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(54) **A CORE FEEDING DEVICE IN A REWINDING MACHINE FOR THE PRODUCTION OF ROLLS**

HÜLSENZUFÜHRUNGSVORRICHTUNG IN EINER WICKELMASCHINE ZUR HERSTELLUNG VON ROLLEN

DISPOSITIF D'ALIMENTATION DE NOYAU DANS UNE REBOBINEUSE POUR LA PRODUCTION DE ROULEAUX

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Description

Technical Field

[0001] The present invention refers to an innovative rewinding machine for the productions of industrial logs of paper, fabric, non-woven fabric and similar materials.

[0002] In particular, the invention refers to an innovative feeding device for feeding the cores into the winding section of the rewinding machine.

[0003] Such rewinding machines are known for example from US2009/001210, US2009/302146 or US2008290207.

Background Art

[0004] As it is well known, a rewinding machine basically includes a winding section and a feeding section for feeding a cardboard core into the winding section. In particular, the cardboard core is conducted in rotation inside the winding section in such a way as to wrap around it a continuous paper tape. The feeding section serves to allow the insertion of a new core into the winding section as soon as the preceding paper log has been completed. Such insertion phase of the new core, and contextual expulsion of the completed roll from the winding section, is generally known as "exchange phase".

[0005] The winding section generally comprises an inferior roller, a superior roller and a press arranged in such a way as to form a winding cradle into which the core is dragged in rotation through the rotation of the said rollers. In particular, the press controls the tension of the paper and the reaching of the diameter set in the rewinding machine. The break of the continuous paper tape during the exchange phase, once the roll is completed, is generally controlled through a variation of speed of the rollers that generate a sort of tension in the tape.

[0006] In order to realize correctly the said exchange phase, a rewinding machine is generally provided with a cradle for introducing the core, which is hinged to the inferior winding roller and provided with a curved profile. The cradle, being hinged to the inferior roller, can therefore rotate to lower and lift itself with respect to it, forming an insertion path that conducts the core directly into the winding cradle. The core, loaded on the introduction cradle through an ordinary loader, therefore stands below the inferior roller up to the moment in which the exchange phase initiates. As soon as the roll in formation has reached the pre-established diameter, the introduction cradle rotates in such a way as to bring the core arranged on it in contact with the rotating inferior roller. As a consequence of this, the core rotates along the introduction cradle, ascending along it up to entering in the winding section simultaneously to the expulsion of the roll now formed. In such a manner, the winding of the new paper log initiates.

[0007] A technical inconvenience related to such a solution is above all related to the high structural complexity. The cradle must have a precise curved profile that traces the curvature of the inferior roller in such a way that, during all the ascending path of the core, it does not risk either losing adherence or being deflected by it. It is clear that in both cases the result would be that of a variation of speed in the entry of the core and therefore, an incorrect exchange with the consequent block of the rewinding machine. Moreover, also a deformation of the core by deflection can be the cause of a waste product or of a block of the whole rewinding machine.

[0008] Moreover, being the cradle hinged to the inferior roller, it is almost impossible to avoid even a minimal deflection of the core in the final rising part along the feeding cradle.

[0009] Another technical inconvenience relates to the fact that such a solution with a mobile cradle is kinetically complex. It is in fact necessary to include sensors and a software ad hoc that manages and synchronizes exactly the rotation of the introduction cradle on the basis of the completion of the log or of the winding speed, apart from, naturally, a complex system that allows the rotation of lifting and lowering of the introduction cradle with respect to the inferior roller.

[0010] Last, it is clear that such a solution allows the winding of paper with cores of different diameters only by disassembling and substituting the cradle with a new one with such a section as to adapt itself to the new diameter of the core.

Disclosure of invention

[0011] It is therefore the aim of the present invention to provide a rewinding machine for the production of industrial logs of paper, fabric, non woven fabric and similar that solves at least in part the said technical inconveniences.

[0012] In particular, it is the aim of the present invention to provide a rewinding machine wherein the feeding section of the core results structurally simple and at the same time versatile, thus allowing the feeding of cores even with very different diameters.

[0013] These and other aims are obtained through a rewinding machine for the production of industrial logs as per claim 1.

[0014] The feeding section (7) of the machine of the invention is realized through a support surface (12) and a pushing surface (13) opposed one to the other in such a way as to form a rising conduit (7') into which the core results comprised to rise into the winding section (8). In order to allow the rise of the core along the conduit (7'), at least the pushing surface (13) is provided with one or more movable tapes (16) (or equivalently movable belts) arranged in correspondence of the said surface (13) in such a way that their movement drags the core in support on the surface (12) along the conduit (7') into the winding section (8).

[0015] In such a manner, the core, pushed by the movable tapes, rotates on the surface 12 along the conduit.

[0016] Such a structural configuration is particularly advantageous since the two surfaces (12, 13) described can easily be adapted to different diameters of cores by simply translating, therefore moving apart or coming close one from/to the other. Moreover, the entry phase of the core results much more precise, apart from the fact that the structure of the feeding section thus configured is constructively simpler if compared with mobile cradles.

[0017] Last, such a configuration of feeding section allows an easy and efficient control of the tearing of the continuous tape (for example, paper). The speed of the said tapes is in fact variable at will and, in particular, it is possible to bring it to an inferior speed with respect to the normal winding speed. In such a manner, when the core enters the conduit (7'), it pushes the paper that is being wrapped around the log in formation against the tapes (16). In such a manner, the paper in the point of contact with the said tapes (the paper comprised between core and tapes 16), is slowed down, thus inducing a tension state that causes the tearing. Therefore, by varying the speed of the tapes it is easily possible to vary the tension state and therefore control the tearing of the continuous tape.

[0018] Advantageously, the pushing surface (13) is formed by the said one or more tapes (16) arranged in such a way as to form each one a closed ring that surrounds at least the tearing roller (17) and the superior roller (10) along their length. The superior roller is therefore configured in such a way that each closed ring is dragged in rotation just by the tearing roller (17) at its specific rotation speed.

[0019] This can be obtained, for example, by realizing the superior roller (10) in sections connected between them through a ball-bearing mounted idle with respect to the rotation axis of the roller itself 10.

[0020] Advantageously, a tension element (18, 18') can be further provided for each tape (16), the said tension element (18, 18') comprising an adjustable pulley (18).

[0021] Such a pulley therefore allows to adjust the tension of each belt ring 16.

[0022] In accordance with what has been described, advantageously, the speed of the said tapes can be controlled in such a way that, in correspondence of the entry of the core into the rising conduit (7') the continuous tape (2) comprised between the said tapes (16) and the core (3) acquires the speed of the tapes (16), thus triggering a tension state that causes the tearing of the same.

[0023] Advantageously, therefore, the speed of the tapes (16) can be controlled through an independent adjustment of the rotation speed of the tearing roller (17).

[0024] Advantageously, to that aim, the superior roller (10) includes a plurality of sections placed side by side through a bearing assembled idle around the rotation axis of the roller (10) itself in such a way that the passage of each belt (16) around the roller (10) takes place in correspondence of the said bearing in such a way that the speed of the belt (16) results independent from the rotation of the superior roller (10) and results determined by the rotation of the tearing roller (17).

[0025] Advantageously, the second support surface (12) is realized through one or more chutes (14) arranged along the inferior roller (9), each one of the said chutes being provided with a support surface (12) opposed, when in use, to the said one or more tapes (16).

[0026] Advantageously, the width of the rising conduit (7') of the core can be variable in such a way as to result adaptable to cores of different diameters.

[0027] Advantageously, the support surface (12) and the pushing surface (13) are adjustable at different distances between them in such a way as to vary the width of the rising conduit (7') of the core.

[0028] Preferably, in an advantageous manner, the adjustment takes place through a sliding translation of just of the group comprising the chute (14) and the roller (9).

[0029] Advantageously, the said translation can take place along a sliding track.

[0030] Advantageously, the rising conduit (7') can eventually be provided along its length with a first group of blows (21) and with a second group of blows (20) arranged in such a way as to inject pressurised air in the rising conduit (7'). The first group of blows (21) is therefore arranged along the pushing surface (13), while the second group of blows (20) results arranged along the support surface (12) opposite to the group of blows (21).

[0031] In particular, advantageously, the first group of blows (21) can be arranged along the conduit in a back position towards the entry of the conduit (7') with respect to the second group of blows (20), which is instead arranged in a forward position towards the winding section. In such a manner, by activating in sequence the first (21) and the second group of blows (20) during the rising rotation of the core into the conduit (7'), after the tearing, the head (31) of the separated tape remains substantially in contact on the core during the whole of a first winding turn.

[0032] In such a manner, a new winding can be initiated without the need of the use of glue.

[0033] Advantageously, at least a rotatable finger (24) is included for arranging the core (3) on the support surface (12) at the entry of the rising conduit (7').

[0034] It is also described here a method for the formation of industrial logs (4) in a rewinding machine (1) comprising the phases of:

- Feeding of a continuous tape (2) towards a winding section (8) for winding the tape around a rotating core (3) into the said winding section;
- Exchange between the log formed (4) and a new log (4) in formation, the said exchange including the entry of a new core (3) into the winding section (8) through a feeding section (7) and contextual tearing of the continuous paper tape (2);

and wherein the exchange of the new core (3) is control-

led through the movement of one or more tapes (16) arranged in the feeding section (7) in such a manner as to realize a pushing surface (13) opposed to a support surface (12), the said pushing surface and the said support surface (12) forming a rising conduit (7') into which the core results comprised in such a way as to rotate on the support surface (12) by the pushing effect of the tapes (16).

[0035] Advantageously, the tearing of the continuous tape (2) is obtained through the maintenance of a speed of the tapes (16) inferior with respect to the winding speed of the log in formation at least during the entry of the core. In such a manner, the core in entry into the conduit (7') pushes the continuous tape (2) in contact against the tapes (16) in movement at an inferior speed and induces the paper to slow down in the point of contact. In such a manner, a tension state is generated that causes the tearing, forming a tail (30) of the tape which is winding on the log formed and a head (31) which is winding on the new core in entry.

[0036] Advantageously, following the said tearing, the operation of winding of the head (31) of the tape around the new core is further included.

