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(71) Applicant: **Delicarta SPA**
55016 Porcari (Lucca) (IT)

(72) Inventor: **Stefani, Emi**
55016 Porcari, Lucca (IT)

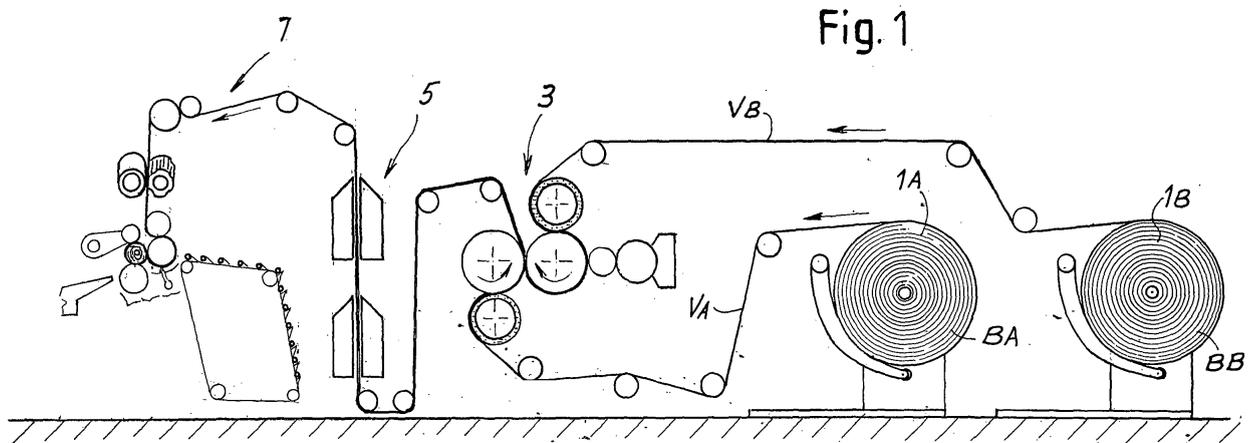
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(74) Representative: **Mannucci, Michele et al**
Ufficio Tecnico Ing.A. Mannucci S.R.L.
Via della Scala 4
50123 Firenze (IT)

(54) **Method and system for converting tissue paper with application of wet strength agents**

(57) A method and system are described in which at least one wet strength agent, such as wet strength resin,

is added to one or more plies of tissue paper or other cellulose product during the converting process.



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Description

Technical field

[0001] The present invention relates to paper converting systems and methods, specifically for tissue paper, with which rolls of toilet paper, kitchen towels, paper handkerchiefs, paper napkins and the like are produced.

State of the art

[0002] To produce tissue paper products a ply of cellulose fibers is normally formed with a dry or - more frequently - wet technique. In the latter case, the ply is obtained by distributing a pulp of cellulose fibers on a forming screen and then gradually draining the water to obtain a ply of sufficient consistency, which is dried in a suitable way, using a Yankee drum, a TAD system or the like.

[0003] The dried ply is then wound in reels of large diameter. These reels are subsequently converted, using converting lines, into the finished product. Typically, one or more reels of cellulose ply are unwound to feed the continuous web material to converting machines that produce finished products in the form of rolls, packets of handkerchiefs, packets of napkins or the like.

[0004] The composition of the ply of cellulose fibers changes as a function of the final use for which the product produced with the ply of cellulose fibers is intended.

[0005] For example, to produce kitchen towels or similar products, a certain quantity of one or more wet strength resins is added to the pulp of cellulose fibers with which the ply is formed; these are resins that give the paper ply at least temporary mechanical strength when wet. This allows said type of paper to be used to clean and dry washable surfaces, for culinary uses and the like, or also as paper sheets replacing conventional cloth towels.

[0006] Examples of wet strength resins for these uses are described in the following United States patents: 6,852,197; 6,702,923; 6,423,179; 6,207,013; 6,149,769; 6,059,928; 5,760,212; 5,264,082; 5,138,002; 4,981,557. The content of these documents forms an integral part of the present description.

