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(54) **METHOD AND DEVICE FOR CONVEYING A TAIL OF A PAPER WEB**

VERFAHREN UND VORRICHTUNG ZUM EINFÄDELN EINER PAPIERBAHN

PROCEDE ET DISPOSITIF DE CONVOYAGE D'UNE POINTE DE BANDE DE PAPIER

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Description

[0001] The invention relates to a method and device for conveying a tail. The method complies with the appended claim 1, and the device is of the type presented in the preamble of the appended claim 4.

[0002] When a paper machine is started after a stoppage or a web break, the paper has to be passed through the machine again. Thus, a narrow edge strip is first separated from the edge of the paper web, which strip is first passed through the machine in the form of a so-called tail. When the tail has been passed through the machine or part of the machine, it can be spread into a full-width web. There are different guiding systems available for guiding the tail to make the tail follow the travel path of the paper web formed by cylinders and rolls. Such guiding systems, such as threading ropes and belts extend next to the actual travel path of the paper web.

[0003] One known way to transfer the narrow tail in a controlled manner is to utilize suction belts driven at the threading speed. The air permeable suction belts form loops that travel via reversing rolls, the tail being sucked against the upper surfaces of the loops by means of a suction arranged inside each loop. Typical examples of tail threadings by means of suction belt loops are disclosed for instance in the US patents 3355349 and 4022366 and in the European patent 232689.

[0004] US 4,692,215 discloses an apparatus for conveying a web lead-in strip in a paper machine. A conveyor belt is arranged in a loop around one or more reversing rolls and the lead-in strip is arranged to adhere the belt through a vacuum. The apparatus can be pivoted sideways to direct the lead-in strip precisely into the rope gap.

[0005] In known threading methods the problem is that the travel of the tail is unstable before it enters the space between the ropes or belts, primarily due to forces in the lateral direction. The tail can be tightened against the rolls during the threading, wherein in diagonal threading the edge of the tail is tightened and the risk that the tail will break is increased. Furthermore, the amount of paper passed between the ropes or the belts is poorly controllable.

[0006] It is an aim of the present invention to eliminate the aforementioned drawbacks and to present a method by means of which it is possible to conduct the threading in a more reliable manner without malfunctions. To attain this purpose, the method according to the invention is primarily characterized in what will be presented in the characterizing part of the appended claim 1. The device according to the invention is characterized in what will be presented in the characterizing part of claim 4.

[0007] It is also easy to adjust the amount of tail passed between the ropes or belts, because it is easy to stop the running of the tail at a desired point. The tail enters the space between the ropes or belts in a stable manner, and the tightening of the edge does not pose a

problem. The method according to the invention can be applied in all vacuum transfer belts.

[0008] At high speeds, it is of significance how the tail is guided between the threading ropes or belts. In the method according to the invention, the threading of the tail is implemented at that stage when it is devoid of substantial tension in the machine direction, i.e. when the tail is slack in such a manner that it is not yet tightened against the rolls. The belt conveyor feeding the tail between the threading ropes or belts is transferred to a suitable position during threading. Negative pressure affects through the belt of the belt conveyor, said negative pressure keeping the tail in its place on the surface of the belt. According to the invention, the belt conveyor is turned automatically and at the correct moment during threading so that the belt conveyor guides the tail away from between the ropes or belts. The belt conveyor is turned with respect to the turning point advantageously in the beginning of the belt. Because the turning of the belt conveyor is conducted before the tail is tightened against the roll, the tail enters the space between the ropes or belts in a stable manner and the edge is not tightened under the forces that affect in the lateral direction. The method according to the invention can be applied in all vacuum transfer belts, in which the tail is passed on a vacuum belt between threading ropes or belts. In threading tests by a pilot machine, the threading conducted by means of the method according to the invention raised the percentage of success to 75%, whereas experiments show that when prior art methods are used, the percentage of success is 33%. The running speed in the test was 1,800 m/min.

[0009] In the following, the invention will be described in more detail with reference to the appended drawings, in which

Fig. 1a shows the state of art in a side-view,

Fig. 1b shows the state of art in a top view,

Fig. 2a shows the method according to the invention in a side-view, and

Figs. 2b to 2c show the method according to the invention in a top view.

