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(54) **A METHOD FOR PRODUCING GLUED REELS WITH TWO OR MORE PLIES AND RELATED MACHINERY**

VERFAHREN ZUR HERSTELLUNG VON GEKLEBTEN ROLLEN MIT ZWEI ODER MEHR LAGEN
UND DIESBEZÜGLICHE MASCHINEN

PROCÉDÉ DE PRODUCTION DE BOBINES COLLÉES AYANT AU MOINS DEUX PLIS ET
MACHINES ASSOCIÉES

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Description

Technical field

[0001] The present invention refers to the technical field of the production of reels, preferably made of paper but also of other materials, such as non-woven fabric or materials obtained from plants, such as cotton.

[0002] In particular, the invention refers to a method and related device, which allows to produce reels, which tape is in the form of two or more plies glued each other in efficient and functional way.

Background art

[0003] The technique for producing paper mother reels has been known for a long time.

[0004] The equipment foresees the cellulose processing, which is mixed to water and other additives. Therefore, a tape is produced, passing along a drying section where it is subjected to warm air flows, in such a manner so as to leave said section substantially dried.

[0005] While leaving the drying section, the tape is rolled up to a mother reel, which is ready to be processed in the shape of napkin, interleaved towels, etc., depending on needs and on specific machineries which are not the object of the present invention. The reel (or more than one reel) is then mounted on aforementioned specific machineries (for example rewinders or interleaving machineries) and it is unwound along a processing path which leads to the final product.

[0006] It is often necessary to produce mother reels wherein the tape is practically formed by two or more overlapping plies and glued each other. For that purpose, the prior art foresees the coupling of two or more plies, which are unwound from their related mother reels and that overlap each other once the glue is sprayed. Therefore, a gluing section is foreseen where the glue distribution takes place and a further section wherein the two or more tape plies are overlapped each other, attaching together by means of the spread glue. Therefore, the exiting tape is a single glued tape formed by one or more plies. Finally, the tape obtained by gluing the aforementioned two or more plies is rolled up in a mother reel (defined Jumbo Roll in technical jargon), which is ready to be mounted and fed to specific machineries for paper processing and so for the production of interleaved towels, rolls, toilet paper, etc.

[0007] Over the prior art, the glue distribution for the production of mother reel of two or more plies can take place in various ways. Document EP 0 440 117 discloses a typical glue distribution method and device in a system foreseen for combining two webs.

[0008] In a case, for example, the passage of at least one of the two tapes is foreseen in contact with a transverse rotatable roller which is wet with glue, as it is semi-immersed into a tank containing glue, for example. The roller rotates slowly, by drawing glue time by time. The

ply transits along its path by brushing against the roller, thus soaking by glue along its diagonal length, corresponding to the span of the roller (i.e. its diagonal length). In that way, along the processing path, such a ply in form of a tape is coupled to the other ply coming from the other mother reel and then attach together to form a single two-ply tape.

[0009] The main technical inconvenience with the use of a distribution roller is the impossibility to reach producing speed over 700 m/min. The whole system results in a strong productive limitation, as modern rewinders reach normally 1000-1200 m/min speed approximately. In addition, the lamination by means of a roller modifies the appearance of the final product. As a matter of fact, as the glue is spread uniformly onto plies, the two or more paper plies result finally less soft and dry to the touch and so hardly processable. Grooved rolls could be used for trying to minimize the problem, or using a regular embossing roller, but anyway the final appearance of the product would be modified in any case and showing visible strips or "small spots". In addition, it is important and also difficult, to adjust the paper tension conveniently, in order to make it brush the roller soaked by glue. This process is not so easy.

[0010] Therefore, it is not possible over the prior art to have a product with two or more glued plies with "smooth" and soft appearance and with technical features of homogeneous processing.

[0011] Another prior art foresees the use of fixed nozzles, which spray and nebulize glue during the passage of the unwinding roll. Nozzles, generally more than one, are arranged in a specific section of the machinery along its diagonal length, in such a manner so as to intercept and cover the diagonal length of the passing tape. The spraying nozzles are connected to a glue tank and they begin to spray while the paper tape is passing, thus soaking the passing ply along its whole diagonal length. The rest of the process is equal to the described one, that is the tape soaked by glue is attached to a second tape, thus creating a double-ply.

[0012] The same technique (both by means of roller and by means of spray nozzles) is obviously applied to the case of three or more plies.

[0013] A problem occurred with the use of simple fixed nozzles is that they lose glue drops in use, falling to the ground and thus creating dangerous puddles for the operators' safety. Accidents due to slipping are frequent. Moreover, glue stiffens as time passes by, sticking to soles, thus making the whole environment dirty and resulting in being hardly cleanable. Another inconvenience concerns the nozzles which become easily obstructed by glue, thus spraying badly as time goes by and altering the product quality. They often get totally obstructed and their replacement or anyway a cleaning operation is necessary.

[0014] Therefore, it is clear that, although the use of fixed nozzles succeeds in solving the technical problem of a better distribution of the glue amount compared to

the use of the roller, without modifying the final product appearance and allowing high processing speeds, nevertheless obstruction and dropping problems remain unsolved, as they cause many safety problems to the operators and the necessity of continuous checks and maintenance. Moreover, the spraying obtainable by spray nozzle creates a "fog" effect which must be limited to avoid glue dispersion into the surrounding environment at a distance from the dispersion point.

Disclosure of the invention

[0015] It is therefore the aim of the present invention to provide an innovative method, and related machinery, which solves the aforementioned technical inconveniences.

[0016] In particular, the aim of the present invention is to provide a method, and related machinery, which allows to spread the glue on one or more paper plies to form the two-ply or more-ply tape, in such a manner that a homogeneous distribution occurs, thus avoiding areas with glue excess or areas without glue.

[0017] At the same time, the aim of the present invention is to provide a method, and related machinery, which allows to obtain a paper tape with two or more paper plies with great qualities, that is soft and processable, even guaranteeing a good endurance between the two or more plies glued each other.

[0018] The aim of the present invention is also to provide a method, and related machinery, which minimizes the risk of malfunctioning of the means used to spread the glue and minimizes accidental loss due to drip, which may cause puddles.

[0019] These and other aims are therefore obtained through the present method for the production of a tape with two or more glued plies, according to claim 1.

[0020] Such a method comprises the following phases:

- The feeding of at least a first ply (100, V1) in the form of a tape along a first processing path;
- The feeding of at least a second ply (200, V2) in the form of a tape along a second processing path;
- Distribution of the adhesive material (C1) on at least two plies along the processing path and subsequent overlapping of said two plies.

[0021] According to the invention, the distribution process of the adhesive material is now made through the rotation of at least one element of rotating distribution (3), to which said adhesive material is fed and which throws, by centrifugal force, a nebulization of said adhesive material.

[0022] In this way, all the aforementioned technical inconveniences are easily solved.

[0023] It has been surprisingly found that the use of a rotor which sprays the glue while rotating allows a homogeneous distribution, with drops of a correct size, such that the gluing proves to be efficient without altering the

qualities of the product.

[0024] Moreover, the use of the aforementioned rotors minimizes the problem of the fogs, due to traditional nozzles and eliminating the obstruction problem that does not occur because of structure and operation of rotors.

[0025] Therefore, the production of paper or other material reels, for example in a rewinder machinery, can use such a technology in order to optimize the quality of the obtained final product.

[0026] According to the claim about the gluing section and machinery which includes said section, preferably a rewinder machinery, the same advantages occur.

