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(54) METHOD AND ASSEMBLY FOR SECURING THE END OF A WEB ROLL

VERFAHREN UND ANORDNUNG ZUR SICHERUNG DES ENDES EINER MATERIALBAHN

PROCÉDÉ ET ENSEMBLE POUR FIXER L'EXTRÉMITÉ D'UN ROULEAU DE BANDE

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(72) Inventor: **CARLANDER, Rolf**
S-423 63 Torshanda (SE)

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(74) Representative: **Genip Oy**
Heikinkatu 7
48100 Kotka (FI)

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(73) Proprietor: **Valmet Technologies, Inc.**
02151 Espoo (FI)

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Description

TECHNICAL FIELD

[0001] The present invention relates to a method for securing on each of a plurality of web rolls in a set of web rolls which lie close to or are adjacent to one another and have a common center axis, the trailing end of the web through applying on each of the rolls at least one securing tape which has an adhering coating on a first side, so that the end securing tape is fixed by said first side against the roll and extends over the edge (52) of the trailing end of the web. The invention also relates to an assembly of cooperating devices for the carrying out of the method.

BACKGROUND OF THE INVENTION

[0002] Various methods and devices are employed today for securing the ends of web rolls, manual as well as automatized. In the paper industry glue, for example, is used for securing the ends. This is fairly easy to automatize. Glue which provides a quick and safe connection, however, impairs the quality of the paper in the top layers of the roll. Therefore, the roll has to be stripped and one or a few layers be rejected before the paper can be used for example in printing machines. In order to avoid that problem, it is therefore common practice to use tape for securing the ends. The tapes are either applied manually, which is uneconomical and troublesome, or are they applied mechanically according any of a number of systems which have been developed in this technical field. Also these systems, however, have drawbacks of various kinds. Within for example the paper manufacturing industry, the paper is normally made in the form of a web material which has a large width and is wound up in a reeling unit provided after the paper machine or is slit up into a number of smaller rolls in a slitting and winding machine provided after the paper machine. For the mechanical securing of the trailing ends of the web it is common practice to employ a great number of so called tape dispensers - normally at least two dispensers per web roll - in order safely to secure the ends of all those rolls which lie axially side by side in the reeling end or in the slitting and winding machine. Further, the tape dispensers have to be mounted on a common carrier at a distance from one another. These distances must correspond to the desired distances between the tapes on the secured roll ends. All the tapes are drawn out simultaneously from the tape dispensers, are cut off and are secured over the web ends. This part is per se rational and can be performed quickly and automatically, but the fact problem that all the web rolls in the set of rolls often do not have equal widths is a problem. Further, the web sometimes are slot up to different widths and thence to different lengths of the rolls from set to set and sometimes even in one and the same set. The tape dispensers therefor must be re-mounted, such that the desired distance between the tapes will be achieved for every set of rolls.

These adjustments are difficult to automatize and are therefore carried out manually, which is troublesome and uneconomical. Further the tape strips seldom are equally long, which means that the strips in the dispensers run out and have to be replaced at different occasions, which is also troublesome, time consuming, uneconomical and difficult or impossible to automatize in practice.

In publication JP 2008 063044 A there is disclosed a method of securing on web roll the trailing end of the web. In the document a line automating a series of work from winding of a manufactured foamed plastic sheet to automatic packaging of a coil is disclosed. In the taping device, the coil of the sheet-like material is supported by a sheet end sucking/releasing device and a coil supporting roll, the sheet end is sucked by an air permeating endless belt and paid out, a position of the sheet end is detected by an optical detecting device, the sheet end is released from the air permeating endless belt along the coil and it is positioned almost directly below a coil center, and an auto-labeler is operated to fix the sheet end to the coil by an adhesive tape.

[0003] Additionally document JP2001206623 discloses a tape applicator for securing web ends on multiple rolls. Another drawback with the use of conventional tape dispensers is that the length of the tapes in the axial direction of the rolls cannot be adjusted. It will always have a length corresponding to the width of the tape strip. If a particularly strong fixation is desired, therefor, a plurality of tapes have to be provided side by side, which makes the taping operation even more complex and requires manual operations in connection with the readjustment of the dispensers.

It is an object of the present invention to address the above complex of problems. This and other objects can be achieved therein that the invention is characterized by what is stated the appending claims.

Through the invention it will be possible to allocate the tapes with great accuracy completely digitally at desired places on the web rolls. In principle an infinitely variable allocation can be achieved. According to the invention it is also possible to choose a desired size of the tapes digitally in the axial direction of the web rolls. An adjustable pattern of the tapes which shall be distributed on the web rolls can be achieved without any physical readjustment of tape dispensers. According to one aspect of the invention, only a single tape dispenser is employed, but on the other hand, according to a preferred embodiment of the invention, the width of the tape strip in that dispenser is substantially wider than the width of the tape strips in those tape dispensers which conventionally are used according to the conventional technique. As a matter of fact, the width may be as large as the length of those tapes is, which are torn off from the conventional tape dispensers which are used in conventional systems for securing the ends of web rolls in the paper manufacturing industry. A single roll of tape of the said kind, which may be used according to the invention, therefore represents an amount of tapes which corresponds to quite

a number of tape rolls of the type used in conventional systems. When this single but large tape roll is used up, it may, according to an aspect of the invention, be replaced by a new, equal roll of tape, while the web material is being wound up in the reeling end of the paper making machine or in a slitting and winding machine. The change of a roll of adhesive tape therefore does not cause any loss of production.

The invention is developed for the purpose of satisfying demands in the paper manufacturing industry, but its field of use is not restricted to that field. Its principles can be applied within many branches where web materials are manufactured, treated, converted and/or used, whether they consist of paper, paper board, non-woven material, plastic, aluminum foils, composite materials, or any other material which can be reeled to the shape of rolls, the trailing ends of which shall be secured by means of adhering tapes.

These and other advantages can, according to one aspect of the invention, be achieved therein that those end securing tapes which shall be applied first are transferred from a tape dispenser to a tape conveyor such that they are caused to lie with their opposite, second side against said conveyor at a distance from one another on the conveyor corresponding to the desired distances between the securing tapes on the web rolls, respectively, that they are temporarily retained on the conveyor as the conveyor then is moved towards the web rolls with the adhering first side facing the web rolls each tape being directed against that place on the rolls where the respective tape shall be applied, that all the tapes are brought into contact with their respective roll and are fixed to it on said respective place, and that the conveyor then is moved from the rolls and from the tapes, which remain fixed to the rolls because said first side of the tapes has a larger adhesive strength to the rolls than the opposite, second side has to the conveyor.

[0004] According to another aspect of the invention, there is employed, for the carrying out of the method, an assembly of cooperating devices, which include a tape dispenser provided to feed tapes one by one to an essentially rigid, elongated tape conveyor which has a length at least as long as the distance between the farthest out positioned tapes that shall be applied against the rolls means provided for placing the tapes on the conveyor with a spacing corresponding with the desired spacing between the tapes when the tapes have been secured on desired places on the web rolls wherein the conveyor is capable of retaining the tapes when the tapes rest with their second side against the conveyor, which second side is opposite said first side, and wherein a first aggregate of motion members is provided to move the conveyor with said tapes towards said desired places on the web rolls from a starting position at a distance from the web rolls till contact between said first side of the tapes and the rolls on said desired places and then back to the starting position, leaving the tapes behind, secured on said desired places on the web rolls. Preferably, the

tapes which are used in the method and in the assembly have an adhering coating only on that side which shall be attached to the web rolls in order to secure their ends. In principle, however, both sides may have adhering coatings. The method and the assembly then are adapted to this circumstance. For example, the surface of the conveyor against which the tapes temporarily shall be brought, in that case may have been afforded features which prevent non-desired adherence, i.e. have release-features. It is, however, understood that this is a complication which can be avoided by using tapes which have an adhering coating on one side only. A conceivable variant also is to use tapes which have a certain amount of, but essentially lower, adhering capacity on that side which shall be brought against the conveyor surface than the tapes have on that opposite side which shall be brought into contact with the rolls of web material. Further aspects on, and advantages of the invention, will be apparent from the following description of a preferred embodiment with reference to the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

[0005] In the following description of a preferred embodiment, reference will be made to the accompanying drawings, in which

Fig. 1 is a perspective view of the rolls of web material, the free or trailing ends of which shall be secured, and the assembly according a preferred embodiment of the invention, which forms part of a slitting machine or reeling end which may be provided in connection to a paper manufacturing machine,

Fig. 2 shows the assembly isolated in the same view as in Fig. 1,

Fig. 3 shows the assembly according to the invention in a view diametrically opposed to the view of Fig. 2, Fig. 4 illustrates, at a larger scale, how a tape dispenser is delivering tapes to a tape conveyor included in the assembly, in the following briefly also called just conveyor,

Fig. 5 shows, also at a larger scale, motion members for moving the conveyor in a linear direction towards and from the web rolls,

Fig. 6 shows in the same perspective as Fig. 1 a developed embodiment of the conveyor in cross section and motion members for turning the conveyor about a longitudinal centre axis in the final part of the initial application of the tapes on the rolls,

Fig. 7 shows the conveyor in its lower position in the final part of the application operation, and

Fig. 8 illustrates a method and means which facilitates change of tape dispenser.

DETAILED DESCRIPTION OF THE INVENTION

[0006] Modern paper manufacturing machines are immensely large machines which at a high rate produce

large width paper, which first is wound up to form a so called tambour. When the tambour has reached a size which is considered to be conveniently large, which may correspond to a weight of many tens of tons, the tambour is lifted up from the paper making machine and is transferred to a slitting and winding machine or to a reeling end, where it is subjected to slitting and cutting to rolls with a roll width and a web length according to the customer's specifications. The example of an embodiment of the invention which shall be described in detail in the following concerns how the trailing ends of the web rolls in such a reeling end or slitting and winding machine are secured.