[0010] Figs. 1a to 1b show a method according to the state of art for threading a tail. The tail T is separated from a web unwound from a reel R. The tail T is tightened against the roll 1, and travels in this tight state to the point 2 in which it is passed between the threading ropes or belts. The tail T is guided by a belt conveyor 3, on top of which the tail T is arranged to fasten itself by means of negative pressure affecting through the belt of the belt conveyor. The tail T travels in an angle with respect to the machine direction, wherein laterally loading forces are applied on the other edge of the same, said forces being capable of causing the breaking of the tail T.

[0011] Figs. 2a to 2c show a method according to the invention for threading a tail. The tail T is separated from a web unwound from a reel R. The threading is conducted at that stage during the travel of the tail T when said tail is slackened and conveyed to the point 2 where it is passed between the threading ropes or belts. The tail T is guided by a belt conveyor 4, on top of which the tail T is arranged to fasten itself by means of negative pressure affecting through the belt of the belt conveyor. The belt conveyor comprises reversing rolls 4a and a belt 4b, which belt can e.g. be made of the wire material of the paper machine. The negative pressure can be arranged in such a manner that a suction device is placed inside the suction belt loop, which device is connected to the lower surface of the belt and effects a holding suction through the air permeable suction belt.

[0012] The suction device can be a vacuum box sealed against the lower surface of the belt, which is connected to the suction. The suction box can be divided into successive zones, or several suction boxes can be arranged successively, and these zones or suction boxes may contain negative pressures which can be adjusted separately.

[0013] The tail T which is substantially strainless, i.e. slack, is arranged to travel to the point 2 in such a manner that during the travel of the tail T under the control of the belt conveyor 4, said tail T is transferred more to the longitudinal direction of the machine. In Fig. 2c the lateral movement of the belt conveyor 4 is illustrated by means of an arrow M. Because the ropes and belts between which the tail is passed are on the side of the actual web area, the belt conveyors are typically located in an angle with respect to the longitudinal direction of the machine when the threading begins. The movement of the belt conveyor 4 in the direction of arrow M is arranged by turning the belt conveyor 4 with respect to a suitable turning point. The turning function effective at the turning point can be a bearing arrangement or the like. The motion of the belt conveyor is automatic, the timing is precise and relates to the threading sequence.

[0014] The invention is not restricted to the description above, but it may vary within the scope of the claims. The main aspect of the invention is that the tail is conveyed on a belt conveyor, which can be moved in the width direction of the machine during threading by turning it around a suitable turning point.

Claims

1. A method for conveying a tail in a paper machine or the like, in which a tail (T) separated from a paper web is conveyed forward for a fixed distance along a moving belt conveyor (4) conveying the paper web by keeping the tail attached by means of a suction affecting through the belt conveyor, the belt conveyor being located in an angle with respect to the longitudinal direction of the paper machine or

the like in the beginning of the threading, **characterized in that** the substantially strainless tail (T) is conveyed on the belt conveyor (4) which is turned around a turning point during threading in the width direction of the paper machine or the like in such a way that the tail is, during its travel, transferred more to the longitudinal direction of the paper machine or the like.

2. The method according to claim 1, **characterized in that** the turning point is located in the beginning of the belt conveyor (4) in the incoming direction of the paper web.
3. The method according to claim 1 or 2, **characterized in that** the belt conveyor (4) is turned by means of an automatic, precisely timed function, which relates to the threading sequence.
4. A paper machine comprising a belt conveyor (4) for conveying a tail (T) forwards in a paper machine or the like, which comprises a belt (4b) rotating around reversing rolls (4a), through which belt a suction is effective, and which belt is arranged to be turned in the width direction of the machine, **characterized in that** the belt conveyor (4) is arranged to be turned around a turning point in the width direction of the machine by means of an automatic, precisely timed function, which relates to the threading sequence.
5. The paper machine according to claim 4, **characterized in that** the turning point is located in the beginning of the belt conveyor (4) in the incoming direction of the paper web.

