel, which is generally

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undesired, is minimized. On account of the fact that the respective cutting devices and dispensing devices can also be used independently of one another for transferring the web, in this refinement of the winder, system-induced redundancy and, resulting from this, optimum process safety are provided.

It goes without saying that the features of the invention mentioned above and still to be explained below can be used not only in the respectively specified combination but also in other combinations or on their own without departing from the scope of the invention. Here, in particular any desired combinations of the various aspects of the invention are also possible.

Further features and advantages of the invention emerge from the subclaims and the following description of preferred exemplary embodiments with reference to the drawing, exemplary embodiments of the first and third aspect of the invention being described in particular by using figures 2 to 14, in particular a further exemplary embodiment of the first aspect of the invention being described by using figure 15, and in particular exemplary embodiments of the second aspect of the invention being described by using figures 16 to 23.

Figure 1 shows a schematic and perspectively illustrated winder according to the prior art;

figures 2 to 5 show schematic and perspective illustrations of a winder according to a first embodiment according to the invention;

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- figure 6 shows an embodiment according to the invention of the winder in a schematic side view;
- 5 figure 7 shows a schematic plan view of a winder according to an embodiment according to the invention;
- 10 figure 8 shows a schematic and perspective illustration of a winder according to a further embodiment according to the invention;
- 15 figures 9 to 11 show schematic and perspective illustrations of one of the possible embodiments of the initial cutting piece according to the invention;
- 20 figure 12 shows a schematic side view of a winder as the web is being led onto a new core, for example after a break;
- 25 figures 13 to 14 show schematic side views of two different winders as the web is being led on to a new core during a reel change;
- 30 figure 15 shows a schematic and perspective illustration of a winder according to a further embodiment according to the invention;
- 35 figures 16 to 18 show schematic and perspective illustrations of a winder according to a first embodiment according to the invention;

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- figure 19 shows an embodiment according to the invention of the winder in a schematic side view;
- 5 figure 20 shows a schematic and perspective illustration of one of the possible embodiments of the initial cutting piece according to the invention;
- 10 figure 21 shows a schematic side view of a winder as the web is being led onto a new core, for example after a break;
- figures 22 and 23 show schematic side views of two different winders as the web is being
15 led onto a new core during a reel change.

Some of the terms used in the following description are defined as follows:

20

A cutting device is a device which has at least one cutting element with which at least cutting or weakening of a web can be achieved.

- 25 A transverse cutting device is a device which has at least one cutting element with which at least cutting or weakening of the web can be achieved, the position of which can be varied, as viewed transversely in the running direction of a web.

30

A nip is a region of a winding roll with which the latter can exert an influence on a wound reel or a new core.

- 35 A nip between the winding roll and the new core is also provided in the sense of this invention when these form a gap suitable for producing a connection between an initial cutting piece and the new core.

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An initial revolution is the first complete revolution of a new core after a connection has been made between the initial cutting piece and a new core.

5 Figure 1 shows a schematic and perspective illustrated winder 1a according to the prior art. A winder of this type sufficiently well known for example from the PCT published specification WO 98/52858 A1
10 (= EP 0 912 435 A1; US 6,129,305 A) or the specifications already mentioned, EP 0 543 788 A1, DE 35 15 519 C2 or US 4,445, 646 A; the content of these specifications is hereby made the subject of this description.

15 The winder 1a comprises, inter alia, a winding roll 2a also designated a pressure drum or carrier drum. The web 3a is led out of a calender, not illustrated here, a final group of a finishing machine or a drying section, likewise not illustrated here, of a paper or
20 board machine, then normally wraps around a guide or spreader roll, likewise not illustrated, and then runs in the direction of the arrow L onto the circumferential surface 4a of the winding roll 2a, wraps around the circumferential surface 4a of the
25 winding roll 2a by a certain angle ("wrap angle") as far as the nip N1a present between the winding roll 2a and the wound reel 5a, and is finally wound onto the wound reel 5a. If, then, the wound reel 5a has reached a predetermined diameter D_{wa} , a new core 6a (empty
30 spool) is accelerated forward by means of a drive device, not illustrated, and brought into contact with the winding roll 2a, forming a nip N2a. Then, upstream of or on the winding roll 2a, at least one cut 7a is normally made in the moving web 3a in at least one edge
35 region 8a by means of at least one known cutting device 9a, which means that at least one transfer strip 10a is formed. In order to transfer the entire web 3a to the new core 6a, the transfer strip 10a is severed and transferred to the new core 6a.

Many variants of such a method of transferring a moving web, forming at least one transfer strip, are known inter alia from the specifications mentioned at the beginning, but none of these variants provides for the introduction of at least one element on the side of the web facing the winding roll in order to cut the transfer strip and in order to lead the transfer strip onto the new core.

10

Figures 2 to 5 show schematic and perspective illustrations of a winder 1a,c according to a first embodiment according to the invention, the construction together with control technology corresponding in principle to that of the winder 1a of figure 1, reference being made to figure 1.

15

According to the invention, provision is now made that, as illustrated in figure 2, at least one initial cutting piece 11a,c is introduced between the web 3a,c, preferably in the form of a transfer strip 10a,c, and the winding roll 2a,c, in such a way that a region 11.2a,c of the initial cutting piece 11a,c introduced is not covered by the web 3a,c, preferably the transfer strip 10a,c of the web 3a,c. The region preferably covered by the transfer strip 10a,c is designated by the reference symbol 11.3a,c.

20

25

In the further course of the method, the nip N2a,c formed by the winding roll 2a,c and the new core 6a,c is reached by the initial cutting piece 11a,c, in which nip the initial cutting piece 11a,c is connected to the new core 6a,c in its region 11.2a,c, it being possible, as a type of connection, for a touch-and-close, form-fitting, welded or another connection to be used apart from the adhesive connection.

35

As already explained, at least one transfer strip 10a,c can have been formed in the web 3a,c. According to the

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invention, this formation of a transfer strip 10a,c, preferably produced by means of at least one cutting device 9a,c, is not absolutely necessary for implementing the method according to the invention.

5 This fact also applies to the description of the further figures.

Figure 3 illustrates that the possibilities of configuring a connection of this type are not limited
10 to the region 11.2a,c of the initial cutting piece 11a,c, but can also be configured optimally on the new core 6a,c in accordance with the type of connection. As an example of this, a circumferential region 14a,c fitted with plastic-bonded permanent magnets can be
15 seen, which is necessary for a connection by means of magnetic forces.

Likewise in the region of the nip N2a,c which, in the examples illustrated in figures 2-5, is identical to
20 the point Qa,c at which the web 3a,c runs off (figures 12 to 14) the transfer strip 10a,c then enclosed between the new core 6a,c and the initial cutting piece 11a,c is severed by the initial cutting piece 11a,c, which leads to the formation of a "new web start", the
25 term "new web start" designating the transfer strip 10a,c which is substantially completely severed and bonded to the new core and the initial cutting piece 11a,c.

30 In figure 4, the new web start transferred in a defined manner to the new core 6a,c is illustrated explicitly during the initial revolution. Furthermore, figure 4 reveals how the width of the transferred web start is enlarged by means of the cutting device 9a,c.

35

Figure 5 shows an advanced state of the method, in which the moving web 3a,c has been severed virtually completely by means of the cutting device 9a,c and

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transferred to a corresponding extent to the new core 6a,c.

Figure 6 shows an embodiment according to the invention
5 of the winder 1a,c in a schematic side view.

The introduction of an initial cutting piece 11a,c between the transfer strip 10a,c and the winding roll 2a,c is implemented, according to the invention, in a
10 direct or indirect way by means of one of the dispensing devices 12a,c, 12.1a,c or 12.2a,c. The dispensing device has, for example, the form and the function of a paper magazine of a plotter or of a printer with multiple or individual sheet feed.

15 In the preferred embodiment, provision is made for the dispensing device 12a,c, merely indicated, to be arranged in such a way that the initial cutting piece 11a,c can be introduced substantially directly between
20 the transfer strip 10a,c and the winding roll 2a,c. The advantageous feature in this arrangement, in addition to the simple configuration of the dispensing device 12a,c and of the initial cutting piece 11a,c, is also the speed at which the initial cutting piece 11a,c
25 can be introduced, which can be several times lower than the web speed. Furthermore, it is possible to dispense entirely with special guidance of the initial cutting piece 11a,c, since this is adequately guided on the way to the nip N2a,c by the transfer strip 10a,c
30 and the winding roll 2a,c.

As an alternative to this, the dispensing device 12.1a,c can be arranged in such a way that the initial cutting piece 11a,c can initially be applied to the
35 underside of the transfer strip 10a,c or the web 3a,c and can then be introduced between the transfer strip 10a,c and the winding roll 2a,c by means of the web 3a,c and/or the transfer strip 10a,c. In particular when space is restricted, this variant provides a good

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possible way of introducing the initial cutting piece 11a,c. The dispensing device 12.2a,c can also be arranged in such a way that, in the case of a temporary connection, the initial cutting piece 11a,c can initially be applied to the circumferential surface 4a,c of the winding roll 2a,c and can then be introduced between the transfer strip 10a,c and the winding roll 2a,c by means of the winding roll 2a,c. The temporary connection can, for example, be implemented in the form of an adhesive connection à la "Post it" or, in the case of an evacuated winding roll, which has been disclosed by German laid-open specification DE 198 22 052 A1, by means of a vacuum. In addition, there is the possibility of providing a suitable dispensing device in the extension of the winding roll 2a,c, as is conventional in the case of known cable pulleys. Each of these variants may be advantageous, depending on the guidance of the web 3a,c, its properties and the special features of the winder.

The cutting device 9a,c can, according to the prior art, be arranged on the top side or underside of the web 3a,c upstream of the nip N2a,c and can have at least one cutting element, preferably a cutting element with a jet or beam with a high power intensity, in particular a water-jet or laser-beam cutting element. Since no uniquely preferred arrangement of the cutting device 9a,c exists, the result, as can clearly be seen from figure 6, is a very large number of possible combinations in the arrangement of the dispensing device 12a,c, 12.1a,c, 12.2a,c and the cutting device 9a,c with the winder 1a,c.

Figure 7 shows a schematic plan view of a winder 1a,c according to an embodiment according to the invention.

Irrespective of whether the initial cutting piece 11a,c is introduced directly or indirectly between the

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transfer strip 10a,c and the winding roll 2a,c by means of a dispensing device, one region 11.2a,c of the initial cutting piece 11a,c is intended not to be covered by the transfer strip 10a,c. While this region is important for a connection between the initial cutting piece 11a,c and the new core 6a,c, the region 11.3a,c of the initial cutting piece 11a,c covered by the transfer strip 10a,c is used primarily for cutting the transfer strip 10a,c, forming a new web start. For this purpose, the initial cutting piece 11a,c can be provided with at least one suitable cutting means and/or a cutting contour 13a,c, 13.1a,c.

Figure 8 shows a schematic and perspective illustration of a winder 1a,c according to a further embodiment according to the invention.

The invention now provides that two cuts 7a,c, 7.1a,c are made in both edge regions 8a,c, 8.1a,c of the material web 3a,c by means of a known cutting device 9a,c, 9.1a,c, in particular a transverse cutting device, as a result of which two transfer strips 10a,c, 10.1a,c are produced, that, for each transfer strip, an initial cutting piece 11a,c, 11.1a,c is introduced directly or indirectly between the transfer strip 10a,c, 10.1a,c and the winding roll 2a,c in each case by means of a dispensing device, not illustrated, in such a way that a region 11.2a,c of the initial cutting piece 11a,c respectively introduced is not covered by the transfer strip 10a,c, 10.1a,c of the web 3a,c, that the initial cutting pieces 11a,c, 11.1a,c, after reaching the nip N2a,c, are connected to the new core 6a,c, in that, at the latest at the point Qa,c at which the web 3a,c runs off the new core 6a,c, the transfer strips 10a,c, 10.1a,c are severed by the respective initial cutting pieces 11a,c, 11.1a,c, as a result of which, for each initial cutting piece, a new web start bonded to the initial cutting piece and the new core 6a,c is formed, and that the width of the web start

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respectively transferred to the new core 6a,c is enlarged in a known manner by means of the cutting device 9a,c, 9.1a,c in such a way that the entire web 3a,c is transferred to the new core.

5

An exemplary embodiment of the initial cutting piece 11a,c according to the invention is revealed by figure 9.

10 Essentially, the initial cutting piece 11a,c, whose thickness is designated by the reference symbol Da, is formed as a molding made of a plastic, a metal, a textile material or a fibrous material. Since the production of a connection between the initial cutting
15 piece 11a,c and the new core belongs to the important method steps, the initial cutting piece 11a,c for this connection is provided with means 15a,c, it being possible for these means to extend over one part, a number of parts or all of the initial cutting piece
20 11a,c. Only in the case of adhesives is a virtually unlimited range of means available with which such a connection can be produced. From the point of view of the reuse of the cores, very good results are achieved in particular with removable adhesives, similar to Tesa
25 Powerstrip from the Beiersdorf company. The use of hot-melts, which have neutral adhesive properties at ambient temperature and become capable of forming a connection only after reaching a specific temperature, are also very interesting not only from the point of
30 view of automated handling and supply of the initial cutting pieces to the dispensing device. For example, an initial cutting piece tailor-made with hot-melt can be supplied simply and reliably from a storage cartridge to the actual dispensing device, in a manner
35 similar to the individual sheet feed of a commercially available printer, and the desired adhesive properties can be activated at a later time by supplying heat. In this way, given a suitable, reactive hot-melt, it is also possible for an only temporary connection,

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existing at least for the period of an initial revolution, to be produced between the initial cutting piece and the new core. Comparable advantages can be achieved by the use of encapsulated adhesives, which
5 are activated only by the exertion of a specific pressure. The enumeration of all suitable types of connection with detailed description of the advantages resulting therefrom is not critical for this invention and would certainly go beyond the context of this
10 specification. For this reason, it will be pointed out only generally that this connection can also be configured as a form-fitting connection, in particular a touch-and-close connection, as a welded connection, in particular a thermal welded connection, or as a
15 magnetic connection, in order that the initial cutting piece can be connected to the new core and can fulfill its tasks.

The object of the initial cutting piece consists, inter
20 alia, in cutting the transfer strip and, in a large number of webs, can be carried out by means of an edge formed as a cutting contour 13a,c. A new web start, bonded to the initial cutting piece 11a,c and the new core, can be formed by the transfer strip enclosed
25 between the new core and the initial cutting piece 11a,c being cut by the initial cutting piece 11a,c substantially completely as a result of tearing along the cutting contour 13a,c. In order to make the tearing progressive and, as a result, reliable, the
30 appropriate edge can be formed at an angle matched to the tearing behavior of the web. Because of the method, the new web start is enclosed between the new core and the initial cutting piece 11a,c and therefore already bonded to the latter. In order to improve the
35 connection of the new web start to the initial cutting piece 11a,c, the latter can additionally be provided with an adhesive region 17a,c, for example, which can also be used for the indirect introduction of the initial cutting piece between the transfer strip and

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the winding roll by means of a dispensing device. On its rear, the initial cutting piece 11a,c can likewise be provided with suitable means, not illustrated here, with which a temporary connection between the initial cutting piece and the winding roll is produced if the initial cutting piece is introduced indirectly between the transfer strip and the winding roll by means of a dispensing device. Furthermore, in figure 9, the region 11.2a,c not covered by the transfer strip and also the region 11.3 covered by the transfer strip and belonging to the initial cutting piece 11 are illustrated, which is intended to achieve an unambiguous association with the other figures.