[0007] With reference first to Fig. 1, a machine frame in the reeling end is designated 1. In the reeling end, two cylinders 2, 3 are mounted in bearings 4, 5 on two bases 6, 7, which form foundation blocks for a pair of gables 8, 9 in the machine frame 1. A transversal beam 10 extends between and connect the upper portions of gables 8, 9. A number of web rolls 11 which have different width and whose ends 50, Fig. 3, shall be secured, rest on the cylinders 2, 3. The cylinders 2, 3 are provided such that they can be rotated, conveniently by means of a motor 20 for each cylinder. In the reeling end, or in the slitting and winding machine, as the case may be, also a number of further means, which normally are included in such machines, may be included, such as means for slitting and cutting the web, means for moving the finished, end secured rolls out from the reeling end or slitting and winding machine, etc.

[0008] The integrated assembly according to the invention is generally designated 12, Fig. 2. Its main components consist of a tape dispenser 13, a tape conveyor 14, and motion means for the conveyor. The tape dispenser 13 is of a type and has a design which is known per se, but is not of the type and design which conventionally is employed in the present field of use. The main difference is that the roll of adhesive tape 15 in the dispenser 13 is much wider than those tape rolls which conventionally are used in the field. While the latter ones normally have a width in the order of 50 mm, the roll of adhesive tape 15 in the dispenser is several times wider. In the present example it has a width of 250 mm. On the other hand, an essentially shorter piece of tape is cut off in connection with each delivery of tape, e.g. 50 mm, than what is conventional, by means of an electromagnetically operated cutter, not shown, which is provided in the dispenser 13. The size of the tape in the example will yet be the same as the size of the tapes which conventionally are used in the field, i.e. 50 x 250 mm. However it is possible according to the invention, if that would be desired, to produce also wider tapes, e.g. tapes with the size 100 x 250 mm, simply by cutting off a 100 mm long piece of tape from the roll of adhesive tape 15. In or on the dispenser 13 there is also an electric motor 18, which is shown symbolically, for feeding out tape. The dispenser 13 can be moved in the vertical direction by means of motion means, generally designated 19, which may be

of a conventional type, between an upper working position, Fig. 1 - Fig. 5, and a lower charging position, Fig. 8, which need to be visited more seldom, for replenishment of tape. The tape has an adhering coating only on that side which shall face those end portions of web material which shall be secured. If the web material is paper, the tape also consists of paper or other material which can be dissolved in connection with recycling in a paper mill. In other cases, the tape is made of a material suitable in the case.

[0009] The main parts of the conveyor 14 consist of an elongated box girder 22, an endless conveying belt 23 extending about the two ends of the box girder, a driving motor 24 (symbolically shown), for the conveying belt, two sets of aggregates 25a and 25b of motion members for the linear movements of the box girder, and two sets of motion members for turning the box girder about a horizontal center of rotation 37. That side of the box girder 22 which in Fig. 3 and in Fig. 4 is facing the viewer is denominated front side 22a, and its opposite side, Fig. 1, Fig. 2, and Fig. 5, consequently denominated rear side 22b. The motion means 25a and 25b for the linear movements of the conveyor are shown only schematically in Fig. 1, Fig. 7 and in Fig. 8. Their design is shown more in detail in Fig. 5.

[0010] The box girder 22 has a perforated bottom 26, Fig. 6, and one of its ends, defined as the front end, 27, Fig. 1, Fig. 4, extends to nearly close to the dispenser 13, separated from the dispenser only by a short gap 29, Fig. 4. Fig. 1 - Fig. 4 shows the box girder in its loading position, that is in the position where it receives tapes 28 from the dispenser 13 at the same level as where the dispenser is located and is oriented such that a slot-shaped feeding out opening 30 in the dispenser 13 is on the same level as the bottom surface of the conveyor belt 23, Fig. 3, Fig. 4. The driving motor 24 for the conveyor belt 23 is provided at the rear end of the box girder and drives the conveyor belt via a not shown driving roll in a chamber 31 in said rear end. Said chamber 31 is separated by a partition wall 32 (indicated by dashed lines on the exterior of the box girder) from the main part of the box girder, where said perforated bottom is located. The conveyor belt's driving roll in the chamber 31 may be coated with friction rubber, or may other conventional or specially designed means be provided in order to ensure a safe grip against the conveyor belt and hence a non-slip coupling between the driving roll and the conveyor belt. The driving motor 24 may be provided in or outside the chamber 31, as well as not shown means for maintaining the conveyor belt stretched. In the drawings, however, the driving motor 24 is placed on the outside.

[0011] The interior 35 of the box girder has, as mentioned, a perforated bottom 26 in the region of the main part of the box girder which extends from the partition wall 32, and is connected to a symbolically shown air exhauster 34 via a symbolically shown hose 33,

[0012] Fig. 6, such that a reduced pressure is maintained in the box girder above the perforated bottom 26.

The conveyor belt 23 consists of a high strength material which is permeable to air. It may for example consist of a belt which is perforated by holes lying closely together and is preferably reinforced such that it will have such a high coefficient of elasticity in the longitudinal direction of the belt, such that its elongation can be neglected. When the interior 35 of the box girder 22 is connected to the air exhauster 34, air will therefore be sucked in into the interior of the box girder via the air permeable conveyor belt 23 and the perforated bottom 26 of the box girder. This is employed for suctioning fast the tapes 28 with their non-adhesive side against the conveyor belt 23, as will be further described in the following.

[0013] The one set of motion members 25a, Fig. 1, now will be described with reference to Fig.5 in a view from below to the left in Fig. 1. The second set of motion members 25a is identically but mirrorwise designed. The box girder 22, which constitutes the framework of the conveyor 14, and the conveyor belt are shown cut off in the drawing. The motion members include an elongated, wide and plate-shaped slide 40 which extends obliquely upwards-downwards at the same angle of inclination as the intended direction of movement of the conveyor 14 to and fro the web rolls 11. One side 40a of the slide 40 is flat and faces the corresponding slide in the second set of motion members 25b. On the opposite side 40b of slide 40 there are provided two pairs of parallel recesses or grooves 41a' and 41a", and 41b' and 41b", respectively, which match two pairs of corresponding rails 42a' and 42a", and 42b' and 42b", respectively, on a guide 38. The two pairs of rails on the guide 38 clutch the two rail-shaped male portions 42" and 42'" which are formed between the grooves 41a' and 41a", and 41b' and 41b", respectively, on the slide. The guide 38 is fixedly mounted on, or forms an integrated part of a bracket 38a, which is fixedly mounted on the machine frame 1.

[0014] Driving means in said members 25a consist of an electrical motor 45 mounted on the bracket 38a, and a toothed drive belt 45a, which extends about half the circumference of a toothed drive wheel 45b on the driving axis of the motor 45, the teeth of which match the teeth of the drive belt 45 a. The toothed drive belt 45a extends along the whole length of the guide 40. It is recessed in a central groove in the guide and is fastened in the two ends of the guide. The bracket 38a and the motor 45 are protected by a cover 39, which has been removed in Fig. 5 in order to visualize the driving members under the cover.

[0015] The conveyor 14 is connected to the lower ends of the two guides 40, in a mode which is partly illustrated in Fig. 5 but will be shown and explained more in detail in the following. But it should be understood already by what has been shown and explained so far, that the two slides 40, which form part of said sets 25a and 25b of motion members, guided by the guides 38, can be displaced through linear movements, bringing the conveyor 14 with them, to and fro the web rolls by means of the stationary mounted motors 45 (one in each set of motion

members 25 a and 25b) and the toothed drive belts 45 a. **[0016]** Each set 36a, 36b of motion members, Fig 3, Fig. 4 and Fig. 6, for turning the box girder 22 about a horizontal axis of rotation 37, comprises the following components in each end of the conveyor 14: a pneumatic actuator 44, a bracket 43 which is stationary mounted on the flat side of 40a of the slide 40, and a short lever 46a in the form of a first arm of a right-angled yoke 46, the second arm 46b of which is secured to the front side 22a of the box girder. The first mentioned arm/lever 46a extends over the upper side of the box girder at a short distance therefrom, such that passages 51 are formed for the conveyor belt 23 between the arms/levers 46a and the box girder 22. Nose portions 47 of the levers 46a in both ends of the box girder extend a distance beyond the rear side 22b of the box girder.

[0017] An axle bar 53 has a first part 53a which has a large diameter and a second part 53b which has a smaller diameter. The first part 53a of the axle bar is stationary connected to the flat side of the slide 40, while the levers 46a in the two ends are pivotally connected to the second part 53b of the respective axle bar 53 in a first hole 48 which forms a bearing in the yoke 46 in a region above the front wall 22a of the box girder. The center of the axle bar 53 defines said center of rotation 37. In the projecting nose portion of the lever 46a, a second hole 49 is provided for the connection of the piston rod of the actuator 56b to the lever 46a.