[0027] Further advantages are inferable from the remaining dependent claims.

Brief description of drawings

[0028] Further features and advantages of the present method and relative machinery or section, according to the invention, will result to be clearer with the description that follows of some embodiments, made to illustrate but not to limit, with reference to the attached drawings, wherein:

- Figure 1 outlines the centrifugal device 1, known in itself, used in the present invention and which is able to produce and cast a nebulization of adhesive material, generally an adhesive fluid, while figure 2 shows a possible known solution to produce a rotor 3 of such a centrifugal device for generating and casting the glue nebulization by means of its rotation;
- Figure 3 outlines a production line, to produce for example paper rolls or reels in a rewinder machinery, wherein a potential positioning example of the centrifugal devices (1, 1') is shown;
- Figure 4 is a further schematization which highlights the passage of the paper tape in front of the centrifugal device 1;
- Figure 5 shows the nebulized drops spread on a part of the tape;
- Figure 6 shows a solution wherein the used centrifugal device is connected to a system 50 for maintaining at a certain distance the paper tape, together with a system 60 for collecting the exceeding glue;
- Figure 7 outlines a preferred positioning of the centrifugal device with respect to the passage of the tape;
- Figure 8 shows the system 50 for maintaining at a certain distance the paper tape of the paper in form of a holed rod 50, through which air under pressure is blown to maintain the tape separated from the centrifugal device;
- Figure 9 and 10 show respectively the positioning of the centrifugal device in a production line of two and three plies.

Description of some preferred embodiments

[0029] Devices of the rotatable type have been known for a long time (i.e. centrifugal ones), suitable for nebulizing liquids/fluids thanks to centrifugal force.

[0030] Many kinds of this device exist and they are formed by rotors, rotating plates for example, which foresees a certain radial canalization.

[0031] They are connected to a feeding system of the fluid to be sprayed and, by means of suitable rotating means, are put in fast rotation, while the fluid feeds them. The fed fluid is thrown by centrifugal force along said specifically shaped radial channels and it is sprayed and thrown radially to a certain distance, that is for a certain distance and with a preset angular spacing.

[0032] As an example, the publication US2009/0212128 is known, describing a plate which allows to spray and cast by centrifugal force a fluid to a certain distance.

[0033] Another solution example is published in EP0796662 which describes a centrifugal apparatus and related method to spread a treating fluid. Figure 2 in attachment shows the rotor used in EP0796662 specifically.

[0034] Provided that, fluids that are sprayed with such a kind of centrifugal device are always perfuming liquids, lotions or softeners, in such a manner that the finished product has better softness and/or perfuming features.

[0035] The aforementioned apparatuses are purchased by factories for paper production, in order to use them for spraying liquid perfuming solutions or conditioners exclusively.

[0036] The same publication EP0796662 specifies the use of the aforementioned apparatuses for casting treating liquid, such as conditioners.

[0037] Nowadays, it has been surprisingly tested and found that the use of the aforementioned rotating apparatuses is able to throw efficaciously also a fluid like glue, which has technical features, like viscosity, specific weight and its own gluing features which make it very different compared to treating liquids which are sprayed with the aforementioned centrifugal apparatuses.

[0038] Therefore, the implementation of the aforementioned centrifugal apparatuses as glue distributing system along the passage of paper not only allows to optimize the glue distribution but also, as explained further, allows to solve all the technical inconveniences of prior art, without causing obstructions due to glue in the rotating device, although it is specifically made for balsamic or perfuming lotions.

[0039] The technical expedient to replace the known apparatuses of glue distribution, such as roller or nozzles, with the aforementioned rotating device, allows to obtain an optimal glue distribution, thus optimizing the quality of the product with respect to results obtained by rollers, thus reducing the problems of dripping and mists. Therefore, it has been found that it is possible to adjust precisely the glue amount to spray and the nebulization with the

use of the aforementioned apparatuses and, at the same time, the leakage by dripping are minimized, as well as the problems of nozzles obstructions.

[0040] Figure 1, as an example, describes a part of such an apparatus of the rotating type 1, wherein rotors 3 and flexible ducts 2 through which the fluid is fed, (glue in this case) are highlighted. Always figure 1 shows the openings 4 which lead to rotors and through which the nebulization is cast.

[0041] It has been found that a particularly functional model for that purposes is the system "WEKO RF COMPACT 3" - "ARTICLE 650445", produced by WEKO.

[0042] As outlined in figure 1, such a model foresees a sequence of rotors 3, forming a line one next to the other and which lead to an opening through which the glue is thrown and such an opening is re-closable through a shutter (S) (see for example figure 6). In this way, at the end of use, the shutter (S) can be closed again automatically to avoid spurts and dropping of glue throughout the environment.

[0043] Therefore, this own expedient of the aforementioned model helps to reduce glue leakage throughout the environment.

[0044] The device 1, as shown in figure 4 or in figure 6, is placed to a certain distance from the paper tape passing horizontally according to the arrow direction of figure 6 downwards.

[0045] According to the invention, it has been surprisingly found that the distance between the paper tape and the rotor which casts the glue can be comprised preferably between 20mm and 25mm (even more preferably, ranges between 20mm and 23mm or between 20mm and 22mm are optimal) with an unwinding direction, and therefore of paper passage, from top downwards (see the arrow direction of figure 4 or figure 6). As a matter of fact, in case of specific use of the aforementioned WEKO device, the producer, as per figure 7, recommends a distance of 18mm with an unwinding of paper from bottom upstream with the help of a carter placed behind the paper. It has been found that such an arrangement creates many problems with fogs, dropping and motions, for this reason the above-mentioned ranges between 20mm and 25mm with the passage of paper from top downwards solve said problems, above all if the carter behind the paper itself is removed.

[0046] As a matter of fact, figure 4, highlights that the centrifugal device is not coupled to a carter to the opposite side of the tape.

[0047] The above-mentioned WEKO model is used, according to the invention, with a 2800 RPM speed, that is the rotating speed of rotors spraying the glue is fixed and not adjustable. Such a value is however optimal for obtaining correct spraying effects, eventually by increasing the flow rate and maintaining constant the rotation when the forward motion speed of the tape increases.

[0048] Moreover, the use of such a centrifugal system eliminates the risks of obstructions completely, as there are no fixed nozzles. At most, obstructions of filters can

occur but they can be replaced also in use, thus allowing to wash the dirty one for its reuse.

[0049] Therefore, the preferred rotation speed of rotors is approximately 2800 RPM.

[0050] Such a speed is independent from the forward motion speed of the tape but, as already said, the flow rate can be varied, that is the glue feeding to said centrifugal device.

[0051] As alternative, it would be also possible to vary the speed. Therefore, a new version of centrifugal system is available, always produced by Weko, allowing to vary the speed rotation of rotors.

[0052] This is possible thanks to a control panel which allows to modify Hertz, thus varying the rotation speed of rotors consequently.

[0053] The new system foresees the Hz variation in a range of $40 \div 60$ Hz.

[0054] Low speed entails bigger and heavier drops.

[0055] As the rotating speed is increased, drops result in being smaller and lighter.

[0056] Therefore, the following settings would be possible:

- 40 Hz -> 2'400 rpm;
- 50 Hz -> 3'000 rpm;
- 60 Hz -> 3'600 rpm

[0057] The new system allows to adjust these parameters by the control panel.