Figure 10 shows a further embodiment of the initial cutting piece 11a,c according to the invention.

Many disadvantages of the known prior art are avoided by the initial cutting piece 11a,c being formed from an extremely thin material. According to the invention, provision is made for the initial cutting piece 11a,c, before being introduced between the transfer strip, not illustrated, and the winding roll, not illustrated, to be applied by means of a relatively easily detachable connection to at least one carrier 16a,c which, following the formation of a new web start bonded to the initial cutting piece 11a,c and the new core, is not carried along with the new core. The advantage of an initial cutting piece 11a,c formed as a composite object consists in the virtually unlimited configuration freedom of its physical and mechanical properties. For example, the material thickness D_a can then be reduced without regard to the stiffness of the initial cutting piece connected to it, since the stiffness required for process reasons can be achieved by the carrier 16a,c. Furthermore, the carrier 16a,c can be formed in such a way that the introduction of the initial cutting piece 11a,c between the transfer strip and the winding roll by means of a dispensing

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device can be carried out in an automated manner and absolutely reliably.

5 A further advantage of an initial cutting piece 11a,c formed as a composite object is illustrated in figure 11.

For some applications, in particular for transferring webs with a high tearing strength, according to the
10 invention the initial cutting piece 11a,c can be configured with means 13.1a,c for cutting the transfer strip, with which the new web start is formed by punching, cutting, pressing or embossing or by a combination thereof, with the aid of the forces
15 prevailing in the nip or by means of at least one auxiliary device not illustrated but additionally arranged upstream of the nip. During the transfer of webs 3a,c which have a defined melting point behavior (plastic web), the heat for cutting the transfer strip
20 can also be applied by the initial cutting piece 11a,c being configured with an electric resistance wire as cutting means 13.1a,c. The energy necessary for producing heat can be transmitted without contact, for example by an inductive route, preferably immediately
25 upstream of the nip, by means of a known device not illustrated here. Figure 11 likewise illustrates the fact that the relatively easily detachable connection between the initial cutting piece and the carrier 16a,c can be detached, for example as soon as a new web start
30 bonded to the initial cutting piece 11a,c and the new core is formed, as a result of which the carrier 16a,c is deliberately not carried along with the new core.

Figures 12 to 14 make clear not only the principal
35 difference between the point Qa at which the web 3a,c runs off the new core 6a,c and the nip N2a,c formed between the winding roll 2a,c and the new core 6a,c but also the fact that the onward guidance of the web 3a,c downstream of the nip N2a,c has no fundamental

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influence on the method and the method can be used universally for all types of winder established in practice.

5 Figure 12 shows a schematic side view of a winder 1a,c as a web 3a,c is being led onto a new core 6a,c in a state which arises sporadically, for example following a break in the web 3a,c. The wound reel is normally then removed from the winder 1a,c and the web 3a,c is
10 supplied to a collecting container, not illustrated. Since the new core 6a,c is not wrapped around by the web 3a,c, the point Qa at which the web 3a,c runs off the new core 6a,c is identical to the nip N2a,c formed between the winding roll 2a,c and the new core 6a,c.

15 Figure 13 shows a schematic side view of a winder 1a,c as a web 3a,c is being led onto a new core 6a,c during a reel change. When the wound reel 5a,c forming the nip N1a,c together with the winding roll 2a,c has
20 reached a predetermined diameter, the web 3a,c is led onto the new core 6a,c without interrupting the manufacturing process. In this arrangement, the web 3a,c does not wrap around the new core 6a,c and the run-off point Qa is identical to the nip N2a,c.

25 In figure 14, which shows a schematic side view of a winder 1a,c of the alternative design as a web 3a,c is led onto a new core 6a,c during a reel change, the new core 6a,c is wrapped around by the web 3a,c, as a
30 result of which the point Qa at which the web 3a,c runs off the new core 6a,c is not identical to the nip N2a,c formed between the winding roll 2a,c and the new core 6a,c.

35 Figure 15 shows a schematic and perspective illustration of a winder according to a further embodiment according to the invention. The construction together with control technology of this winder 1a corresponds in principle to that of the

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winder 1a of figure 1, with which a reference is made to figure 1a.

According to the invention, the initial cutting piece
5 11a is introduced in any desired region of the web 3a to be transferred to a new core 6a. Here - as viewed in the running direction L - a strip 10.2a is separated out from the web 3a upstream of the winding roll 2a by means of a cutting device 9a indicated only
10 schematically. This strip 10.2a formed is preferably led away by means of a device not illustrated, such as an extraction device. In the region of the strip 10.2a led away, the at least one initial cutting piece 11a is then introduced in the manner already described by
15 means of at least one dispensing device 12a. The further method sequence has already been described extensively; reference is hereby made thereto.

Figures 16 to 18 show schematic and perspective
20 illustrations of a winder 1b according to a further embodiment according to the invention, the construction together with control technology corresponding in principle to that of the winder 1a of figure 1, with which a reference is made to figure 1. The web 3b is
25 illustrated in transparent form, so that the components and subassemblies lying underneath become visible.

The invention now provides that, as illustrated in figure 16, at least one opening 17b, in particular a
30 slit or an introduction area 17.1b, is produced, preferably in the center Mb of the web 3b, preferably by means of a first cutting device 9.1b, that, in the region of the introduction area 17b, at least one initial cutting piece 11b is introduced between the web
35 3b and the winding roll 2b in such a way that a region 11.1b of the initial cutting piece 11b introduced is not covered by the web 3b, that the initial cutting piece 11b, after reaching a nip N2b formed by the winding roll 2b and the new core 6b, is connected to

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the new core 6b, at least temporarily, in the uncovered region 11.1b, and that, at the latest at the point Qb at which the web 3b runs off the new core 6b, cutting of the web 3b by the initial cutting piece 11b is effected and/or made possible, as a result of which at least two new web starts bonded to the initial cutting piece 11b and the new core 6b are formed.

The at least one introduction area 17.1b is preferably produced by means of the first cutting device 9.1b by producing at least one removal strip 18b.

In a further refinement, but which is not illustrated, the introduction area 17.1b can also be produced in the central region of the web 3b, lying between the two edge regions 8.1b. In addition, at least one introduction area 17.1b, preferably two introduction areas 17.1b, can be produced in the two edge regions 8.1b of the web 3b, which means that the transfer of the web 3b can advantageously be accelerated.

The at least one removal strip 18b, having a strip width B_{sb} in the range from 10 mm to 250 mm, in particular from 25 mm to 100 mm, is produced by means of a first cutting device 9.1b and is led away directly after its production by means of at least one removal device 19b having a vacuum of from 0.01 bar to 0.2 bar, preferably 0.05 bar to 0.1 bar. This removal device 19b can in the simplest case be designed as a conventional suction hose. On the outgoing run of the removal device 19b there is advantageously at least one cutting device, preferably a cutting edge, for the single and initial cutting of the removal strip 18b.

In the further course of the method, the nip N2b formed by the winding roll 2b and the new core 6b is reached by the initial cutting piece 11b, in which nip the initial cutting piece 11b is connected to the new core 6b in the region 11.1b of the former, at least

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temporarily and sufficiently firmly by means of means,
these means being used to produce an adhesive,
vulcanization, touch-and-close, suction stud, form-
fitting, frictional-fitting or welded connection or a
5 magnetic or electrostatic connection to the new core 6.

As already mentioned, the removal strip 18 is produced
by a first cutting device 9.1b. In this case, the
start of the cut of the cutting lines 9.11b of the
10 removal strip 18b can be produced in parallel, in point
form and enlarging or crossing and enlarging. Since
this type of production of a start of a cut belongs to
the known prior art, this will not be discussed further
at this point. Instead, reference is made, for
15 example, to the European patent application
EP 0 543 788 A1 already mentioned.

Furthermore, the first and/or the second cutting device
9.1b, 9.2b is arranged in a common subassembly with
20 preferably common components, in particular a common
carrier.

In addition, the formation of only one opening in the
form of a cut is sufficient to provide the precondition
25 for the production of a sufficiently large area for the
introduction of an initial cutting piece. The
sufficiently large area can be created, for example, by
means of an element that dips into the cut and has an
external contour that widens in the running direction
30 of the web, or by guiding the cut web over a spreader
roll.

In figure 17, the initial cutting piece 11b transferred
to the new core 6b, together with its two new web
35 starts, is illustrated explicitly during the initial
revolution.

Furthermore, it can clearly be seen that, by means of a
second cutting device 9.2b, at least two further

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cutting lines 9.21b, whose spacing is preferably smaller than the width of the initial cutting piece, are produced. The cutting lines 9.21b initially preferably run parallel to each other.

5

Figure 18 shows the continuation of Figure 17. The widths of the web starts transferred to the new core 6b are now enlarged by means of a second cutting device 9.2b in such a way that the entire web 3b is transferred to the new core 6b. The production of the transfer strip 19b is stopped, preferably by bringing the two cutting lines 9.11b together or by switching off the first cutting device 9.1b.

15 The second cutting device 9.2b is preferably moved relative to the web 3b in a plane approximately parallel to the web 3b, preferably at least substantially perpendicular to the running direction 1b of the web 3b, so that oblique cutting lines 9.21b are produced.

20 The moving web 3b has then been severed virtually completely by means of the second cutting device 9.2b and transferred to a corresponding extent to the new core 6b.

25

Figure 19 shows an embodiment according to the invention of the winder 1b in a schematic side view.

The introduction according to the invention of an initial cutting piece 11b between the web 3b and the winding roll 2b in such a way that a region of the initial cutting piece 11b is not covered by the web 3b is implemented, according to the invention, in a direct or indirect way by means of one of the dispensing devices 12b, 12.1b or 12.2b. The dispensing device 12b, 12.1b or 12.2b has, for example, the form and the function of a paper magazine of a plotter or of a printer with multi-sheet or individual sheet feed.

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The preferred embodiment provides for the dispensing device 12b, merely indicated, to be arranged in such a way that the initial cutting piece 11b can be introduced substantially directly between the web 3b and the winding roll 2b. The advantage with this arrangement, apart from the simple configuration of the dispensing device 12b and of the initial cutting piece 11b, is also the speed at which the initial cutting piece 11b can be introduced, which can be many times lower than the web speed. Furthermore, it is possible to dispense entirely with special guidance of the initial cutting piece 11b, since this is guided adequately by the web 3b and the winding roll 2b on the way to the nip N2b.

As an alternative to this, the dispensing device 12.1b can be arranged in such a way that the initial cutting piece 11b can initially be applied to the underside of the web 3b and can then be introduced between the web 3b and the winding roll 2b by means of the web 3b. In particular when space is restricted, this variant offers a good possible way of introducing the initial cutting piece 11b. The dispensing device 12.2b can also be arranged in such a way that, in the case of a temporary connection, the initial cutting piece 11b can initially be applied to the circumferential surface 4b of the winding roll 2b and can then be introduced between the web 3b and the winding roll 2b by means of the winding roll 2b. The temporary connection can be implemented, for example, in the form of an adhesive connection à la "Post it" or, in the case of an evacuated winding roll, which has been disclosed by German laid-open specification DE 198 22 052 A1, by means of a vacuum. In addition, there is the possibility of providing a suitable dispensing device in the extension of the winding roll 2b, as is normally the case in known rope pulleys. Each of these variants may be advantageous, depending on the guidance of the

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web 3b, its properties and the special features of the winder.

In a further refinement of the invention, but which is not illustrated, it is also possible for the dispensing device to be fitted in a region above the web and to introduce the initial cutting piece, as already explained, directly or indirectly between the web and the new core. In this case, the initial cutting piece can have the same contour but, on the other hand, the adhesive region between the initial cutting piece and the web must be formed specifically, in particular with respect to its adhesive effect.

The first and/or second cutting device 9.1b, 9.2b can be arranged according to the prior art on the top side or underside of the web 3b upstream of the nip N2b and have at least one cutting element, preferably a cutting element with a jet or beam with a high power density, in particular a water-jet or laser-beam cutting element.

Since there is no uniquely preferred arrangement of the first and/or second cutting device 9.1b, 9.2b, the result, as can be seen clearly from figure 19, is an extremely large number of possible combinations in the arrangement of the dispensing device 12b, 12.1b, 12.2b and the first and/or second cutting device 9.1b, 9.2b with the winder 1b.

An exemplary embodiment of the initial cutting piece 11b according to the invention can be seen from figure 20.

Essentially, the initial cutting piece 11b, whose thickness D_b lies in the range from 0.5 mm to 0.05 mm, preferably in the range from 0.25 mm to 0.1 mm, is formed as a molding made of a plastic, a metal, a textile material or a fibrous material. Since the

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production of a connection between the initial cutting piece 11b and the new core belongs to the essential method steps, the initial cutting piece 11b for this connection is provided with means 15b, it being possible for these means to extend over one part, a number of parts or all of the initial cutting piece 11b. Only in the case of adhesives is a virtually unlimited range of means available with which such a connection can be produced. From the point of view of reusing the cores, very good results are achieved in particular with removable adhesives, similar to Tesa Powerstrip from the Beiersdorf company. The use of hot-melts, which have neutral adhesive properties at ambient temperature and become capable of forming a connection only after reaching a specific temperature, are also very interesting not only from the point of view of automated handling and supply of the initial cutting pieces to the dispensing device. For example, an initial cutting piece tailor-made with hot-melt can be supplied simply and reliably from a storage cartridge to the actual dispensing device, in a manner similar to the individual sheet feed of a commercially available printer, and the desired adhesive properties can be activated at a later time by supplying heat. In this way, given a suitable, reactive hot-melt, it is also possible for an only temporary connection, existing at least for the period of an initial revolution, to be produced between the initial cutting piece and the new core. Comparable advantages can be achieved by the use of encapsulated adhesives, which are activated only by the exertion of a specific pressure. The enumeration of all suitable types of connection with detailed description of the advantages resulting therefrom is not critical for this invention and would certainly go beyond the context of this specification. For this reason, it will be pointed out only generally that this connection can also be configured as a form-fitting connection, in particular a touch-and-close connection, as a welded connection,

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in particular a thermal welded connection, or as a magnetic connection, in order that the initial cutting piece can be connected to the new core and can fulfill its tasks.