[0018] Fig. 6 shows a development of the invention which aims at making the application of the tapes 28 on the web rolls 11 more efficient. For that purpose, according to the embodiment, the tape conveyor is equipped with first devices 56 for causing an initial application of the tapes 28, and second devices 57 for completing the application. These devices are placed on the rear side 22b of the box girder 22. The first devices include a ruler or a series of rulers 56a, which consist of a metal rail having a thick layer of a plastic material with a low friction coefficient, e.g. Teflon, on its underside. The ruler/rulers 56a extends/extend along the entire part of the box girder 22 which is provided with a perforated bottom. The ruler/rulers is/are provided simultaneously to be moved down against a portion 28a of the tapes 28 which extends beyond the rear edge of the box girder 22, and for a fraction of a second press that portion 28a against the web rolls, so that the tapes initially stick with their adhesive underside to the web material, whereupon the ruler/rulers are brought back to their resting position as shown in Fig. 6. A number of pneumatic actuators 56b are provided for the movements of the ruler/rulers, suspended by and connected via hinges/hangers 58 which extend downwards from an elongated, horizontal carrier 59 which is secured on the rear side 22b of the box girder 22. The further devices 57, which shall complete the application and also minimize formation of wrinkles in connection with the application, include a series of rolls 57a. Said rolls are carried by bent arms 57b, which are pivotally connected to the same hangers 58 which carry the said

first devices 56, and are pressed by means of springs 57c against the web rolls 11 and successively also against the tapes and the web ends 50.

[0019] The box girder 22 may have a considerable length. In the case when the invention shall be applied in the paper manufacturing industry, the length may exceed ten meters. In order to prevent any unacceptably large deflection, the box girder therefor should have a low dead weight and an adequate bending rigidity, particularly in the vertical direction. It may also be reinforced by an exterior or, as is shown in Fig. 6, by an interior, perforated framework 60.

[0020] The mode according to which the assembly of the invention is intended to operate, can be automatized to a high degree. This is particularly true as far the paper manufacturing industry is concerned, the specific demands of which the application in the first place has been developed to satisfy. Within other fields of use, the demand of automatization may not be correspondingly great, or is a high degree of automatization not possible or even desirable, but also in those fields of use the invention may hold out many advantages in connection with manufacturing and/or winding up web material, even if not as obvious as within the paper manufacturing industry. In the following, however, the mode of operation of the invention shall be described as an example of the highly automatized technique which the invention makes possible for securing the ends of web rolls in the paper manufacturing industry.

[0021] The process for the manufacturing of paper is computerized to a high degree. This is true also as far as those units are concerned, which are provided in direct connection to the reeling end or the slitting and winding machine. When the web material has been cut and slot and the paper rolls 11 are resting on the cylinders 2, 3 in the reeling end 1, data are already stored in the control unit which is responsible for controlling the automatic application of the tapes. Thus, in the control unit information is stored about the diameter of the rolls 11 of paper/web material, the width of each of them, how many tapes that shall be attached on each of them, where the tapes shall be placed, and the distance between them.

[0022] The process for securing the ends of the paper web on the finished rolls is initiated already when the paper is being processed in the reeling end or in the slitting and winding machine of the paper manufacturing machine. The tape dispenser 13 and the tape conveyor 14 then are in their charging positions far above the levels which the finished rolls later on shall occupy, Fig. 1, Fig. 3. The conveyor belt 23 is moved at a low, constant rate about the box girder 22 during this phase. At times determined according to data which are stored in the control unit for that specific set of web rolls which is being manufactured, a pulse transducer transmits a signal to the electromagnetically operated cutter in the tape dispenser 13 to cut off a piece of tape from the roll of adhesive tape 15, such as the tape 28a, Fig. 4, which immediately is fed out through the slot shaped feeding-out opening 30,

Fig. 4, which is essentially at level with the bottom surface of the conveyor belt 23, and from there the tape is directed out under the conveyor belt 23. Then the tape 28a, due to the reduced pressure in the box girder 22 is immediately sucked fast, while the tapes which previously have been fed out, are maintained sucked fast against underside of the air permeable conveyor belt 23, which is in contact with symbolically shown vacuum source 34. In this mode a desired number of tapes 28 are successively distributed to the underside of conveyor belt, Fig. 3, on places which correspond to those places on the finished web rolls 11 in the reeling end 1 where the tapes shall be attached, Fig. 4, whereupon the conveyor belt is stopped.

[0023] When the paper, or other web material, of a desired length has been manufactured, has been slot to desired widths, and in the form of rolls have been placed on the cylinders 2,3 in the reeling end 1, the ends 50 shall be secured by means of those tapes 28 which have been distributed in the said desired way on the conveyor belt 23. Information is also stored about where the end of the web material is located, when the tape application process is initiated, as well as information about where the end should be located when the tapes are applied. If the actual is- value does not correspond with the desired should-value, the rolls 11 are rotated a certain angle on the rolls 2,3 by means of the motors 20 until the desired should- value, which is stored in the control unit, has been reached.

[0024] Simultaneously, or when the position of the web ends have been adjusted, the tape conveyor 14 with the on its underside releasably adhering tapes is moved obliquely downwards towards the web ends 50 on the rolls 11, more specifically towards the edges 52 of said ends 50, by means of the motion members 25a and 25b.

[0025] Simultaneously, or when the underside of the tape conveyor has reached a position close to the rolls, the tape conveyor 14, if necessary, is turned about its horizontal axis of rotation 37 by means of the aggregation of motion members 36a and 36b for adaptation of the position of the conveyor to the diameter of the rolls 11, so that the underside of the conveyor belt 23 will be essentially parallel with a tangent to the rolls 11 where the tapes shall be placed.

[0026] The tape conveyor 14 now has been brought to the position illustrated in Fig. 6. The ruler/rulers 56a then are quickly brought down against the sticking out portions 28a of the tapes 28 until contact with the roller 11 at a distance inside the edge 52 of the web ends 50, causing the projecting portions 28a of all the tapes to contact its respective web end 50 simultaneously, whereupon they are quickly returned. When the adhering surface of the projecting portion of the tapes contacted the web ends, they were immediately adhered to them. The web rolls 11 then are rotated in the clock- wise direction with reference to Fig. 6. The direction is also indicated by an arrow in the drawing. As the rolls 57a are rolled over the adhering portions 28a and successively also over the

rest of the tapes, at the same time as the rolls 57a are pressed against the tapes 28 by means of the springs 57c, efficient adherence between the whole adhering surface of the tapes is achieved. At the same time also possible wrinkles are eliminated. The application of the tapes thence is finished and all components of the assembly may be returned to their starting positions, Fig. 1.

[0027] The tape dispenser 13 which is employed in the above described example contains a roll of adhering tape 15 which represents a large volume of tapes. But even that volume is eventually ended and has to be replaced, which is illustrated in Fig. 8. The dispenser 13 thus is moved down by means of an elevator 19 from its upper working position, Fig. 1, to the lower tape charging position at a level above the floor which is a comfortable working level for the staff who shall do that job. The elevator 19 can be designed in numerous ways according to conventional technique, i.e. as a screw conveyor, or by means of elements similar to those which are employed in the aggregate of motion members 25a, 25b for the linear movements of conveyor 14/box girder 22, and shall not be described more in detail. In the lower position a quick change of tape roll can be done, whereupon the dispenser 13 is lifted up to its working position.

[0028] Due to the design of the assembly, the invention is well adapted to a high degree of automatizing, which is illustrated by the above description. As mentioned in the preamble, however, there are applications where a high degree of automatizing is neither possible nor desired. In such cases the basic principles of the invention can be combined with measures which can be performed manually. The invention and the claimed patent protection is therefore not restricted to the application which is described in the example, but only by the patent claims.

Claims

1. A method for securing on each of a plurality of web rolls in a set of web rolls which lie close to or are adjacent to one another and have a common centre axis, the trailing end (50) of the web through applying on each of the rolls at least one securing tape (28) which has an adhering coating on a first side, so that the end securing tape is fixed with said first side against the roll and extends over the edge (52) of the trailing end of the web,
characterized in that those end securing tapes (28) which shall be applied, first are transferred from a tape dispenser (13) to a tape conveyor (14,22) such that they are caused to lie with their opposite, second side against said conveyor at a distance from one another on the conveyor corresponding to the desired distances between the securing tapes on the web rolls, respectively, that they are temporarily retained on the conveyor as the conveyor thereafter is moved towards the web rolls with the adhering first side (28b) facing the web rolls, each tape being di-

rected against that place on the rolls where the respective tape shall be applied, that all the tapes are brought into contact with their respective roll and are fixed to it on said respective place, and that the conveyor then is moved from the rolls and from the tapes, which remain fixed to the rolls therein that said first side of the tapes has a larger adhesive strength to the rolls than the opposite, second side has to the conveyor.

2. A method according to claim 1, **characterized in that** the tapes (28) have an adhesive coating only on said first side and that they temporarily are retained by suction power against the conveyor.
3. A method according to claim 1 or 2, **characterized in that** the tapes temporarily are retained against a conveying belt (23) on the conveyor.
4. A method according to claim 3, **characterized in that** the tapes are fed from a tape dispenser (13) to the conveyor, that they are distributed on the conveyor belt at a distance from one another corresponding to the desired distances between the tapes when they have been applied on the web rolls, that the conveyor provided with said tapes is moved towards the web rolls until contact between the adhering surfaces of the tapes and the web rolls on intended places so that the tapes will cover the end edges (52) of the webs, and that the conveyor then is moved away from the web rolls, leaving the tapes behind, securing the web ends.
5. A method according to any of claims 1-4, **characterized in that** the tapes are cut off from a tape roll in said tape dispenser such that their length crosswise to the longitudinal direction of the tape web in the tape roll is caused to be longer than the length of the tape in the outflow direction of the tape web from the dispenser.
6. A method according to any of claims 1-5, **characterized in that** the tapes are distributed along the conveyor by means of the movable conveyor belt, that they are stuck fast through suction against the conveyor belt because the conveyor belt is pervious to air and contacts a wall of the conveyor which is perforated, and because an underpressure is maintained in the interior (35) of the conveyor inside of said perforated wall.
7. A method according to any of claims 1-6, **characterized in that** the tapes are transferred from the tape dispenser to the conveyor such that a portion (28a) of the tapes extends beyond a rear side (22b) of the conveyor.
8. A method according to claim 7, **characterized in**

that said extending portion (28a) of each tape initially is brought into contact with said trailing end/ends (50) at a distance from the edge (52) of the trailing end, and that the rest of the tapes thereafter successively are pressed against the web.