Patentansprüche

1. Verfahren zum Befördern eines Bahnendes in einer Papiermaschine oder dergleichen nach vorne, wobei ein von einer Papierbahn getrenntes Bahnende (T) über eine feststehende Distanz entlang einer sich bewegenden Bandfördervorrichtung (4) nach vorne befördert wird, welche die Papierbahn befördert, indem das Bahnende mittels eines durch die Bandfördervorrichtung hindurch wirkenden Unterdruckes in befestigtem Zustand gehalten wird, wobei die Bandfördervorrichtung im Verhältnis zu der Längsrichtung der Papiermaschine oder dergleichen zu Beginn der Einfädelung winklig angeordnet ist, **dadurch gekennzeichnet, dass** das im Wesentlichen spannungsfreie Bahnende (T) auf der Bandfördervorrichtung (4) befördert wird, welche während der Einfädelung in Richtung der Breite der Papiermaschine oder dergleichen so um einen Wendepunkt gewendet wird, dass das Bahnende während seiner Bewegung mehr in die

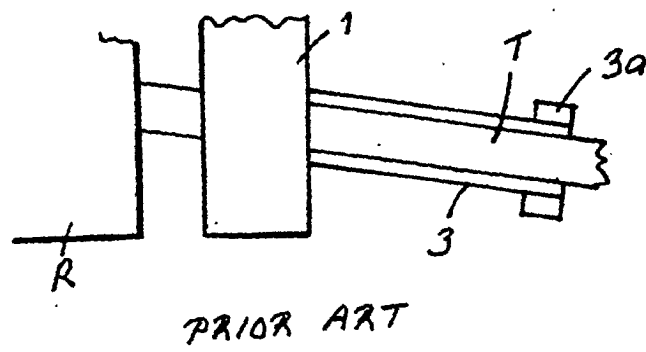
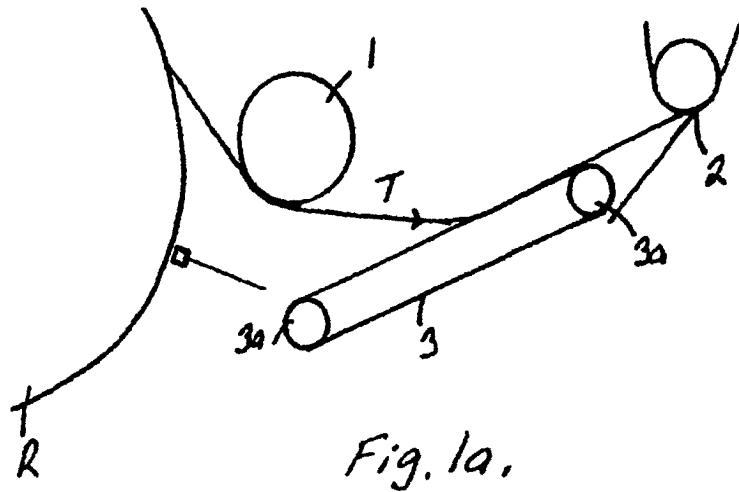
Längsrichtung der Papiermaschine oder dergleichen verlagert wird.

2. Verfahren nach Anspruch 1,
dadurch gekennzeichnet, dass
der Wendepunkt am Anfang der Bandfördevorrichtung (4) in der Einlaufrichtung der Papierbahn angeordnet ist. 5
3. Verfahren nach Anspruch 1 oder 2,
dadurch gekennzeichnet, dass
die Bandfördevorrichtung (4) mittels einer automatischen, zeitlich genau abgestimmten Funktion gewendet wird, die sich auf die Einfädelungsfolge bezieht. 10
4. Papiermaschine mit einer Bandfördevorrichtung zum Befördern eines Bahnendes (T) in einer Papiermaschine oder dergleichen nach vorne, die ein sich um Umlenkwalzen (4a) drehendes Band (4b) aufweist, wobei ein Unterdruck durch das Band hindurch wirkt und das Band so angeordnet ist, dass es in Richtung der Breite der Maschine gewendet wird,
dadurch gekennzeichnet, dass
die Bandfördevorrichtung (4) so angeordnet ist, dass sie in Richtung der Breite der Maschine mittels einer automatischen, zeitlich genau abgestimmten Funktion um einen Wendepunkt gewendet wird, die sich auf die Einfädelungsfolge bezieht. 15 20 25 30
5. Papiermaschine nach Anspruch 5,
dadurch gekennzeichnet, dass
der Wendepunkt am Anfang der Bandfördevorrichtung (4) in der Einlaufrichtung der Papierbahn angeordnet ist. 35