[0007] As these resins are added to the pulp of cellulose fibers and water, the entire ply produced in the continuous machine has substantially the same composition and the same wet strength characteristics. Typically, a system is used to produce plies of cellulose fibers in which the pulp is fed continuously onto a felt or cloth through one or more headboxes. An example of a headbox for this use is described in the patent USA n. 5,560,807.

[0008] In products intended for other types of use wet strength is not desired, but is instead a disadvantage. In particular, in the production of toilet paper the ply of cellulose fibers must disintegrate upon contact with water to allow easy disposal in waste water systems, preventing pipes from clogging and facilitating decomposition in

septic tanks and purification plants. In this case wet strength resins are not added to the cellulose pulp with which the ply of tissue paper is produced, or only a minimum quantity is added.

5 **[0009]** It is clear from the above that a reel for producing paper without wet strength (toilet paper) or alternatively with wet strength for producing kitchen towel or the like is fed time by time to a production line or to a converting line.

10 **[0010]** To switch from one production to the other in the same system it is first necessary to finish the reels of paper present in the unwinder that feeds the line, or to replace partially used reels with others of different composition. This operation is complicated and requires long periods of line downtime, which has a negative influence on productivity and consequently on the cost of the finished product, especially considering that paper converting lines operate at ply speeds that can reach and exceed 1000 m/min.

15 **[0011]** This makes the production line somewhat inflexible or in any case increases the economic charges of production and consequently the cost of the finished product.

25 Objects and summary of the invention

[0012] According to a first aspect, an object of a possible embodiment of the present invention is to provide a production method or process that allows greater flexibility to be obtained, or products intended for different uses to be produced even simultaneously on the same line for converting a cellulose material and preferably a cellulose material of indefinite length, i.e. typically in the form of a web or ply.

30 **[0013]** Cellulose material is intended, in general, as a semi-finished material obtained by depositing one or more layers containing cellulose fibers. According to a particularly advantageous embodiment, the invention relates in particular to a method for processing or converting a ply or a plurality of plies of tissue paper obtained by a wet process, i.e. in which the ply containing cellulose fibers is obtained from an aqueous suspension of cellulose fibers and any other components, additives, fillers, or the like as required. However, the present invention can also be applied to "dry" production, converting or manufacturing processes of plies, layers or sheets of paper, i.e. obtained using the air-laid technique, in which the cellulose fibers are deposited to form a ply, subsequently consolidated in a suitable manner, without being carried in an aqueous suspension.

45 **[0014]** According to a different aspect, an object of one embodiment of the present invention is to provide a system or line for converting tissue paper or other cellulose material, which is more flexible, or which allows even simultaneous production of products intended for different uses.

55 **[0015]** According to a further aspect, an object of an embodiment of the invention is to provide a method or a

production system or line that allows the production of mixed packs containing products intended for different uses, such as kitchen towel and toilet paper.

[0016] Hereunder, reference will frequently be made to a product based on tissue paper, as the present invention allows particular advantages and benefits to be attained when applied to this type of material. However, it must be understood that the invention is not limited to this particular type of material, as in some cases it can also be advantageously applied to other products, in which it is necessary to impart or improve wet strength characteristics, especially products based on cellulose fibers or to other types of materials based on nonwoven fibers.

[0017] In substance, according to a possible embodiment, according to the invention a system for converting tissue paper is provided, comprising a path for said tissue paper, at least one unwinder to unwind at least one reel of tissue paper and, downstream of said unwinder, at least one converting machine, to convert the tissue paper fed from said unwinder, and along said path at least one applicator to apply at least one wet strength agent to said tissue paper.

[0018] According to a possible embodiment, the wet strength agent is a wet strength resin, although it would also be possible to apply agents of other kinds.

[0019] According to a possible embodiment, the applicator is disposed between the unwinder and the converting machine.

[0020] In a possible embodiment of the invention, the applicator is arranged and designed to apply the wet strength agent to a longitudinal portion of the tissue paper fed from said reel, of lesser width than the overall width of said tissue paper.