[0058] It is recommended to work preferably with 50 Hz, thus obtaining similar speeds to the model with fixed speed described above.

[0059] In theory, it would be useful to work with Hz comprised between $20 \div 80$ Hz, in such a manner so as to vary the speed, in order to "pulverize" the glue depending on needs and depending on the paper speed.

[0060] Obviously, the flow rate of glue is adjusted by a pump which feeds the glue toward the aforementioned apparatus 1. Therefore, if the production speed increases, so the forward motion speed of the tape increases and it is possible to operate by increasing the flow rate and/or varying the rotating speed of rotors, in such a manner so as to maintain the sprayed glue amount fixed per square centimeter.

[0061] However, if the available technology does not allow to vary the rotation speed of rotors, it is necessary to operate on the flow rate of the pump only.

[0062] Generally, the pump which feeds the centrifugal device is regulated on values ideal for balm. Therefore, the inverter which monitors the pump engine can be programmed in such a manner so as to allow to vary the pump speed depending on specific need, in the case of use of glue.

[0063] Moreover, in order to optimize the glue spraying, measuring valves with 1mm diameters, instead of measuring valves equipped with 0,54mm diameters, have been used, those valves can be customized upon request to the producer. In those types of well-known

devices, the aforementioned Weko model in particular, a flexible tube 2 is foreseen, bringing the fluid to the rotor. The rotor, as already said, is rotatable around an axis. The flexible tube 2 is connected to a feeding duct, which is equipped with an adjusting valve, that is said adjusting valve (not represented in figure 1 for the sake of simplicity). It has to be underlined that the 0,54mm diameter is a standard converting size. The need to increase the flow rate has led to such a selection of increased diameters, speeds of the current rewinder machineries permitting. Moreover, by using increased (heavier) bulks (types of paper), adjusting valves of bigger sizes will be necessary. **[0064]** Therefore, if the standard value 0,54 for conditioners was not used with the glue, the glue feeding would not be enough, while the optimal use of 1mm glue would be excessive in the case of conditioners.

[0065] Carrying on with the structural description of the invention, figure 3 outlines a production line (rewinder machinery), wherein two paper tapes are glued each other, in such a manner so as to obtain a single two-ply tape which will form the two-ply mother roll. The arrangement of figure 3, as explained further, is for the production of three or more plies and it is to be highlighted that the other gluing sections have been omitted for the sake of simplicity.

[0066] Therefore, as shown in figure 3, a first mother roll 10 is highlighted, formed by a wound paper tape and from which such a tape 10 unwinds, which forms a first-ply of the tape. As outlined in the figure, such a ply of tape 100 is made pass in front of the centrifugal device 1, where the glue is sprayed along the horizontal length of the tape.

[0067] Figure 4 shows in details, as already said, the passage of paper in front of the apparatus 1.

[0068] A second ply of the paper tape is unwound equally from a second reel 20, following his processing path itself.

[0069] If a two-ply tape is produced, the glue is spread only on a side of a ply, attaching together the two plies subsequently. Instead, in the case of more plies, the glue is spread on a side of the first ply and on the opposite side of the subsequent ply (as in figure 3).

[0070] For clarity purposes, figure 9 shows a machinery for the production of a glued two-ply tape, wherein only a centrifugal device is arranged, spraying on the side of a ply only, in such a manner that the glue layer (C1) is comprised between the two plies to glue them. Instead, in the case of three plies, as in figure 10, the glue is spread onto the side of the first ply (V1) which glues to the second one (V2) and to the opposite side of the second ply (V2) which glues to the third one (V3). The same sequence is repeated in the case of four or more plies, by spreading additional glue on the opposite side of the third ply which glue to the fourth one, etc. Then plies along the path are attached by gluing by overlapping one another as per prior art and then they are wound onto a single mother reel (see schematization in figures 9 and 10).

[0071] According to such a technique, it is obvious that any number of plies (even three or more) can be spread with glue and then they are overlapped one another.

[0072] The used glue is preferably a traditional glue used in the specific technical field of "covering paper". It is a polyvinyl alcohol based glue that must be used with certain dilutions, compatible with the centrifugal device. The dilution from 1:2 (two liters of water each liter of glue) to 1:10 (ten liters of water each liter of glue) range has proved to be optimal, depending on the glue supplier. The optimal dilution proves to be 1:5.

[0073] The bought glue has to be diluted, according to the aforementioned dilutions. To maintain its features, a continue agitation of the solution is necessary, as water and glue tend to separate themselves. Therefore, a preparation tank has been foreseen and it is placed close to the Weko machinery with an agitating system with a lower number of rotations than the preparation tub, to avoid the separation between glue and water. This second tank is linked to a feeding system, a pump for example, which feeds the diluted glue continuously, in such a manner so as to maintain the processing conditions stable.

[0074] Nevertheless, the use of different glues, already diluted with various dilution degrees, is not excluded.

[0075] In order to optimize the machinery, further expedients have been added.

[0076] One of these expedient concerns a blowing system 50 to distance the paper from the section which sprays the glue by means of the described centrifugal device (see figure 6).

[0077] This is necessary as, even if glue is not supplied, the risk of contact of paper parts to the parts of the spraying device may occur, leading the paper to stick to it, as a result of residual glue. Even if the aforementioned Weko model is specifically used, foreseeing a closing shuttle which isolates rotors, the risk is still present, as other parts of the Weko machinery itself may be dirtied by glue. In particular, potential motions or loosening of paper tension may bring the product in contact with the glued parts. As a matter of fact, glue dirties the machinery body and if the paper touches the glue, it tears off while restarting: then it is necessary to clean the whole machinery with a waste of time, as glue and paper creates a mixture difficult to remove. Moreover, it is necessary to arrange the passage of paper again.

[0078] For that purpose, as shown in figure 6 and figure 8, a rod 50 has been added (simply made by a holed tube), wherein pressurized air flows. Holes are directed properly and work as nozzles. The rod is arranged in such a manner that the air flow intercepts the paper tape diagonally. As the WEKO system begins to work, the air cast by nozzles maintains the paper distanced from the machinery itself. The air pressure range may be between 0,05 bar to 1 bar, with a found optimal value of 0,15 bar.

[0079] Generally, the air flow is continuous and is sent also during the normal operation of the machinery, that is while gluing. In this way, the air helps to conduct better the sprayed glue on the passing paper, thus allowing to

obtain a double advantage. Moreover, air flows allow a more efficient gluing, because they prevent the dust from depositing onto the paper tape and the glue can have a better adherence on the paper itself.

[0080] According to the embodiment of the invention, a containing tank 60 has been integrated below said section which sprays glue by centrifugal force (outlined in figure 6). As a matter of fact, hat centrifugal system are used for conditioners and a potential conditioner excess is absorbed by paper. Instead, a potential glue excess causes the paper to rip. The glue system used in the paper factory operates in an environment different from those one for such converting centrifugal devices. For example, there is more dust in the paper factory. If it is dispersed in the environment, the glue together with dust forms clumps which stick to the various parts of the machine, thus spoiling its operation. For this reason, the tank 60 collecting the exceeding glue has been integrated, placed below the centrifugal device. The position can be optimized by placing the tank slightly backward with respect to the rotor itself, in order to collect as much glue as possible, thus facilitating the further cleaning and the maintenance. Therefore, if glue is collected, it will be held in the tub, even forming clumps together with dust, without the risk of dirtying other parts of the machinery or even the paper under production.