5

The object of the initial cutting piece consists, inter alia, in cutting the transfer strip and, in a large number of webs, can be carried out by means of an edge formed as a cutting contour 13b. A new web start, 10 bonded to the initial cutting piece 11b and the new core, can be formed by the transfer strip enclosed between the new core and the initial cutting piece 11b being cut substantially completely by the initial cutting piece 11b as a result of tearing along the 15 cutting contour 13b. In order to make the tearing progressive and, as a result, reliable, the appropriate edge can be formed at an angle matched to the tearing behavior of the web. Because of the method, the new web start is enclosed between the new core and the 20 initial cutting piece 11b and therefore already bonded to the latter. In order to improve the bonding of the new web start to the initial cutting piece 11b, the latter can additionally be provided with adhesive regions 14b, for example, which can also be used for 25 the indirect introduction of the initial cutting piece between the transfer strip and the winding roll by means of a dispensing device. On its rear, the initial cutting piece 11b can likewise be provided with suitable means, not illustrated here, with which a 30 temporary connection between the initial cutting piece and the winding roll is produced if the initial cutting piece is introduced indirectly between the transfer strip and the winding roll by means of a dispensing device.

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Many disadvantages of the known prior art are avoided by the initial cutting piece 11b being formed from an extremely thin material. According to the invention, provision is made for the initial cutting piece 11b,

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before being introduced between the web, not illustrated, and the winding roll, likewise not illustrated, to be applied by means of a relatively easily detachable connection to at least one carrier
5 16b which, following the formation of the new web starts bonded to the initial cutting piece 11b and the new core, is not carried along with the new core. The advantage of an initial cutting piece 11b formed as a composite object consists in the virtually unlimited
10 configuration freedom of its physical and mechanical properties. For example, the material thickness can then be reduced without regard to the stiffness of the initial cutting piece connected to it, since the stiffness required for process reasons can be achieved
15 by the carrier 16b. Furthermore, the carrier 16b can be formed in such a way that the introduction of the initial cutting piece 11b between the web and the winding roll by means of a dispensing device can be carried out in an automated manner and absolutely
20 reliably.

Furthermore, the initial cutting piece can be configured as a composite object having means of
25 cutting the web, with which the new web start is formed by punching, cutting, pressing or embossing or by a combination thereof, with the aid of the forces prevailing in the nip or by means of at least one auxiliary device additionally arranged upstream of the
30 nip but not illustrated. During the transfer of webs which have a defined melting point behavior, such as plastic webs, the heat for cutting the web can also be applied by the initial cutting piece being configured with an electric resistance wire as cutting means. The
35 energy necessary for producing heat can be transmitted without contact, for example by an inductive route, preferably immediately upstream of the nip, by means of a known device not illustrated here. The relatively easily detachable connection between the initial

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cutting piece and the carrier can be detached, for example as soon as a new web start bonded to the initial cutting piece and the new core is formed, as a result of which the carrier is deliberately not carried
5 along with the new core.

10 Figures 21 to 23 make clear not only the basic difference between the point Qb at which the web 3b runs off the new core 6b and the nip N2b formed between the winding roll 2b and the new core 6b but also the fact that the onward guidance of the web 3 downstream
15 of the nip N2b has no fundamental influence on the method, and the method can be used universally for all types of winder established in practice.

Figure 21 shows a schematic side view of a winder 1b as
20 a web 3b is being led onto a new core 6b in a state which arises sporadically, for example following a break in the web 3b. The wound reel is normally then removed from the winder 1b and the web 3b is supplied to a collecting container, not illustrated. Since the
25 new core 6b is not wrapped around by the web 3b, the point Qb at which the web 3b runs off the new core 6b is identical to the nip N2b formed between the winding roll 2b and the new core 6b.

30 Figure 22 shows a schematic side view of a winder 1b as a web 3b is being led onto a new core 6b during a reel change. When the wound reel 5b forming the nip N1b together with the winding roll 2b has reached a predetermined diameter, the web 3b is led on to the new
35 core 6b without interrupting the manufacturing process. In this arrangement, the web 3b does not wrap around

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the new core 6b and the run-off point Qb is identical to the nip N2b.

5 In figure 23, which shows a schematic side view of a winder 1b of the alternative design as a web 3b is led onto a new core 6b during a reel change, the new core 6b is wrapped around by the web 3b, as a result of which the point Qb at which the web 3b runs off the new core 6b is not identical to the nip N2b formed between
10 the winding roll 2b and the new core 6b.

In summary, it should be emphasized that the invention provides a method and a winder of the type mentioned at the beginning which permit optimum transfer of a moving
15 web to a new core with high process safety, process efficiency and beneficial investment and operating costs and entirely avoid the disadvantages of the known prior art. Furthermore, the method can be applied to the same extent virtually to all known types of reel-
20 ups and to a broad range of webs.

List of reference symbols

1a,b,c	Winder
2a,b,c	Winding roll
3a,b,c	Web
4a,b,c	Circumferential surface
5a,b,c	Wound reel
5.1a,c	Axis of rotation (wound reel)
6a,b,c	New core (empty spool)
6.1a,c	Axis of rotation (new core)
7a,b,c, 7.1a,c	Cut
8a,b,c, 8.1a,b,c	Web edge
9a,b,c, 9.1a,b,c	Cutting device
9.11b	Cutting line
9.2b	Second cutting line
10a,b,c, 10.1a,c	Transfer strip
10.2a	Strip
11a,b,c, 11.1a,b,c	Initial cutting piece
11.2a,c	Region (not covered)
11.3a,c	Region (covered)
12a,b,c, 12.1a,b,c, 12.2a,b,c	Dispensing device
13a,b,c, 13.1a,c	Cutting contour, cutting means
14a,b,c	Means (adhesive, magnetic, form- fitting connection, etc.)
15b,c	Means (adhesive, magnetic, form- fitting connection, etc.)
16a,b,c	Carrier
17a,c	Adhesive region
17b	Opening
17.1b	Introduction area
18b	Removal strip
19b	Removal device
B _{Sb}	Strip width
Db	Thickness (initial cutting piece)
D _{Wa,Wb,Wc}	Diameter (wound reel)

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La,b,c	Running direction (arrow)
Qa,b,c	Run-off point (web)
N1a,b,c	Nip (winding roll-wound reel)
N2a,b,c	Nip (winding roll-new core)

The embodiment of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A method of transferring a moving web to a new core, wherein **(a)** at least one initial cutting piece is introduced between the web and a winding roll in such a way that a region of the initial cutting piece introduced is not covered by the web, **(b)** after reaching a nip formed by the winding roll and the new core, the initial cutting piece is connected to the new core, at least temporarily, in the uncovered region, and **(c)** at the latest at the point at which the web runs off the new core, cutting of the web by the initial cutting piece is effected and/or made possible, as a result of which a new web start, bonded to the initial cutting piece and the new core, is formed.
2. The method as claimed in claim 1, wherein at least one initial cutting piece is introduced, at least in an edge region of the web.
3. The method as claimed in claim 1 or 2, wherein use is made of an initial cutting piece which, in the region not covered by the web, is provided with means with which, at the latest when reaching the nip formed by the winding roll and the new core, an at least temporary, sufficiently strong connection between the initial cutting piece and the new core is produced by the initial cutting piece.
4. The method as claimed in claim 3, wherein, using these means, an adhesive, vulcanization, touch-and-close, suction stud, form-fitting, frictional-fitting or welded connection or a magnetic or electrostatic connection to the new core is produced.

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5. The method as claimed in any one of claims 1 to 4, wherein use is made of an initial cutting piece which, in the region covered by the web, has at least one adhesive region, in order to produce at least a temporary connection between the web or between the new web start and the initial cutting piece.
6. The method as claimed in any one of the claims 1 to 5, wherein use is made of the initial cutting piece with a thickness in the range from 0.5 mm to 0.05 mm.
7. The method as claimed in claim 6 wherein the thickness is in the range from 0.25 mm to 0.1 mm.
8. The method as claimed in any one of claims 1 to 7, wherein use is made of the initial cutting piece formed as a molding which consists of a plastic, a metal, a textile material, a tear-resistant fibrous material or at least one material combination.
9. The method as claimed in claim 8 wherein the initial cutting piece is made of paper.
10. The method as claimed in any one of claims 1 to 9, wherein the initial cutting piece is formed as an easily detachable part of a carrier.
11. The method as claimed in any one of claims 1 to 9, wherein, before being introduced between the web and the winding roll, the initial cutting piece is fitted to at least one carrier by means of a relatively easily detachable connection.
12. The method as claimed in claim 10 or 11, wherein, after leaving the nip, the at least one carrier is carried

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along neither with the new web start nor with the new core.

13. The method as claimed in any one of claims 1 to 12, wherein the initial cutting piece is provided with means for punching, cutting, perforating or embossing the web, with which, at the latest at the point at which the web runs off the new core, the web is weakened or severed in such a way so that a new web start is formed in a defined manner.
14. The method as claimed in any one of claims 1 to 13, wherein the initial cutting piece is introduced substantially directly between the web and the winding roll by means of at least one dispensing device.
15. The method as claimed in claim 14, wherein, in the case of a winding roll around which the web does not wrap, the initial cutting piece is introduced substantially directly into the nip by means of at least one dispensing device.
16. The method as claimed in any one of claims 1 to 13, wherein the initial cutting piece is introduced indirectly between the web and the winding roll by means of at least one dispensing device.
17. The method as claimed in claim 16, wherein the initial cutting piece is initially applied to the underside of the web and is then introduced between the web and the winding roll by means of the web.
18. The method as claimed in claim 16, wherein, in the case of a temporary connection, the initial cutting piece is initially applied to the circumferential surface of the

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winding roll and is then introduced between the web and the winding roll by means of the winding roll.

19. The method as claimed in claim 18, wherein the temporary connection is produced by means of at least one adhesive area, by means of electrostatic forces, by means of magnetic forces, by means of applying vacuum to the winding roll, by means of a touch-and-close fastener or by means of at least one suction stud coupling.
20. The method as claimed in any one of claims 1 to 19, wherein the initial cutting piece forms the last device and/or the last element, as viewed in the running direction of the web, for cutting and/or for transferring the web to a new core.
21. The method as claimed in any one of claims 1 to 20, wherein the width of the web start transferred to the new core is enlarged by means of the cutting device in such a way that the entire web is transferred to the new core.
22. A winder for implementing the method as claimed in any one of claims 1 to 21, wherein at least one dispensing device for introducing at least one initial cutting piece between the web and the winding roll is arranged in such a way that the initial cutting piece can be introduced substantially directly between the web and the winding roll.
23. A winder for implementing the method as claimed in any one of claims 1 to 21, wherein at least one dispensing device for introducing at least one initial cutting piece between the web and the winding roll is arranged in such a way that the initial cutting piece can be introduced indirectly between the web and the winding roll.

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24. The winder as claimed in claim 23, wherein the dispensing device is arranged in such a way that the initial cutting piece is initially applied to the underside of the web and can then be introduced between the web and the winding roll by means of the web.
25. The winder as claimed in claim 23, wherein the dispensing device is arranged in such a way that, at least in the case of a temporary connection, the initial cutting piece is applied to the circumferential surface of the winding roll and can then be introduced between the web and the winding roll by means of the winding roll.
26. The winder as claimed in any one of claims 22 to 25, wherein, at the latest at the point where the web runs off the new core, at least part of the web is substantially completely severed by the initial cutting piece.
27. The winder as claimed in claim 26, wherein, at the latest at the point where the web runs off the new core, at least part of the web is substantially completely severed along a cutting contour predefined by the initial cutting piece.
28. The winder as claimed in any one of claims 22 to 27, wherein the initial cutting piece has at least one adhesive region in the region not covered by the web.
29. The winder as claimed in any one of claims 22 to 28, wherein the initial cutting piece has at least one adhesive region in the region covered by the web.
30. The winder as claimed in any one of claims 22 to 29, wherein the initial cutting piece has at least one cutting contour in the region covered by the web.

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31. The winder as claimed in claim 30, wherein the cutting contour is formed neither in the running direction nor transversely with respect to the running direction of the web.
32. The winder as claimed in any one of claims 22 to 31, wherein the initial cutting piece has a thickness in the range from 0.5 mm to 0.05 mm.
33. The winder as claimed in claim 32 wherein the thickness is in the range from 0.25 mm to 0.1 mm.
34. The winder as claimed in any one of claims 22 to 33, wherein the initial cutting piece is formed as a molding made of a plastic, a metal, a textile material, a tear-resistant fibrous material or at least one material combination.
35. The winder as claimed in claim 34 wherein the initial cutting piece is formed of paper.
36. The winder as claimed in any one of claims 22 to 35, wherein the initial cutting piece is formed as a part of a carrier.
37. The winder as claimed in any one of claims 22 to 36, wherein, before being introduced between the web and the winding roll, the initial cutting piece is fitted to at least one carrier by means of a relatively easily detachable connection.
38. The winder as claimed in any one of claims 22 to 37, wherein the cutting device is arranged in the region of the winding roll.

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39. The winder as claimed in any one of claims 22 to 37, wherein, in the running direction of the web, the cutting device is arranged upstream of the winding roll in the region of a free running path.
40. The winder as claimed in any one of claims 22 to 37, wherein, in the running direction of the web, the cutting device is arranged in a region in which the web touches at least one roll mounted upstream of the winding roll.
41. The winder as claimed in any one of claims 22 to 40, wherein the cutting device is arranged on the top side of the web.
42. The winder as claimed in any one of claims 22 to 40, wherein the cutting device is arranged on the underside of the web.
43. The winder as claimed in any one of claims 22 to 42, wherein the cutting element provided is a cutting element having a jet or beam with a high power density cutting element.
44. The winder as claimed in claim 43 wherein the cutting element has a water-jet or a laser-beam cutting element.
45. The winder as claimed in any one of claims 22 to 43, wherein only one cutting device is provided and in that this cutting device can be set against the edge of the web.
46. The winder as claimed in claim 45, wherein the cutting device can be moved as far as the opposite web edge.

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47. The winder as claimed in any one of claims 22 to 43, wherein two cutting devices are provided, which can be set against the two web edges.
48. The winder as claimed in claim 47, wherein the two cutting devices can be moved as far as the center of the web.
49. The winder as claimed in any one of claims 22 to 48, wherein the initial cutting piece forms the last device and/or the last element, as viewed in the running direction of the web, for cutting and/or for transferring the web to the new core.
50. The method as claimed in any one of claims 1 to 21 wherein said moving web is a paper or board web.