9. An assembly for securing on each of a plurality of web rolls in a set of web rolls which lie close to or adjacent to one another and have a common centre axis, the trailing end (50) of the web through applying on each of the rolls at least one securing tape (28) and totally a plurality of tapes which have an adhering coating on a first side, and applying the tapes with said first side against the rolls such that they extend over the edge of the web end,
characterized in that it comprises a tape dispenser (13) provided to feed tapes one by one to an essentially rigid, elongated tape conveyor (14) which has a length at least as long as the distance between the farthest out positioned tapes that shall be applied against the rolls, that means (23) are provided for placing the tapes on the conveyor with a spacing corresponding with the desired spacing between the tapes when the tapes have been secured on desired places on the web rolls, that the conveyor is capable of retaining the tapes when the tapes rest with their second side against the conveyor, which second side is opposite said first side, and that a first aggregate of motion members (25a,25b) is provided to move the conveyor with said tapes towards said desired places on the web rolls from a starting position at a distance from the web rolls till contact between said first side of the tapes and the rolls on said desired places and then back to the starting position leaving the tapes behind, secured on said desired places on the web rolls.
10. An assembly according to claim 9, **characterized in that** the conveyor (14) has a movable conveyor belt.
11. An assembly according to claim 10, **characterized in that** the interior of the box girder (22) is connected to a vacuum source (34) in order to maintain an underpressure (pressure below that of the atmosphere) in the interior of the box girder, that the box girder has a perforated bottom (26), that the conveyor belt is permeable to air and that it directly or indirectly contacts said perforated girder bottom such that the tapes can be held by suction power against the conveyor belt.
12. An assembly according to claim 10, **characterized in that** the conveyor body comprises a box girder (22), that the conveyor belt is endless and movable around the box girder, that the conveyor has a first end adjacent to the tape dispenser, and that an out feeding opening (30) for tapes is essentially at level with an outside of the conveyor belt, preferably with

its underside, when the conveyor and the tape dispenser are in their feeding out position.

13. An assembly according to claim 9, **characterized in that** a second aggregation of motion members (36a,36b) are provided for turning the conveyor (14) about a horizontal axis of rotation (37).
14. An assembly according to claim 9, **characterized in that** at least any of the following means are provided on the rear side of the conveyor, namely any of the means which include means (56) for initially pressing against the web rolls a tape portion (28a) which extends beyond said rear side, and means for successively pressing the rest of the tapes against the web material.
15. An assembly according to any of claims 9-14, **characterized in that**, during the feeding out of tapes from the tape dispenser to the conveyor, the tape dispenser and the conveyor are located at an essentially higher level than those web rolls which shall be coated with said tapes, and that said first aggregate of motion members (25a,25b) for the provision of the linear movements of the conveyor are provided to displace the conveyor down from and up to said higher level.

30 Patentansprüche

1. Verfahren zur Befestigung, an jeder einer Mehrzahl von Bahnrollen in einem Satz von Bahnrollen, die nahe aneinander oder aneinander angrenzend liegen und eine gemeinsame Mittelachse aufweisen, des nachlaufenden Endes (50) der Bahn durch Aufbringen, an jeder der Rollen, mindestens eines Befestigungsbands (28), das eine haftende Beschichtung auf einer ersten Seite aufweist, so dass das Band zur Befestigung des Endes mit der ersten Seite an der Rolle befestigt ist und sich über die Kante (52) des nachlaufenden Endes der Bahn erstreckt,
dadurch gekennzeichnet, dass jene Bänder (28) zur Befestigung des Endes, die aufgebracht werden sollen, zuerst derart von einem Bandspender (13) zu einem Bandförderer (14, 22) übertragen werden, dass bewirkt wird, dass sie mit ihrer gegenüberliegenden, zweiten Seite in einem Abstand voneinander auf dem Förderer an dem Förderer anliegen, deren gewünschten Abständen zwischen den Befestigungsbandern auf den Bahnrollen entspricht, beziehungsweise, dass sie zeitweise auf dem Förderer festgehalten werden, wenn der Förderer danach hin zu den Bahnrollen bewegt wird, wobei die haftende erste Seite (28b) den Bahnrollen zugewandt ist, wobei jedes Band gegen jene Stelle auf den Rollen geleitet wird, wo das jeweilige Band aufgebracht werden soll, dass alle Bänder mit ihrer jeweiligen

- Rolle in Kontakt gebracht werden und an der jeweiligen Stelle an ihr befestigt werden, und dass der Förderer dann von den Rollen und von den Bändern weg bewegt wird, welche an den Rollen befestigt bleiben, dadurch, dass die erste Seite der Bänder eine größere Haftfestigkeit an den Rollen als die gegenüberliegende, zweite Seite am Förderer aufweist.
2. Verfahren nach Anspruch 1, **dadurch gekennzeichnet, dass** die Bänder (28) eine Haftbeschichtung nur auf der ersten Seite aufweisen, und dass sie zeitweise durch Saugkraft an dem Förderer festgehalten werden.
 3. Vorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** die Bänder zeitweise an einem Förderband (23) auf dem Förderer festgehalten werden.
 4. Verfahren nach Anspruch 3, **dadurch gekennzeichnet, dass** die Bänder dem Förderer von einem Bandspender (13) zugeführt werden, dass sie auf dem Förderband in einem Abstand voneinander verteilt werden, der den gewünschten Abständen zwischen den Bändern entspricht, wenn sie auf die Bandrollen aufgebracht worden sind, dass der Förderer, der mit den Bändern versehen ist, bis zum Kontakt zwischen den haftenden Flächen der Bänder und den Bahnrollen an vorgesehenen Stellen hin zu den Bahnrollen bewegt wird, so dass die Bänder die Endkanten (52) der Bahnen bedecken, und dass der Förderer dann von den Bahnrollen wegbewegt wird, wobei die Bahnen zurückgelassen werden, wobei die Bahnenden befestigt werden.
 5. Verfahren nach Anspruch 1 bis 4, **dadurch gekennzeichnet, dass** die Bänder von einer Bandrolle in dem Bandspender derart abgeschnitten werden, dass bewirkt wird, dass ihre Länge quer zu der Längsrichtung der Bandbahn in der Bandrolle länger als die Länge des Bands in der Ausströmrichtung der Bandbahn aus dem Spender ist.
 6. Verfahren nach Anspruch 1 bis 5, **dadurch gekennzeichnet, dass** die Bänder entlang des Förderers mittels des beweglichen Förderbands verteilt werden, dass sie schnell durch Ansaugung an dem Förderband fixiert werden, weil das Förderband luftdurchlässig ist und mit einer Wand des Förderers in Kontakt steht, die perforiert ist, und weil ein Unterdruck im Inneren (35) des Förderers innerhalb der perforierten Wand beibehalten wird.
 7. Verfahren nach Anspruch 1 bis 6, **dadurch gekennzeichnet, dass** die Bänder von dem Bandspender derart zu dem Förderer übertragen werden, dass sich ein Abschnitt (28a) der Bänder über eine Rückseite (22b) des Förderers hinaus erstreckt.
 8. Verfahren nach Anspruch 7, **dadurch gekennzeichnet, dass** der sich erstreckende Abschnitt (28a) jedes Bands anfangs mit dem/den nachlaufenden Ende(n) (50) in einem Abstand von der Kante (52) des nachlaufenden Endes in Kontakt gebracht wird, und dass der Rest der Bänder danach nacheinander gegen die Bahn gedrückt wird.
 9. Anordnung zur Befestigung, an jeder einer Mehrzahl von Bahnrollen in einem Satz von Bahnrollen, die nahe aneinander oder aneinander angrenzend liegen und eine gemeinsame Mittelachse aufweisen, des nachlaufenden Endes (50) der Bahn durch Aufbringen, an jeder der Rollen, mindestens eines Befestigungsbands (28), und gänzlich einer Mehrzahl von Bändern, die eine haftende Beschichtung auf einer ersten Seite aufweisen, und Aufbringen der Bänder mit der ersten Seite auf die Rollen, so dass sie sich über die Kante des Bahnendes erstrecken, **dadurch gekennzeichnet, dass** sie einen Bandspender (13) umfasst, der vorgesehen ist, um Bänder eins nach dem anderen einem im Wesentlichen steifen, langgestreckten Bandförderer (14) zuzuführen, der eine Länge aufweist, die mindestens so lang ist wie der Abstand zwischen den am weitesten außen positionierten Bändern, die auf die Rollen aufgebracht werden sollen, dass Mittel (23) zur Platzierung der Bänder auf dem Förderer mit einem Abstand vorgesehen sind, der mit dem gewünschten Abstand zwischen den Bändern übereinstimmt, wenn die Bänder an gewünschten Stellen auf den Bahnrollen befestigt worden sind, dass der Förderer geeignet ist, die Bänder festzuhalten, wenn die Bänder mit ihrer zweiten Seite an dem Förderer anliegen, wobei die zweite Seite der ersten Seite gegenüberliegt, und dass ein erstes Aggregat von Bewegungselementen (25a, 25b) vorgesehen ist, um den Förderer mit den Bändern hin zu den gewünschten Stellen auf den Bahnrollen aus einer Ausgangsposition in einem Abstand von den Bahnrollen bis zum Kontakt zwischen der ersten Seite der Bänder und den Rollen an den gewünschten Stellen und dann zurück zu der Ausgangsposition zu bewegen, wobei die Bänder an den gewünschten Stellen auf den Bahnrollen befestigt zurückgelassen werden.
 10. Anordnung nach Anspruch 9, **dadurch gekennzeichnet, dass** der Förderer (14) ein bewegliches Förderband aufweist.
 11. Anordnung nach Anspruch 10, **dadurch gekennzeichnet, dass** das Innere des Kastenträgers (22) an eine Vakuumquelle (34) angeschlossen ist, um einen Unterdruck (Druck unterhalb jenes der Atmosphäre) im Inneren des Kastenträgers beizubehalten,

dass der Kastenträger einen perforierten Boden (26) aufweist, dass das Förderband luftdurchlässig ist und dass es direkt oder indirekt derart mit dem perforierten Trägerboden in Kontakt steht, dass die Bänder durch Ansaugkraft an dem Förderband gehalten werden können.

