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Reel-up and method for regulation of the nip pressure in a reel-up
Aufwickeln und Verfahren zur Regelung des Kontaktdrucks während eines Aufwickelns
Enroulement et méthode pour la régulation de la pression de contact durant un enroulement

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References cited:
FR-A-1 175 214
US-A-1 950 159
US-A-2 528 713
GB-A-2 168 040

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Description

The invention concerns a reel-up, comprising a first revolving roll and a second revolving roll, which form a nip, into which nip the web is introduced and in which nip a nip pressure acts upon the web and after which nip the web is reeled onto said second revolving roll, which said second revolving roll is supported on reeling rails or equivalent.

The invention also concerns a method for regulation of the nip pressure in a reel-up, which comprises a first revolving roll and a second revolving roll, which form a nip, into which nip the web is introduced and in which nip a nip pressure acts upon the web and after which nip the web is reeled onto said second revolving roll, which said second revolving roll is supported on reeling rails or equivalent.

In prior art different methods and apparatuses are known for regulation of the nip pressure in a reel-up as described above. US-A-2 528 713 discloses a method and apparatus where the nip pressure between the paper roll and the reeling cylinder is regulated by adjusting the inclination of rails which slideably support the paper roll. The nip pressure should be adjusted for varying weights of paper and it may also be adjusted when it increases with increased size and weight of the paper roll. Another method of controlling the nip pressure and obtaining a substantially smooth load distribution is described in GB-A-2 168 040. The method in this document seeks to solve the problem of the sudden peak in nip pressure that occurs when moving the paper roll from the primary support forks to secondary support forks and also remedy the problem with uneven hardness distribution, i.e. variation of the radial density in the paper reel. This is achieved by providing loading cylinders acting on the ends of the reeling drum.

During reeling, at the beginning of the reeling, owing to bending of the reeling drums, it is difficult to produce an uniform linear load or nip load between the reeling drum and the reeling cylinder by means of the prior-art methods. In primary reeling, owing to the supporting of the reeling drum, the linear load becomes considerably higher in the middle than at the edges. In secondary reeling, the loading effect of the reeling forks produces a higher linear load at the edges than in the middle.

In the case of some reel-ups, such as Pope-type reel-up, in the process of changing from the primary rails to the secondary rails, points of discontinuity are readily produced between the reeling cylinder and the reeling drum, such as peaks of linear load, which produce broke in the reel bottom.

In US-A-1 950 159 the main purpose is to obtain an evenly wound paper roll. This is achieved by providing the paper rewinder with means for varying the relative position of the roll being wound circumferentially of the under contact drum. Another problem is how to obtain uniform hardness across the width of the paper machine. This problem is solved by providing the rewinder with sectional winding drums and a variable speed application to each section.

The object of the present invention is to provide a reel-up in which the problems mentioned above do not occur. It is a particular object of the invention to provide a reel-up in which the nip load between the reeling drum and the reeling cylinder is uniform. A further object of the invention is to provide a reel-up in which points of discontinuity that produce broke in the reel bottom do not occur.

In view of achieving the objectives stated above and those that will come out later, the reel-up in accordance with the invention is mainly characterized in that, for the purpose of regulation of said nip pressure, the reeling drum comprises members for alteration of the positions of the first revolving roll and the second revolving roll in relation to one another.

The method in accordance with the invention is mainly characterized in that, in the method, the positions of the first revolving roll and the second revolving roll in the reel-up in relation to one another are changed and/or additional forces are applied to the ends of the second revolving roll in a direction perpendicular to the direction of the axis of the roll.

According to the invention, the linear load can be made uniform in the transverse direction of the machine by placing the reeling drum on support in relation to the reeling cylinder so that the force component of the force of gravity of the earth that passes through the centre points of the reeling drum and the reeling cylinder forms the force that is needed for the load or nip load. The linear load is adjusted by altering the position of the reeling drum in relation to the reeling cylinder, and in this way, at the same time, the magnitude of the force component that produces the linear load is altered. Thus, a suitable linear load or nip load is produced by means of the own weight of the reeling drum and of the web reeled onto said drum. In the invention, the reeling of the web onto the reeling drum is started against the reeling cylinder at a point at which the force component of the force of gravity of the earth applied to the reeling drum that is directed at the centre point of the reeling cylinder is suitable and forms the linear load.