[0081] Moreover, according to the embodiment of the invention, if a conditioner is used and it is sprayed onto rollers as paper has some defects (holes, rips or lacerations), no problems occur: the conditioner is reabsorbed by paper during the passage. Instead, in the case of glue, it is necessary to stop the supply, as the paper passing on the roller may cause the paper itself to rip, due to holes, as glue begins to stiffen. For that purpose, a controlling system has been integrated, in order to detect paper breakages or lacerations, such a technology is very well known in itself in the technical field of paper processing.

[0082] Ultrasound and optical sensors have been placed in suitable points upstream the gluing section (also different sensors may be used, such as for example inductive optimal sensors, in the case of dark paper colorations). The aforementioned sensors are placed upstream the centrifugal device, along the unwinding path of the paper. Sensors are connected to the centrifugal device and, as they detect a hole or a laceration on paper, they send a signal for closing the shutter of the rotor, thus preventing the glue from being sprayed. The defective paper is removed by the operator, which lets an extra piece to the strips of "healthy" paper and starts again, making the shutter open from the panel. As alternative, sensors can block the glue supply and/or block the operation of the whole production line.

[0083] Finally, figure 5 shows the result obtained as the glue is sprayed onto a paper passing approximately 1200 meters per minute (extremely high speed). The figure shows a uniform distribution of nebulized drops which lay on the part of the passing tape.

[0084] The preferred embodiment of the invention is destined for the paper production, preferably paper reels, but the interleaved towels production is not excluded.

Claims

1. A method for the production of a tape with two or more glued plies, the method comprising the following phases:

- The feeding of at least a first ply (100) in the form of a tape along a first processing path;
- The feeding of at least a second ply (200) in the form of a tape along a second processing path;
- Distribution of the adhesive material on at least one of the two plies along the processing path and subsequent overlapping of said two plies;
- **Characterized in that** said distribution process of the adhesive material is made through the rotation of at least one element of rotating distribution (3), to which said adhesive material is fed and which throws by centrifugal force, a nebulization of said adhesive material on the ply placed at a predetermined distance from it.

2. A method, according to claim 1, wherein the generation of a gaseous flow is foreseen, hitting the part of the ply placed in front of the element of rotating distribution (3), preferably during the whole manufacturing process or at least in the case of block of the ply/plies feeding.

3. A method, according to claim 1 or 2, wherein, during the feeding of the plies, through suitable detecting means, an analysis of entirety of the plies themselves is comprised, upstream to the part where the gluing phase takes place.

4. A method, according to one or more of the previous claims, wherein said process of adhesive material distribution is made through the arrangement of a centrifugal device (1) comprising a plurality of element of rotating distribution, arranged one close to the other, in such a manner so as to intercept horizontally the ply in transit.

5. A method, according to one or more of the previous claims, wherein the distance for the arrangement of each element of rotating distribution (3) with respect to the ply in transit is selected from a range from 20mm and 25mm.

6. A method, according to one or more of the previous claims, wherein the advancing direction of the ply in front of said element of rotating distribution (3) is from the top to the downwards.

7. A method, according to one or more of the previous claims, wherein the adhesive material fed by the element of rotating distribution (3) is diluted with another liquid, preferably water

8. A method, according to claim 7, wherein the dilution glue/liquid selected is comprised in a range from 1:2 to 1:10, preferably 1:5.

9. A method, according to one or more of the previous claims, wherein the rotation speed of the element of the rotating distribution (3) is adjustable.

10. A method, according to one or more of the previous claims, wherein the rotation speed of the element of the rotating distribution (3) is comprised between 2400 RPM and 3600 RPM, preferably of 2800 RPM or approximately 3000 RPM.

11. A machinery for the production of a continuous tape with one or more glued plies, preferably a rewinder, the machinery comprising:

- At least a first feeding path through which at least a first ply (100) can be fed in the form of a tape;
- At least a second feeding path through which at least a second ply (200) can be fed in the form of a tape;
- A gluing section (1) to allow the distribution of adhesive material on at least one of the two plies in transit along its processing path, in such a manner that the two plies can be coupled each other;
- **Characterized in that** said gluing section (1) comprises at least one element of rotating distribution (3) arranged in such a manner that it results to a preset distance from the ply in transit and to which it is fed in use said adhesive material, in such a manner so as to throw a nebulization of said adhesive material by centrifugal force.

12. A machinery, according to claim 11, wherein a device for generating a gaseous flow (50) is comprised, arranged in such a manner that it can hit, with the generated flow, the part of ply placed in front of the element of the rotating distribution (3).

13. A machinery, according to claim 11 or 12, wherein one or more detecting sensor are comprised and arranged upstream the gluing section (1) and configured for checking potential rips or holes in the tape.

14. A machinery, according to one or more previous claims from 11 to 13, wherein the distance for the arrangement of the element of rotating distribution (3) with respect to the ply in transit is selected in a

rage between 20mm and 25mm.

15. A machinery, according to one or more of the previous claims from 11 to 14, wherein the direction of the ply in front of said element of rotating distribution (3) is from the top to the downwards. 5
16. A machinery, according to one or more of the previous claims from 11 to 15, wherein at least two rollers are comprised and distanced one from the other, forming the passage of the tape in front of the element of rotating distribution (3) from the top to the downwards. 10
17. A machinery, according to one or more of the previous claims from 11 to 16, wherein a tank for containing glue, provided with a stirrer and a pumping system to pump adhesive material to the element of rotating distribution (3) with variable flow rate, are comprised. 15 20
18. A machinery, according to one or more of the previous claims from 11 to 17, wherein a regulating valve with diameter of approximately 1 mm is comprised for each element of rotating distribution (3). 25
19. A machinery, according to one or more of the previous claims from 11 to 18, wherein the rotation speed of the element of rotating distribution (3) is comprised between 2400 RPM and 3600 RPM, preferably between 2800 RPM and 3000 RPM, more preferably of 2800 RPM. 30
20. The use of a centrifugal device (1) having at least one element of rotating distribution (3), through which to sprinkle by centrifugal force a nebulization of an adhesive material for the formation of a tape with two or more glued plies. 35

Patentansprüche

1. Ein Verfahren zur Herstellung eines Bandes mit zwei oder mehr geklebten Lagen, wobei das Verfahren die folgenden Phasen umfasst: 45
 - Das Zuführen von mindestens einer ersten Lage (100) in Form eines Bandes entlang eines ersten Verarbeitungsweges;
 - Das Zuführen von mindestens einer zweiten Lage (200) in Form eines Bandes entlang eines zweiten Verarbeitungsweges;
 - Die Verteilung des Klebematerials auf mindestens einer der beiden Lagen entlang des Verarbeitungsweges und das anschließende Übereinanderlegen der beiden genannten Lagen;
 - **dadurch gekennzeichnet, dass** der Verteilungsprozess des Klebstoffmaterials durch die 50

Rotation mindestens eines Elementes der rotierenden Verteilung (3) erfolgt, dem das Klebstoffmaterial zugeführt wird und das durch Zentrifugalkraft eine Zerstäubung des genannten Klebstoffmaterials auf die in einem vorbestimmten Abstand von ihm angeordnete Lage vornimmt.