12. Anordnung nach Anspruch 10, **dadurch gekennzeichnet, dass** der Fördererkörper einen Kastenträger (22) umfasst, dass das Förderband endlos und um den Kastenträger herum beweglich ist, dass der Förderer ein erstes Ende angrenzend an den Bandspender aufweist, und dass eine Ausgabeöffnung (30) für Bänder im Wesentlichen auf gleicher Ebene wie eine Außenseite des Förderbands liegt, vorzugsweise wie dessen Unterseite, wenn sich der Förderer und der Bandspender in ihrer Ausgabeposition befinden.
13. Anordnung nach Anspruch 9, **dadurch gekennzeichnet, dass** eine zweite Aggregation von Bewegungselementen (36a, 36b) zum Drehen des Förderers (14) um eine horizontale Drehachse (37) vorgesehen ist,
14. Anordnung nach Anspruch 9, **dadurch gekennzeichnet, dass** mindestens beliebige der folgenden Mittel auf der Rückseite des Förderers vorgesehen sind, und zwar beliebige der Mittel, die Mittel (56) zum anfänglichen Drücken eines Bandabschnitts (28a), der sich über die Rückseite hinaus erstreckt, gegen die Bahnrollen, und Mittel zum sukzessiven Drücken des Rests der Bänder gegen das Bahnmaterial umfassen.
15. Anordnung nach einem der Ansprüche 9 bis 14, **dadurch gekennzeichnet, dass** während der Ausgabe von Bändern aus dem Bandspender an den Förderer der Bandspender und der Förderer sich auf einer im Wesentlichen höheren Ebene als jene Bahnrollen befinden, die mit den Bändern beschichtet werden sollen, und dass das erste Aggregat von Bewegungselementen (25a, 25b) für die Bereitstellung der linearen Bewegungen des Förderers bereitgestellt ist, um den Förderer von der höheren Ebene nach unten und nach oben auf diese zu verschieben.

Revendications

1. Procédé de fixation sur chacun d'une pluralité de rouleaux de bande continue dans un jeu de rouleaux de bande continue, qui reposent près ou sont adjacents les uns des autres et ont un axe central commun, l'extrémité arrière (50) du rouleau en appliquant sur chacun des rouleaux au moins un adhésif de fixation (28) qui a un revêtement adhésif sur un premier côté, de façon à ce que l'adhésif de fixation

d'extrémité soit fixé avec ledit premier côté contre le rouleau et s'étende sur le bord (52) de l'extrémité arrière du rouleau, **caractérisé en ce que** les adhésifs de fixation d'extrémité (28) qui doivent être appliqués, sont d'abord transférés depuis un distributeur d'adhésif (13) vers un convoyeur d'adhésif (14, 22) de telle façon qu'ils reposent par leur second côté opposé contre ledit convoyeur à distance l'un de l'autre sur le convoyeur correspondant aux distances souhaitées entre les adhésifs de fixation sur les rouleaux de bande continue, respectivement, qu'ils soient retenus temporairement sur le convoyeur à mesure que le convoyeur est ensuite déplacé en direction des rouleaux de bande continue avec le premier côté d'adhérence (28b) face aux rouleaux de bande continue, chaque adhésif étant dirigé contre l'emplacement sur les rouleaux où l'adhésif respectif doit être appliqué, que tous les adhésifs sont amenés en contact avec leur rouleau respectif et sont fixés dessus audit emplacement respectif, et que le convoyeur est alors éloigné des rouleaux et des adhésifs qui restent fixés aux rouleaux, que ledit premier côté des adhésifs a un pouvoir adhésif plus grand envers les rouleaux que le second côté opposé a envers le convoyeur.

2. Procédé selon la revendication 1, **caractérisé en ce que** les adhésifs (28) ont un revêtement adhésif uniquement sur ledit premier côté et qu'ils sont temporairement retenus par la force d'aspiration contre le convoyeur.
3. Procédé selon la revendication 1 ou 2, **caractérisé en ce que** les adhésifs sont temporairement retenus contre une courroie de convoyeur (23) sur le convoyeur.
4. Procédé selon la revendication 3, **caractérisé en ce que** les adhésifs sont alimentés depuis un distributeur d'adhésif (13) vers le convoyeur, qu'ils sont distribués sur la courroie de convoyeur à une distance l'un de l'autre correspondant aux distances souhaitées entre les adhésifs lorsqu'ils ont été appliqués sur les rouleaux de bande continue, que le convoyeur doté desdits adhésifs est déplacé en direction des rouleaux de bande continue jusqu'au contact entre les surfaces d'adhérence des adhésifs et les rouleaux de bande continue sur les emplacements prévus de façon à ce que les adhésifs couvrent les bords d'extrémité (52) des rouleaux, et que le convoyeur est alors éloigné des rouleaux de bande continue, laissant les adhésifs derrière, fixant les extrémités de rouleaux.
5. Procédé selon l'une quelconque des revendications 1 - 4, **caractérisé en ce que** les adhésifs sont découpés d'un rouleau d'adhésif dans ledit distributeur d'adhésif de telle façon que leur longueur transver-

salement à la direction longitudinale de la bande continue d'adhésif dans le rouleau d'adhésif soit plus longue que la longueur de l'adhésif dans la direction de sortie de la bande continue d'adhésif depuis le distributeur.

6. Procédé selon l'une quelconque des revendications 1 - 5, **caractérisé en ce que** les adhésifs sont répartis le long du convoyeur au moyen de la courroie de convoyeur mobile, qu'il sont collés rapidement par aspiration contre la courroie de convoyeur car la courroie de convoyeur est perméable à l'air et contacte une paroi du convoyeur qui est perforée et parce qu'une dépression est maintenue dans l'intérieur (35) du convoyeur à l'intérieur de ladite paroi perforée.
7. Procédé selon l'une quelconque des revendications 1 - 6, **caractérisé en ce que** les adhésifs sont transférés du distributeur d'adhésif vers le convoyeur de façon à ce qu'une partie (28a) des adhésifs s'étende au-delà d'un côté arrière (22b) du convoyeur.
8. Procédé selon la revendication 7, **caractérisé en ce que** ladite partie d'extension (28a) de chaque adhésif est amenée initialement en contact avec ladite/lesdites extrémité (s) arrière (50) à distance du bord (52) de l'extrémité arrière et que le reste des adhésifs est ensuite appuyé successivement contre le rouleau.
9. Ensemble pour fixer sur chacun d'une pluralité de rouleaux de bande continue dans un jeu de rouleaux de bande continue, qui reposent près ou sont adjacents les uns des autres et ont un axe central commun, l'extrémité arrière (50) du rouleau en appliquant sur chacun des rouleaux au moins un adhésif de fixation (28) et totalement une pluralité d'adhésifs qui ont un revêtement adhésif sur un premier côté, et en appliquant les adhésifs avec ledit premier côté contre les rouleaux de façon à ce qu'ils s'étendent sur le bord de l'extrémité du rouleau, **caractérisé en ce qu'il** comprend un distributeur d'adhésif (13) prévu pour alimenter des adhésifs un par un à un convoyeur d'adhésif (14) allongé essentiellement rigide qui a une longueur au moins aussi longue que la distance entre les adhésifs positionnés le plus loin en dehors qui doivent être appliqués contre les rouleaux, qu'un moyen (23) est prévu pour placer les adhésifs sur le convoyeur avec un espacement correspondant à l'espacement souhaité entre les adhésifs lorsque les adhésifs ont été fixés sur les emplacements souhaités sur les rouleaux de bande continue, que le convoyeur est capable de retenir les adhésifs lorsque les adhésifs reposent par leur second côté contre le convoyeur, lequel second côté est opposé audit premier côté, et qu'un premier groupe de membres de mouvement (25a, 25b) est

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prévu pour déplacer le convoyeur avec lesdits adhésifs en direction desdits emplacements souhaités sur les rouleaux de bande continue à partir d'une position de départ à distance des rouleaux de bande continue jusqu'au contact entre ledit premier côté des adhésifs et les rouleaux sur les emplacements souhaités et retour à leur position de départ laissant les adhésifs derrière, fixés sur leurs emplacements souhaités sur les rouleaux de bande continue.

10. Ensemble selon la revendication 9, **caractérisé en ce que** le convoyeur (14) a une courroie de convoyeur mobile.

11. Ensemble selon la revendication 10, **caractérisé en ce que** l'intérieur de la poutre en caisson (22) est connecté à une source de vide (34) afin de maintenir une dépression (pression en-dessous de celle de l'atmosphère) à l'intérieur de la poutre en caisson, que la poutre en caisson a un fond perforé (26), que la courroie de convoyeur est perméable à l'air et qu'elle contacte directement ou indirectement ledit fond de poutre en caisson de telle façon que les adhésifs puissent être maintenus par aspiration contre la courroie de convoyeur.