The alteration of the force component is produced in a number of different ways, for example by adjusting the inclination of the reeling rails or forks. When the size of the jumbo roll becomes larger, the inclination is reduced to a suitable level.

The discontinuities occurring in connection with the change or transfer from the primary rails to the secondary rails in a paper reel-up can be eliminated, according to the invention, for example, by starting the reeling directly from the rails.

When a full jumbo roll revolves on the secondary rails, the roll is shifted into the braking position, whereupon the primary rails can be shifted into an optimal position of inclination, in view of the linear load, so that the linear load, i.e. the line pressure, becomes uniform across the whole machine in the transverse direction.
When the size of the jumbo roll becomes larger as the reeling makes progress, the angle of inclination of the primary rails is made smaller. The change, i.e. the shifting onto the secondary rails, takes place by shifting the secondary rails to the same angle of inclination with the primary rails, whereby the replacing reeling drum rolls over the joint, and during and after that time the primary rails and the secondary rails move as synchronized and regulate the linear load by altering the angle of inclination.

Also, according to the invention, additional forces can be applied to the ends of the reeling drum in a direction perpendicular to the axial direction of the roll, whereby the nip load or linear load in the transverse direction of the machine, i.e. in the axial direction of the reeling drum, can also be controlled and regulated by means of the additional forces. If it is desirable, for example by means of adjustment operations, to act upon the transverse profile of linear loading while at the same time keeping the level of overall linear loading unchanged, the angle of inclination can be regulated so that the effect of the additional forces on the level of overall linear load is compensated for.

The method of the invention is well suitable for application when the reeling is started directly from the rails. In such a case it is possible to make use of regulation of loading based on the geometry. When the paper roll formed on the reeling drum becomes larger, the effect of increasing the linear load of the force of gravity is lowered.

By means of the arrangement in accordance with the invention, other advantages are also achieved. For example, at the beginning of reeling there is no process of exchange, and the loading situation is seen naturally by observing the inclination of the rails. Further, by means of the solution of the invention, sudden changes in linear loads and in other loads are avoided, and regulation of the linear loads in accordance with the invention is mechanically easy, and its control is technically easy.

In the following, the invention will be described in more detail with reference to the figures in the accompanying drawing, the invention being, however, in no way strictly confined to said figures.

Figures A and B are schematic illustrations of some problems of nip loads or linear loads known in prior art, the solution of these problems being an object of the present invention.

Figure 1 is a schematic illustration of the reeling process at the initial stage of the reeling.

Figure 2 is a schematic illustration of the reeling process at the final stage of the reeling.

Figure 3 is a schematic illustration of an arrangement in accordance with the invention in view of providing a uniform linear load or nip pressure.

Figure 4 is a schematic illustration of a further exemplifying embodiment of the invention.

Figure 5 is a schematic illustration of an embodiment of the arrangement in accordance with the invention which is suitable for use in continuous reeling.

Figure 6 is a schematic illustration of a second embodiment of the arrangement in accordance with the invention which is suitable for use in continuous reeling.

Figure 7 is a schematic illustration of an arrangement in accordance with the invention as fitted in connection with the process of exchange of reeling drum.

As is shown in Fig. A, in primary reeling, the linear load between the reeling cylinder 15 and the reeling drum 20 is formed higher in the middle than at the edges. The linear load in the middle is denoted with the arrows Z. The higher linear load in the middle results from the effect of supporting of the reeling drum 20, which effect is denoted schematically with the arrows X.

From Fig. B it comes out how, in secondary reeling, the loading effect of the reeling drum 20, which effect is denoted schematically with the arrows X 2 in the figure, produces a higher loading 22 at the edges than in the middle.

As is shown in Fig. 1, in the reel-up the web, e.g. a paper web W, is reeled from the first roll, i.e. the reeling cylinder 15, onto the second roll, i.e. the reeling drum 20, both of which rolls 15,20 are revolving and form a nip N, into which nip the web W is passed and after which nip N the web W is reeled onto the second revolving roll, i.e. the reeling drum 20, which is supported by reeling rails 10.

As is shown in Fig. 1, the reeling of the web W onto the reeling drum 20 against the reeling cylinder 15 is started at a point at which the component Gr of the force of gravity G of the earth directed at the centre point of the reeling cylinder 15 is suitable. In such a case, the linear load effective in the nip N is uniform across the whole machine in the transverse direction and does not become excessively high at the middle. In the figure, the sense of rotation of the reeling cylinder 15 is denoted with the reference S1, and the sense of rotation of the reeling drum 20 with the reference S2. The reeling drum 20 is supported by means of the reeling rails 10.