[0037] Such an operation includes the activation in succession of a first air blow (21), directed from the pushing surface (13) towards the conduit (7'), and a second air blow (20) directed from the support surface (12) towards the conduit (7'). In such a manner, we are able to maintain substantially in adherence the head (31) of the tape to the rotating core during all the first winding turn up to the moment in which the head (31) is arranged below the subsequent tape (2) which is winding on the core.

[0038] Advantageously, the activation of the first air blow (21) maintains substantially in adherence the head (31) of the tape to the rotating core up to the moment in which the head (31) reaches the support surface (12), while the second air blow (20), activated subsequently to the overcoming by rolling of the head (31) of the said support surface (12), maintains the head in adherence to the core up to the completion of the said first winding turn in correspondence of the reaching of substantially the pushing surface (13).

Brief description of drawings

[0039] Further characteristics and advantages of the present rewinding machine, according to the invention, will result clearer with the description of one of its embodiments that follows, made to illustrate but not to limit, with reference to the annexed drawings, wherein:

- Figure 1 shows a lateral view of the rewinding machine in accordance with the invention;
- Figure 2 shows a detail of the chute 14;
- Figure 3 shows in an axonometric view the plurality of belts or tapes 16 arranged in a closed-ring manner around the superior roller 10, the tearing roller 17 and the relative pulley 18, while figure 4 shows a lateral view;
- Figures from 5 to 12 show functioning phases in accordance with the relative method.

Description of one preferred embodiment

[0040] With reference to figure 1, a rewinding machine 1 is schematically represented in accordance with the present invention.

[0041] Figure 1 therefore represents a continuous tape 2 (generally of paper but eventually also of a different material such as fabric or non-woven fabric) along its winding path in such a way as to wrap around a core 3 for the formation of a log 4.

[0042] As per the background art, the rewinding machine 1 is generally provided with perforation rollers 5 on top of the machine and provided with blades that serve to perforate the paper according to a predetermined pitch along its width (generally called paper light).

[0043] The continuous tape 2 can pass then through one or more idle wheels 6 in such a way as to maintain always a predetermined advancing speed along its path as well as a correct tension level. The idle wheels can be arranged in any point of the machine in which it may be necessary. Figure 1, in an absolutely non-limiting manner, describes, for example, three idle wheels 6 arranged between the perforation rollers 5 and the feeding section 7 described below.

[0044] The rewinding machine therefore comprises a feeding section 7 and a winding section 8. As shown in figure 1, the winding section 8 includes an inferior roller 9, a superior roller 10 and a press 11 arranged in such a way as to form a cradle into which the paper is wrapped around the log 4 in formation. In particular, the combined rotation of the said inferior roller, superior roller and press causes the rotation of the core 3 arranged between them in such a way that the continuous tape 2 can wrap around it. When the log in formation is completed, the exchange with the entry of the new core 3 takes place.

[0045] In accordance with the present invention, the feeding section 7 comprises a support surface 12 opposite, at a certain distance, to a pushing surface 13 in such a way as to form a rising conduit 7' through which the core 3 can be conducted into the winding cradle.

[0046] The distance between the rolling surface 12 and the pushing surface 13 must therefore be such as to allow the contact of the core into the conduit with both surfaces 12 and 13, as better described in detail below.

[0047] As shown in figure 1, the surface 12 is part of a chute 14 assembled below the inferior roller 9. The chute, together with the inferior roller, can be eventually translated horizontally forward or backward in such a way as to adapt the rising conduit 7' to cores even of very different diameters.

[0048] In accordance with such a technical solution, it is therefore possible to include a sliding track, generally a substantially horizontal track, on which the group com-

prising the chute 14 and the roller 9 can move in such a way as to be able to adjust the distance with respect to the pushing surface 13 and therefore allow to adapt in a simple manner the rising channel 7' to cores of different diameters.

[0049] Alternatively, also if structurally more complex, it would be possible to translate just the group that forms the pushing surface 13 and comprising the rollers 10 and 17 together with the tapes 16.

[0050] Alternatively, a translation of both the said groups would be possible.

[0051] Figure 2 shows constructively in an axonometric view a possible solution of such a chute 14. In particular, it is highlighted how a constructively simple solution includes the assembly of one or more chutes along the upper surface (that is the length) of the inferior roller 9 and distanced between them of a predetermined quantity. Alternatively, a single chute 14 of a width substantially coinciding with the length of the inferior roller can be included. Both figure 1 and figure 2 show the curved configuration of the part 15 of the chute destined to be fixed under the inferior roller near it. The surface 12 of the chute 14 can also be covered, if necessary, with a high friction material, also called "grip" (for example, glass-paper), in such a way as to guarantee the better rotation of the core on it.

[0052] Figure 1 instead shows the pushing surface 13 opposite to the support surface 12 and described in detail below. The pushing surface 13 is obtained through a plurality of tapes 16, or equivalently belts 16, assembled in a closed-ring manner along the board of the superior roller 10.

[0053] The tapes 16 therefore form each one a closed ring, passing around the superior roller 10, around the tearing roller 17 and around a tension pulley 18. In particular, the rotation of the tearing roller 17 drags and therefore determines the rotation speed of the belts or tapes 16.

[0054] This is possible, for example, by realizing the superior roller 10 through a certain number of sections, each one placed side by side through a bearing assembled idle around the rotation axis of the roller 10 itself. The number of sections is equivalent to the number of belts or tapes 16 included, in such a way that the passage of each belt 16 around the roller 10 takes place precisely in correspondence of the said bearing. In such a manner, the speed of the belt is absolutely unrelated from the rotation of the superior roller 10, and is instead determined by the rotation of the tearing roller 17.

[0055] The idle pulley 18, connected to a tension block 18', also allows the adjustment of the right level of tension of the belt in such a way as to avoid that it slips on the rollers. The tension block is therefore translatable with respect to the superior and tearing rollers precisely for increasing and/or diminishing the tension of the belt. Alternatively, the pulley 18 can be assembled translatable with respect to the block 18' on which it is assembled.

[0056] Figure 3 and figure 4, for greater clarity, show in an axonometric and frontal view an assembly of the superior roller 10, the tearing roller 17 and the pulleys 18 with the relative belts 16 (for descriptive simplicity, only two have been drawn), assembled in a closed-ring manner in such a way as to realize the pushing surface 13. Figure 4 particularly indicates with the double arrow the coming close and moving apart direction of the pulley 18 for adjusting the tension of the belt.

[0057] Going back to figure 1, a first 21 and a second group of blows 20 are arranged along the board of rollers. The blows, in the shape of nozzles, can be arranged in correspondence of one or more chutes 14 and respectively in correspondence of one or more tension blocks 18' and serve to blow air into the conduit 7' at a predetermined pressure. Their function will be better described in detail in the descriptive part of the functioning method. Each blow 20 arranged on its own chute 14 can find ahead the relative blow 21 arranged in correspondence of the block 18. Alternatively, the arrangement can be staggered. The arrangement of the blows is anyway such by which the jet of pressurised air arrives into the conduit 7'.

[0058] Figure 1, last, shows a loading system of the cores to conduct them into the rising conduit 7'. The system includes an ordinary transport belt 22 provided with a plurality of supports 23 connected to the belt to hold the cores 3. Figure 1 shows the situation in which a core 3 is arranged in stand-by for the entry into the conduit 7'. As better described in detail below in the description of functioning, a finger 24 is hinged in such a way as to rotate at the right time to push the core in the conduit 7' .

[0059] Having structurally described in detail all the basic elements of the invention, we now pass onto a description of its functioning.

[0060] As shown in figure 5, a new core 3 is on standby to enter in the winding section 8 through the feeding section 7, in such a way as to realize the exchange phase and initiate the new winding. As soon as the log 4 in formation is completed, it is sent in signal to the finger 24, which rotates to bring the core 3 to the entry of the conduit 7' (see subsequent figure 6). Figure 7 therefore shows the phase in which the new core 3 is arranged into the conduit 7' in contact with the support surface 12 and the pushing surface 13 constituted by the plurality of tapes 16 arranged around the superior and tearing rollers rotating in an integral manner to the tearing roller 17. In such a manner, the tapes, by appropriately being in contact with the core arranged into the conduit, drag it in rotation, causing its rolling on the support surface 12 and the consequent rise along all the conduit up to the winding cradle.

[0061] Figure 8 shows the tearing phase of the tape notoriously obtained through the creation of a tension state in the tape 2 itself. Such a tension state, as already stated, is induced in accordance with the invention through an appropriate control of the speed of the tapes. In particular, during the ordinary winding of the tape around the log in formation 4, the paper substantially

does not touch the tapes 16. This can be easily obtained through the appropriate arrangement of the rollers. At the moment of the entry of the core into the conduit, the paper results pushed against the tapes 16, that is the paper in the point of contact is interposed between the tapes and the core. By controlling, therefore, the speed of the tapes 16 in such a way as to result minor to the winding speed of the continuous tape 2 around the log 4 in formation, a tension state is generated able to tear the continuous tape 2.

[0062] The speed can be naturally controlled foreseeing an appropriate motorization that allows to vary at will and in an independent manner either the speed of the roller 17 or that of the roller 10. A speed control through the roller 17 has shown a better performance in the tearing.

[0063] The tearing (see figure 8) therefore realizes a tail 30 of the tape relative to the log 4 formed and a head 31 of the tape relative to the new winding around the core in rise into the conduit.

[0064] In accordance with the invention, as shown in figure 8, the first group of blows 21 is activated in such a way that the pressurised air strikes the head 31 of the tape, pushing it in adherence against the rotating core 3 along the conduit and contextually facilitates the separation of the torn tape. In such a manner, the head 31 of the tape that is maintained by the blows 21 in adherence against the core, precisely by means of the rotation of the core itself, is wrapped partially during a winding half turn of about 180°. The head passes under the core, going beyond the fixed plane 12. As in fact shown in figure 9, the head 31 of the tape has now passed under the core and the tape wraps the core for more than 180°, that is half angle turn. At this point, as shown in subsequent figure 10, the second group of blows intervenes in such a way as to maintain the head of the tape 31 always in adherence against the core. In such a manner, the tape remains wrapped around the core, while it completes its angle turn. The rotation of the core makes that the head 31 becomes blocked below the continuous tape which is winding in the subsequent rolling turns along the conduit, as shown in figure 11. At this point, the core completes its entry path into the winding cradle as shown in figure 12. Contextually, during the exchange phase described, the log formed is expelled from the winding cradle to allow the entry of the new log in formation (see figure 12). The press 11 lowers again on the new log to follow its growth and adjust the tension of the paper.