12. Ensemble selon la revendication 10, **caractérisé en ce que** le corps de convoyeur comprend une poutre en caisson (22), que la courroie de convoyeur est sans fin et mobile autour de la poutre en caisson, que le convoyeur a une première extrémité adjacente au distributeur d'adhésif, et qu'une ouverture d'alimentation en sortie (30) pour les adhésifs est essentiellement à niveau avec un extérieur de la courroie de convoyeur, de préférence avec sa sous-face, lorsque le convoyeur et le distributeur d'adhésif sont dans leur position d'alimentation en sortie.

13. Ensemble selon la revendication 9, **caractérisé en ce qu'un** second groupe de membres de mouvement (36a, 36b) sont prévus pour tourner le convoyeur (14) sur un axe horizontal de rotation (37).

14. Ensemble selon la revendication 9, **caractérisé en ce qu'au** moins n'importe lequel des moyens suivants est prévu sur l'arrière du convoyeur, à savoir que n'importe lequel de ces moyens qui inclut un moyen (56) pour appuyer initialement contre les rouleaux de bande continue une partie d'adhésif (28a) qui s'étend au-delà dudit côté arrière, et un moyen pour appuyer successivement le reste des adhésifs contre le matériau de bande continue.

15. Ensemble selon l'une quelconque des revendications 9 - 14, **caractérisé en ce que**, pendant l'alimentation en sortie d'adhésif du distributeur d'adhésif vers le convoyeur, le distributeur d'adhésif et le convoyeur sont situés à un niveau essentiellement

plus haut que les rouleaux de bande continue qui doivent être revêtus avec lesdits adhésifs, et que ledit premier groupe de membres de mouvement (25a, 25b) pour fournir les mouvements linéaires du convoyeur sont prévus pour déplacer le convoyeur vers le bas depuis et vers ledit niveau plus élevé.

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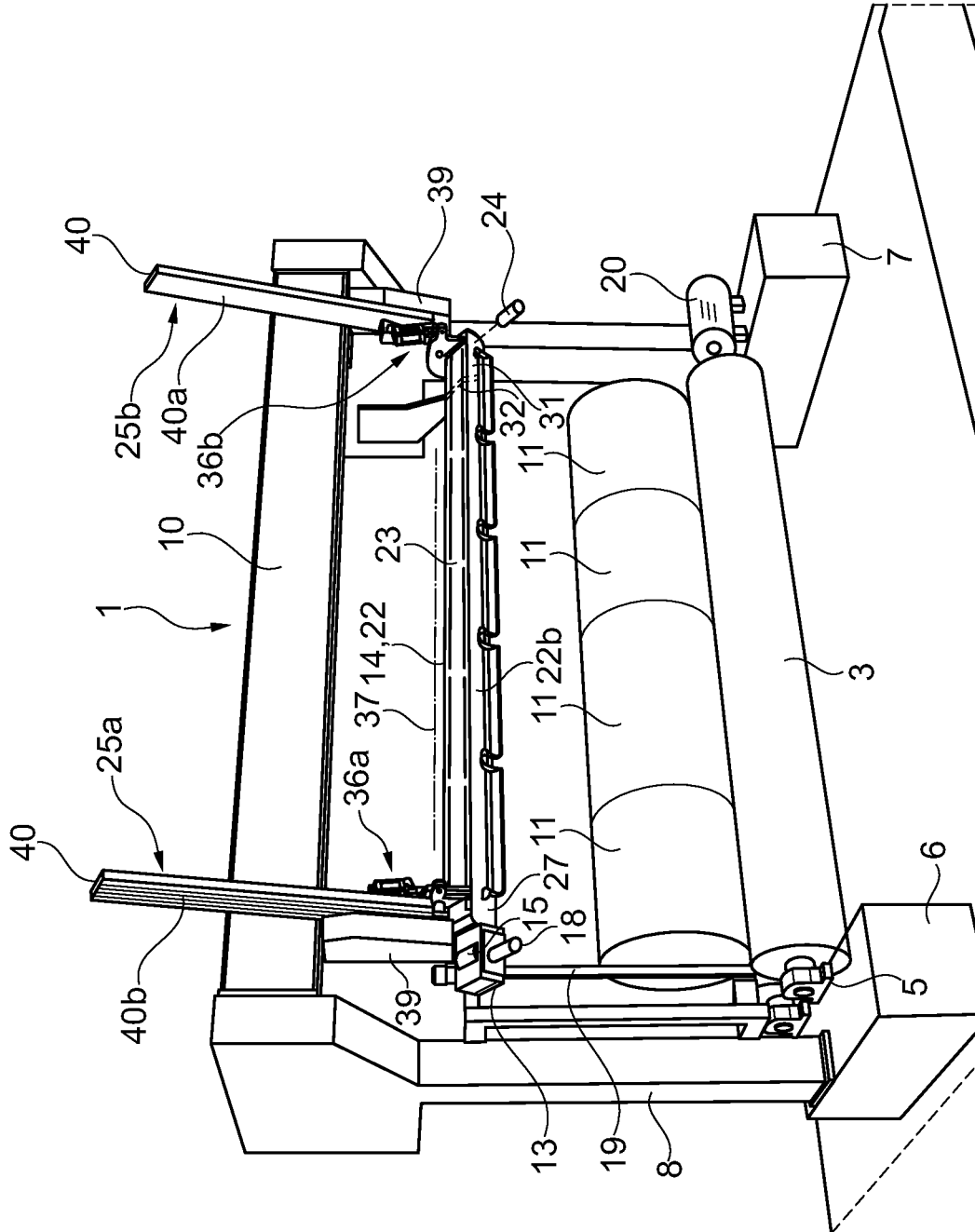