As is shown in Fig. 2, regulation of loading based on geometry is utilized. When the web roll that is reeled onto the reeling drum 20 becomes larger, the effect of producing linear load of the force of gravity G becomes lower, i.e. the angle $\beta_1 < \beta_2$.

As is shown in Fig. 3, the linear load in the transverse direction of the machine, i.e. in the axial direction of the reeling drum or revolving roll 20, can be made uniform at the nip N by placing the reeling drum 20 on support in relation to the reeling cylinder or revolving roll 15 so that the force component Gr of the force of gravity G that passes through the centre points of the reeling drum 20 and the reeling cylinder 15 forms the force component that is required for the linear load. The linear load is regulated by altering the position of the reeling drum 20 in relation to the reeling cylinder 15 so that the nip point N is changed and, at the same time, the magnitude of the force component Gr that produces the linear load is
altered. The alteration of the force component $Gr$ takes place most easily by adjusting the inclination of the reeling rails 10, i.e. the angle $\alpha$. In such a case, the linear load is $Gr = G \cdot \sin \alpha$, the own weight of the reeling drum 20 and the weight of the web reeled onto the drum produce the linear load or nip load at the point $N$. When the size of the jumbo roll 20 becomes larger, the angle $\alpha$ of inclination is, of course, made smaller to maintain a uniform linear load or nip load, preferably from about $20^\circ$ to $1^\circ$.

The angle $\alpha$ of inclination of the reeling rails 10 is adjusted by means of an actuator, e.g. a screw jack 30, a cylinder, or some other, corresponding member. A great number of well-known arrangements are suitable for members 30 of adjustment of the angle $\alpha$ of inclination. The reeling rails 10 are attached pivotally to the reeling cylinder 15, and the reeling rails 10 are preferably mounted to the centre point of the reeling cylinder 15.

As is shown in Fig. 4, additional forces $F$ are applied to the ends of the reeling drum 20 in a direction perpendicular to the axial direction of the roll by means of suitable members 35, e.g. means for supporting and shifting the reeling drum, in which case it is possible to control and to regulate the nip load or linear load in the transverse direction of the machine, i.e. in the axial direction of the reeling drum 20. If it is desirable to act upon the transverse profile of linear load by means of the above regulation operation and by the intermediate of the additional forces $F$ while, at the same time, keeping the level of overall linear load unchanged, the angle $\alpha$ of inclination can be adjusted so that the effect of the additional forces $F$ on the level of overall linear load is compensated for.

The linear load or nip load in the transverse direction of the machine, i.e. in the axial direction of the reeling drum 20, is regulated in the middle by changing the positions of the reeling cylinder 15 and the reeling drum 20 in relation to each other, e.g., by altering the angle $\alpha$ of inclination of the rails 10. When the angle $\alpha$ of inclination is made larger, the linear load or nip load is increased in the middle, and when the angle $\alpha$ of inclination is made smaller, the linear load or nip load is reduced in the middle. By means of the additional forces $F$, the nip load or linear load is increased or reduced in the lateral areas. Thus, the overall linear load can be regulated in the desired way in the nip.

As is shown in Fig. 5, the arrangement of the invention is suitable for use when the reeling is continuous. In Fig. 5, a construction is shown in which two systems of reeling cylinders 15 and rails 10 are employed. In Fig. 5, the web W guide rolls are denoted with the reference numeral 25. As is shown in the figure, when the size of the jumbo roll 20 becomes larger, the angle $\alpha$ is made smaller. After the first jumbo roll 20 has become complete, the web W is passed to the other reeling system, which operates in a similar way.

In Fig. 6, a second possibility is illustrated for a system in which two systems of reeling cylinders 15 and rails 10 are employed. The web W is passed over the guide rolls 25 onto the reeling cylinder 15, and from there further onto the reeling drum 20 supported on the rail 10. Upon completion of the reeling, the web W is guided to the other reeling system. In Fig. 6, the dashed lines indicate the positions of the rails 10 and the reeling drums 20 when the jumbo rolls are complete.