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Fig.3

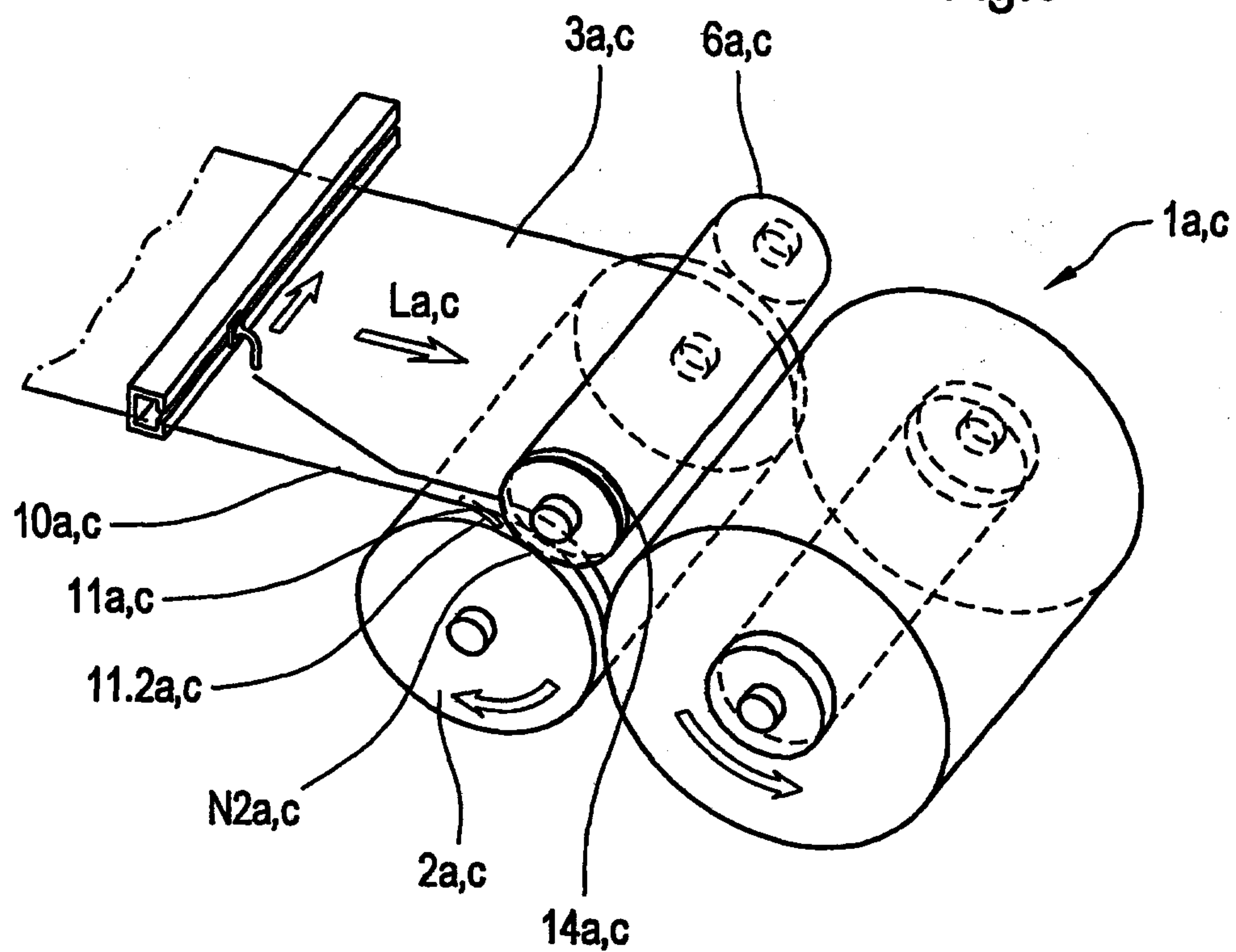
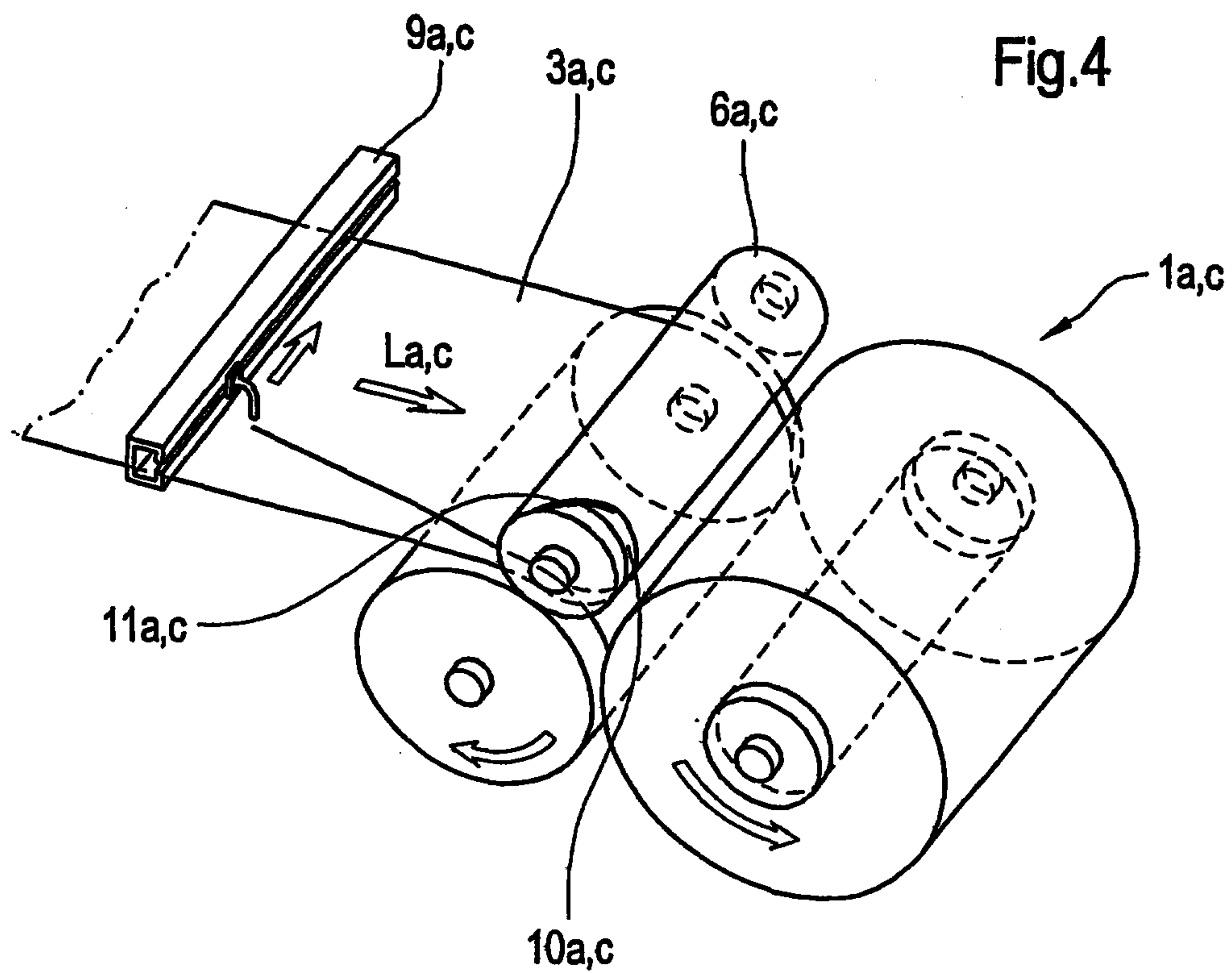


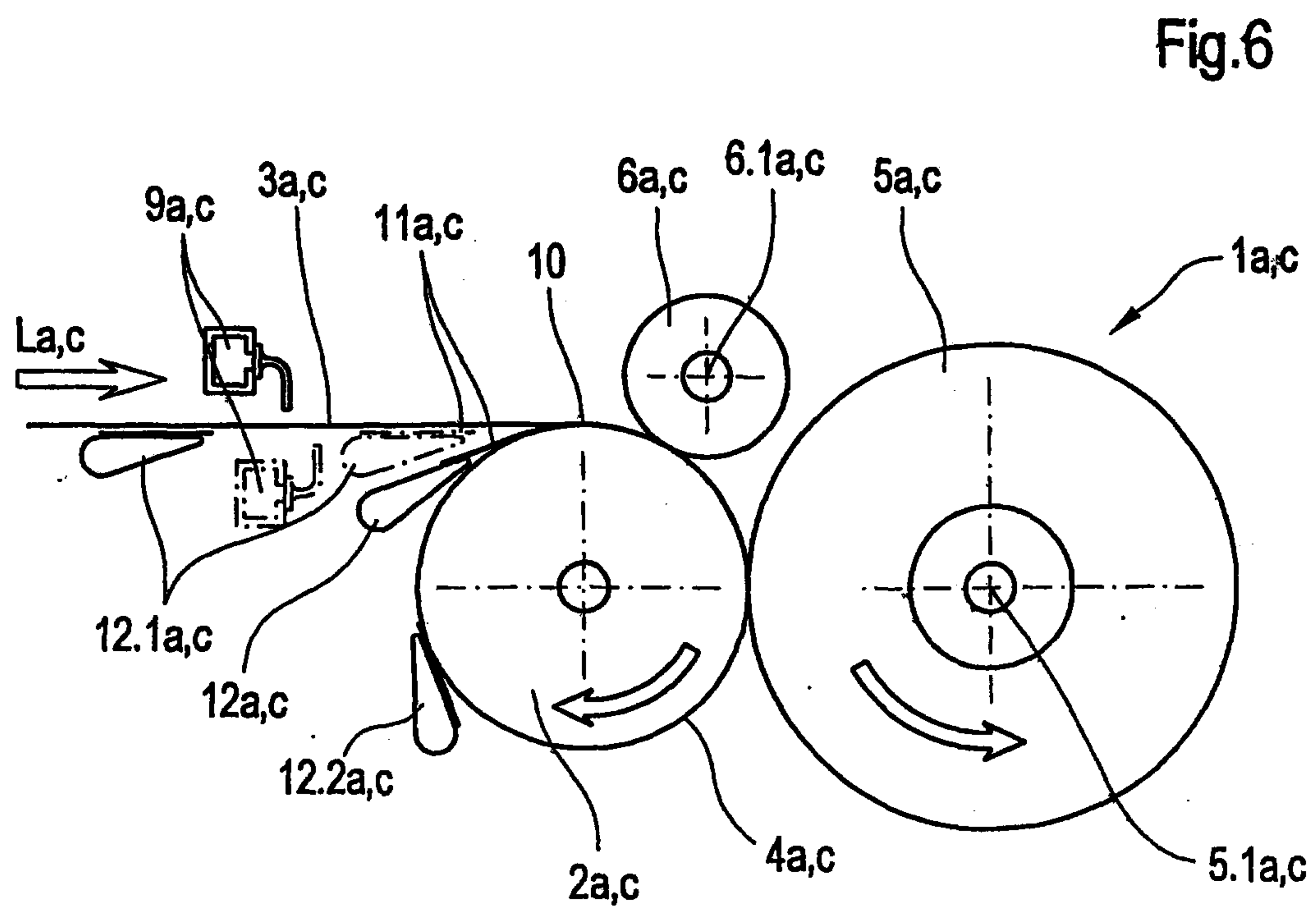
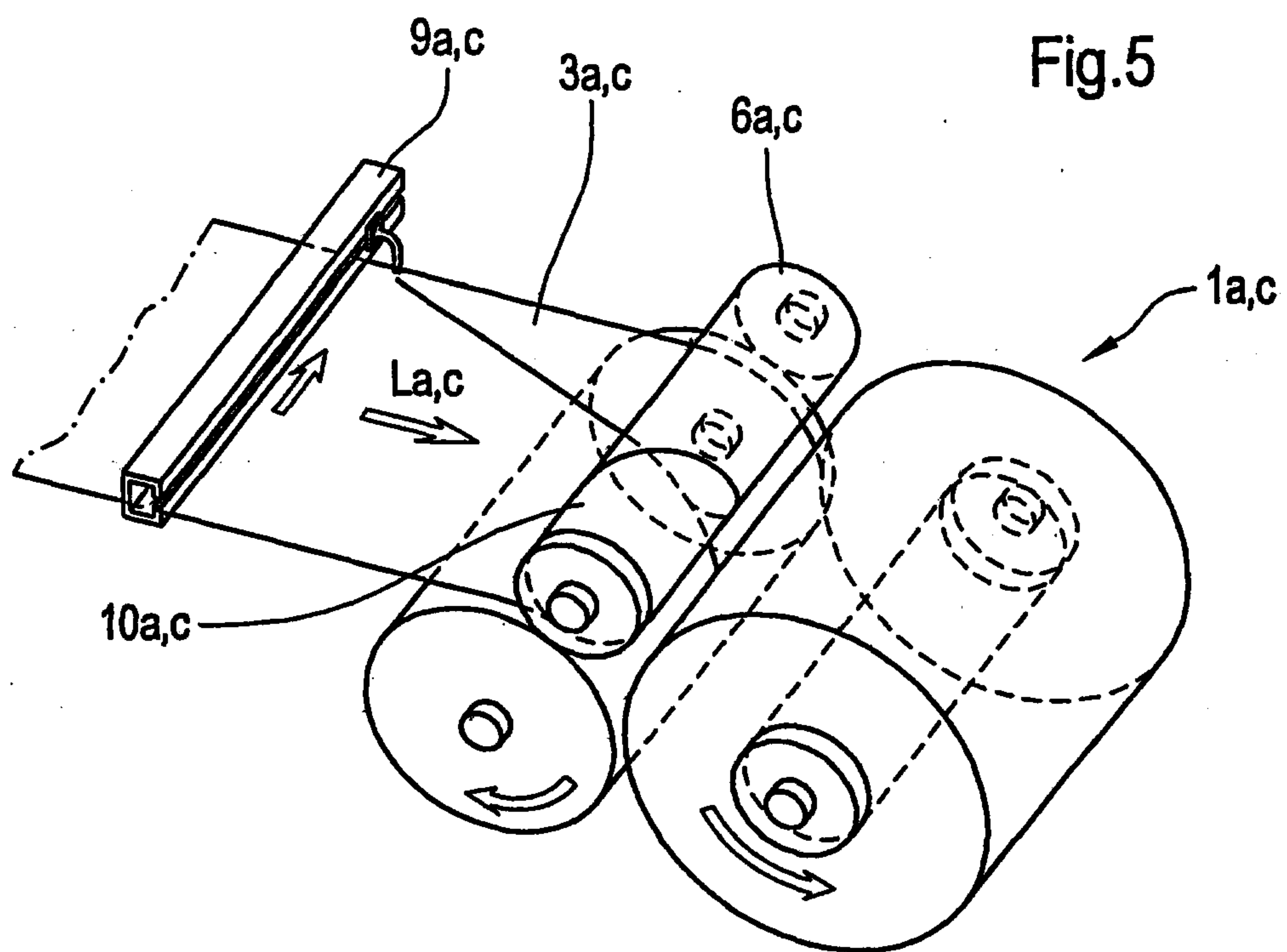
Fig.4