Fig. 1

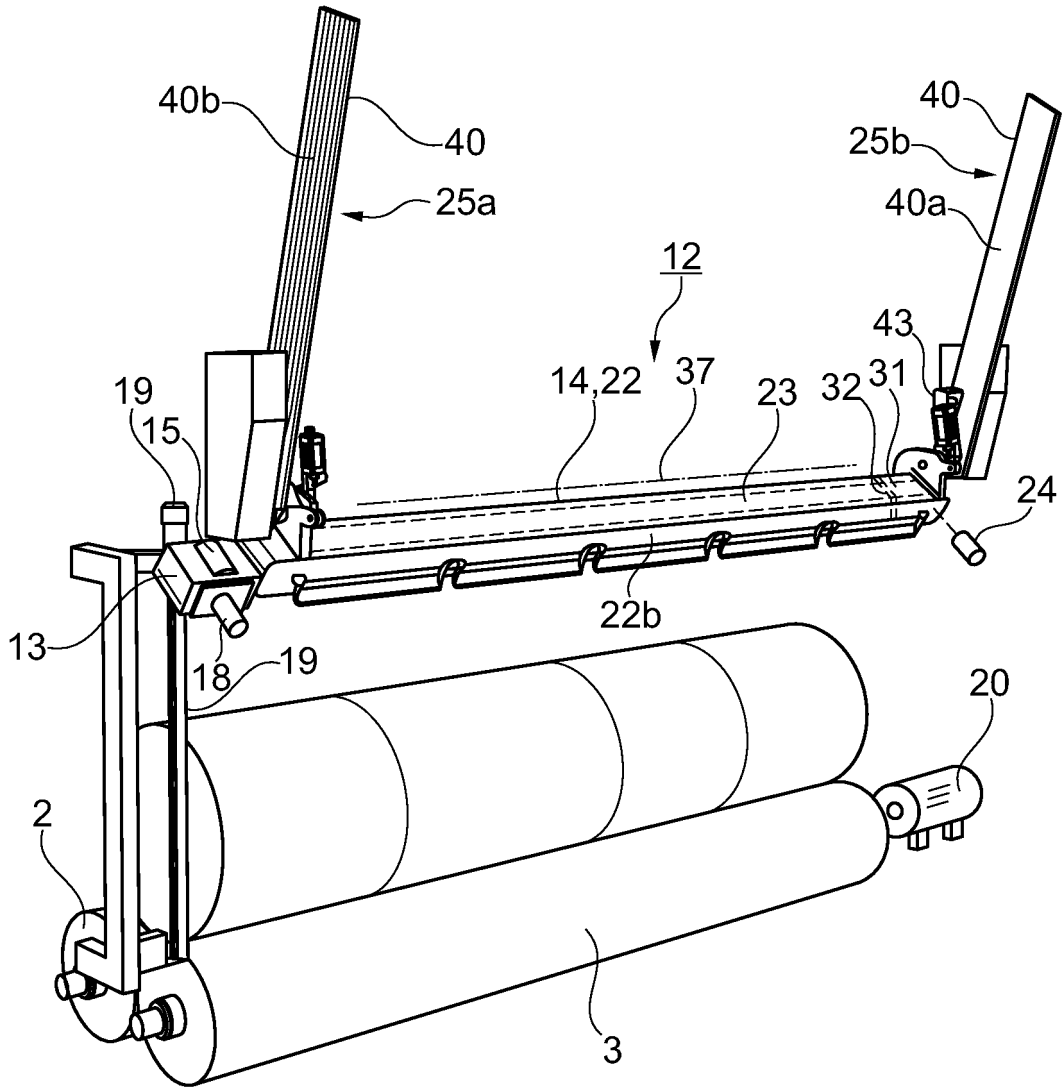


Fig. 2

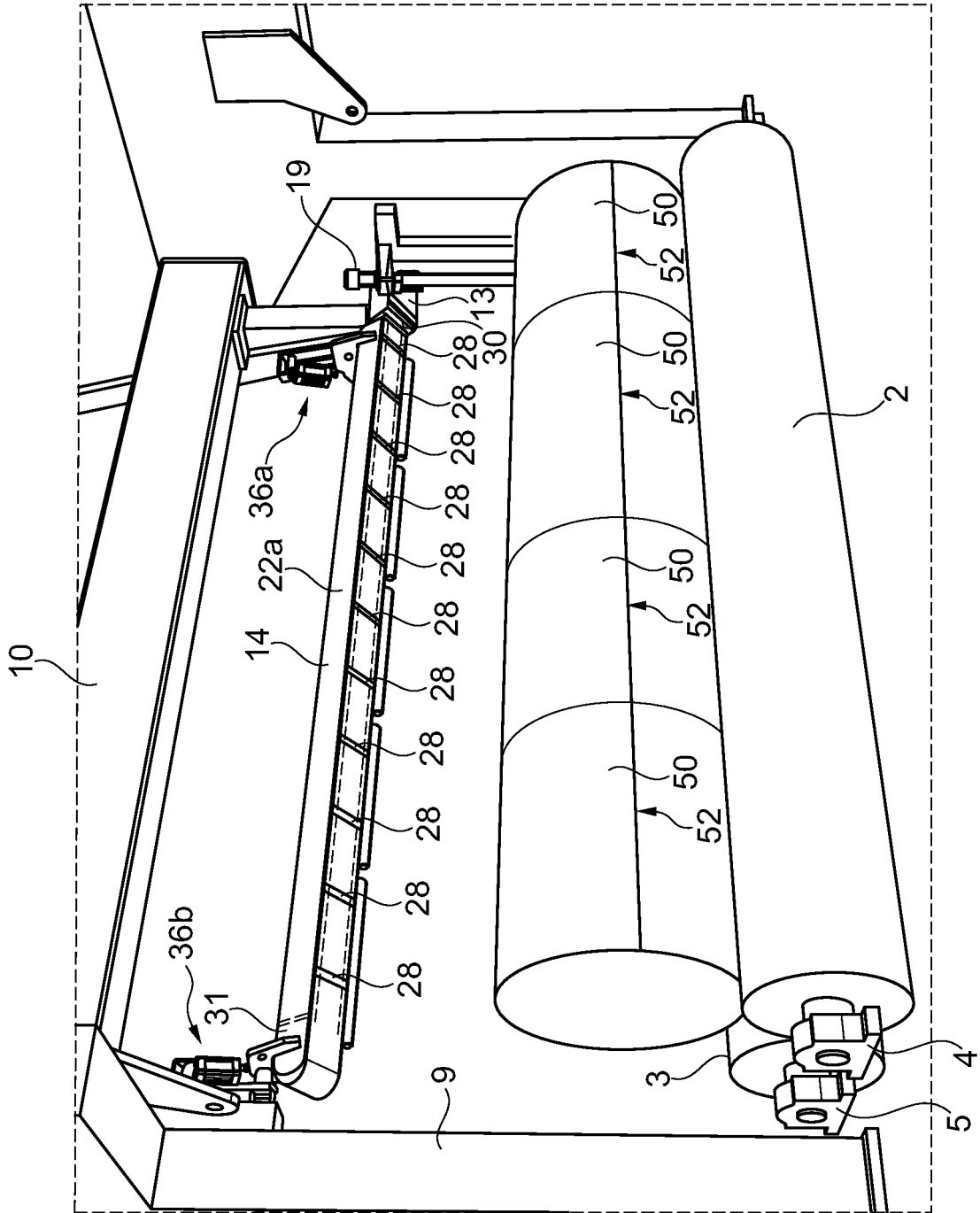


Fig. 3

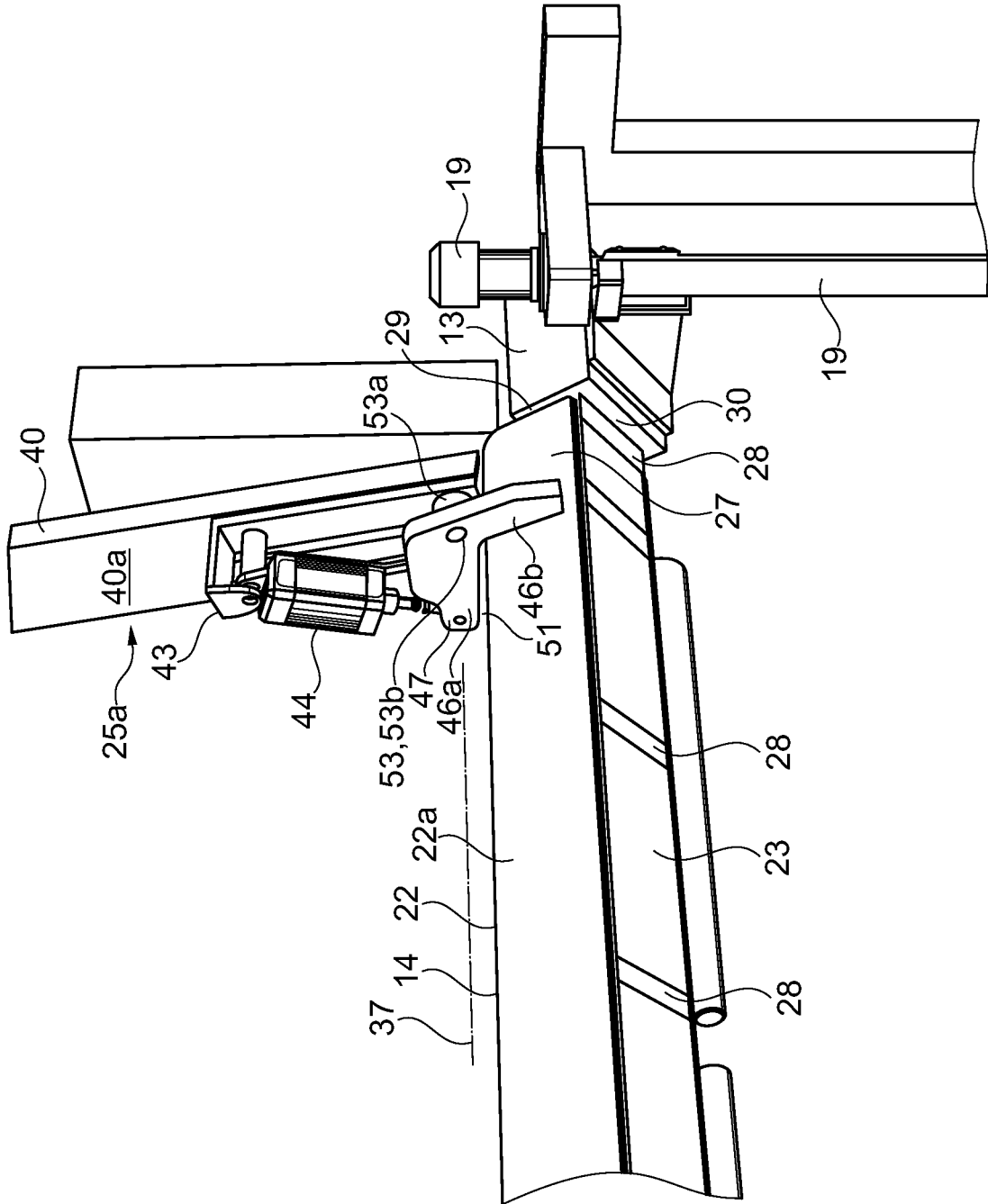


Fig. 4

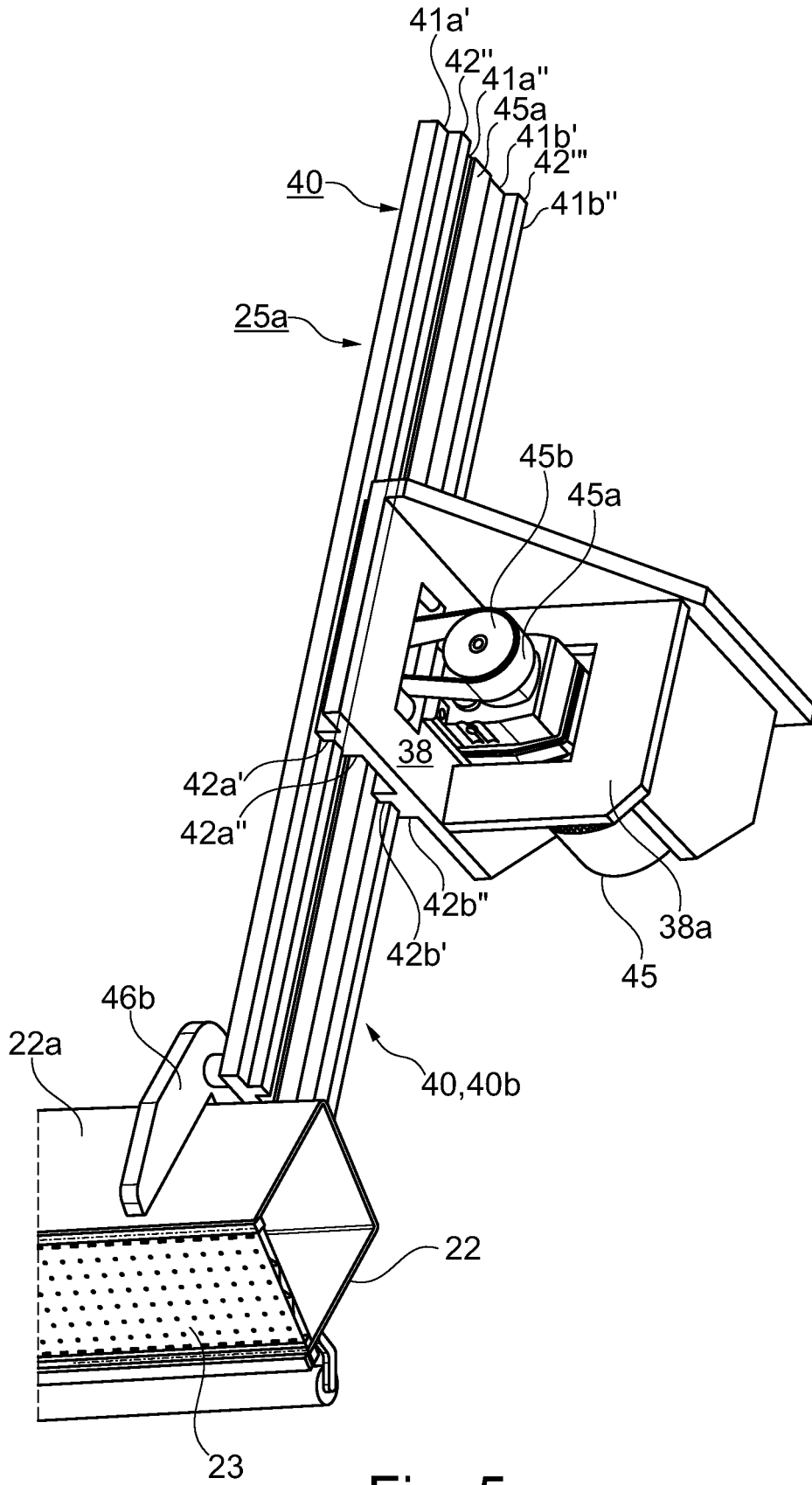