[0021] The converting machine can be any machine, or a series of machines, for example a machine to produce napkins or handkerchiefs, a machine to produce interleaved products or the like. However, according to a particularly advantageous embodiment, the converting machine comprises a rewinder. The converting machine can be combined with other units, apparatus or machines, such as embossing units, embossing-laminating units, ply-bonding units, printing units, joining units to join two or more plies together or other machinery useful for producing a finished product with specific aesthetic or functional characteristics.

[0022] In a possible embodiment the rewinder comprises means to distribute the wet strength agent directly in the winding area. Alternatively, the wet strength agent can be applied upstream of the rewinding area.

[0023] The rewinder can advantageously be a central rewinder, but will preferably be a peripheral rewinder or a combined rewinder with peripheral and central winding systems coordinated with each other.

[0024] If necessary, a drying device can be disposed downstream of the applicator that applies the wet strength agent. This drying device can be disposed upstream of said converting machine, so that the web ma-

terial reaches the converting machine already dry.

[0025] According to a possible embodiment, the system comprises a device for dividing the tissue paper delivered from said reel into at least two longitudinal portions, and separate paths for said at least two portions, along each of said separate paths there being disposed at least one respective converting machine to convert said two portions into different products. Alternatively, there will be provided a single path and (in the case of producing products in a roll) the web material or tissue paper will be wound to form a series of rolls all of a length substantially the same as the width of the web material delivered from the parent reel(s) placed in an unwinder or other suitable device of the system.

[0026] If several separate paths are provided, a rewinder can be disposed in each of said separate paths. Alternatively, said paths can comprise at least partly different machines.

[0027] According to a different aspect, an advantageous embodiment of the invention relates to a method to produce tissue paper products comprising the steps of:

- unwinding at least one ply of tissue paper from a reel;
- applying at least one wet strength agent to said ply of tissue paper;
- converting said ply of tissue paper into said products.

[0028] The ply of tissue paper is preferably converted into rolls, although it would also be possible to manufacture products of other type, for example folded articles, such as handkerchiefs or napkins.

[0029] In a possible embodiment of the method according to the invention, the wet strength agent (preferably although not exclusively a wet strength resin) is applied to a longitudinal portion of said ply of tissue paper, of lesser width than the overall width of said ply.

[0030] According to a mode of implementing the method according to the present invention, the ply of paper is divided longitudinally into at least two portions, said wet strength agent being applied to a first of said portions and not applied to a second portion. The different longitudinal portions are converted into products of different type.

[0031] It must be understood that "longitudinal division" of the web material into several longitudinal portions is not necessarily intended as physical separation of two or more portions, by a cut or a longitudinal cutting line. This term is instead intended as dividing physically or even only functionally the web material into several longitudinal portions. In the second case, the longitudinal portions are not separated from one another during processing but if necessary after processing, in the step to cut the rolls or of division into longitudinal strips sent to a folding machine or the like.

[0032] The longitudinal portions into which the ply of tissue paper is divided can if necessary be separated and fed to distinct sections of the system, but according to a possible embodiment of the method they will remain

joined and fed to a single line or section of the system, to be cut if necessary after further converting operations, such as a winding step. In this case the rolls or logs of wound paper will be cut by a cutting machine also at the ideal separation line of the two or more portions into which the web material has been separated (in the above sense).

[0033] According to a possible embodiment of the method of the present invention, said first portion into which the ply of tissue paper is divided is converted into rolls of kitchen towel and said second portion of the ply of tissue paper is converted into toilet paper.

[0034] If necessary, the ply of tissue paper is dried after application of the wet strength resin, although this is not normally necessary.

[0035] In general, the tissue paper can be composed of one, two or more plies that are joined together in a known manner, such as by mechanical ply-bonding, embossing, gluing or the like, or by a combination of these techniques. The two or more plies can be fed from the same reel on which two or more plies are wound, or from different reels.