[0065] As it is well known, the tail of the log formed will then be closed with glue in an appropriate glueing section.

[0066] In accordance with the method described, it is clear that such a configuration of feeding section 7 adds several further advantages in addition to those already described.

[0067] In particular, its structural simplicity and configuration allows the assembly of the said opposed first 21 and second group 20 of blows. The solution with a chute on one side and tapes on the opposite side in fact allows an easy access and assembly of the said blows, which are synchronized with the motion of entry of the core. The winding of the paper tape around the new core in entry through the aid of the blows described therefore allows the winding without the help of the generally used glue. It is therefore not necessary anymore, in the case blows as described are used, to include the use of a glueing section ad hoc that spreads a glue veil on the core to allow the head 31 of the tape to adhere to the same to initiate the winding.

[0068] The enormous advantages in terms of structural simplification, quality of the product obtained and huge save of production costs are clear, particularly the purchase costs of the glue.

[0069] Although the machine described, and the relative method, lend themselves well to a winding without the help of glue, it is clear that the same machine can also be used with a specific glueing section of the tape to the core and with or without the help of the blows.

[0070] Last, it is clear that the further innovations described and relative to the possibility of adjusting the width of the conduit, the use of the blows to facilitate the winding without the use of glue and the possibility of adjusting the speed of the tapes 16 for the tearing, can be included on such a rewinding machine all together or singularly, absolutely independently one from the other.

Claims

1. A rewinding machine (1) for the production of logs of tape material (2) and comprising:

   - A winding section (8) for winding the continuous tape (2) around a core (3) set in rotation;
   - A feeding section (7) for feeding one or more cores (3) in succession into the winding section (8); wherein the feeding section (7) comprises a support surface (12) and a pushing surface (13) opposed one to the other in such a way as to form a rising conduit (7') into which the core results comprised, and wherein, further, at least the pushing surface (13) is provided with one or more movable tapes (16) arranged in such a way as to drag the core along the said rising conduit (7') into the winding section (8) and **characterized by the fact that** the speed of the said tapes (16) can be controlled in such a way that in correspondence of the entry of the core into the rising conduit (7') the continuous tape (2) comprised between the tapes (16) and the core (3) acquires the speed of the said tapes (16), triggering a tension state of the tape that causes the tearing of the same.

2. A rewinding machine, according to claim 1, wherein the pushing surface (13) is formed by the said one

or more tapes (16), each one of the said one or more tapes being arranged in such a way as to form a closed ring which surrounds at least the tearing roller (17) and the upper roller (10), the upper roller being configured in a such a way that each closed ring is dragged in rotation by the tearing roller (17) only.

3. A rewinding machine, according to claim 2, wherein a tension element (18, 18') is further provided for each tape (16), the said tension element (18, 18') comprising an adjustable pulley (18).

4. A rewinding machine, according to claim 1, wherein the said speed of the tapes (16) can be controlled through the independent adjustment of the rotation speed of the roller (17).

5. A rewinding machine, according to one or more of claims from 1 to 4, wherein the superior roller (10) includes a plurality of sections, each one of them placed side by side through a bearing assembled idle around the rotation axis of the roller (10) itself in such a way that the passage of each belt (16) around the roller (10) takes place in correspondence of the said bearing in such a way that the speed of the belt (16) results independent from the rotation of the superior roller (10) and results determined by the rotation of the tearing roller (17).

6. A rewinding machine, according to one or more of the preceding claims, wherein the second support surface (12) is realized through one or more chutes (14) arranged along the tearing roller (9), each one of the said chutes being provided with a support surface (12) opposed, when in use, to the said one or more tapes (16).

7. A rewinding machine, according to one or more of the preceding claims, wherein the width of the rising conduit (7') of the core is variable in such a way as to result adaptable to cores of different diameters.

8. A rewinding machine, according to one or more of the preceding claims, wherein the said support surface (12) and the said pushing surface (13) are adjustable at different distances between them in such a way as to vary the width of the rising conduit (7') of the core.

9. A rewinding machine, according to claim 7, wherein the said adjustment of width takes place through a sliding translation of just the group comprising the chute (14) and the roller (9).

10. A rewinding machine, according to claim 9, wherein the said sliding translation takes place along a sliding track.

11. A rewinding machine, according to one or more of the preceding claims, wherein the rising conduit (7') is further provided along its length with a first group of blows (21) and a second group of blows (20) arranged in such a way as to inject pressurised air into the rising conduit (7'), the said group of blows (21) being arranged along the pushing surface (13) and the said second group of blows (20) being arranged along the support surface (12), opposed to the said group of blows (21).

12. A rewinding machine, according to claim 11, wherein the first group of blows (21) is arranged along the conduit in a back position towards the entry of the conduit (7') with respect to the second group of blows (20) arranged in a forward position towards the winding section in such a way that, by activating in sequence the first (21) and the second group of blows (20) during the rising rotation of the core into the conduit (7'), the head (31) of the separated tape remains substantially in contact on the rotating core under the said groups of blows, realizing the first winding turn.

13. A method for the formation of industrial logs (4) in a rewinding machine (1) comprising the phases of:

- Feeding of a continuous tape (2) towards a winding section (8) to wind the tape around a rotating core (3) into the said winding section;
- Exchange between the formed log (4) and the new log (4) in formation, the said exchange comprising the entry of a new core (3) into the winding section (8) through a feeding section (7) and contextual tearing of the continuous paper tape (2);

that the exchange of the new core (3) is controlled through the movement of one or more tapes (16) arranged in the feeding section (7) in such a way as to realize a pushing surface (13) opposed to a support surface (12), the said pushing surface and the said support surface (12) forming a rising conduit (7') into which the core results comprised in such a way as to roll on the support surface (12) by the pushing effect of the tapes (16) and **characterized by** the fact that the tearing of the continuous tape (2) is obtained through the maintenance of a speed of the tapes (16) minor with respect to the winding speed of the log in formation, at least during the entry phase of the core into the conduit (7'), in such a way that the core in entry into the conduit (7') pushes the continuous tape (2) in contact against the said tapes (16) causing a tension state that results in the tearing, the said tearing forming a tail (30) of the winding tape on the log formed and a winding head (31) on the said new core in entry.

14. A method for the formation of industrial logs (4), according to claim 15 or 16, wherein following the said tearing phase of the tape, it is further provided the operation of winding of the head (31) of the tape around the new core, the said operation comprising the activation in succession of a first air blow (21), directed from the pushing surface (13) towards the conduit (7'), and of a second air blow (20) directed from the support surface (12) towards the conduit (7') in such a way as to substantially maintain in adherence the head (31) of the tape to the rotating core during the first winding turn until the moment in which the head (31) results arranged below the subsequent winding tape (2) on the core.

15. A method for the formation of industrial logs (4), according to claim 17, wherein the activation of the first air blow (21) substantially maintains in adherence the head (31) of the tape to the rotating core until the moment in which the head (31) reaches the support surface (12) and wherein the second air blow (20), activated subsequently to the reaching by rolling of the head (31) of the said support surface (12), maintains the head in adherence to the core until the completion of the said first winding turn substantially in correspondence of the pushing surface (13).

Patentansprüche

1. Wickelmaschine (1) für die Herstellung von Rollen aus Bandmaterial (2), die Folgendes umfasst:

- einen Aufwicklungsabschnitt (8) zum Aufwickeln des Endlosbandes (2) um einen in Drehung versetzten Kern (3);
- einen Zuführungsabschnitt (7) zum aufeinanderfolgenden Zuführen von einem oder mehreren Kernen (3) in den Aufwicklungsabschnitt (8);

wobei der Zuführungsabschnitt (7) eine Auflagefläche (12) und eine Andrückfläche (13) umfasst, die einander derart gegenüberliegen, dass sie einen aufsteigenden Kanal (7') bilden, in dem der Kern eingeschlossen ist, und wobei überdies zumindest die Andrückfläche (13) mit einem oder mehreren beweglichen Bändern (16) versehen ist, das/die derart angeordnet ist/sind, dass es/sie den Kern entlang des aufsteigenden Kanals (7') in den Aufwicklungsabschnitt (8) zieht/ziehen, und **dadurch gekennzeichnet, dass** die Geschwindigkeit der Bänder (16) derart geregelt werden kann, dass das zwischen den Bändern (16) und dem Kern (3) eingeschlossene Endlosband (2) entsprechend dem Eintritt des Kerns in den aufsteigenden Kanal (7') die Geschwindigkeit der Bänder (16) erlangt, wodurch ein Spannungszustand des Bandes ausgelöst wird, der sein Reißen bewirkt.

2. Wickelmaschine nach Anspruch 1, wobei die Andrückfläche (13) durch das eine oder die mehreren Bänder (16) gebildet ist, wobei jedes von dem einen oder den mehreren Bändern derart angeordnet ist, dass es/sie einen geschlossenen Ring bildet/bilden, der zumindest die Reißwalze (17) und die obere Walze (10) umgibt, wobei die obere Walze derart ausgestaltet ist, dass jeder geschlossene Ring lediglich durch die Reißwalze (17) drehbar gezogen wird.

3. Wickelmaschine nach Anspruch 2, wobei ein Spannelement (18, 18') ferner für jedes Band (16) bereitgestellt ist, wobei das Spannelement (18, 18') eine einstellbare Rolle (18) umfasst.

4. Wickelmaschine nach Anspruch 1, wobei die Geschwindigkeit der Bänder (16) durch die unabhängige Einstellung der Drehgeschwindigkeit der Walze (17) geregelt werden kann.

5. Wickelmaschine nach einem oder mehreren der Ansprüche 1 bis 4, wobei die obere Walze (10) mehrere Abschnitte umfasst, von denen jeder nebeneinander durch ein Lager angeordnet ist, das im Leerlauf um die Drehachse der Walze (10) selbst zusammengebaut ist, derart, dass der Durchgang von jedem Förderband (16) um die Walze (10) derart dem Lager entsprechend erfolgt, dass die Geschwindigkeit des Förderbandes (16) unabhängig von der Drehung der oberen Walze (10) wird und durch die Drehung der Reißwalze (17) bestimmt wird.