As is shown in Fig. 7, for example, in a Pope-type ree-up, the exchange of drum from the primary rails 10 onto the secondary rails 11 is carried out so that the exchange is carried out by means of the primary rails 10 while the full jumbo roll 20 revolves on the secondary rails 11. The full jumbo roll 21 is shifted to the braking position, whereupon the primary rails 10 can be shifted to a position optimal in view of the linear load. The linear load or linear pressure $Gr$ is uniform across the whole machine in the transverse direction, $Gr = G \cdot \sin \alpha$. When the jumbo roll 20 becomes larger, the angle $\alpha$ is made smaller while the diameter of the jumbo roll 20 continues to become larger. The shift onto the secondary rails 11 takes place by shifting the secondary rails 11 to the same angle $\alpha$ with the primary rails 10, whereby the replacing reeling drum rolls over the joint, during and after which time the primary rails 10 and the secondary rails 11 move as synchronized while adjusting the linear load. The secondary rails 11 may also be fixed stationarily, in which case the regulation of the linear load takes place on said rails 110 normally by means of reeling forks.

Above, the invention has been described with reference to some of its preferred embodiments only. This is, however, by no means supposed to confine the invention to these exemplifying embodiments only, but many variations and modifications are possible within the scope of the inventive idea defined in the following patent claims.

**Claims**

1. Ree-up, comprising a first revolving roll (15) and a second revolving roll (20), which form a nip (N), into which nip (N) a web (W) is introduced and in which nip (N) a nip pressure (Gr) in the form of a linear load acts upon the web (W) and after which nip (N) the web (W) is reeled onto said second revolving roll (20), which said second revolving roll (20) is supported on reeling rails (10) or equivalent, characterized in that it comprises means for regulating the nip pressure (Gr) in order to compensate for irregularities in the nip pressure due to deflection of the second revolving roll (20) and to obtain a uniform nip pressure in the axial direction of the second revolving roll (20), said regulating means comprising members (30) for alteration of the positions of the first revolving roll (15) and the second revolving roll (20) in relation to one another by means of which the nip pressure (Gr) in the middle region of the second revolving roll (20) is regulated, and said regulating means also comprising members (35) for the application of additional forces (F) to the ends of said second revolving roll (20) by means of which the nip
pressure (Gr) in the end regions of said second roll (20) is regulated.

2. Reel-up as claimed in claim 1, characterized in that the nip pressure (Gr) is acted upon by means of members by whose means the position of the second revolving roll (20) is altered in relation to the first revolving roll (15).

3. Reel-up as claimed in any of the claims 1 or 2, characterized in that the members by whose means the position of the second revolving roll (20) is altered in relation to the first revolving roll (15) comprise members (30) which change the inclination (α) of the reel ing rails (10) or equivalent.

4. Reel-up as claimed in any of the claims 1 to 3, characterized in that the members that change the inclination (α) of the reel ing rails (10) or equivalent are screw jacks (30).

5. Reel-up as claimed in any of the claims 1 to 4, characterized in that the reel-up is fitted to be used in continuous reel ing.

6. Reel-up as claimed in any of the claims 1 to 4, characterized in that the reel-up is fitted to be used in connection with the exchange of the second revolving roll (20; Fig. 7)

7. Method for regulation of the nip pressure in a reel-up in order to obtain a uniform nip pressure in a transverse direction of the reel-up, which reel-up comprises a first revolving roll (15) and a second revolving roll (20), which form a nip (N), into which nip (N) a web (W) is introduced and in which nip (N) a nip pressure (Gr) in the form of a linear load acts upon the web (W) and after which nip (N) the web (W) is reel ed onto said second revolving roll (20), which said second revolving roll (20) is supported on reel ing rails (10) or equivalent, and in which reel-up irregularities in nip pressure in the axial direction of the second revolving roll (20) are due to deflection of said second revolving roll (20), characterized by regulating the nip pressure (Gr) in the middle region of the second revolving roll (20) by means of members (30) for alteration of the positions of the first revolving roll (15) and the second revolving roll (20) in relation to one another, and regulating the nip pressure (Gr) in the end regions of said second roll (20) by means of members (35) for the application of additional forces (F) to the ends of said second revolving roll (20) in a direction perpendicular to the direction of the axis of said roll.

8. Method as claimed in claim 7, characterized in that, in order to alter the position of the first revolving roll (15) and the second revolving roll (20) in relation to one another, the reeling rails (10) or equivalent are inclined.