[0036] According to a further aspect, the present invention relates to a pack of tissue paper products, comprising at least two products with different functional characteristics. The term functional characteristic is intended as a characteristic that influences the mode of use or the properties of the product, including aesthetic properties. Functional characteristics in general can include: the form of the product (i.e. a product wound in a roll or a folded product); or the greater or lesser wet strength and therefore the presence or absence, or greater or lesser quantity, of wet strength agents; or the presence or absence of printed patterns or the presence of different printed patterns; the presence or absence of embossing, or the different shape of embossing; or yet again the different dimension of the products, etc. Products that differ from one another through a combination of functional characteristics can also be included.

[0037] According to a particularly advantageous embodiment of the invention, the pack comprises two types of cellulose products, preferably made of tissue paper, wound in a roll. According to a preferred embodiment, a first product is constituted by rolls of toilet paper and a second product is constituted by rolls of kitchen towel. In this case, the two products differ above all by the different dimension, i.e. the different axial length of the rolls. Typically, to facilitate packaging, the rolls of toilet paper will have an axial length equivalent to half that of the rolls of kitchen towel. The two types of roll will preferably also differ by further functional characteristics such as: the presence of resins or other wet strength agents in the rolls of kitchen towel and the absence (or presence in substantially lesser quantities) of these agents in the toilet paper; possible differences in embossing; possible differences in printed patterns.

[0038] Preferably, the ratio between number of rolls of toilet paper and number of rolls of kitchen towel will take

into account, in addition to packaging needs, also the different consumption of these products in an average family. It has been found that consumption of rolls of toilet paper is typically higher than consumption of rolls of kitchen towel. For example, the pack can contain two rolls of kitchen towel and four rolls of toilet paper, or six rolls of toilet paper. Larger packs can have a multiple number of rolls of the two types of product.

10 Brief description of the drawings

[0039] The invention will now be better understood according to the description and accompanying drawing, which schematically shows possible non-limiting embodiments of the invention. More specifically, in the drawing:

Figure 1 shows a diagram of a system according to the invention in a first embodiment;

Figure 2 shows a diagram of a system according to the invention in a different embodiment;

Figure 3 shows a diagram of processing a reel according to the method of the present invention; and Figures 4 and 5 show two examples of mixed packs obtainable with a system and a method according to the invention.

25 Detailed description of preferred embodiments of the invention

[0040] Hereunder reference will frequently be made to wet strength resins. This term must not be interpreted in a limited sense, as the use of any agent falls within the scope of the present invention, even with a different formulation to that of a conventional resin, which imparts the necessary temporary wet strength to the cellulose products, to allow or facilitate use in particular applications, such as a kitchen towel.

[0041] Figure 1 schematically and briefly illustrates a possible converting line designed according to the invention. The line is concisely composed of the following components: a pair of unwinders 1A, 1B, in which there are disposed reels BA, BB of ply of tissue paper with which the converting line is fed; an embossing unit 3, in which the plies VA, VB fed from the reels BA, BB are embossed and joined together, a station 5 for applying wet strength resins to the embossed plies; a rewinder 7 for producing rolls or logs of an axial length equivalent to the width of the plies fed from the parent reels BA, BB present in the unwinders; a gluing device that seals the free end of the logs formed by the rewinder 7; an optional intermediate magazine or storage unit; a cutting machine that divides the logs into individual small rolls intended for final consumption. The gluing device, the intermediate storage unit and the cutting machine, just as the packaging machines downstream, are not shown in the diagram in Figure 1. The individual machines of which the line is composed are known per se to those skilled in the art and do not require detailed descriptions herein.

[0042] The station 5 can comprise one or more devices for applying wet strength resins. These devices can be chosen from known devices for applying liquid substances to plies of tissue paper, for example of the type used in the field to produce scented wipes for cleaning and disinfecting purposes. A device suitable for this purpose is produced by Weko Biel AG (Switzerland) and is known with the name Weko Compact III.