6. Wickelmaschine nach einem oder mehreren der vorhergehenden Ansprüche, wobei die zweite Auflagefläche (12) durch ein oder mehrere Leitblech/e (14) ausgeführt ist, die entlang der Reißwalze (9) angeordnet sind, wobei jedes der Leitbleche mit einer Auflagefläche (12) versehen ist, die bei der Verwendung dem einen oder den mehreren Bändern (16) gegenüberliegt.

7. Wickelmaschine nach einem oder mehreren der vorhergehenden Ansprüche, wobei die Breite des aufsteigenden Kanals (77') des Kerns derart variabel ist, dass sie Kernen mit verschiedenen Durchmessern angepasst werden kann.

8. Wickelmaschine nach einem oder mehreren der vorhergehenden Ansprüche, wobei die Auflagefläche (12) und die Andrückfläche (13) derart in verschiedenen Abständen zwischen ihnen einstellbar sind, dass die Breite des aufsteigenden Kanals (7') des Kerns verändert wird.

9. Wickelmaschine nach Anspruch 7, wobei die Breiteneinstellung durch eine gleitende Translation von lediglich der Gruppe erfolgt, die das Leitblech (14) und die Walze (9) umfasst.

10. Wickelmaschine nach Anspruch 9, wobei die gleitende Translation entlang einer Gleitschiene erfolgt.

11. Wickelmaschine nach einem oder mehreren der vorhergehenden Ansprüche, wobei der aufsteigende Kanal (7') ferner entlang seiner Länge mit einer ersten Gruppe von Gebläsen (21) und einer zweiten Gruppe von Gebläsen (20) versehen ist, die derart angeordnet sind, dass sie Druckluft in den aufsteigenden Kanal (7') einblasen, wobei die Gruppe von Gebläsen (21) entlang der Andrückfläche (13) angeordnet ist und die zweite Gruppe von Gebläsen (20) entlang der Auflagefläche angeordnet ist, die der Gruppe von Gebläsen (21) gegenüberliegt.

12. Wickelmaschine nach Anspruch 11, wobei die erste Gruppe von Gebläsen (21) entlang des Kanals in einer hinteren Position in Richtung des Eingangs des Kanals (7') in Bezug zur zweiten Gruppe von Gebläsen (20) angeordnet ist, die in einer vorderen Position in Richtung des Aufwicklungsabschnitts angeordnet ist, derart, dass durch aufeinanderfolgendes Aktivieren der ersten (21) und der zweiten Gruppe von Gebläsen (20) während der aufsteigenden Drehung des Kerns in den Kanal (7') der Kopf (31) des getrennten Bandes im Wesentlichen auf dem drehenden Kern unter den Gruppen von Gebläsen in Kontakt bleibt, wodurch die erste Aufwicklungsdrehung ausgeführt wird.

13. Verfahren zur Bildung industrieller Rollen (4) in einer Wickelmaschine (1), das die folgenden Phasen umfasst:

- Zuführen eines Endlosbandes (2) in Richtung eines Aufwicklungsabschnitts (8) zum Aufwickeln des Bandes um einen drehbaren Kern (3) in dem Aufwicklungsabschnitt;
- Austausch zwischen der gebildeten Rolle (4) und der neuen, gegenwärtig gebildeten Rolle (4), wobei der Austausch den Eintritt eines neuen Kerns (3) in den Aufwicklungsabschnitt (8) durch einen Zuführungsabschnitt (7) und das gleichzeitige Reißen des Endlospapierbandes (2) umfasst;

wobei der Austausch des neuen Kerns (3) durch die Bewegung von einem oder mehreren Bändern (16) gesteuert wird, das/die in dem Zuführungsabschnitt (7) angeordnet ist/sind, derart, dass eine Andrückfläche (13) ausgeführt wird, die einer Auflagefläche (12) gegenüberliegt, wobei die Andrückfläche und die Auflagefläche (12) einen aufsteigenden Kanal (7') bilden, in dem der Kern derart eingeschlossen ist, dass er auf der Auflagefläche (12) durch die Andrückwirkung der Bänder (16) rollt, und **dadurch gekennzeichnet, dass** das Reißen des Endlosbandes (2) durch das Aufrechterhalten einer Geschwindigkeit der Bänder (16) erhalten wird, die, zumindest während der Phase des Eintritts des Kerns in den Kanal (7'), kleiner als die Aufwicklungsgeschwindigkeit der gegenwärtig gebildeten Rolle ist, derart, dass der in den Kanal (7') eintretende Kern das Endlosband (2) in Kontakt gegen die Bänder (16) drückt, wodurch ein Spannungszustand bewirkt wird, der das Reißen zur Folge hat, wobei das Reißen ein hinteres Ende (30) des Aufwicklungsbandes auf der gebildeten Rolle und einen Aufwicklungskopf (31) auf dem neuen eintretenden Kern bildet.

14. Verfahren zum Bilden industrieller Rollen (4) nach Anspruch 15 oder 16, wobei auf die Phase des Reißens des Bandes folgend ferner der Arbeitsvorgang des Aufwickelns des Kopfes (31) des Bandes um den neuen Kern bereitgestellt wird, wobei der Arbeitsvorgang die aufeinanderfolgende Aktivierung eines ersten Luftgebläses (21), das von der Andrückfläche (13) in Richtung des Kanals (7') gerichtet ist, und eines zweiten Luftgebläses (20) umfasst, das von der Auflagefläche (12) in Richtung des Kanals (7') gerichtet ist, derart, dass der Kopf (31) des Bandes während der ersten Aufwicklungsdrehung bis zu dem Augenblick, in dem der Kopf (31) unter dem darauffolgenden Aufwicklungsband (2) auf dem Kern angeordnet ist, im Wesentlichen an dem sich drehenden Kern haftend gehalten wird.

15. Verfahren zum Bilden von industriellen Rollen (4) nach Anspruch 17, wobei die Aktivierung des ersten Luftgebläses (21) den Kopf (31) des Bandes bis zu dem Augenblick, in dem der Kopf (31) die Auflagefläche (12) erreicht, im Wesentlichen an dem sich drehenden Kern haftend hält, und wobei das zweite Luftgebläse (20), das im Anschluss an das Erreichen der Auflagefläche (12) durch das Rollen des Kopfes (31) aktiviert wird, den Kopf bis zur Vollendung der ersten Aufwicklungsdrehung im Wesentlichen der Andrückfläche (13) entsprechend an dem Kern haftend hält.

Revendications

1. Rebobineuse (1) pour la production de rouleaux de matériau en bande (2) et comprenant :

- une section d'enroulement (8) pour enrouler la bande continue (2) autour d'un noyau (3) entraîné en rotation ;
- une section d'alimentation (7) pour alimenter un ou plusieurs noyaux (3) de façon successive dans la section d'enroulement (8) ;

dans laquelle la section d'alimentation (7) comprend une surface de support (12) et une surface de poussée (13) opposées l'une à l'autre de ma-

nière à former un conduit montant (7') dans lequel le noyau est inclus et dans laquelle, en outre, au moins la surface de poussée (13) est munie d'une ou plusieurs bandes mobiles (16) disposées de manière à traîner le noyau le long dudit conduit montant (7') dans la section d'enroulement (8), et **caractérisée par le fait que** la vitesse desdites bandes (16) peut être commandée d'une manière telle qu'en correspondance de l'entrée du noyau dans le conduit montant (7'), la bande continue (2) comprise entre les bandes (16) et le noyau (3) acquiert la vitesse desdites bandes (16), déclenchant un état de tension de la bande qui provoque la déchirure de celle-ci.

2. Rebobineuse selon la revendication 1, dans laquelle la surface de poussée (13) est formée par ladite ou lesdites bandes (16), ladite ou chacune desdites bandes étant disposée de manière à former un anneau fermé qui entoure au moins le rouleau de déchirure (17) et le rouleau supérieur (10), le rouleau supérieur étant configuré d'une manière telle que chaque anneau fermé est traîné en rotation par l'anneau de déchirure (17) uniquement.

3. Rebobineuse selon la revendication 2, dans laquelle un élément de mise en tension (18, 18') est en outre prévu pour chaque bande (16), ledit élément de mise en tension (18, 18') comprenant une poulie ajustable (18).

4. Rebobineuse selon la revendication 1, dans laquelle ladite vitesse des bandes (16) peut être commandée par l'intermédiaire de l'ajustement indépendant de la vitesse de rotation du rouleau (17).

5. Rebobineuse selon une ou plusieurs des revendications 1 à 4, dans laquelle le rouleau supérieur (10) comprend une pluralité de sections, chacune d'elles étant placée côte à côte par un palier monté fou autour de l'axe de rotation du rouleau (10) lui-même d'une manière telle que le passage de chaque bande (16) autour du rouleau (10) a lieu en correspondance dudit palier d'une manière telle que la vitesse de la bande (16) est indépendante de la rotation du rouleau supérieur (10) et est déterminée par la rotation du rouleau de déchirure (17).

6. Rebobineuse selon une ou plusieurs des revendications précédentes, dans laquelle la seconde surface de support (12) est réalisée à l'aide d'une ou plusieurs goulottes (14) disposées le long du rouleau de déchirure (9), chacune desdites goulottes étant munie d'une surface de support (12) opposée, en utilisation, à ladite ou auxdites bandes (16).

7. Rebobineuse selon une ou plusieurs des revendications précédentes, dans laquelle la largeur du conduit montant (7') du noyau est variable de manière à être adaptable à des noyaux de différents diamètres.

8. Rebobineuse selon une ou plusieurs des revendications précédentes, dans laquelle ladite surface de support (12) et ladite surface de poussée (13) sont ajustables à différentes distances entre elles de manière à faire varier la largeur du conduit montant (7') du noyau.

9. Rebobineuse selon la revendication 7, dans laquelle ledit ajustement de largeur est réalisé par une translation par coulissement uniquement du groupe comprenant la goulotte (14) et le rouleau (9).

10. Rebobineuse selon la revendication 9, dans laquelle ladite translation par coulissement est réalisée le long d'une voie de coulissement.