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Fig.7

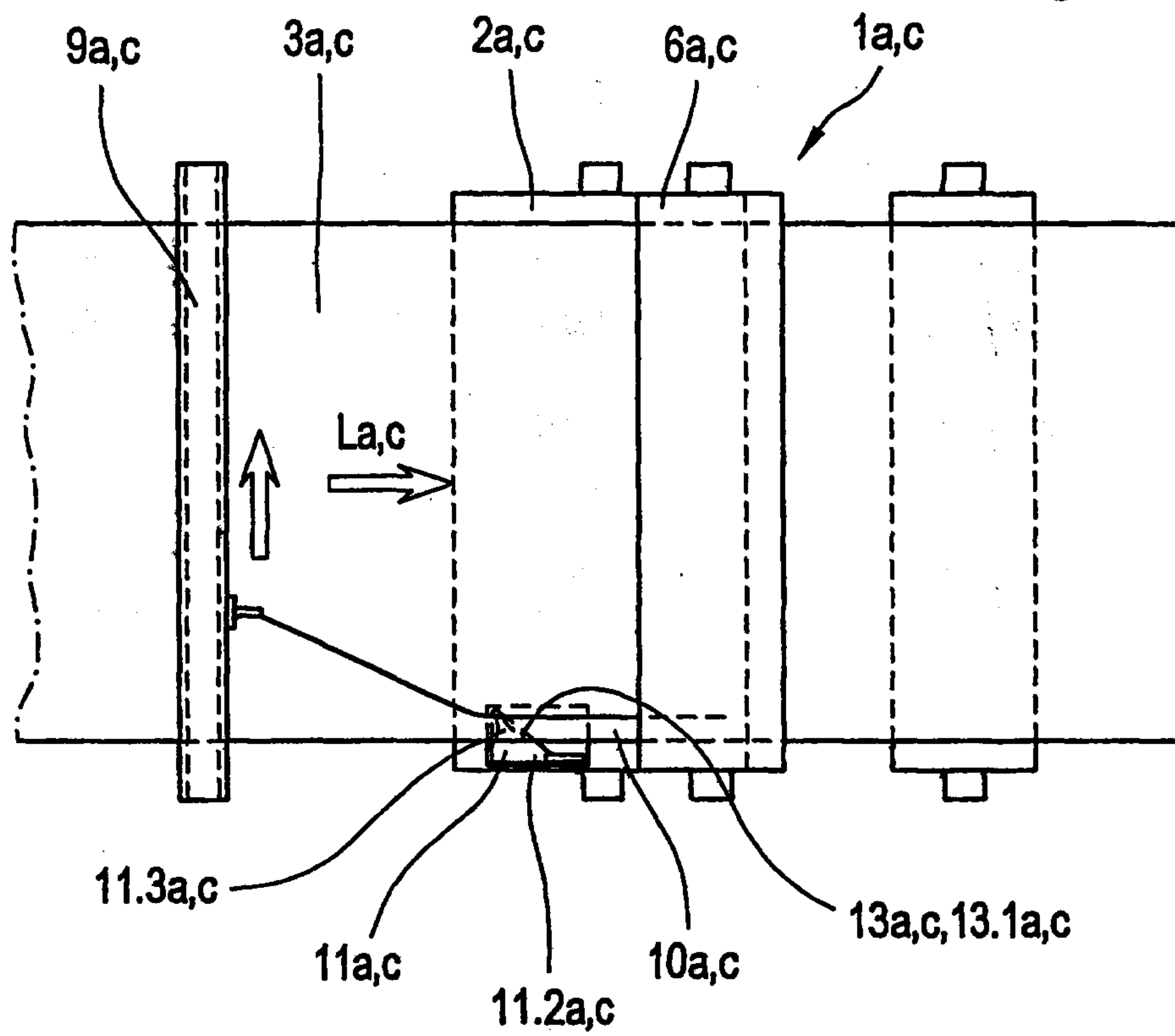
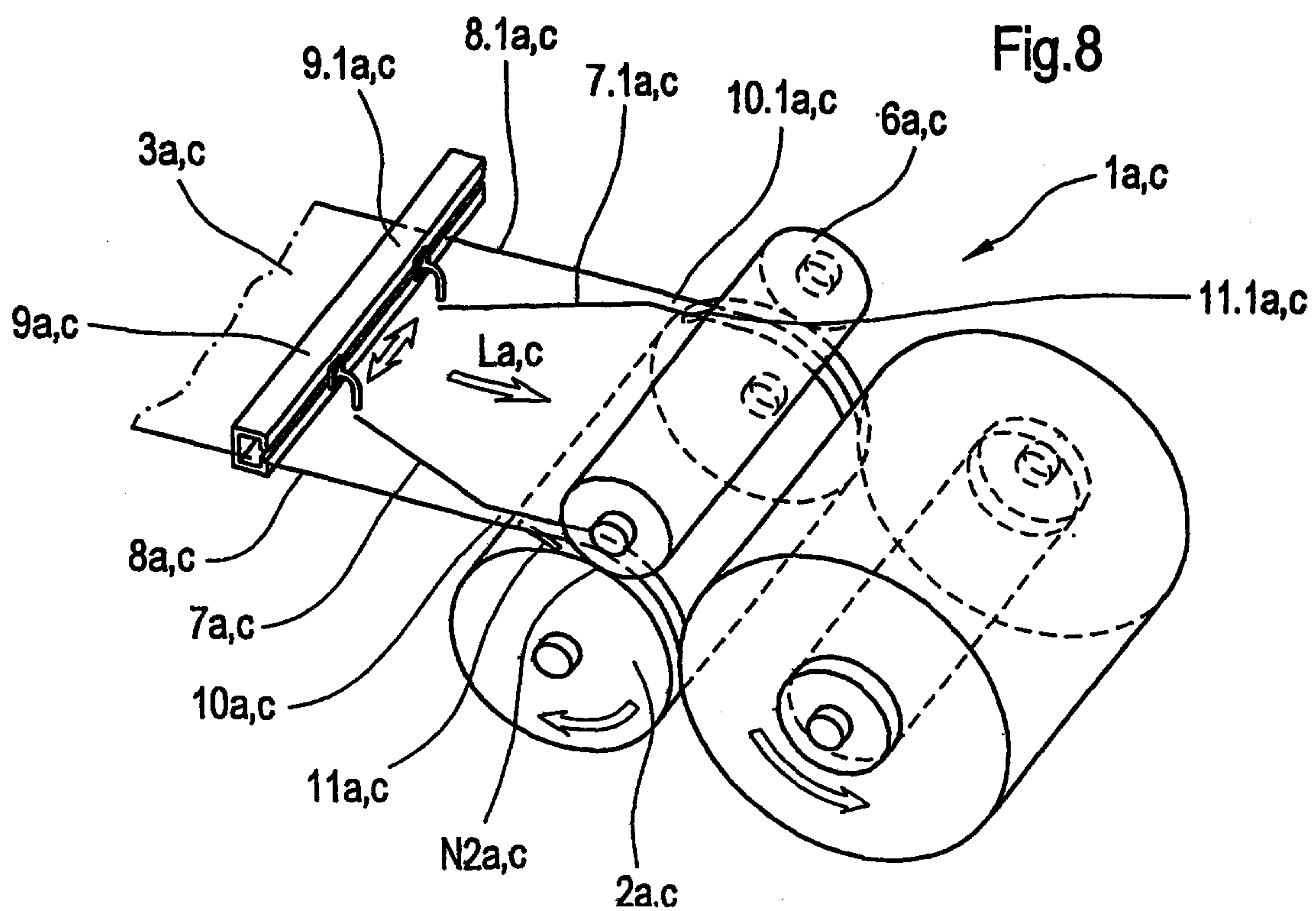


Fig.8



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Fig.9

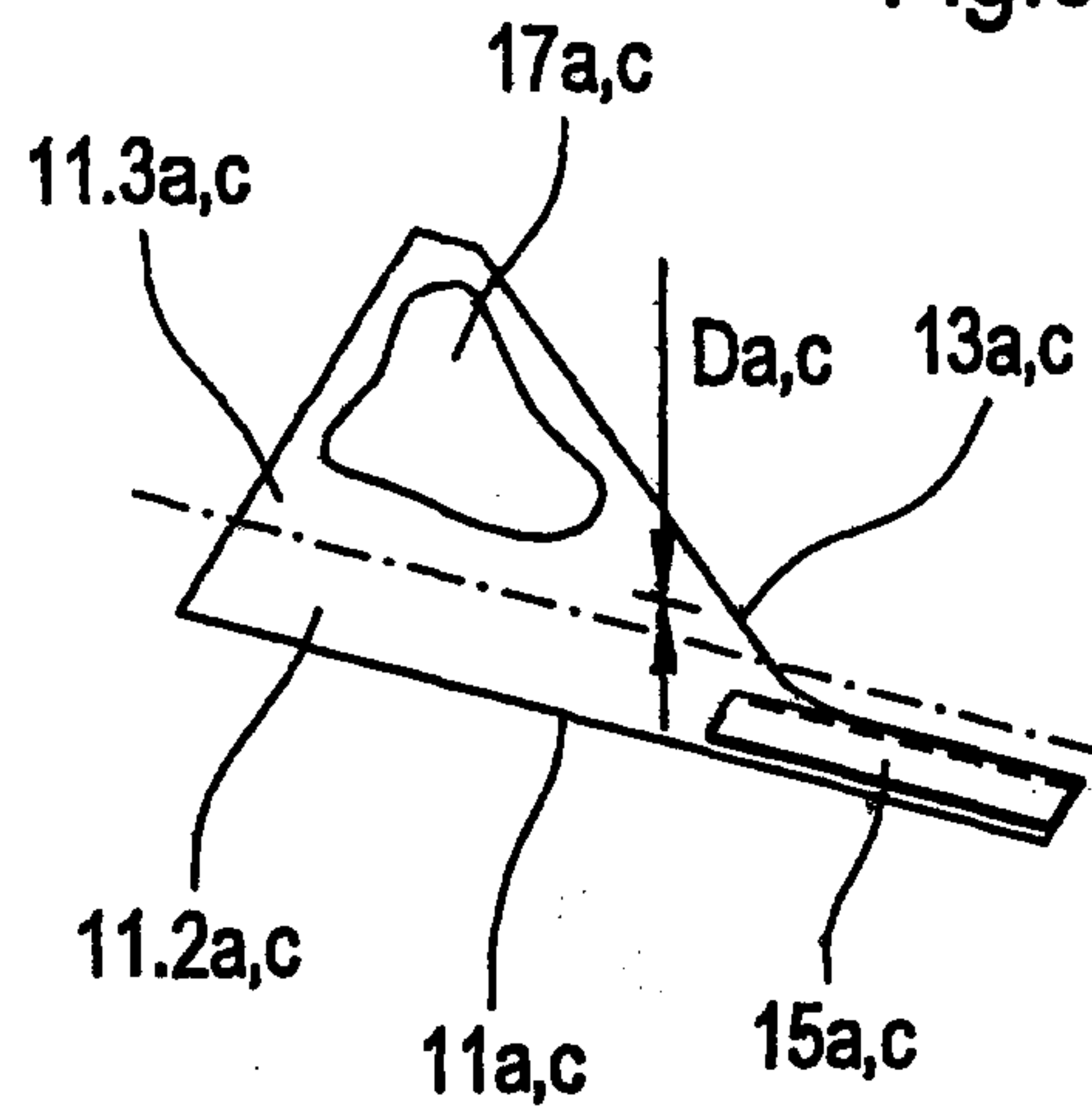


Fig.10

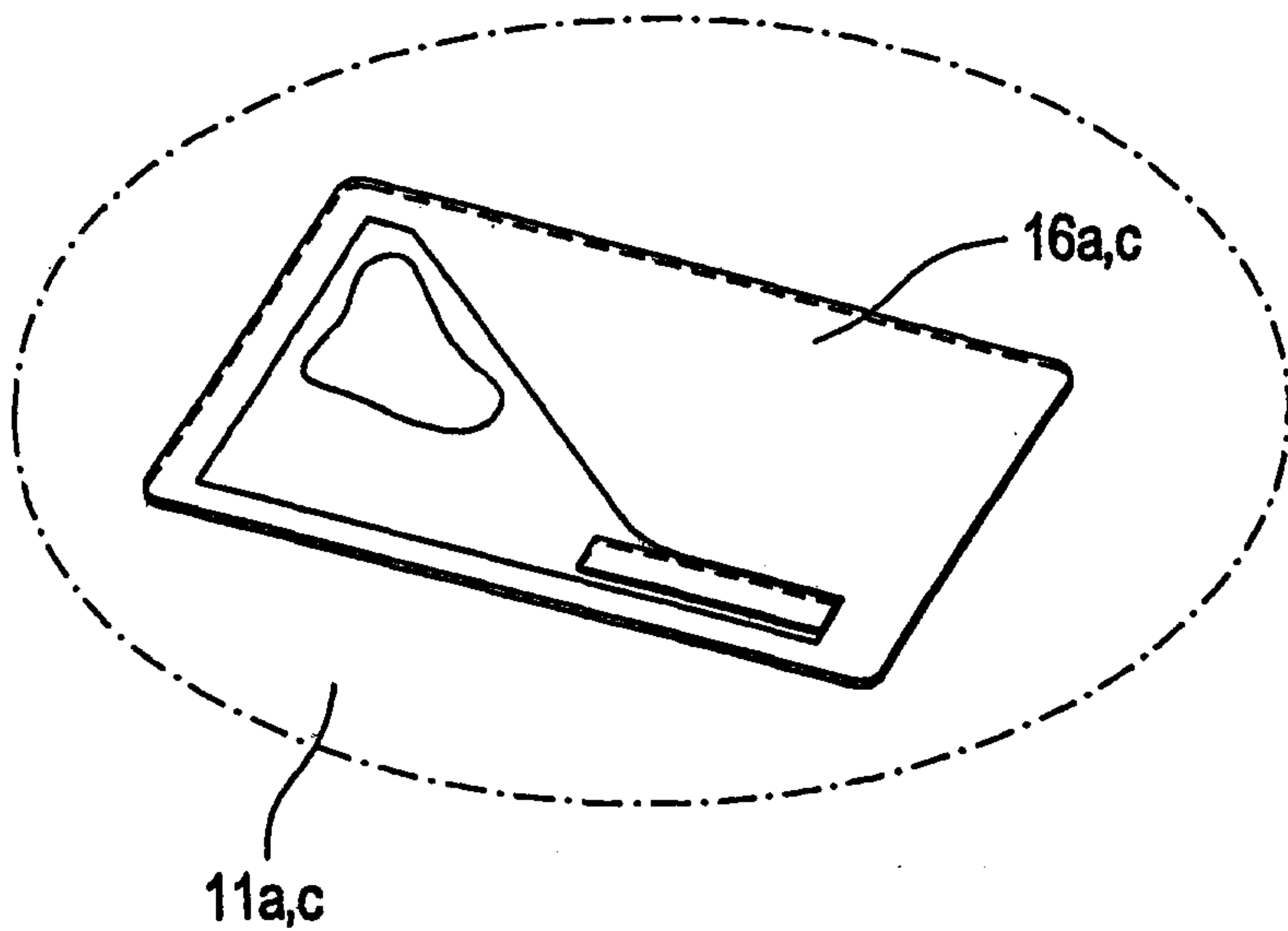
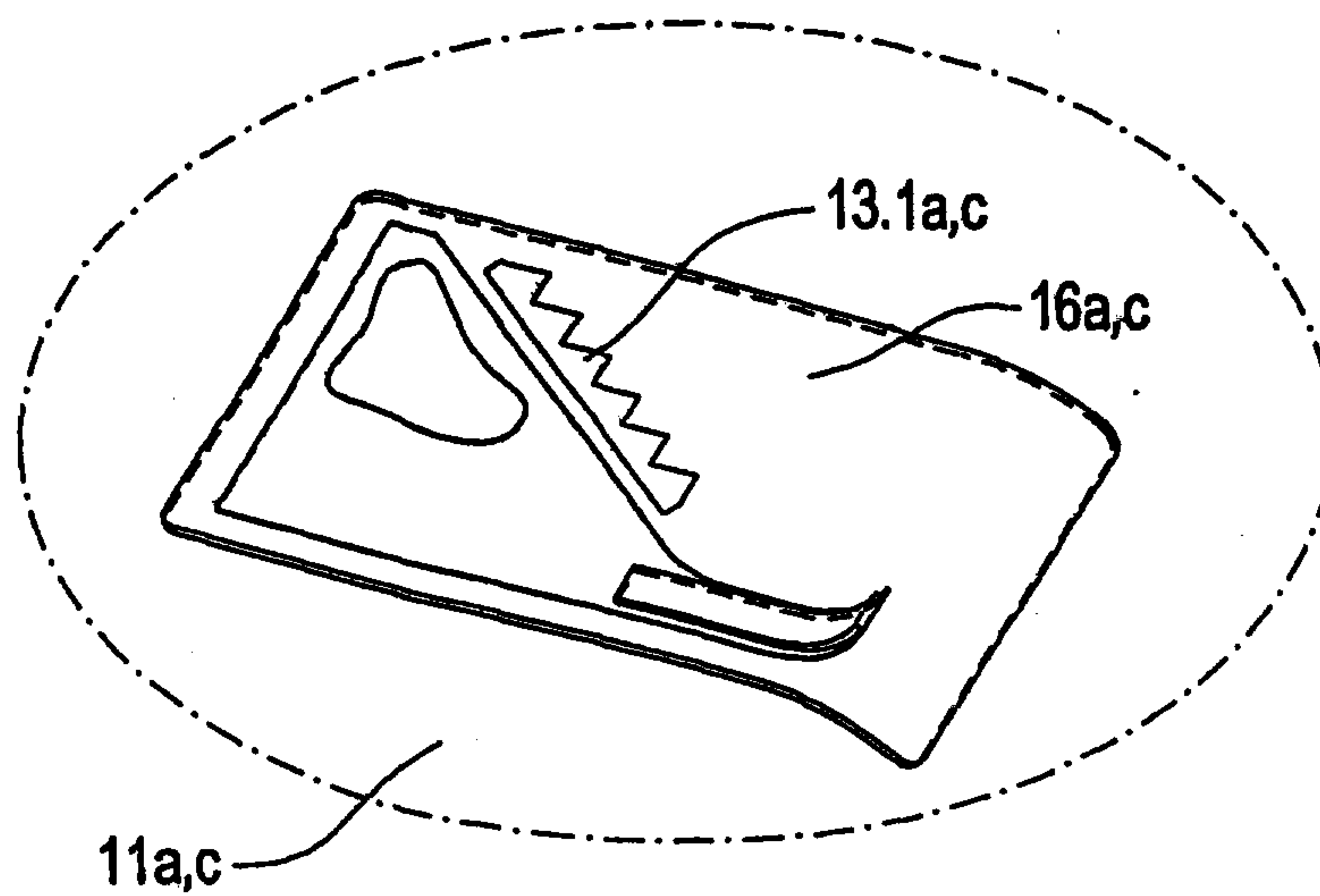