2. Ein Verfahren gemäß Anspruch 1, bei dem die Erzeugung einer Gasströmung vorgesehen ist, die auf den Teil der Lage auftrifft, der vor dem Element der rotierenden Verteilung (3) angeordnet ist, vorzugsweise während des gesamten Herstellungsprozesses oder zumindest im Falle einer Blockierung der Zuführung der Lage/der Lagen.
3. Ein Verfahren gemäß Anspruch 1 oder 2, bei dem während der Zuführung der Lagen durch geeignete Erfassungsmittel eine Analyse der Gesamtheit der Lagen selbst vor dem Teil durchgeführt wird, in dem die Klebephase stattfindet.
4. Ein Verfahren gemäß einem oder mehreren der vorhergehenden Ansprüche, wobei der Prozess der Verteilung des Klebstoffmaterials durch die Anordnung einer Zentrifugalvorrichtung (1) erfolgt, die eine Vielzahl von Elementen der rotierenden Verteilung umfasst, die nahe beieinander so angeordnet sind, dass sie die durchlaufende Schicht horizontal abfangen.
5. Ein Verfahren gemäß einem oder mehreren der vorhergehenden Ansprüche, bei dem der Abstand für die Anordnung jedes Elements der rotierenden Verteilung (3) in Bezug auf die durchlaufende Lage aus einem Bereich von 20 mm und 25 mm ausgewählt wird.
6. Ein Verfahren gemäß einem oder mehreren der vorhergehenden Ansprüche, bei dem die Vorschubrichtung der Lage vor dem genannten Element der rotierenden Verteilung (3) von oben nach unten verläuft.
7. Ein Verfahren gemäß einem oder mehreren der vorhergehenden Ansprüche, bei dem das durch das Element der rotierenden Verteilung (3) zugeführte Klebstoffmaterial mit einer anderen Flüssigkeit, vorzugsweise Wasser, verdünnt wird.
8. Ein Verfahren gemäß Anspruch 7, bei dem der ausgewählte Verdünnungsklebstoff/die ausgewählte Verdünnungsflüssigkeit in einem Verhältnis von 1:2 bis 1:10, vorzugsweise 1:5, enthalten ist.
9. Ein Verfahren gemäß einem oder mehreren der vorhergehenden Ansprüche, bei dem die Drehgeschwindigkeit des Elements der rotierenden Verteilung (3) einstellbar ist.

10. Ein Verfahren gemäß einem oder mehreren der vorhergehenden Ansprüche, bei dem die Drehgeschwindigkeit des Elements der rotierenden Verteilung (3) zwischen 2400 U/min und 3600 U/min, vorzugsweise 2800 U/min oder ungefähr 3000 U/min, liegt. 5
11. Eine Maschine zur Herstellung eines Endlosbandes mit einer oder mehreren geklebten Lagen, vorzugsweise eine Aufwickelmaschine, wobei die Maschine umfasst:
- Mindestens einen ersten Zuführweg, durch den mindestens eine erste Lage (100) in Form eines Bandes zugeführt werden kann; 15
 - Mindestens einen zweiten Zuführweg, durch den mindestens eine zweite Lage (200) in Form eines Bandes zugeführt werden kann; 15
 - einen Klebebereich (1), um die Verteilung von Klebematerial auf mindestens einer der beiden Lagen im Durchlauf entlang seines Verarbeitungsweges zu ermöglichen, und zwar derart, dass die beiden Lagen miteinander verbunden werden können; 20
 - **dadurch gekennzeichnet, dass** der Klebebereich (1) mindestens ein Element der rotierenden Verteilung (3) umfasst, das so angeordnet ist, dass sich ein vorgegebener Abstand von der im Durchlauf befindlichen Lage ergibt und der es bei Verwendung des genannten Klebematerials zugeführt wird, und zwar so, dass eine Zerstäubung des genannten Klebematerials durch Zentrifugalkraft erfolgt. 25
12. Eine Maschine gemäß Anspruch 11, bei der eine Vorrichtung zur Erzeugung einer Gasströmung (50) enthalten ist, die so angeordnet ist, dass sie mit der erzeugten Strömung auf den Teil der Lage treffen kann, der vor dem Element der rotierenden Verteilung (3) angeordnet ist. 30
13. Eine Maschine gemäß Anspruch 11 oder 12, bei der ein oder mehrere Erfassungssensoren vor dem Klebebereich (1) vorgesehen und angeordnet sind und so konfiguriert sind, dass sie potenzielle Risse oder Löcher im Band überprüfen. 35
14. Eine Maschine gemäß einem oder mehreren der vorhergehenden Ansprüche 11 bis 13, bei der der Abstand zur Anordnung des Elements der rotierenden Verteilung (3) in Bezug auf die durchlaufende Lage in einem Bereich zwischen 20 mm und 25 mm gewählt wird. 40
15. Eine Maschine gemäß einem oder mehreren der vorhergehenden Ansprüche 11 bis 14, bei der die Richtung der Lage vor dem genannten Element der rotierenden Verteilung (3) von oben nach unten ver-

läuft.

16. Eine Maschine gemäß einem oder mehreren der vorhergehenden Ansprüche 11 bis 15, bei der mindestens zwei voneinander beabstandete Rollen vorhanden sind, die den Durchlauf des Bandes vor dem Element der rotierenden Verteilung (3) von oben nach unten bilden. 5
17. Eine Maschine gemäß einem oder mehreren der vorhergehenden Ansprüche 11 bis 16, bei der ein Behälter zur Aufnahme von Klebstoff enthalten ist, der mit einem Rührer und einem Pumpsystem zum Pumpen von Klebstoffmaterial zum Element der rotierenden Verteilung (3) mit variabler Strömungsrate ausgestattet ist. 10
18. Eine Maschine gemäß einem oder mehreren der vorhergehenden Ansprüche 11 bis 17, bei der ein Regelventil mit einem Durchmesser von ungefähr 1 mm für jedes Element der rotierenden Verteilung (3) vorgesehen ist. 15
19. Eine Maschine gemäß einem oder mehreren der vorhergehenden Ansprüche 11 bis 18c, bei der die Drehgeschwindigkeit des Elements der rotierenden Verteilung (3) zwischen 2400 U/min und 3600 U/min, vorzugsweise zwischen 2800 U/min und 3000 U/min, noch besser bei 2800 U/min liegt. 20
20. Die Verwendung einer Zentrifugalvorrichtung (1) mit mindestens einem Element der rotierenden Verteilung (3), das durch Zentrifugalkraft die Zerstäubung eines Klebematerials vornimmt, um ein Band mit zwei oder mehr Klebelagen herzustellen. 25

Revendications

1. Procédé de fabrication d'un ruban à deux plis ou plus collés, le procédé comprenant les phases suivantes :
- alimentation d'au moins un premier pli (100) sous forme de ruban le long d'un premier chemin de traitement ;
 - alimentation d'au moins un second pli (200) sous forme de ruban le long d'un second chemin de traitement ;
 - distribution du matériau adhésif sur au moins l'un des deux plis le long du chemin de traitement et chevauchement ultérieur desdits deux plis ;
 - **caractérisé en ce que** ledit processus de distribution du matériau adhésif est réalisé par la rotation d'au moins un élément de distribution par rotation (3), vers lequel ledit matériau adhésif est alimenté et qui lance par effet de la force centrifuge, une nébulisation dudit matériau ad-

hésif sur le pli placé à une distance prédéterminée de l'élément.