11. Rebobineuse selon une ou plusieurs des revendications précédentes, dans laquelle le conduit montant (7') est en outre muni, le long de sa longueur, d'un premier groupe de soufflantes (21) et d'un second groupe de soufflantes (20) disposés de manière à injecter de l'air mis sous pression dans le conduit montant (7'), ledit groupe de soufflantes (21) étant disposé le long de la surface de poussée (13) et ledit second groupe de soufflantes (20) étant disposé le long de la surface de support (12), à l'opposé dudit groupe de soufflantes (21).

12. Rebobineuse selon la revendication 11, dans laquelle le premier groupe de soufflantes (21) est disposé le long du conduit dans une position vers l'arrière en direction de l'entrée du conduit (7') par rapport au second groupe de soufflantes (20) disposé dans une position vers l'avant en direction de la section d'enroulement d'une manière telle que, par activation en séquence des premier (21) et second (20) groupes de soufflantes pendant la rotation montante du noyau dans le conduit (7'), la tête (31) de la bande séparée reste sensiblement en contact sur le noyau tournant sous lesdits groupes de soufflantes, réalisant le premier tour d'enroulement.

13. Procédé pour la formation de rouleaux industriels (4) dans une rebobineuse (1) comprenant les étapes :

- d'alimentation d'une bande continue (2) en direction d'une section d'enroulement (8) pour enrouler la bande autour d'un noyau tournant (3) dans ladite section d'enroulement ;
- d'échange entre le rouleau formé (4) et le nouveau rouleau (4) en formation, ledit échange comprenant l'entrée d'un nouveau noyau (3) dans la section d'enroulement (8) à travers une

section d'alimentation (7) et la déchirure contextuelle de la bande de papier continue (2) ;
l'échange du nouveau noyau (3) est commandé par le mouvement d'une ou plusieurs bandes (16) disposées dans la section d'alimentation (7) de manière à réaliser une surface de poussée (13) opposée à une surface de support (12), ladite surface de poussée et ladite surface de support (12) formant un conduit montant (7') dans lequel le noyau est inclus de manière à rouler sur la surface de support (12) par l'effet de poussée des bandes (16), et **caractérisé par le fait que** la déchirure de la bande continue (2) est obtenue par le maintien d'une vitesse des bandes (16) inférieure à la vitesse d'enroulement du rouleau en formation, au moins pendant la phase d'entrée du noyau dans le conduit (7'), d'une manière telle que le noyau en entrée dans le conduit (7') pousse la bande continue (2) en contact contre lesdites bandes (16) provoquant un état de tension qui conduit à la déchirure, ladite déchirure formant une queue (30) de la bande d'enroulement sur le rouleau formé et une tête d'enroulement (31) sur ledit nouveau noyau en entrée.

14. Procédé pour la formation de rouleaux industriels (4) selon la revendication 15 ou 16, dans lequel, à la suite de ladite phase de déchirure de la bande, il est en outre prévu l'opération d'enroulement de la tête (31) de la bande autour du nouveau noyau, ladite opération comprenant l'activation de manière successive d'un premier souffle d'air (21), dirigé de la surface de poussée (13) en direction du conduit (7'), et d'un second souffle d'air (20) dirigé de la surface de support (12) en direction du conduit (7') de manière à sensiblement maintenir l'adhérence de la tête (31) de la bande avec le noyau tournant pendant le premier tour d'enroulement jusqu'au moment où la tête (31) est disposée au-dessous de la bande d'enroulement suivante (2) sur le noyau.

15. Procédé pour la formation de rouleaux industriels (4) selon la revendication 17, dans lequel l'activation du premier souffle d'air (21) maintient sensiblement l'adhérence de la tête (31) de la bande avec le noyau tournant jusqu'au moment où la tête (31) atteint la surface de support (12), et dans lequel le second souffle d'air (20), activé à la suite de l'arrivée par roulement de la tête (31) de ladite surface de support (12), maintient la tête en adhérence avec le noyau jusqu'à l'achèvement dudit premier tour d'enroulement sensiblement en correspondance de la surface de poussée (13).

Fig. 1

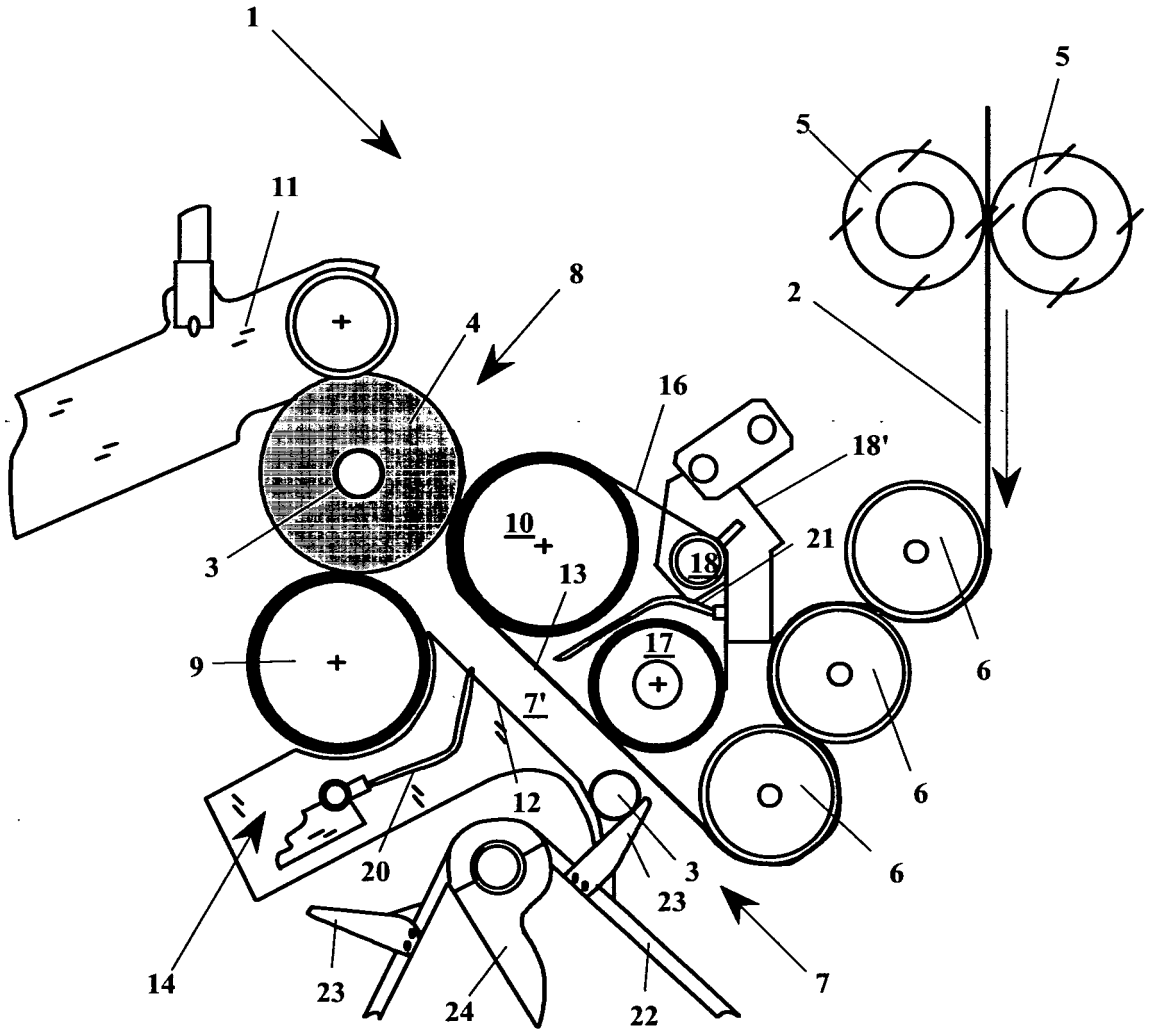
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Fig. 2

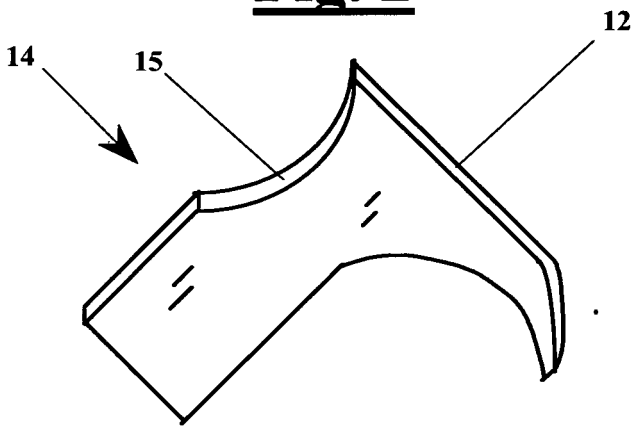
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Fig. 3