Fig. 5

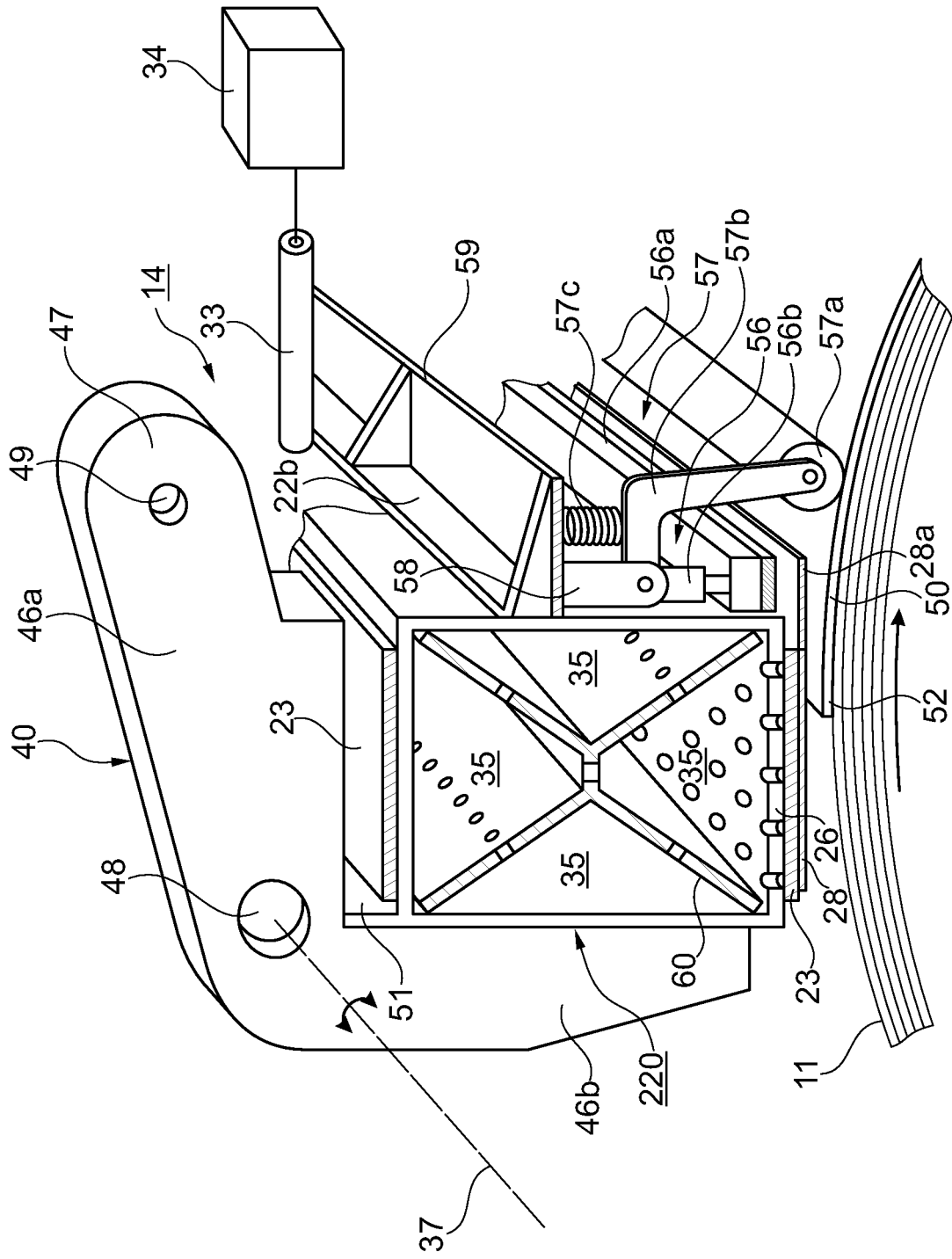


Fig. 6

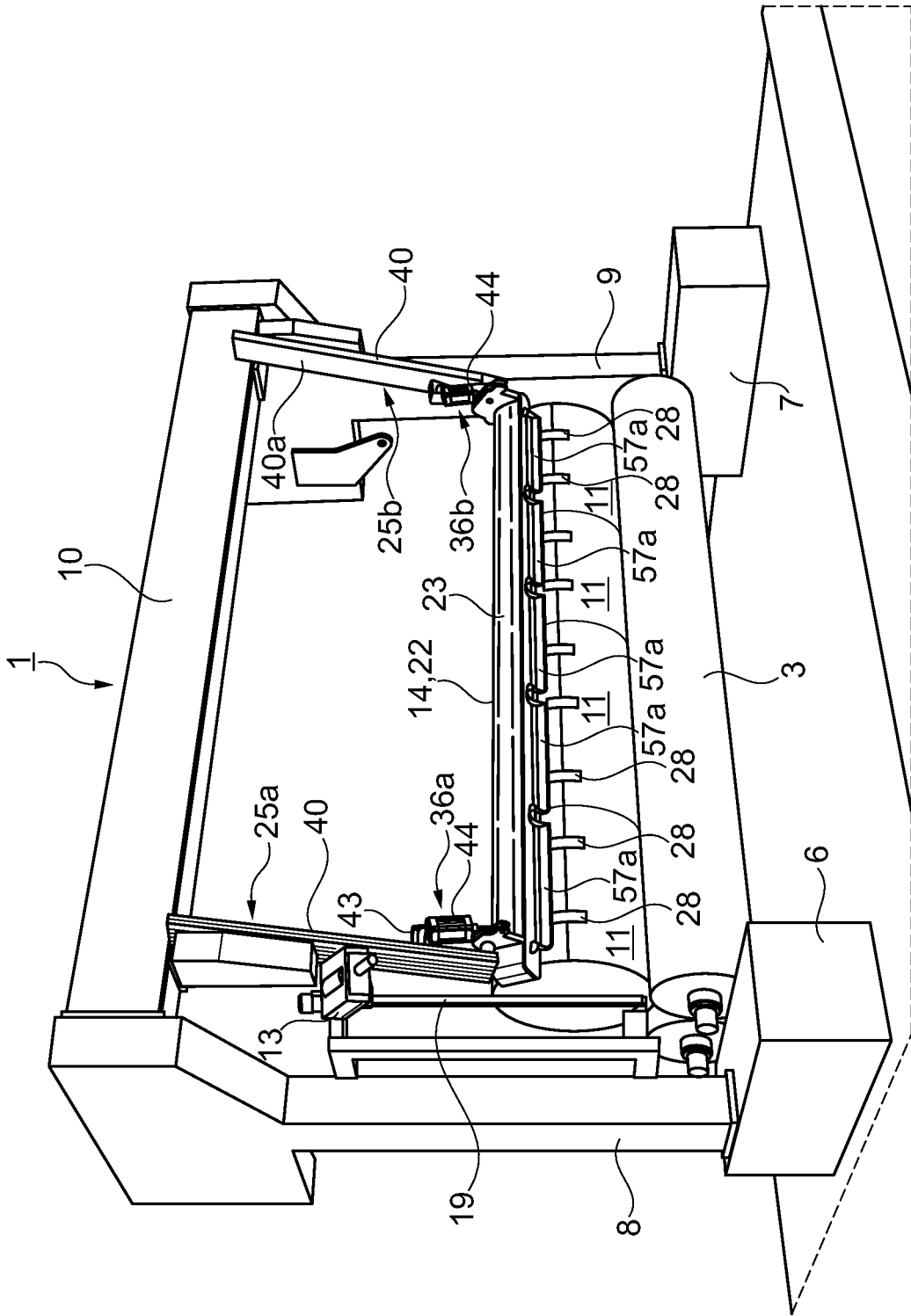


Fig. 7

REFERENCES CITED IN THE DESCRIPTION

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