[0043] Figure 2 illustrates a diagram of an alternative system implementing the invention. In this diagram the unwinders and the rewinder are also omitted and the area of the line upstream of the rewinder is shown. This area comprises: a path for a first ply VA; a path for a second ply VB; along the first path a printing unit 21A; along the second path a printing unit 21 B; an embossing unit 23 that embosses the ply VA and joins it by gluing to the ply VB, to form a web material N which is fed to the rewinder, not shown.

[0044] According to the invention, instead of being used to apply an ink, the printing units 21A, 21 B, are used to distribute a wet strength resin on the two plies VA, VB. The printing units for use in tissue paper converting lines are known per se and in general can be adapted to apply a wet strength resin instead of an ink to the entire surface.

[0045] Alternatively, the printing unit or units to distribute wet strength resins can be disposed downstream of the embossing unit instead of upstream thereof. Two printing units can be provided to apply wet strength resins to both sides of the embossed web material.

[0046] In any case, the wet strength resin applicator units can be combined with units that apply the actual printed pattern to the web material. Also in the embodiment in Figure 1 the unit or station 5 can be disposed differently, e.g. downstream of the embosser.

[0047] Regardless of the type of distribution system used to apply the wet strength resins to the tissue paper, the application area of these resins can be limited, i.e. instead of applying the wet strength resin to the entire width of the web material, it can be distributed only on a longitudinal band of limited width. This is illustrated schematically in Figure 3, which diagrammatically represents the main converting steps of the web material from the reel of large diameter to the finished rolls. The letter B indicates a reel, it being understood that two or more reels and/or individual reels with several plies could be used to produce the small rolls. The reel B is unwound and the web material N is rewound forming the logs L. These are then cut to form small rolls RA, RB.

[0048] In this schematic figure it can be seen that the wet strength resin is applied to a portion or area in the form of a longitudinal band or strip S1 of the web material N, while this resin is not applied in the adjacent area or band S2. As the ply or plies forming the web material were produced in a continuous machine without the addition of wet strength resins, the band S2 reaches the converting area and in particular the rewinding machine without the addition of wet strength resins and this strip

is used to produce rolls of toilet paper RB, while the strip S1, to which the wet strength resin has been applied in the specific station provided between the unwinder and the rewinder, is used to produce rolls of kitchen towel RA.

[0049] Also as a function of the type of system used to apply the wet strength resins, it is possible to modify the width of the strips S1 and S2 also during production, e.g. through a simple keyboard command. For this purpose, the systems to apply wet strength resins can extend for at least the total width of the ply or web material N to be converted and limited portions of these systems can be activated. For example, the applicator means can have a plurality of rotating discs aligned in a transverse direction (i.e. orthogonal to the direction of feed of the ply material). Some of these rotating discs can be deactivated, or the nozzles through which the wet strength resins are sprayed onto the paper material can be closed.

[0050] If application takes place through a printing unit, specifically shaped distributor rollers can be used, or several distributor rollers aligned axially which can be carried respectively to the operating or idle position.

[0051] The logs L produced by the rewinder in general will have a portion PA of paper treated with wet strength resins, and a portion PB not treated with these resins.

The two portions are divided into rolls of kitchen towel RA and of toilet paper RB respectively. The entire line is controlled by a control unit that synchronizes the position of the blade of the cutting machine and of the means to feed the log in the cutting machine so as to cut the two areas of the log into a suitable number of rolls RA and RB, where the separation line between the two groups of rolls coincides with the separation line of the two strips S1, S2 and consequently of the two areas or portions PA, PB, respectively treated with wet strength resins and untreated.

[0052] The above description provides implementation solutions in which the wet strength resins are applied to the ply or to the web material upstream of the rewinder 7. This solution is preferable as the resins can be distributed in the depth of the material and at least partially dry before winding the web material and forming the logs L. If necessary, auxiliary drying systems can also be provided. Nonetheless, it would also be possible to distribute the wet strength resins directly in the rewinding machine. For this purpose, rewinding machines of the type illustrated in the US patent 6,752,344, the content of which is fully incorporated in the present description, can, for example, be used.