Fig.11



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Fig.12

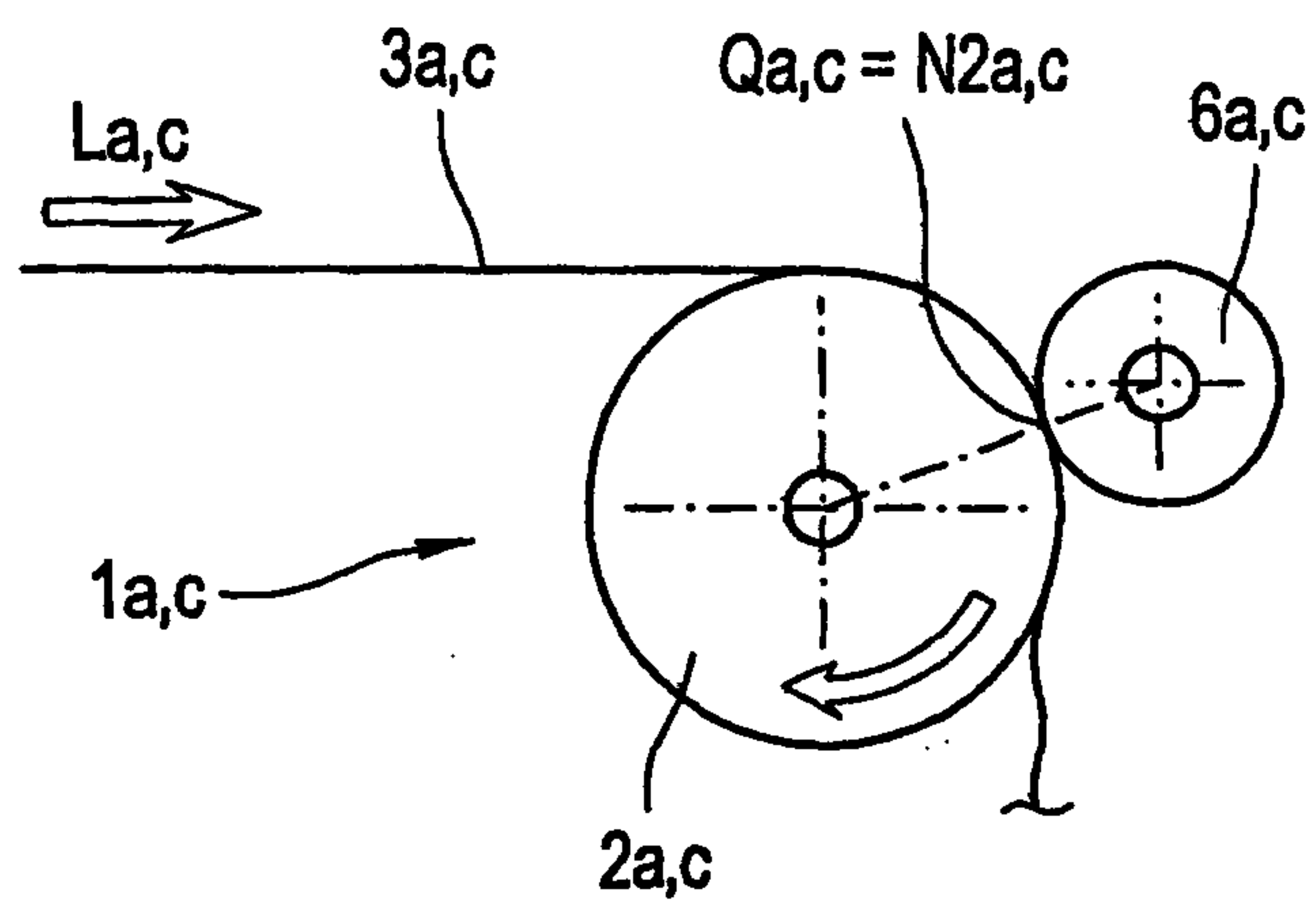


Fig.13

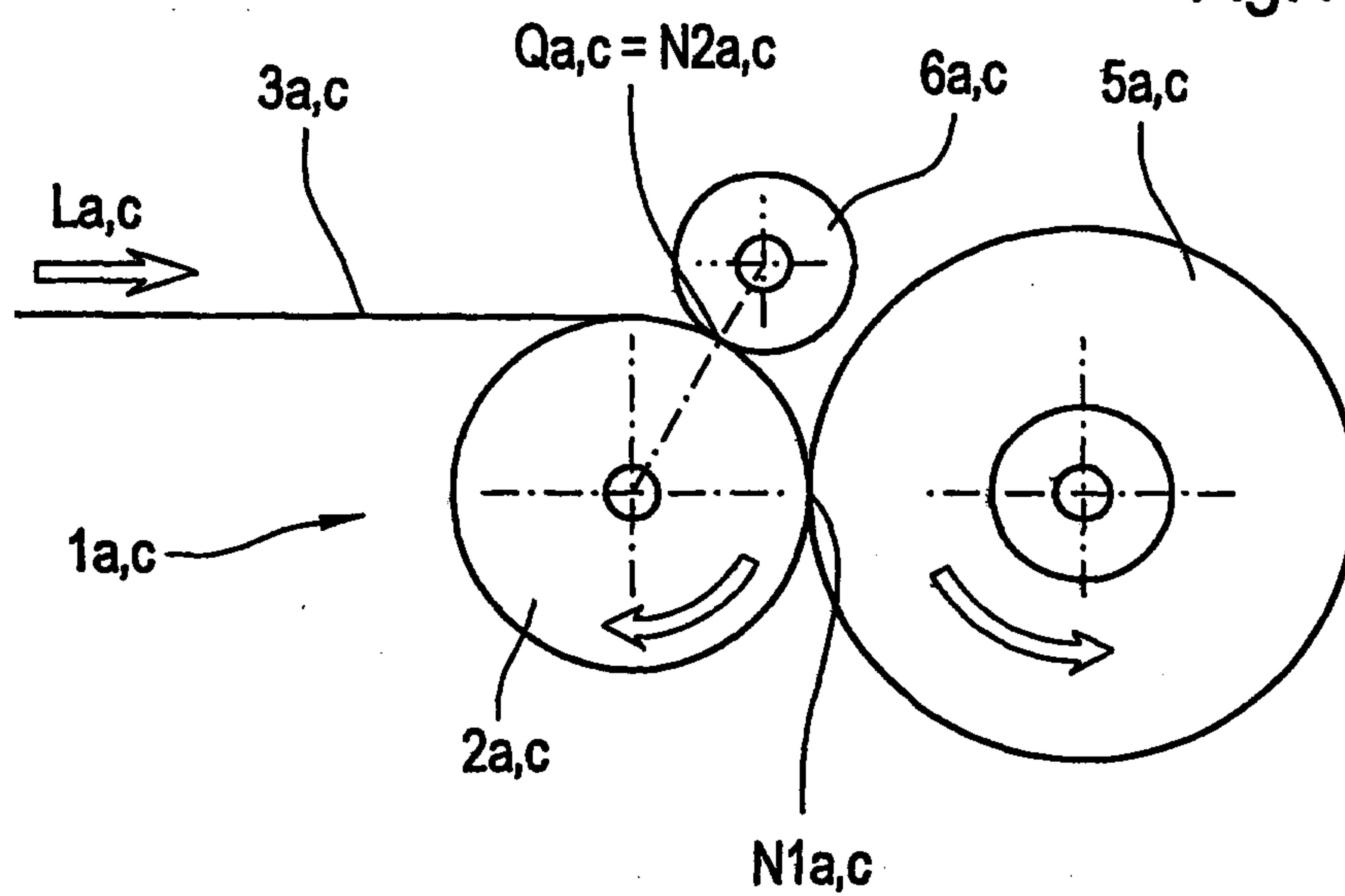
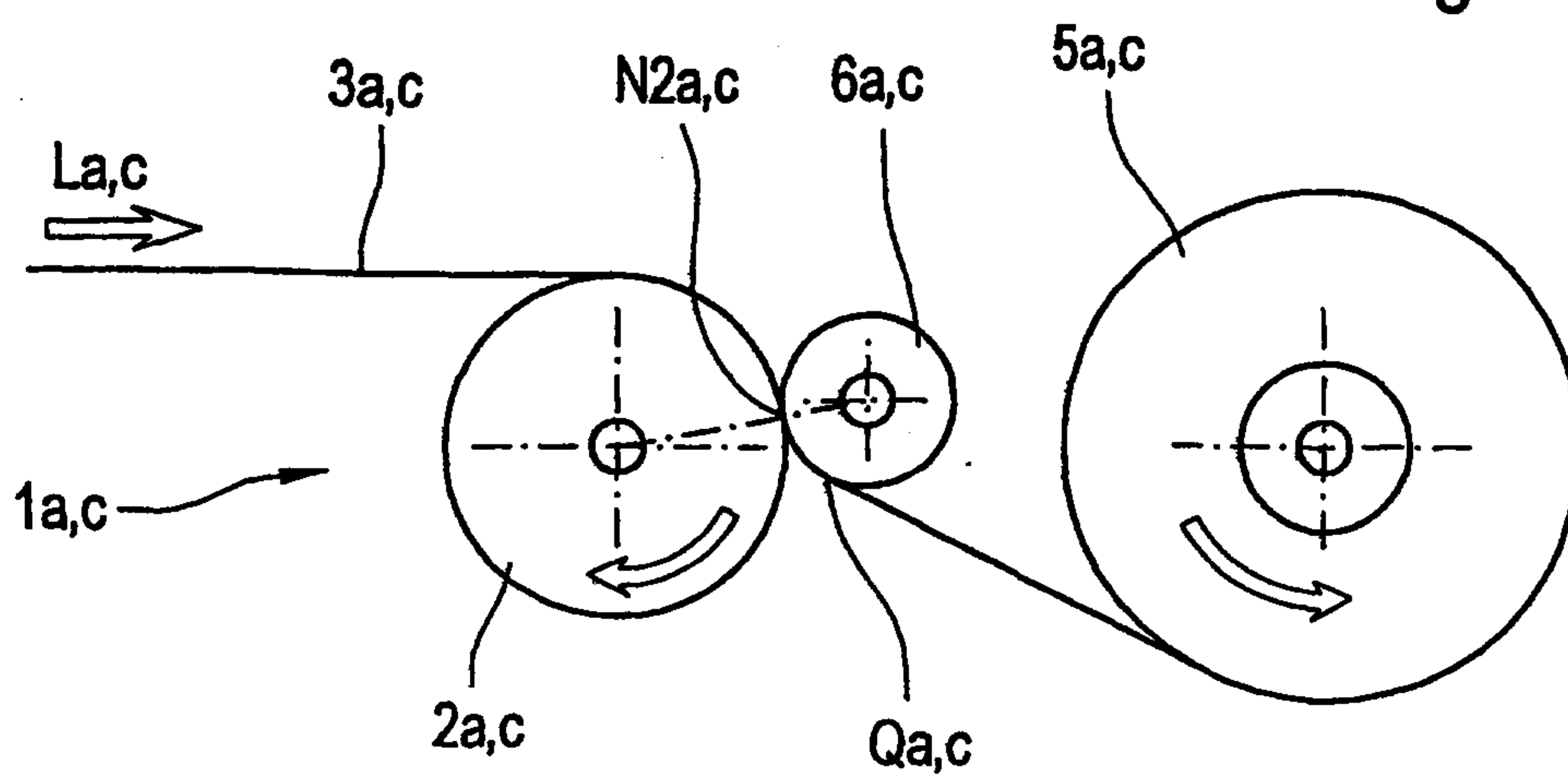