Patentansprüche

1. Auflroller, mit einer ersten Drehwalze (15) und einer zweiten Drehwalze (20), die einen Kniff (N) bilden, wobei eine Bahn (W) in den Kniff (N) eingeführt wird und im Kniff (N) ein Kniffdruck (Gr) in der Form einer linearen Belastung auf die Bahn (W) wirkt und nach dem Kniff (N) die Bahn (W) auf der zweiten Drehwalze (20) aufgerollt wird, wobei die zweite Drehwalze (20) auf Rollschienen (10) oder dergleichen getragen wird, dadurch gekennzeichnet, daß er eine Einrichtung für das Regulieren des Kniffdruckes (Gr) aufweist, um Unregelmäßigkeiten des Kniffdrucks aufgrund einer Abweichung der zweiten Drehwalze (20) auszugleichen und um einen gleichmäßigen Kniffdruck in Axialrichtung der zweiten Drehwalze (20) zu erreichen, wobei die Reguliereinrichtung Elemente (30) für die Änderung der Stellungen der ersten Drehwalze (15) und der zweiten Drehwalze (20) in Beziehung zueinander aufweist, mittels welcher der Kniffdruck (Gr) im Mittelbereich der zweiten Drehwalze (20) reguliert wird, und die Reguliereinrichtung zudem Elemente (35) für die Anwendung von Zusatzkräften (F) an den Enden der zweiten Drehwalze (20) aufweist, mittels welcher der Kniffdruck (Gr) in den Endbereichen der zweiten Walze (20) reguliert wird.

2. Auflroller nach Anspruch 1, dadurch gekennzeichnet, daß der Kniffdruck (Gr) mit Hilfe von Elementen ausgeübt wird, mit deren Hilfe die Stellung der zweiten Drehwalze (20) in Beziehung zur ersten Drehwalze (15) geändert wird.

3. Auflroller nach einem der Ansprüche 1 oder 2, dadurch gekennzeichnet, daß die Elemente, mit deren Hilfe die Stellung der zweiten Drehwalze (20) in Beziehung zur ersten Drehwalze (15) geändert wird, Elemente (30) aufweisen, die die Neigung (α) der Rollschienen (10) oder dergleichen ändern.

4. Auflroller nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die Elemente, die die Neigung (α) der Rollschienen (10) oder dergleichen ändern, Hebeschrauben (30) sind.

5. Auflroller nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß der Auflroller angebracht ist, um beim kontinuierlichen Rollen verwendet zu werden.

6. Auflroller nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß der Auflroller angebracht ist, um in Verbindung mit dem Austausch der zweiten Drehwalze (20; Fig. 7) verwendet zu werden.
7. Verfahren zur Regulierung des Kniffruckes in einem Aufroller, um einen gleichmäßigen Kniffdruck in Querrichtung des Aufrollers zu erhalten, wobei der Aufroller eine erste Drehwalze (15) und eine zweite Drehwalze (20) aufweist, die einen Kniff (N) bilden, wobei eine Bahn (W) in den Kniff (N) einge- führt wird und im Kniff (N) ein Kniffdruck (Gr) in Form einer linearen Belastung auf die Bahn (W) einwirkt und nach dem Kniff (N) die Bahn (W) auf der zweite Drehwalze (20) aufgerollt wird, wobei die zweite Drehwalze (20) auf Rollschienen (10) oder der- gleichen getragen wird, wobei in dem Aufroller Unregelmäßigkeiten des Kniffdrucks in Axialrich- tung der zweiten Drehwalze (20) aufgrund einer Abweichung der zweiten Drehwalze (20) vorhanden sind, gekennzeichnet durch das Regulieren des Kniffdruckes (Gr) im Mittelbereich der zweiten Drehwalze (20) mit Hilfe von Elementen (30) für die Änderung der Stellungen der ersten Drehwalze (15) und der zweiten Drehwalze (20) in Beziehung zueinander, und durch das Regulieren des Kniffdruckes (Gr) in den Endbereichen der zweiten Walze (20) mit Hilfe von Elementen (35) für die Anwendung von Zusatzkräften (F) an den Enden der zweiten Drehwalze (20) in zur Achsrichtung der Walze senk- rechter Richtung.