2. Procédé selon la revendication 1, dans lequel la génération d'un écoulement gazeux est prévue, frappant la partie du pli placée devant l'élément de distribution par rotation (3), de préférence pendant tout le processus de fabrication ou au moins en cas de blocage de l'alimentation du pli ou des plis. 5
3. Procédé selon la revendication 1 ou 2, dans lequel, lors de l'alimentation des plis, par des moyens de détection appropriés, une analyse de l'intégralité des plis eux-mêmes est réalisée, en amont de la partie où se déroule la phase de collage. 10
4. Procédé selon une ou plusieurs des revendications précédentes, dans lequel ledit processus de distribution du matériau adhésif est réalisé par l'agencement d'un dispositif centrifuge (1) comprenant une pluralité d'éléments de distribution par rotation, disposés l'un à proximité de l'autre, de manière à intercepter horizontalement le pli en transit. 20
5. Procédé selon une ou plusieurs des revendications précédentes, dans lequel la distance pour l'agencement de chaque élément de distribution par rotation (3) par rapport au pli en transit est choisie dans une plage comprise entre 20 mm et 25 mm. 25
6. Procédé selon une ou plusieurs des revendications précédentes, dans lequel la direction d'avancement du pli devant ledit élément de distribution par rotation (3) va du haut vers le bas. 30
7. Procédé selon une ou plusieurs des revendications précédentes, dans lequel le matériau adhésif alimenté par l'élément de distribution par rotation (3) est dilué par un autre liquide, de préférence de l'eau. 35
8. Procédé selon la revendication 7, dans lequel la colle ou le liquide de dilution sélectionné est compris dans une plage de 1:2 à 1:10, de préférence 1:5. 40
9. Procédé selon une ou plusieurs des revendications précédentes, dans lequel la vitesse de rotation de l'élément de distribution par rotation (3) est réglable. 45
10. Procédé selon une ou plusieurs des revendications précédentes, dans lequel la vitesse de rotation de l'élément de distribution par rotation (3) est comprise entre 2400 tr/min et 3600 tr/min, de préférence égale à 2800 tr/min ou à environ 3000 tr/min. 50
11. Équipement de fabrication d'un ruban à deux plis ou plus collés, comprenant de préférence un enrouleur, l'équipement comprenant : 55

- au moins un premier chemin d'alimentation à travers lequel au moins un premier pli (100) peut être alimenté sous la forme d'un ruban ;
 - au moins un second chemin d'alimentation à travers lequel au moins un second pli (200) peut être alimenté sous la forme d'un ruban ;
 - une section de collage (1) pour permettre la distribution de matériau adhésif sur au moins l'un des deux plis en transit le long de son chemin de traitement, de telle manière que les deux plis puissent être couplés l'un à l'autre ;
 - **caractérisé en ce que** ladite section de collage (1) comprend au moins un élément de distribution par rotation (3) agencé de manière à ce qu'il se trouve à une distance prédéfinie du pli en transit et vers lequel il est alimenté lors de l'utilisation dudit matériau adhésif, de manière à provoquer une nébulisation dudit matériau adhésif par effet de la force centrifuge.

12. Équipement selon la revendication 11, comprenant un dispositif pour générer un écoulement gazeux (50), agencé de manière à pouvoir frapper, avec l'écoulement généré, la partie du pli placée devant l'élément de distribution par rotation (3).
13. Équipement selon la revendication 11 ou 12, dans lequel un ou plusieurs capteurs de détection sont compris et disposés en amont de la section de collage (1) et configurés pour vérifier les déchirures ou les trous potentiels du ruban.
14. Équipement, selon une ou plusieurs des revendications précédentes 11 à 13, dans lequel la distance pour l'agencement de chaque élément de distribution par rotation (3) par rapport au pli en transit est choisie dans une plage comprise entre 20 mm et 25 mm.
15. Équipement, selon une ou plusieurs des revendications précédentes 11 à 14, dans lequel la direction d'avancement du pli devant ledit élément de distribution par rotation (3) va du haut vers le bas.
16. Équipement, selon une ou plusieurs des revendications précédentes 11 à 15, comprenant au moins deux rouleaux distants l'un de l'autre, formant le passage du ruban devant l'élément de distribution par rotation (3) du haut vers le bas.
17. Équipement, selon une ou plusieurs des revendications précédentes 11 à 16, comprenant un réservoir pour contenir de la colle, pourvu d'un agitateur et d'un système de pompage pour pomper le matériau adhésif vers l'élément de distribution par rotation (3) à une vitesse d'écoulement variable.
18. Équipement, selon une ou plusieurs des revendica-

tions précédentes 11 à 17, comprenant une vanne de régulation d'un diamètre d'environ 1 mm pour chaque élément de distribution par rotation (3).

19. Équipement, selon une ou plusieurs des revendications précédentes 11 à 18, dans lequel la vitesse de rotation de l'élément de distribution par rotation (3) est comprise entre 2400 tr/min et 3600 tr/min, de préférence comprise entre 2800 tr/min et 3000 tr/min et de façon plus préférentielle égale à 2800 tr/min. 5 10
20. Utilisation d'un dispositif centrifuge (1) comportant au moins un élément de distribution par rotation (3), à travers lequel on peut former par la force centrifuge une nébulisation d'un matériau adhésif pour la formation d'un ruban avec deux ou plusieurs plis collés. 15

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FIG. 1

(Prior Art)

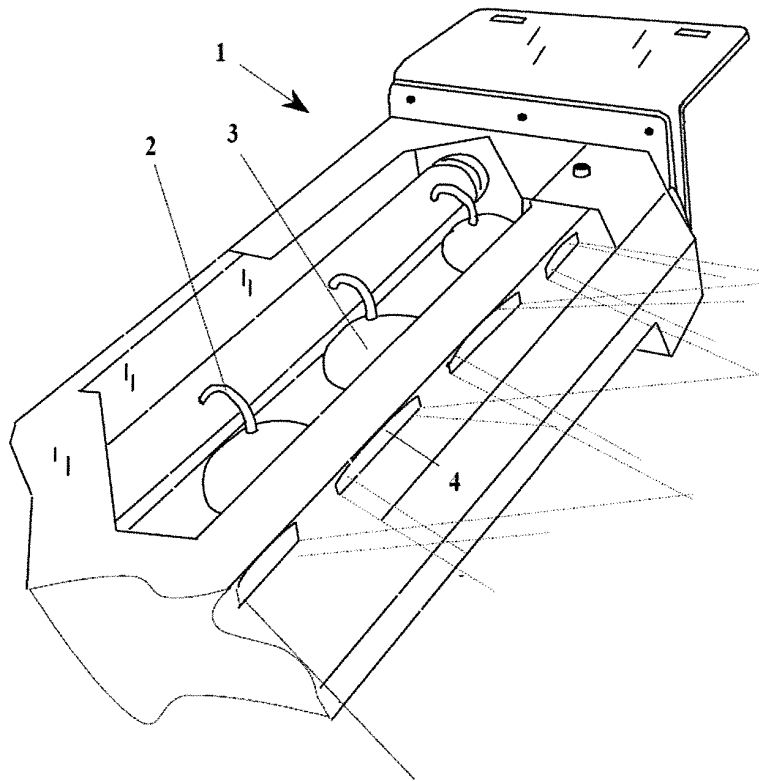


FIG. 2

(Prior Art)