Fig.14

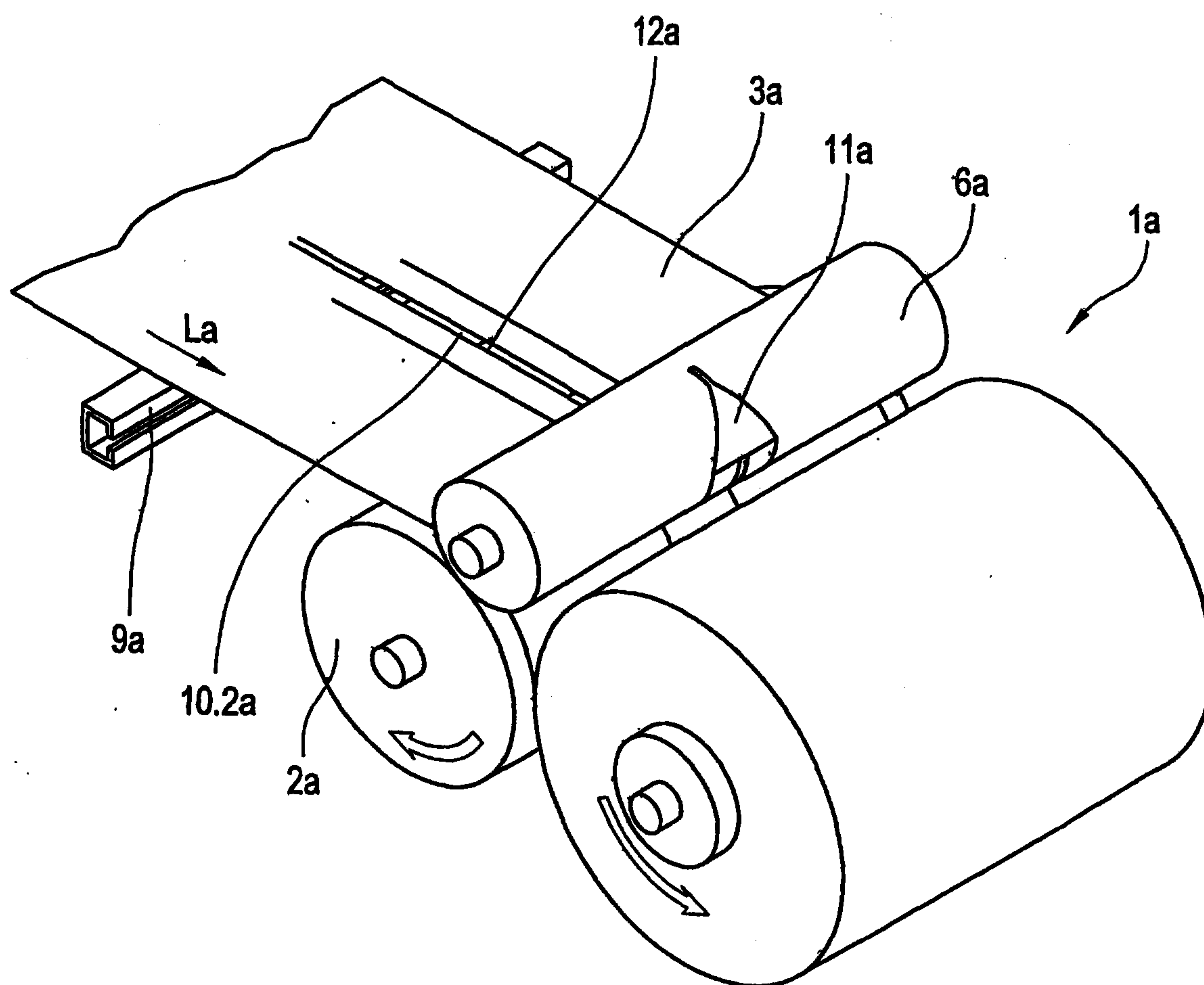


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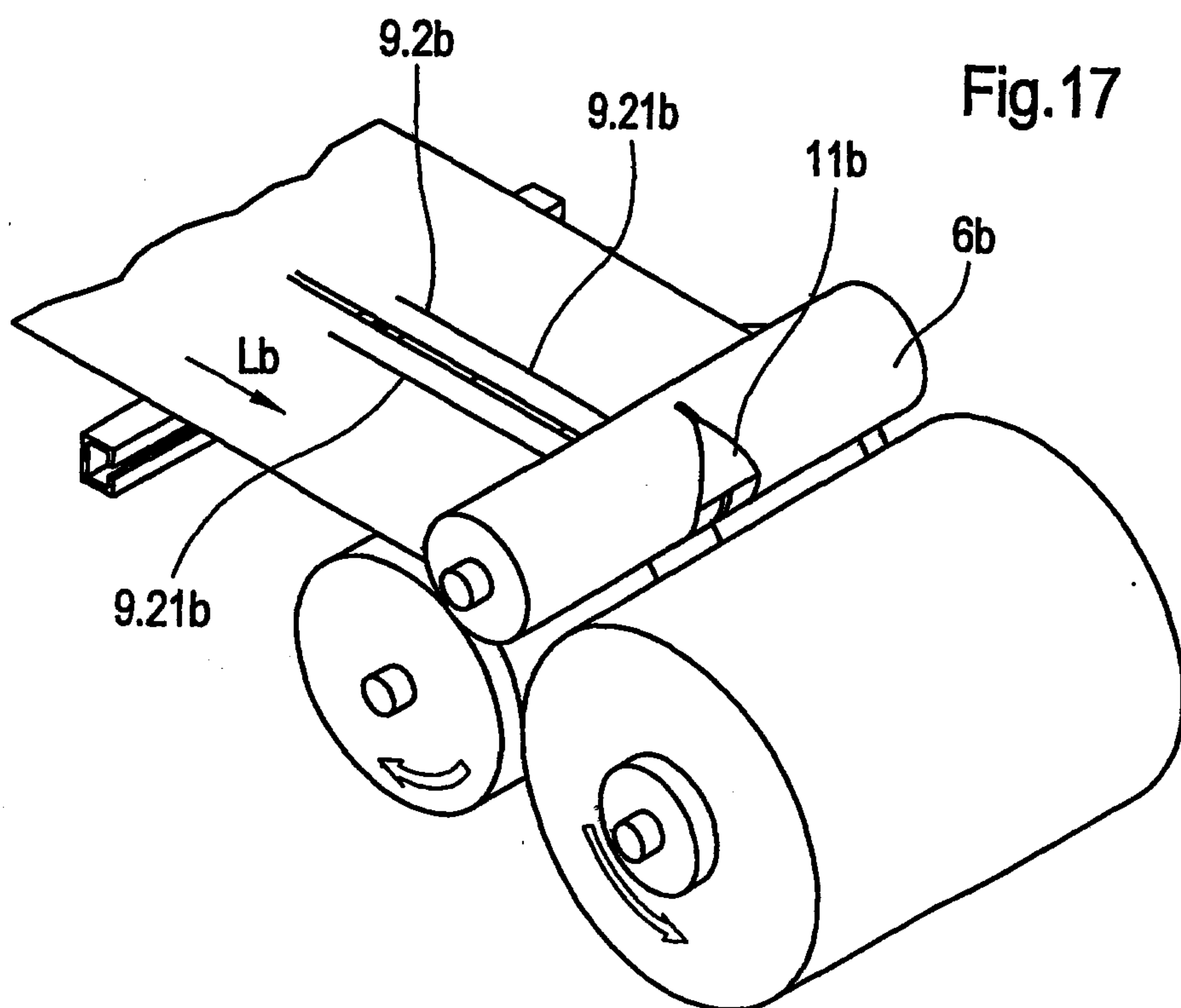
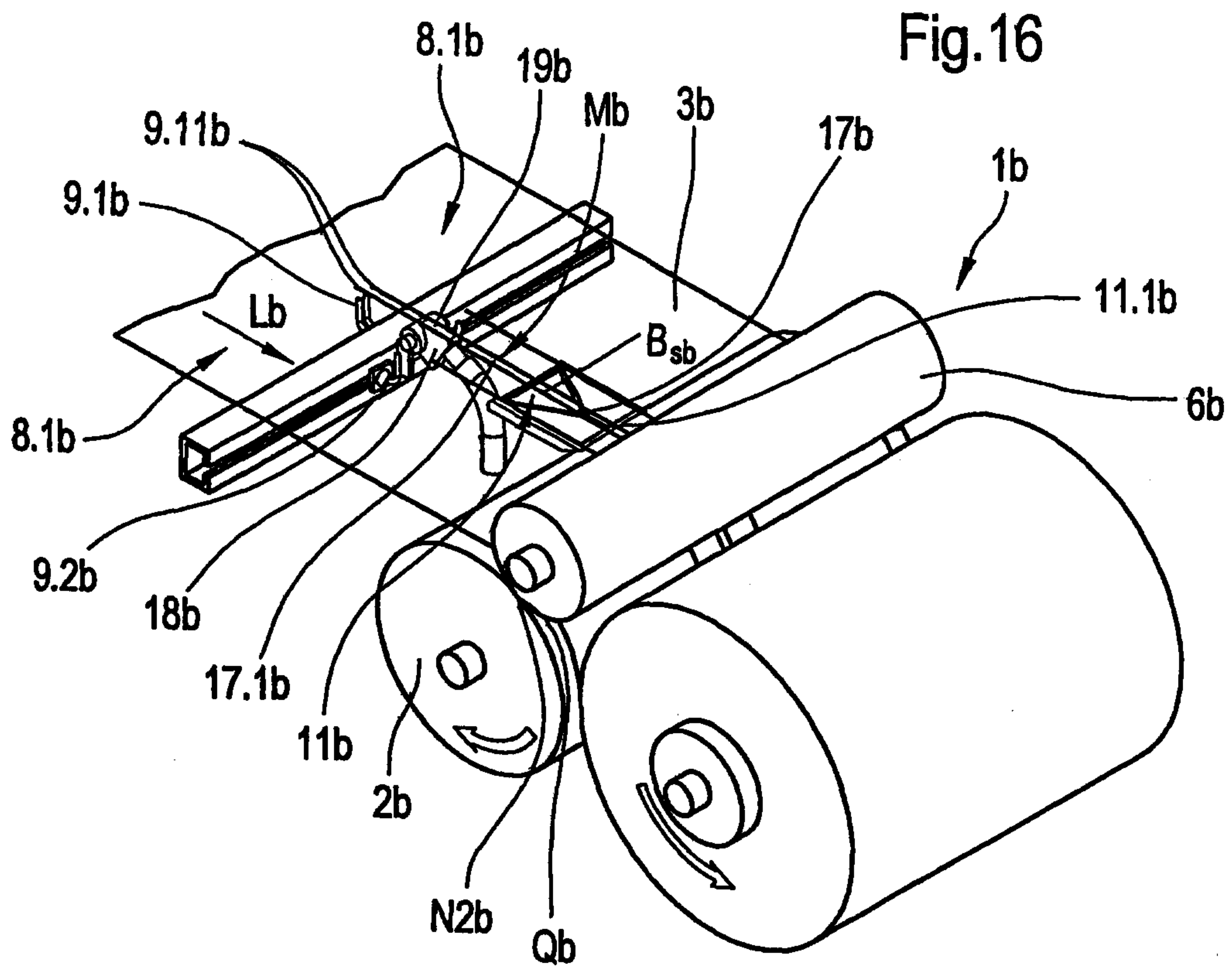
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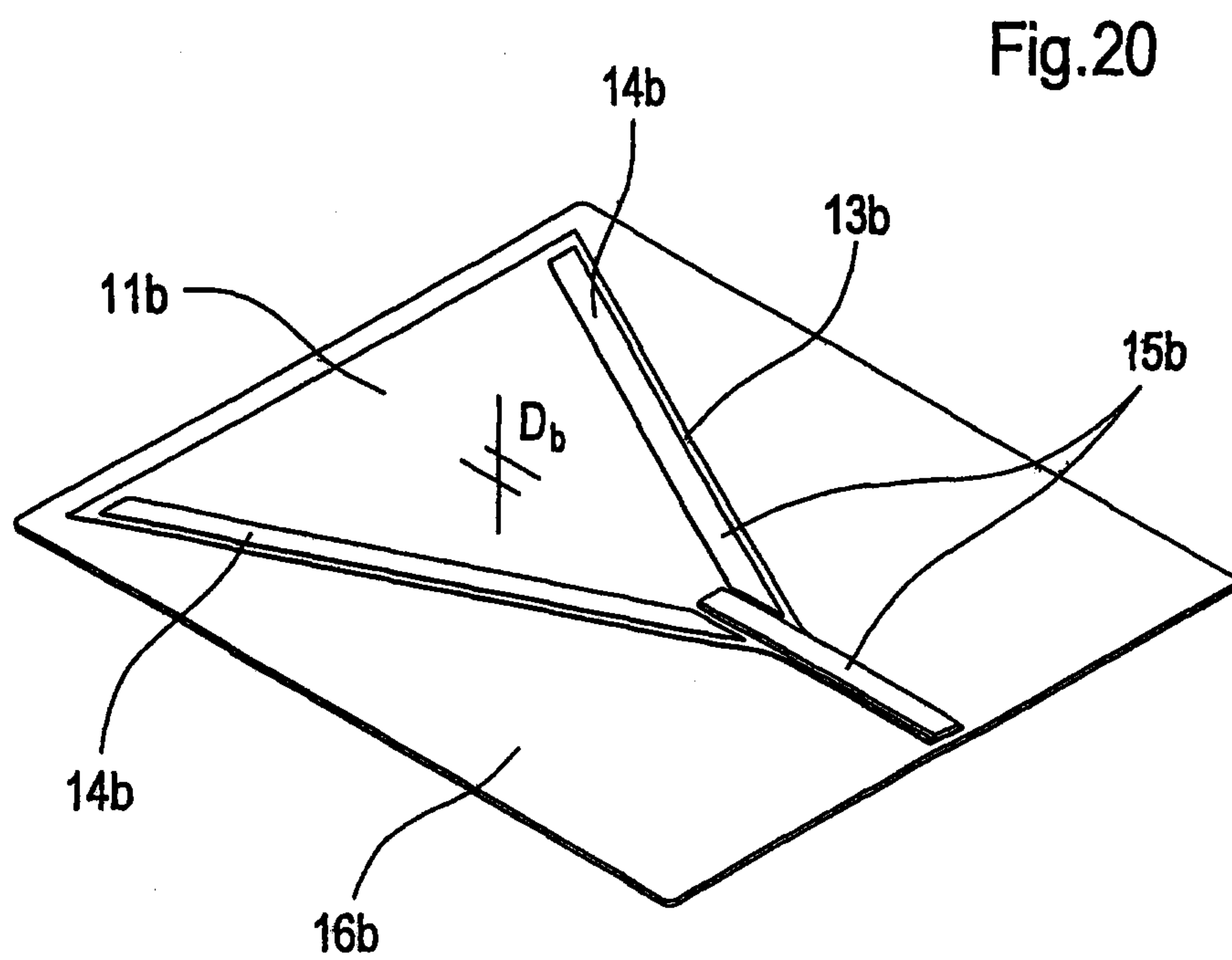
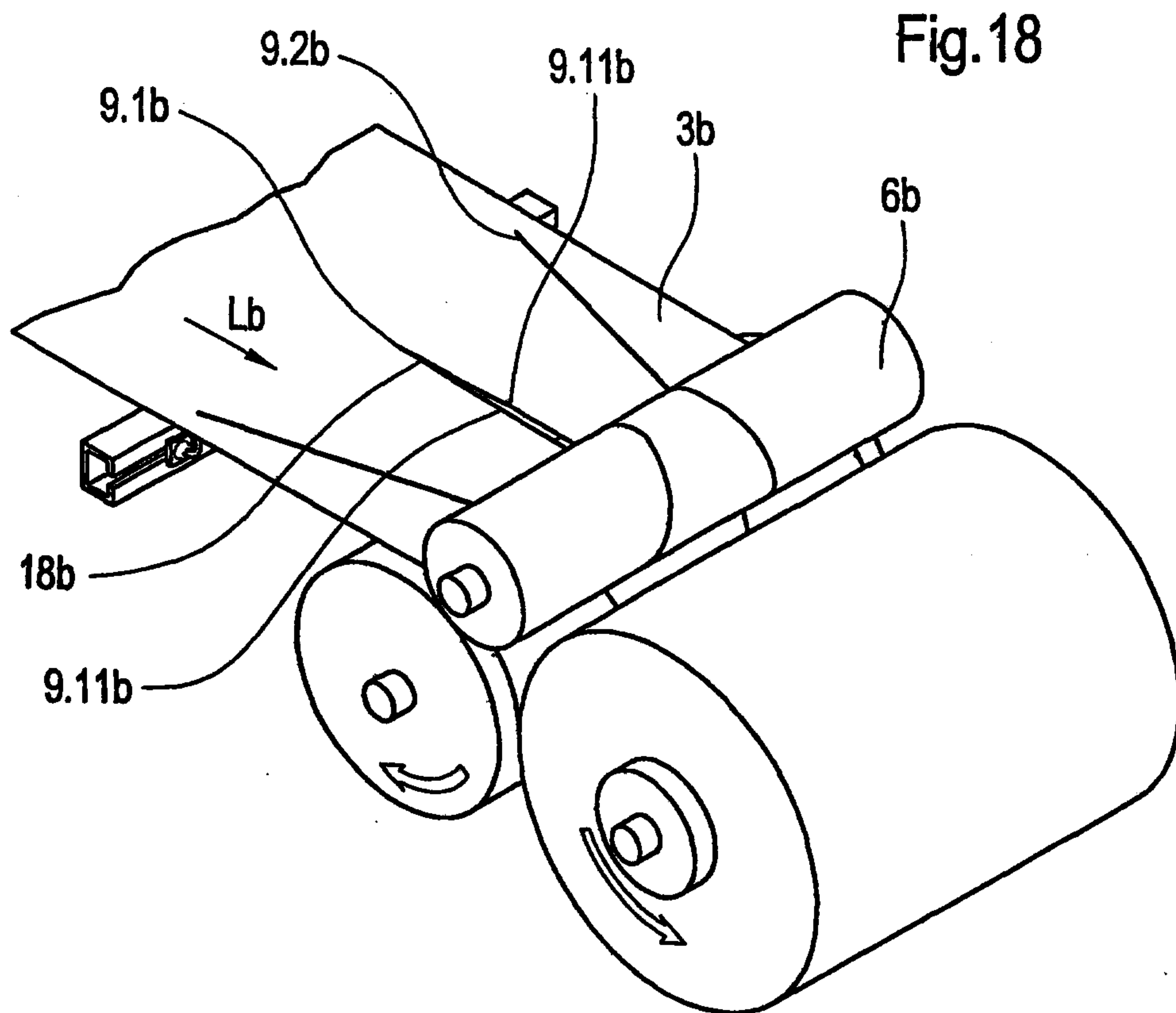
Fig.15