8. Verfahren nach Anspruch 7, dadurch gekennzeich- net, daß, um die Stellung der ersten Drehwalze (15) und der zweiten Drehwalze (20) in Beziehung zueinander zu ändern, die Rollschienen (10) oder der- gleichen geneigt sind.

**Revendications**

1. Enrouleuse comprenant un premier rouleau rotatif (15) et un second rouleau rotatif (20) qui forment une zone de pincement (N) dans laquelle est introduite une bande (W) et dans laquelle une pression de contact (Gr) sous forme d’une charge linéaire agit sur la bande (W) et suite à laquelle la bande (W) est enroulée sur ledit second rouleau rotatif (20), qui est supporté sur des rails d’enroulement (10) ou équiv- alents, caractérisée en ce qu’elle comprend des moyens pour réguler la pression de contact (Gr) pour compenser des irrégularités de cette pression dues à une déflection du second rouleau rotatif (20) et pour obtenir une pression de contact uniforme dans la direction axiale du second rouleau rotatif (20), lesdits moyens de régulation comprenant des dispositifs (30) pour modifier les positions du premier rouleau rotatif (15) et du second rouleau rotatif (20) l’un par rapport à l’autre, et au moyen desquelles la pression de contact (Gr) dans la région centrale du second rouleau rotatif (20) est régulée, lesdits moyens de régulation comprenant également des dispositifs (35) pour l’application de forces additionnelles (F) sur les extrémités du second rouleau rotatif (20), au moyen desquelles la pression de contact (Gr) dans les régions d’extrémité du second rouleau (20) est régulée.

2. Enrouleuse selon la revendication 1, caractérisée en ce que la pression de contact (Gr) est soumise à l’action de dispositifs au moyen desquels la position du second rouleau rotatif (20) est modifiée par rapport au premier rouleau rotatif (15).

3. Enrouleuse selon la revendication 1 ou 2, cara- térisée en ce que les dispositifs au moyen desquels la position du second rouleau rotatif (20) est modifiée par rapport au premier rouleau rotatif (15) comprennent des dispositifs (30) qui modifient l’inclinaison (α) des rails d’enroulement (10) ou équivalents.

4. Enrouleuse selon l’une quelconque des revendica- tions 1 à 3, caractérisée en ce que les dispositifs qui modifient l’inclinaison (α) des rails d’enroulement (10) ou équivalents sont des vérins à vis (30).

5. Enrouleuse selon l’une quelconque des revendica- tions 1 à 4, caractérisée en ce qu’elle est prévue pour être utilisée pour un enroulement continu.

6. Enrouleuse selon l’une quelconque des revendica- tions 1 à 4, caractérisée en ce qu’elle est prévue pour être utilisée en liaison avec l’échange du seco- nd rouleau rotatif (20; figure 7).

7. Procédé de régulation de la pression de contact dans une enrouleuse pour obtenir une pression de contact uniforme dans la direction transversale de l’enrouleuse, laquelle comprend un premier rouleau rotatif (15) et un second rouleau rotatif (20) qui forment une zone de pincement (N) dans laquelle est introduite une bande (W) et dans laquelle une pres- sion de contact (Gr) sous forme d’une charge linéaire agit sur la bande (W) et à la suite de la bande (W) est enroulée sur le second rouleau rotatif (20), qui est supporté sur des rails d’enrou- lément (10) ou équivalents, et dans laquelle des irrégularités de la pression de contact dans la direc- tion axiale du second rouleau rotatif (20) sont dues à une déflexion de ce dernier, caractérisée par la régulation de la pression de contact (Gr) dans la région centrale du second rouleau rotatif (20) au moyen de dispositifs (30) pour modifier les positions du premier rouleau rotatif (15) et du second rouleau rotatif (20) l’un par rapport à l’autre, et la régulation de la pression de contact (Gr) dans les régions d’extrémité du second rouleau (20) au moyen de dispositifs (35) permettant l’application de forces additionnelles (F) sur les extrémités du second rouleau rotatif (20) dans une direction perpendiculaire à la direction de l’axe de ce rouleau.
8. Procédé selon la revendication 7, caractérisé en ce que les rails d’enroulement (10) ou équivalents sont inclinés pour modifier la position du premier rouleau rotatif (15) et du second rouleau rotatif (20) l’un par rapport à l’autre.
FIG. A PRIOR ART

FIG. B PRIOR ART