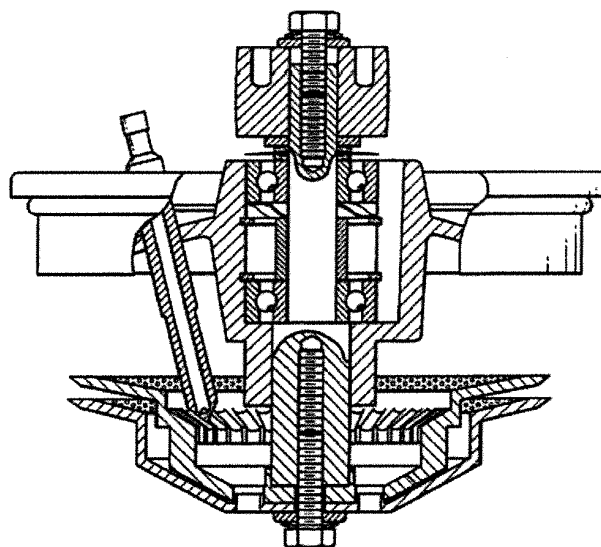


FIG. 3

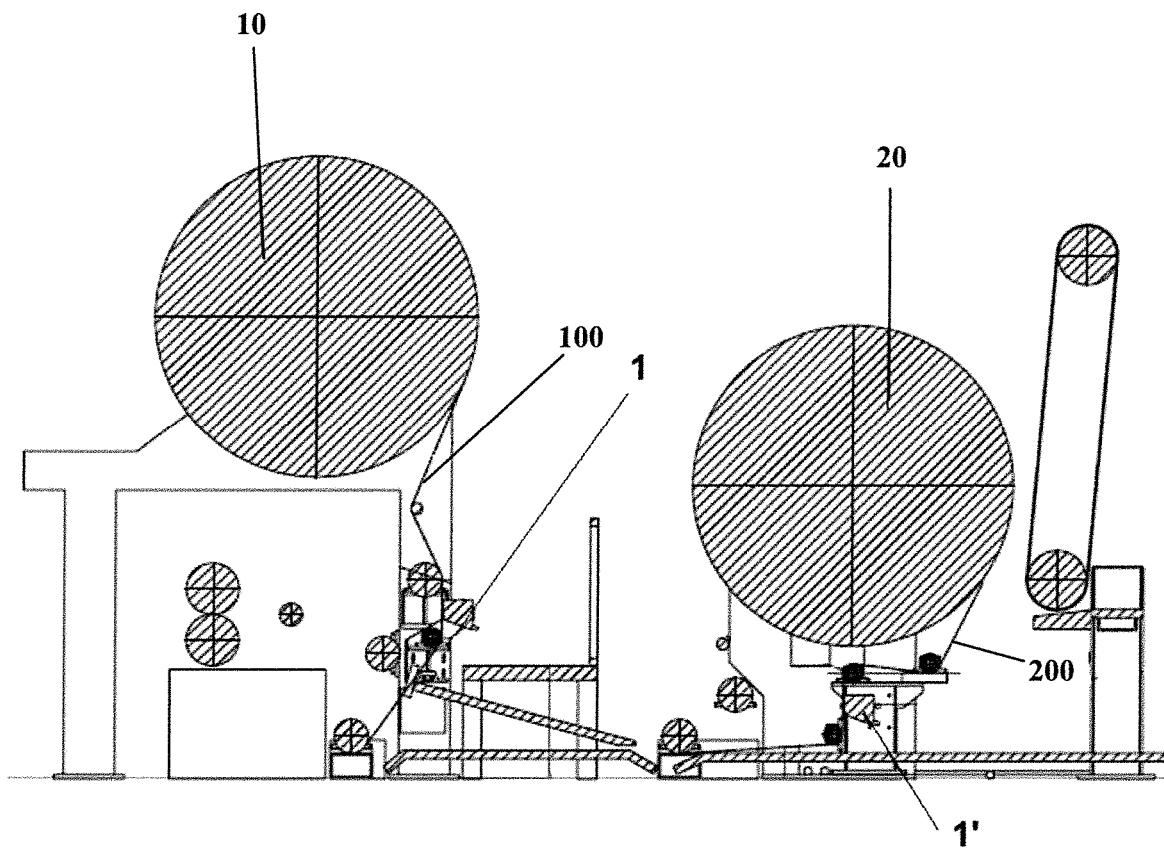


FIG. 4

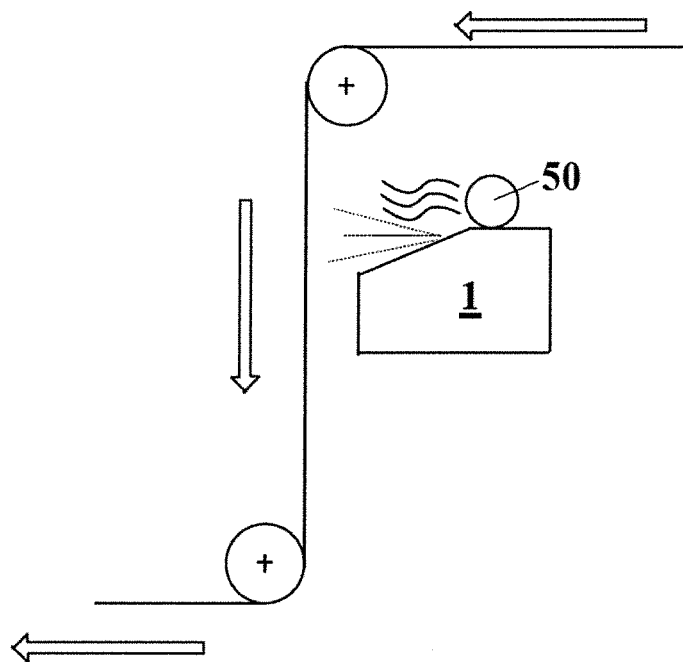


FIG. 5

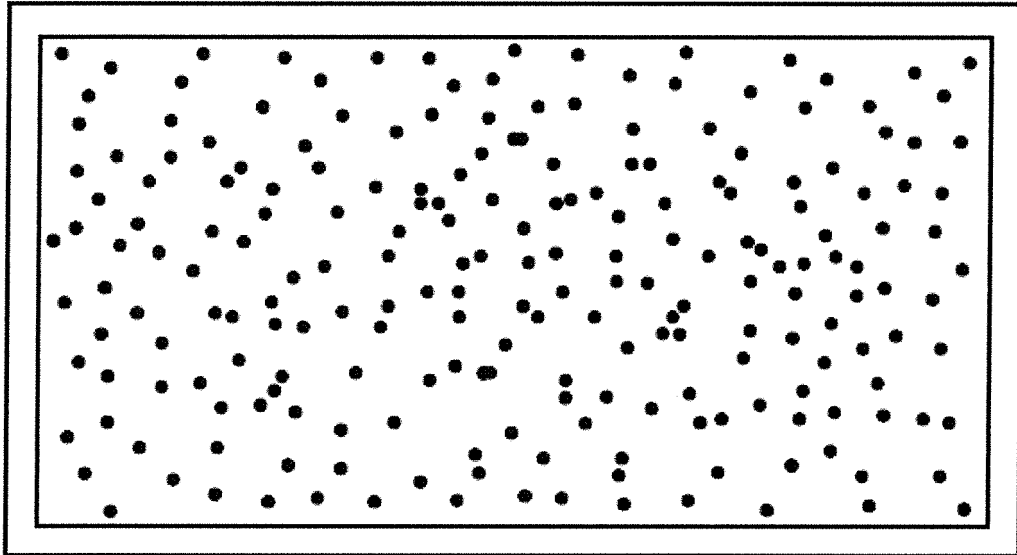


FIG. 6

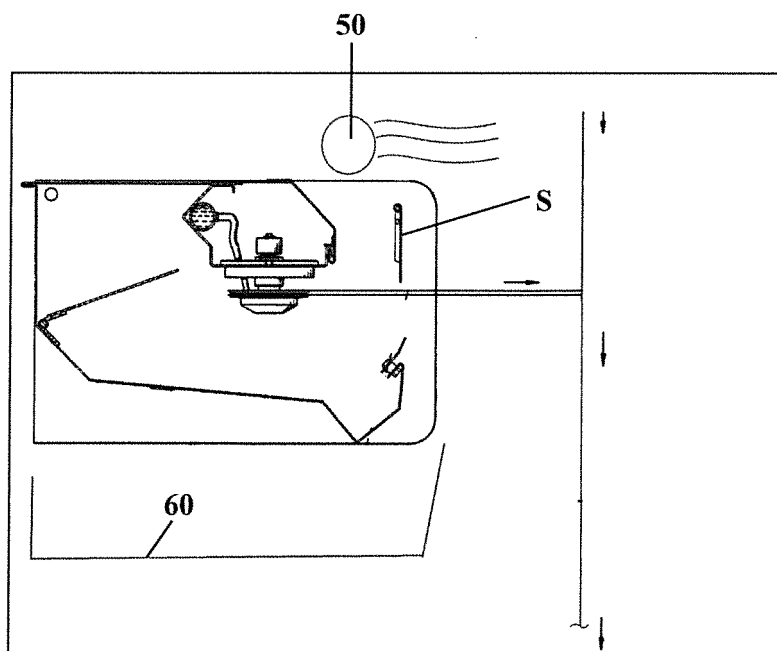