Revendications

1. Procédé de transport d'une queue dans une machine à papier ou similaire, dans lequel une queue (T) séparée d'une toile de papier est transportée vers l'avant sur une distance fixe le long d'un tapis roulant en mouvement (4) transportant la toile de papier en maintenant la queue collée au moyen d'une aspiration agissant à travers le tapis roulant, le tapis roulant étant situé de sorte à former un angle avec la direction longitudinale de la machine à papier ou similaire au début de l'enfilage, **caractérisé en ce que** la queue (T) essentiellement sans tension est transportée sur le tapis roulant (4) qui est retourné autour d'un point de retour pendant l'enfilage dans la direction transversale de la machine à papier ou similaire de telle manière que la queue, pendant son déplacement, est transférée plus dans la direction longitudinale de la machine à papier ou similaire. 40 45 50 55

2. Procédé selon la revendication 1, **caractérisé en ce que** le point de retour est situé au début du tapis roulant (4) dans le sens d'entrée de la toile de papier.
3. Procédé selon la revendication 1 ou 2, **caractérisé en ce que** le tapis roulant (4) est retourné au moyen d'une fonction automatique, minutée avec précision, qui se rapporte à la séquence d'enfilage.
4. Machine à papier comprenant un tapis roulant (4) pour faire avancer une queue (T) dans une machine à papier ou similaire, qui comprend une bande (4b) qui tourne autour de rouleaux de retournement (4a), au travers de laquelle une aspiration produit ses effets, laquelle bande est disposée pour être retournée autour d'un point de retour dans la direction transversale de la machine au moyen d'une fonction automatique, minutée avec précision, qui se rapporte à la séquence d'enfilage.
5. Machine à papier selon la revendication 4, **caractérisée en ce que** le point de retour est situé au début du tapis roulant (4) dans le sens d'entrée de la toile de papier.



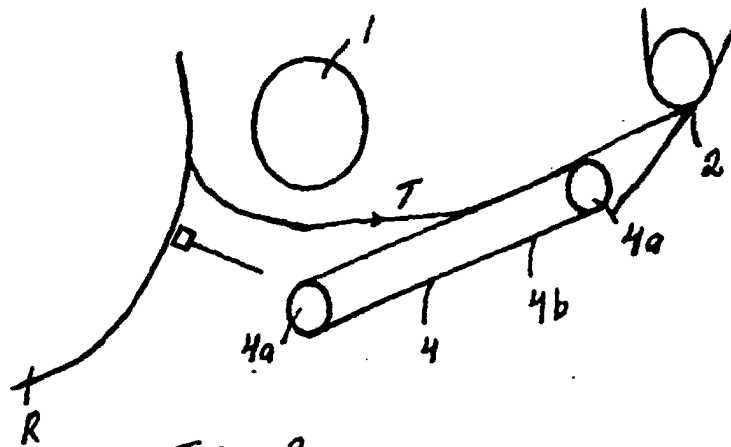


Fig. 2a.

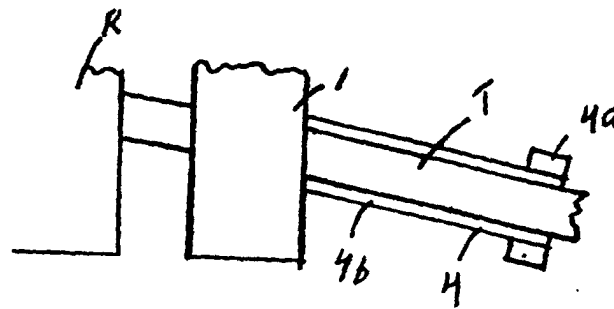


Fig. 2b.

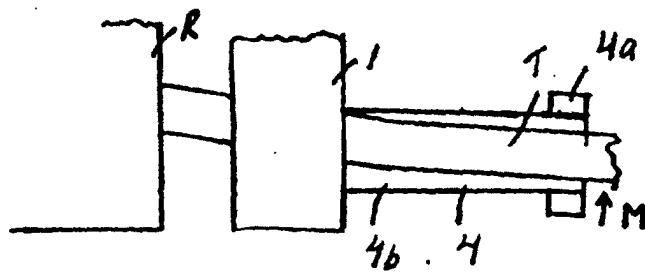


Fig. 2c.