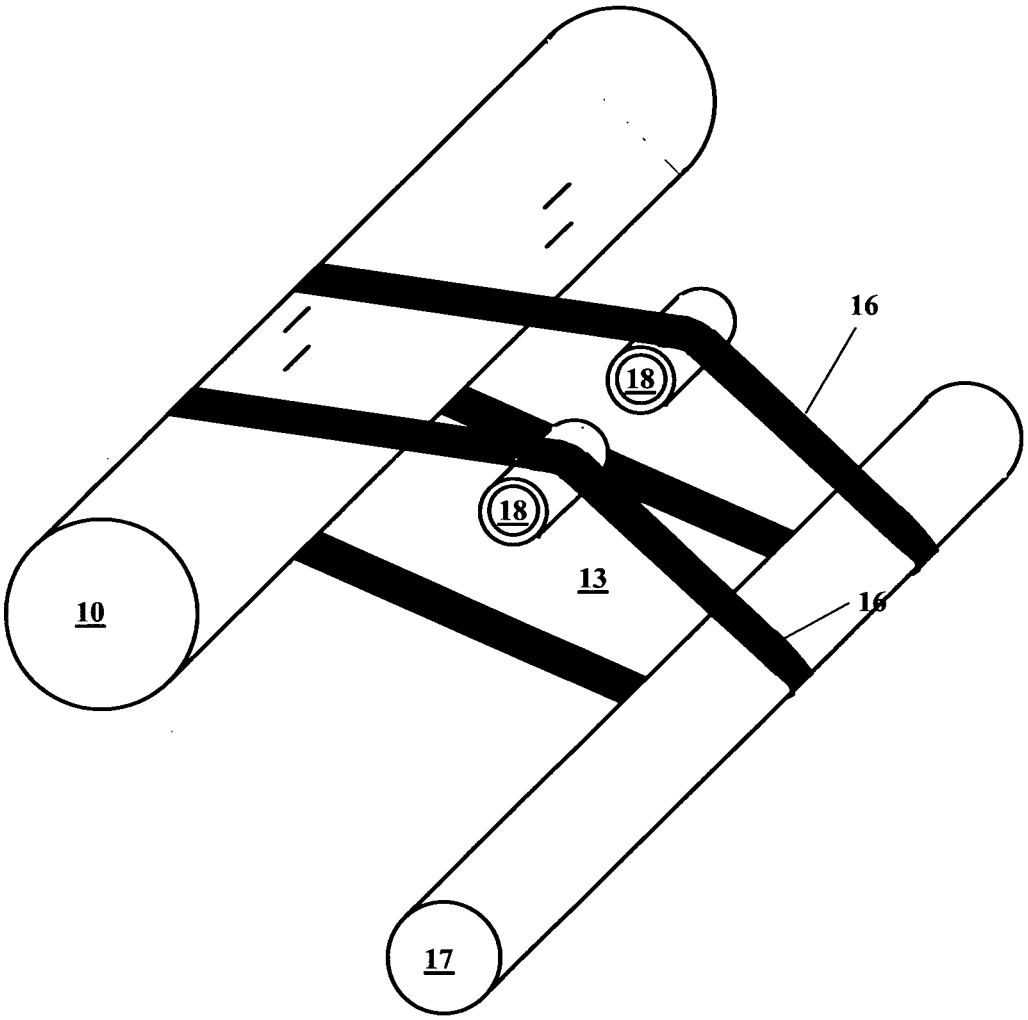


Fig. 4

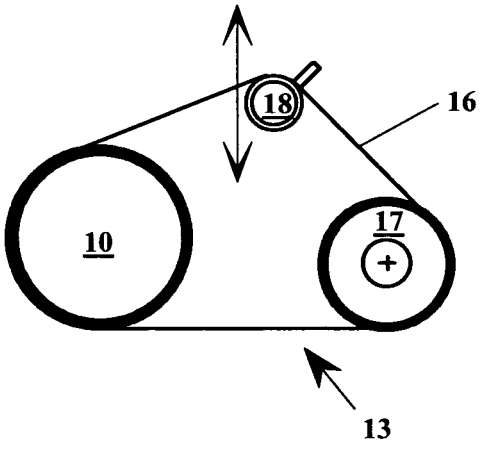


Fig. 5

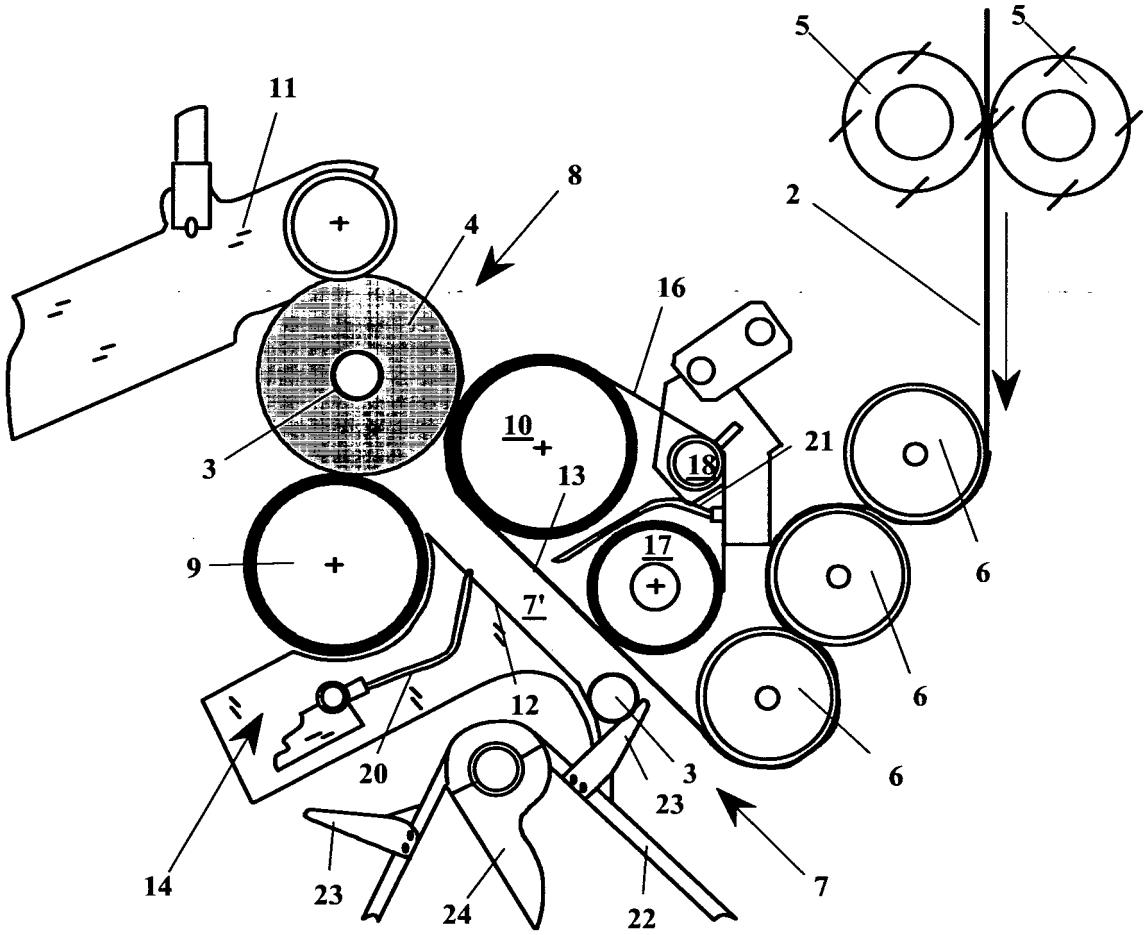


Fig. 6

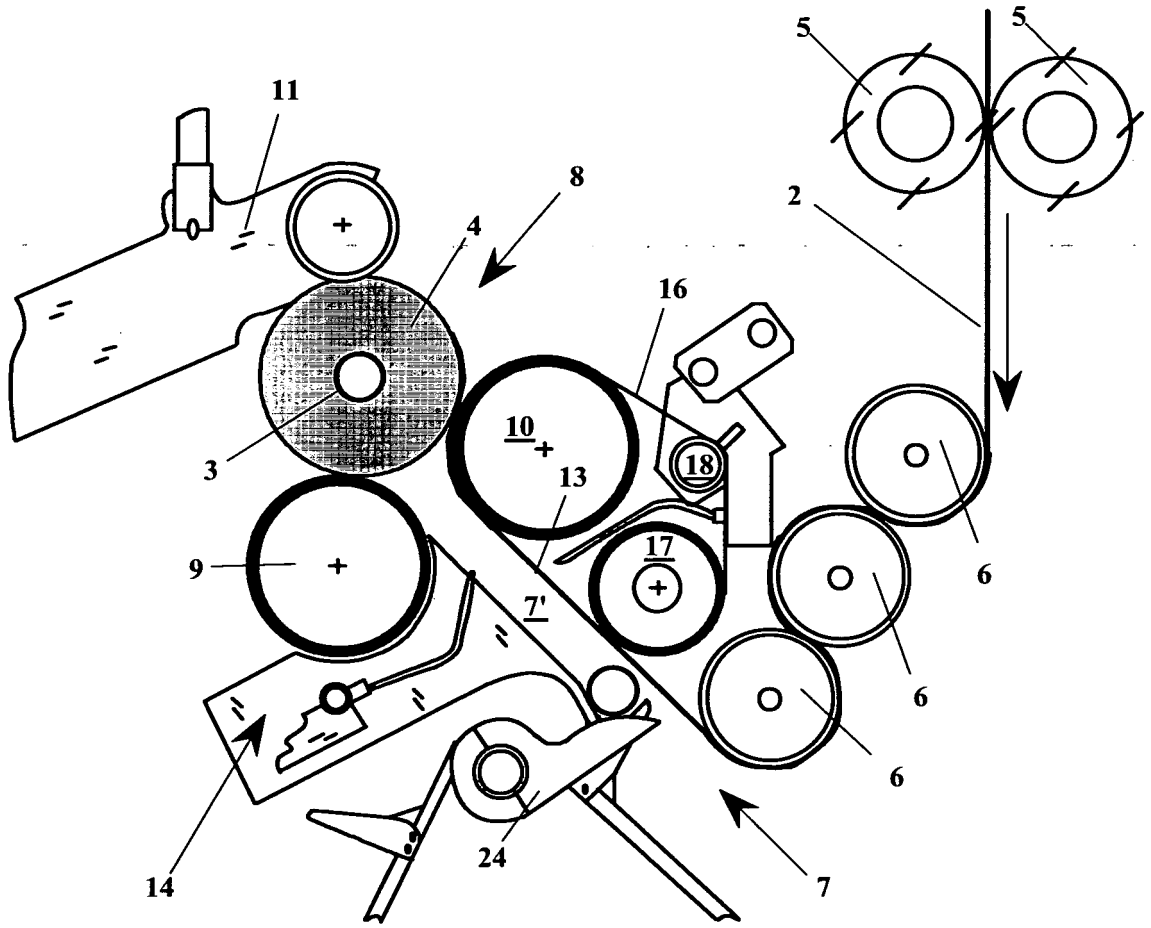