FIG. 7

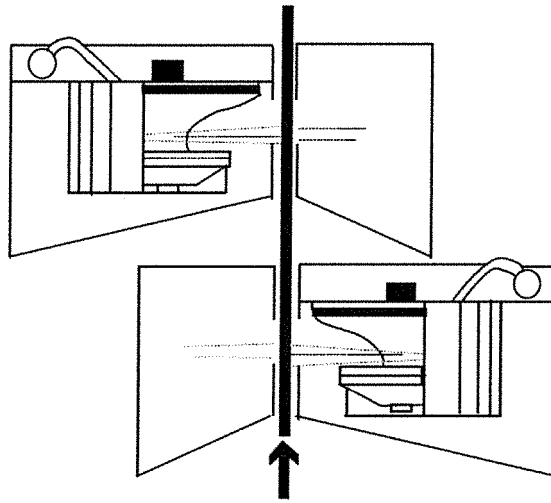


FIG. 8



FIG. 9

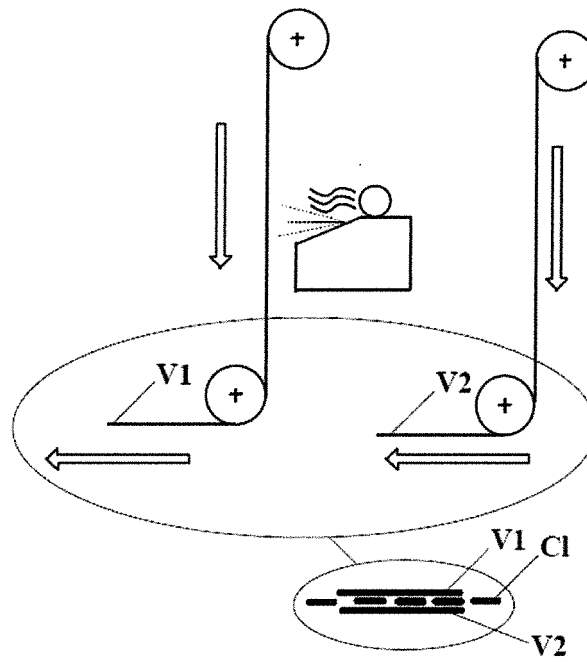
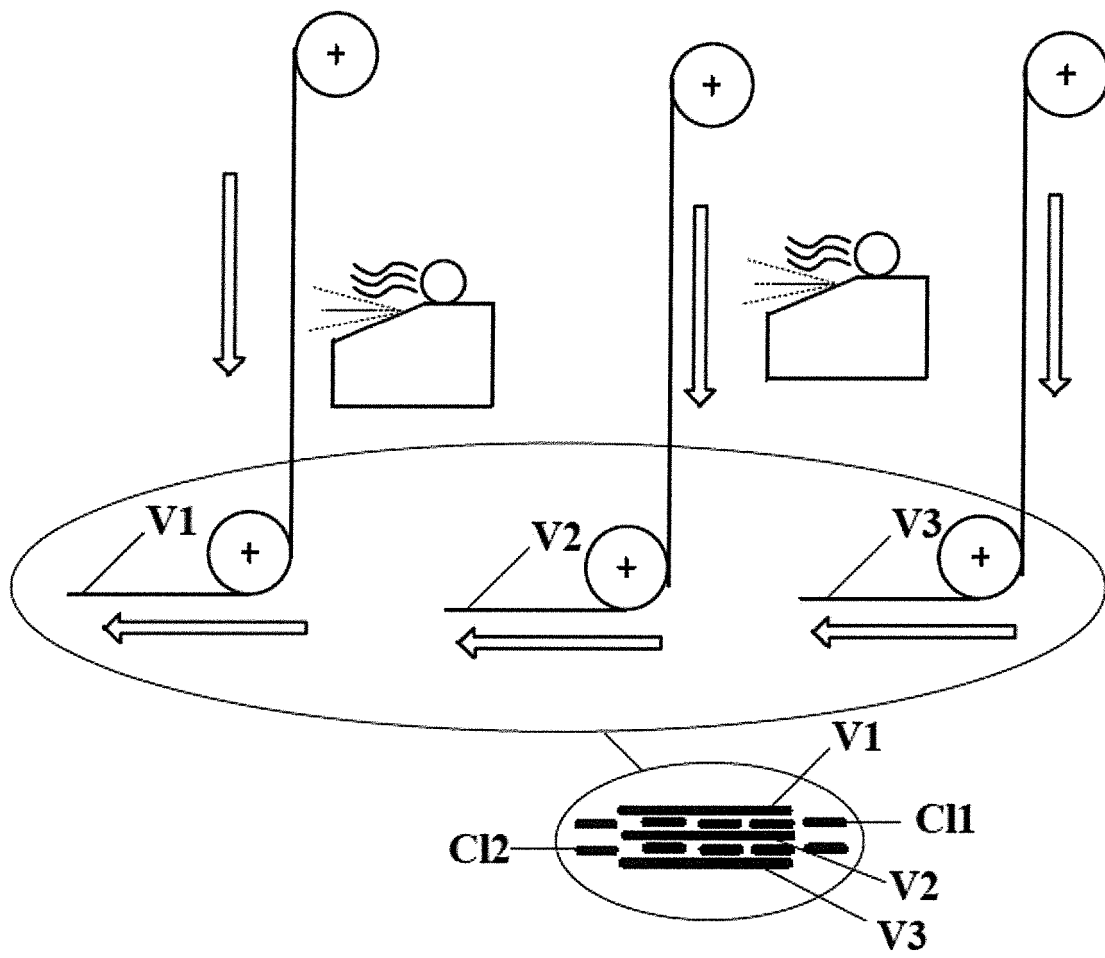


FIG. 10



REFERENCES CITED IN THE DESCRIPTION

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