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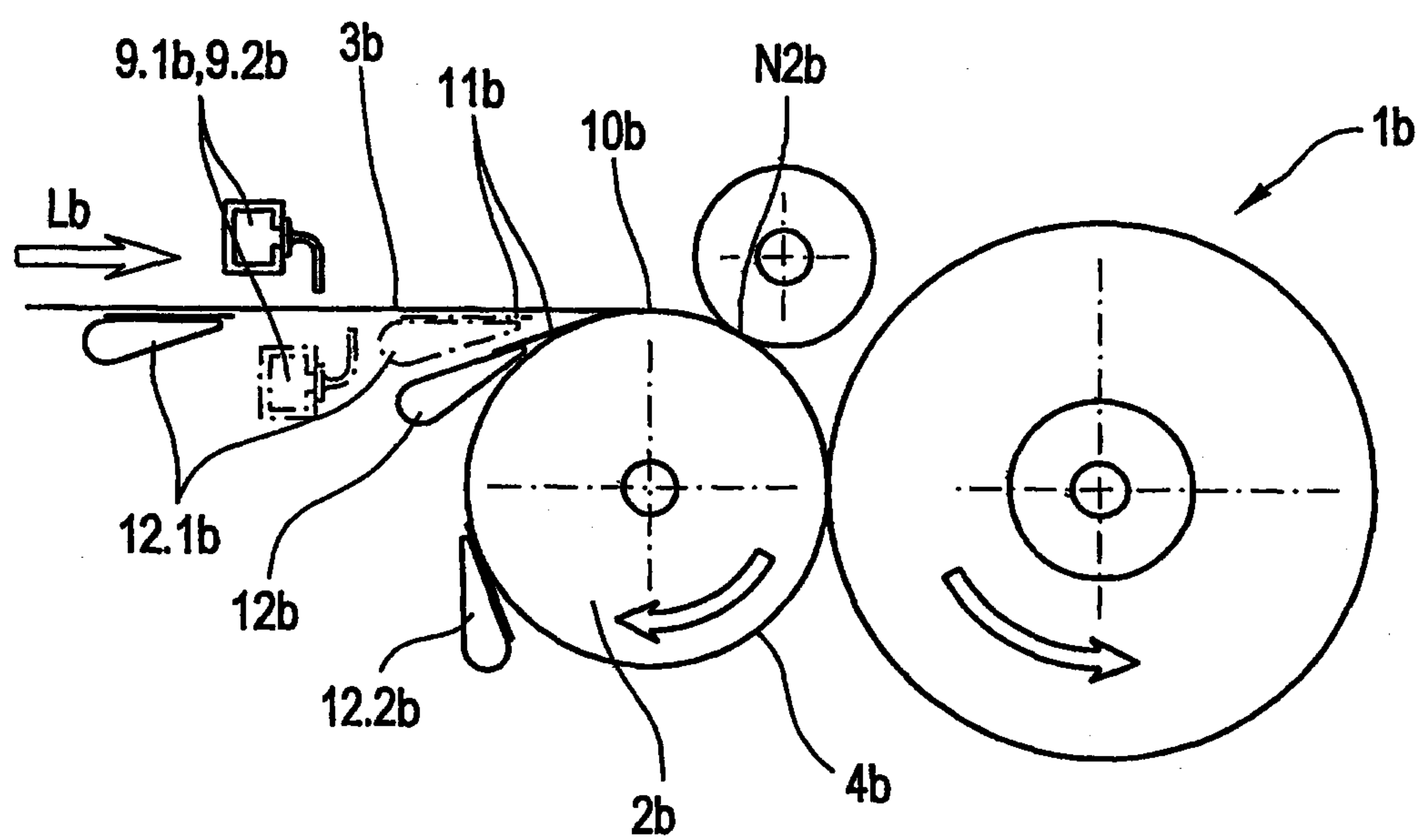


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Fig.19



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Fig.21

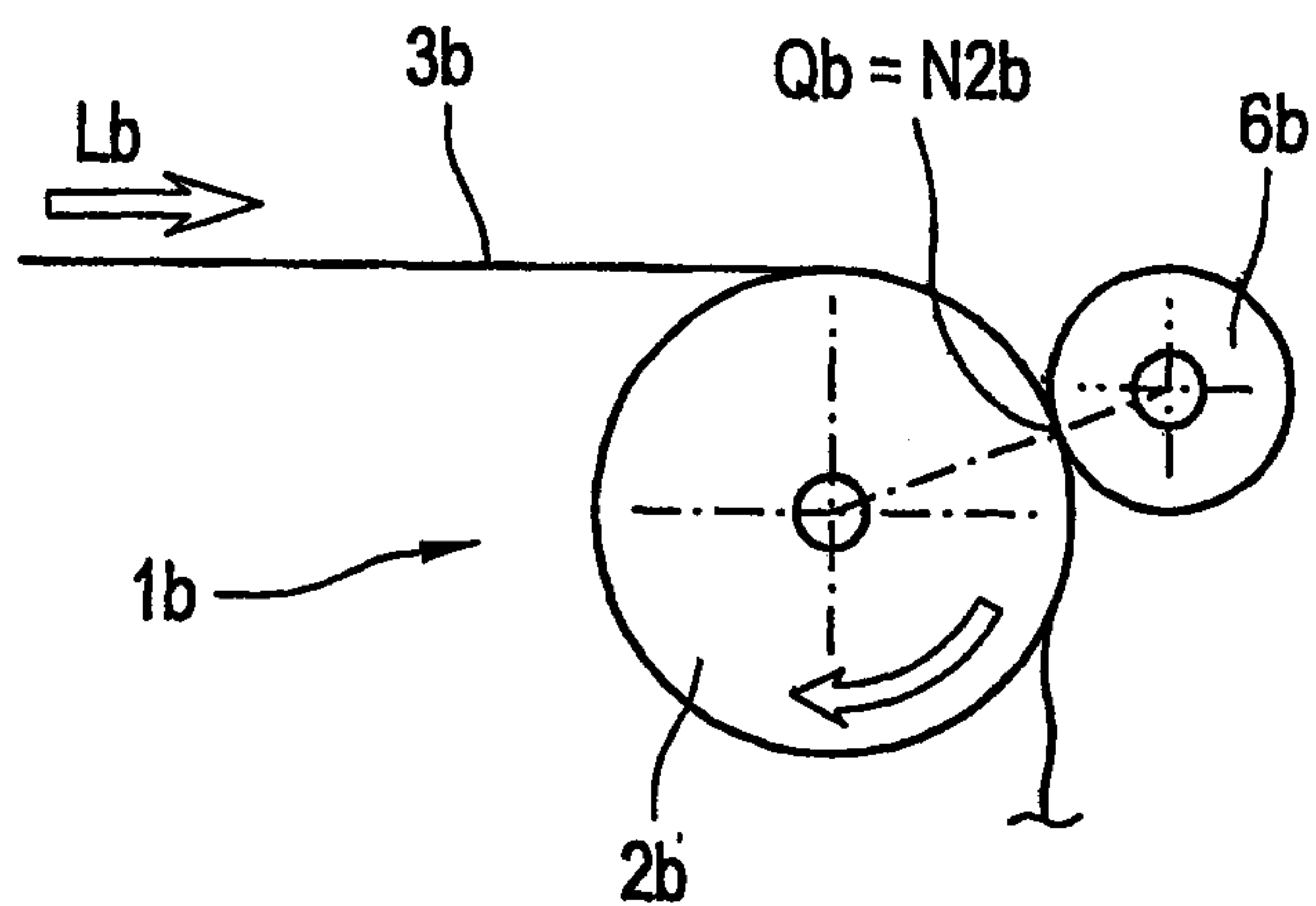


Fig.22

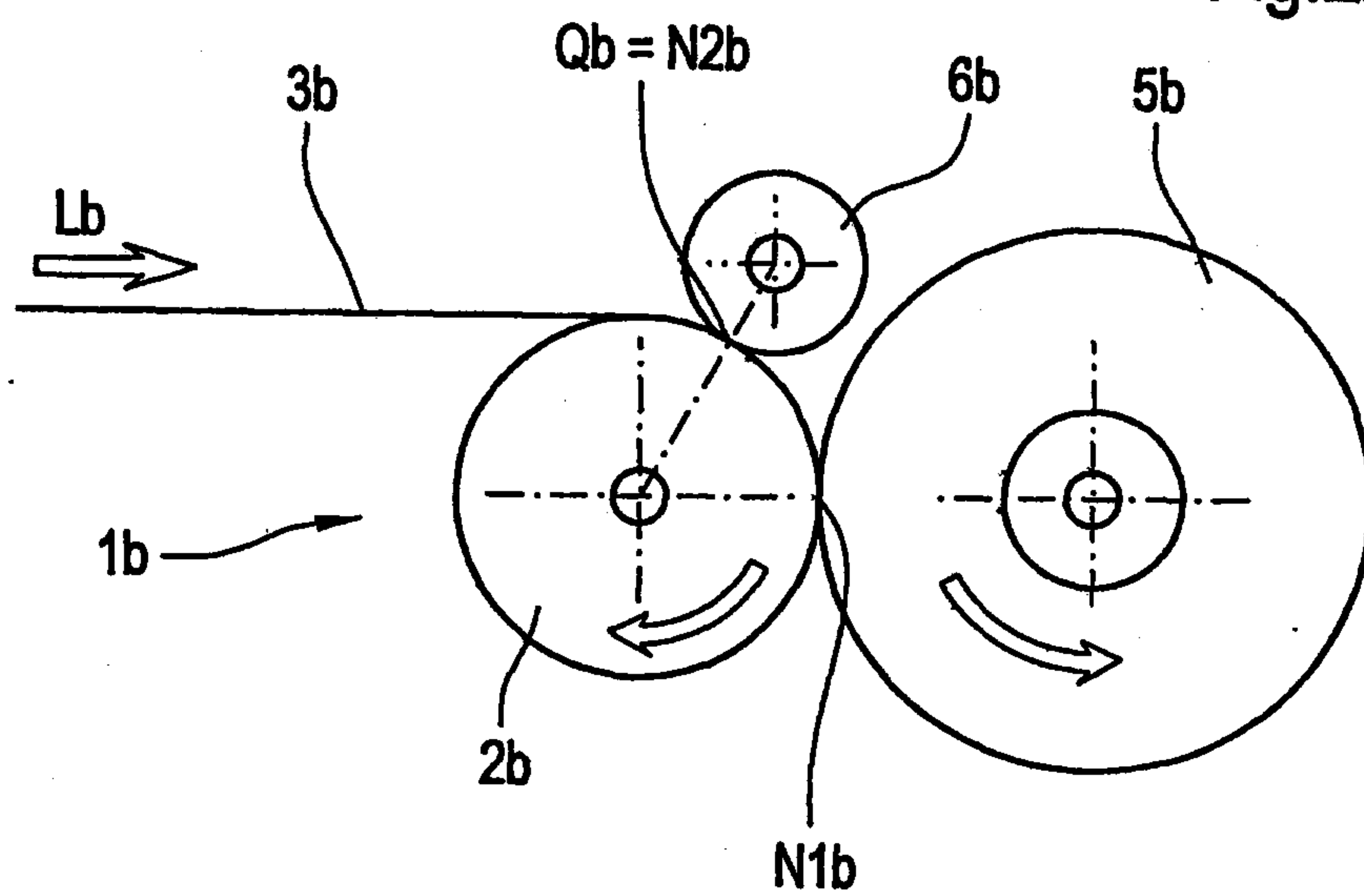


Fig.23