Fig. 7

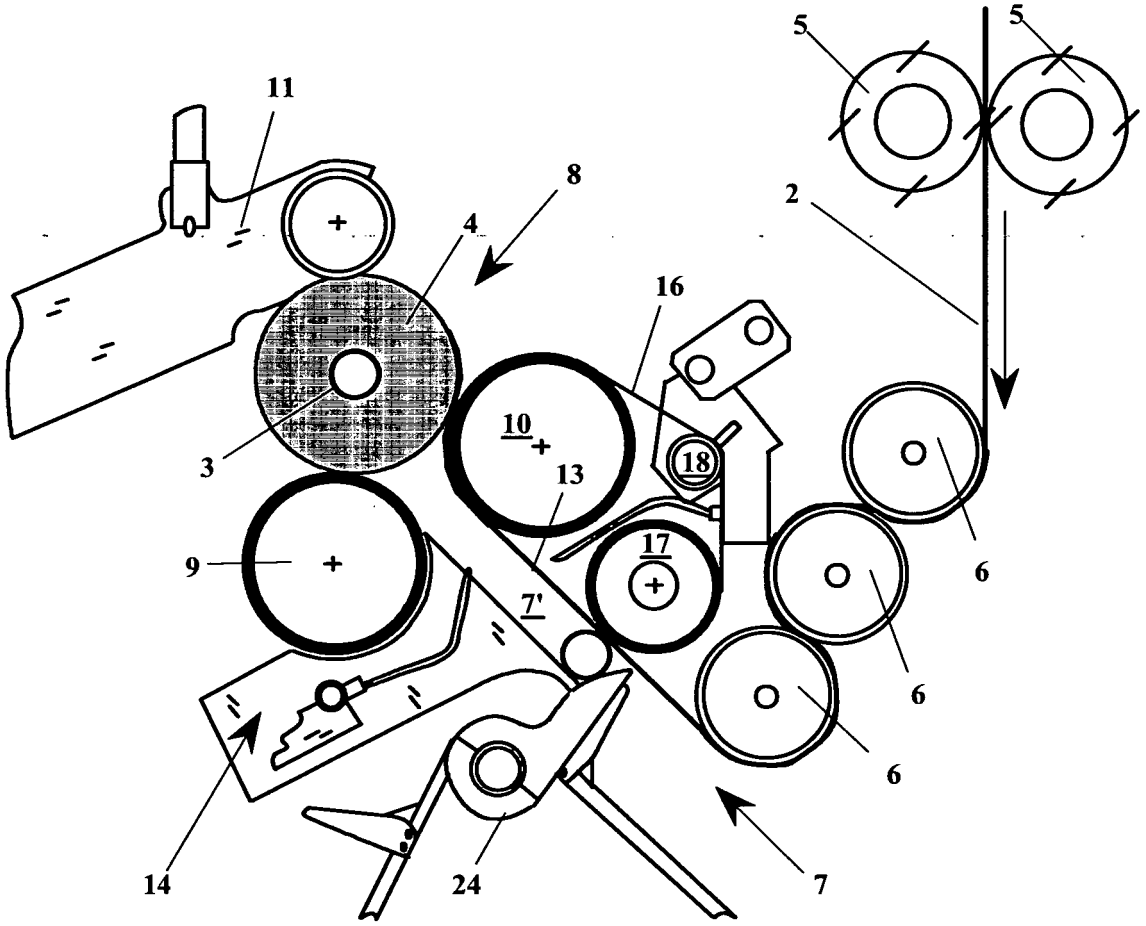


Fig. 8

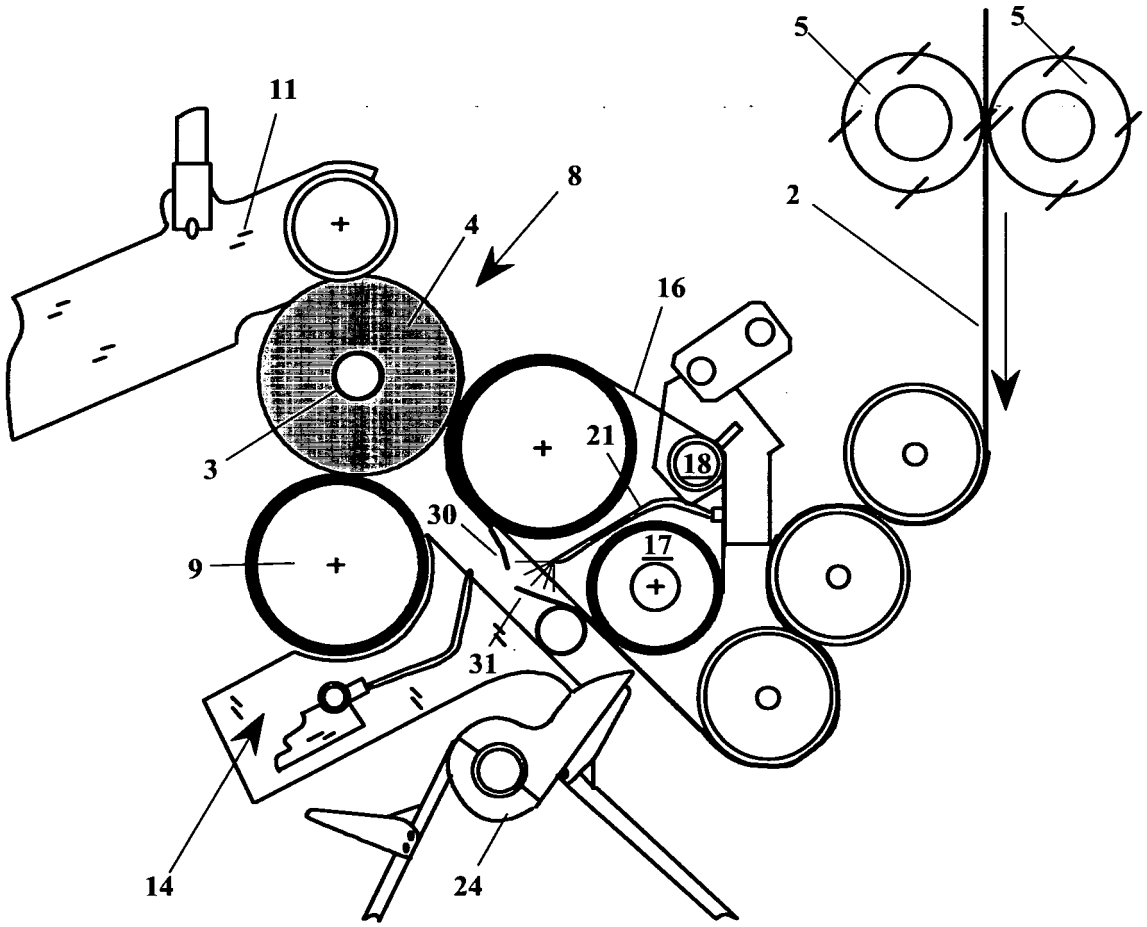


Fig. 9

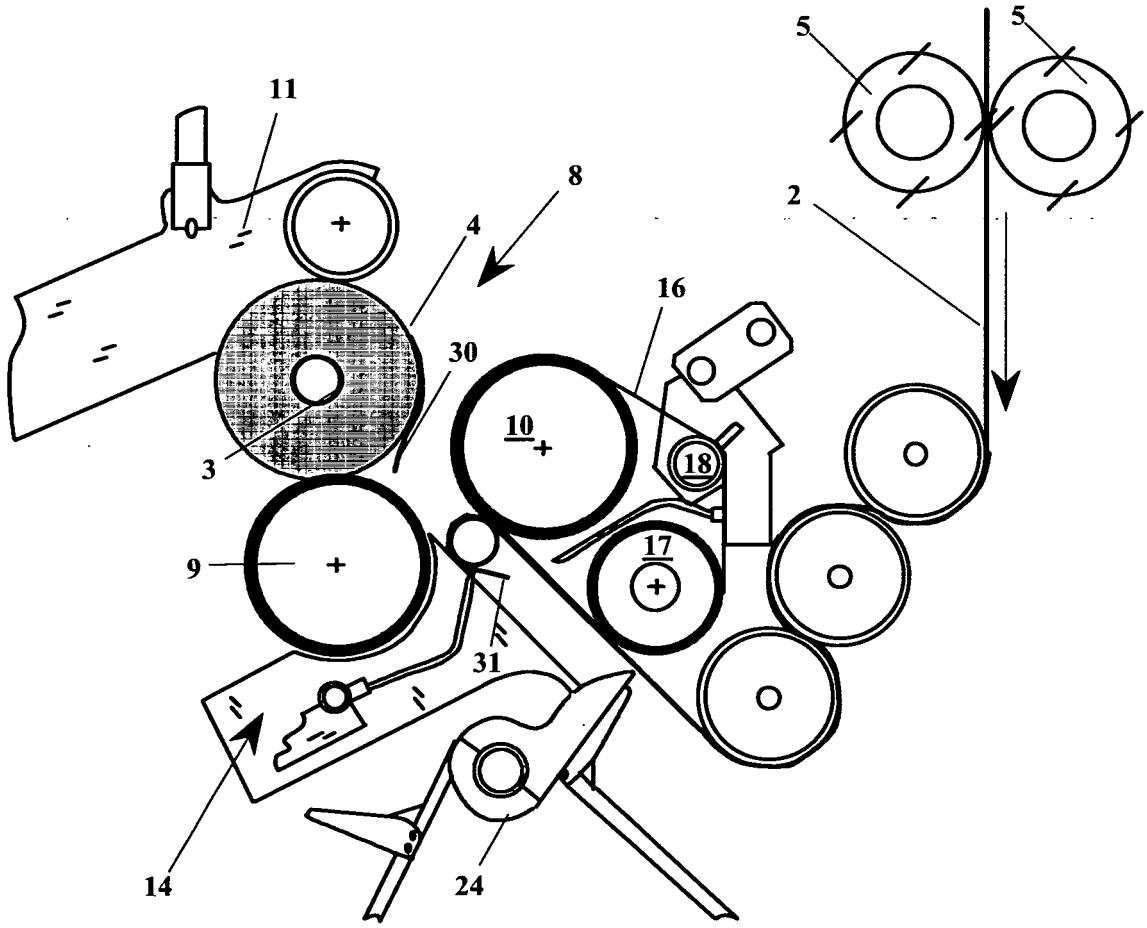


Fig. 10

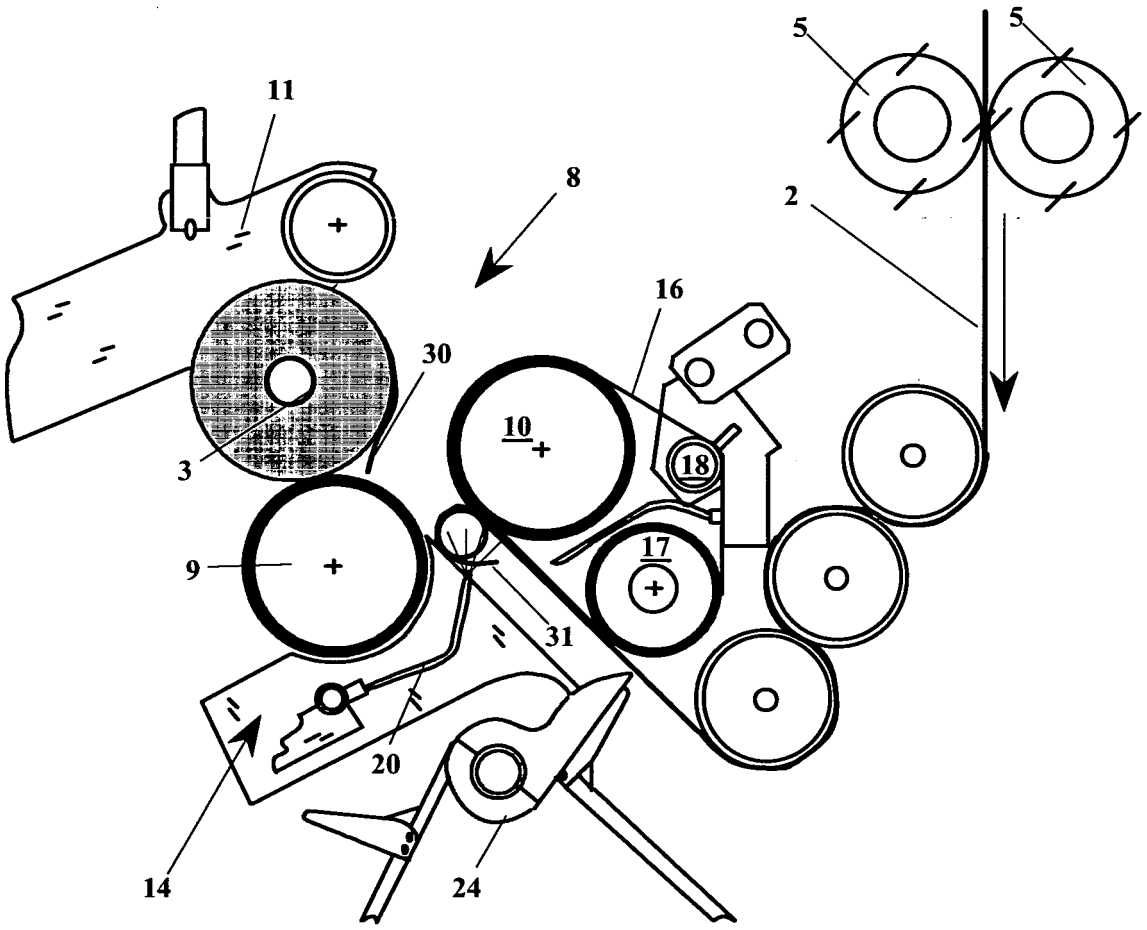


Fig. 11

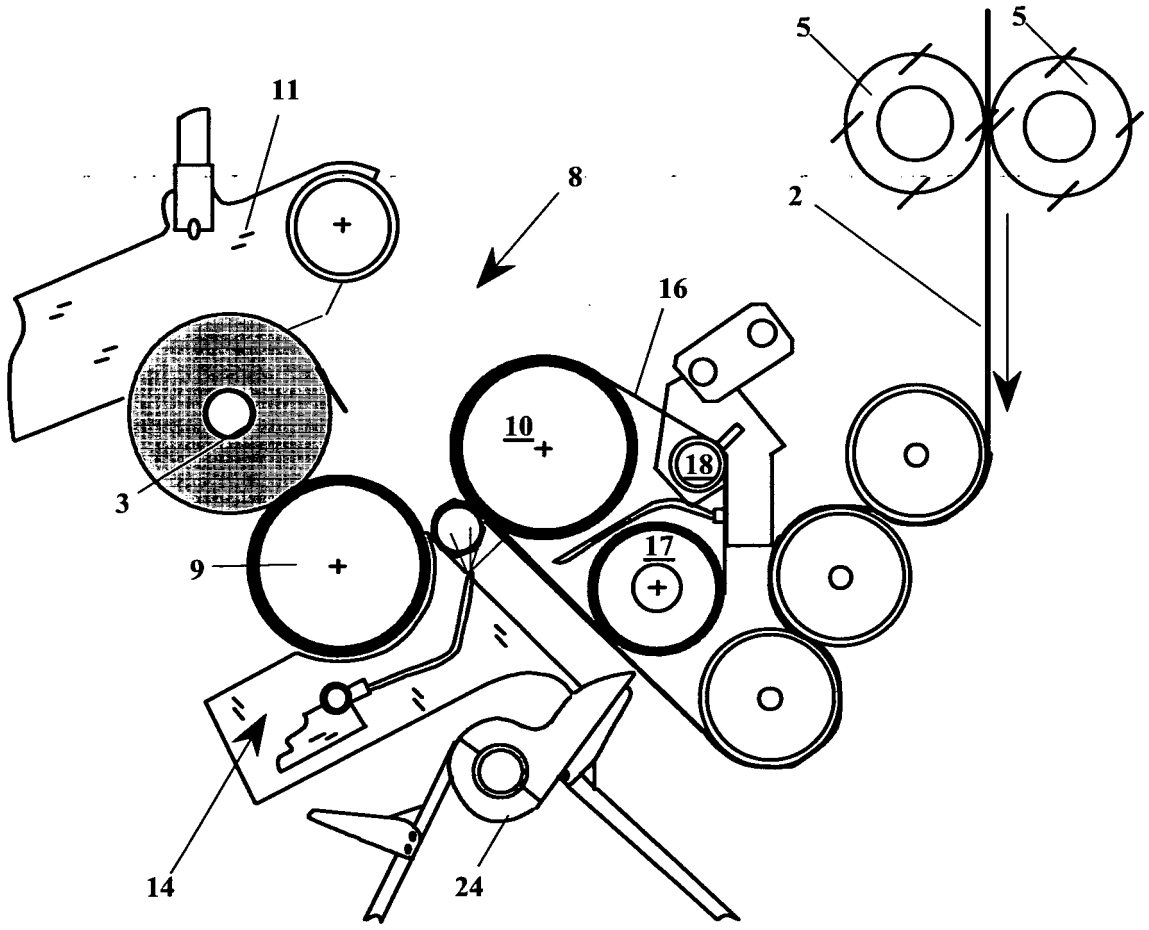
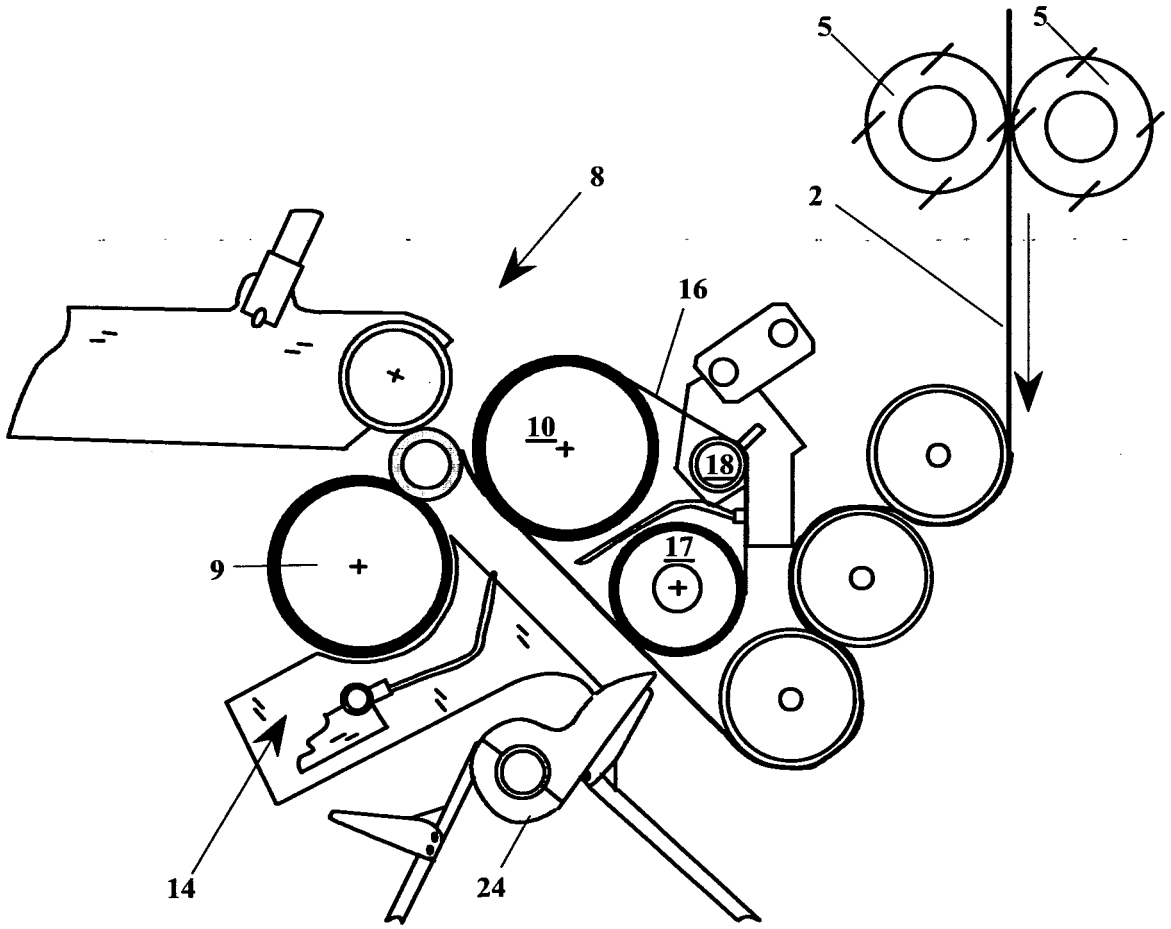


Fig. 12



REFERENCES CITED IN THE DESCRIPTION

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