[0053] Also in this case, the width of the strips S1 and S2 respectively treated with wet strength resins and untreated can be modified as a function of the specific production needs.

[0054] In general, with the method and the system according to the invention a single ply or multi-ply web material which is partially treated with wet strength resins and partially untreated can be produced from the same reel or from the same plurality of reels. The material can thus be divided into two portions with which two different

types of finished products are produced. Nonetheless, to the consumer the rolls RA and RB appear substantially identical to one another (with the exception of axial length which will be greater for the rolls RA of kitchen towel and lesser for the rolls RB of toilet paper). Alternatively, it would also be possible to produce finished products that also differ externally, e.g. through different embossing, in parallel and simultaneously from the same parent reel (or from a plurality of parent reels). For this purpose embossing units with different patterns can be used for the different types of finished product obtained from the same converting line. Similarly, differentiation between products (e.g. kitchen towel and toilet paper) can be obtained using, in alternative to or in combination with embossing, different printed patterns for the different products.

[0055] These two types of rolls of different quality and substantially identical (or different, if required) appearance can for example be packaged in packs containing both one and the other product, so that the consumer can purchase multi-product packs with particular aesthetic characteristics.

[0056] Besides the advantages attained from a viewpoint of presentation of the finished product, the method and the system according to the invention also make the production line more flexible, passing from the production of toilet paper to the production of kitchen towel without replacing the reels in the machine. It is also possible to modify the quantity of rolls of kitchen towel and the quantity of rolls of toilet paper produced simply by modifying the width of the strips S1 and S2 without stopping the production line. In fact, all the machines or stations of which said line is composed are interfaced with one or more programmable electronic control units which allow the production parameters to be modified directly from the keypad on the machine control panel.

[0057] According to a further aspect of the present invention, the application of wet strength agents, such as wet strength resins, during converting can also take place on cellulose web materials already containing wet strength agents added to the pulp with which the initial material was formed. In this case, by applying resins or other wet strength agents during converting, for example upstream of the rewinder, increased values of wet strength agents can be obtained with respect to those obtainable when these agents are added only to the pulp in the paper mill. This results in greater wet strength. Also in this case, the wet strength resin or resins or other wet strength agent can be added to the entire width of the cellulose web material, or only to a longitudinal portion thereof, to obtain at the end of the line two different products from the same reel or same series of reels.

[0058] Figure 4 schematically shows a mixed pack, which contains rolls of toilet paper RB and rolls of kitchen towel RA. The rolls can be obtained from a line of the type shown in Figure 3, taking care to produce in each log L areas PA and PB of an axial length suitable to obtain from each log a full number of rolls RA and RB where the axial length of the rolls RB is approximately half that

of the rolls RA. This facilitates packaging, as is clearly understood from Figure 4. In fact, in this way a pack is obtained that is uniform and easy to handle in the production and storage step, with (in the example) two rolls of kitchen towel RA and eight rolls of toilet paper, the rolls of toilet paper being disposed on top of each other in pairs adjacent to the rolls of kitchen towel. It must be understood that the number of rolls can vary with respect to those shown. For example, four rolls of toilet paper and two rolls of kitchen towel, or three rolls of kitchen towel and six of toilet paper can be provided, as shown by way of example in the pack in Figure 5, etc.

[0059] In practice, to obtain a suitable number of rolls RA and RB, as the height or axial length A of the rolls RA is equivalent to double the axial length B of the rolls RB ($B=A/2$), the method of the invention is preferably implemented by cutting the ply fed to the rewinder into two portions S1, S2 of the width defined as follows: a first portion or strip S1 of the ply (to form the rolls RA of height A) has a width approximately corresponding to a multiple (n) of the base length (A) represented by the height of the largest rolls; the second portion S2 of the ply has a width again approximately corresponding to a multiple (m) of said base length (A), which can differ from the multiple (n) defining the width of the first strip or portion S1. Typically this will be $m = 2n$ or $3n$.

[0060] "Approximately corresponding to" is intended as a dimension that differs from the exact measurement by a quantity corresponding to a value determined by the width of the trimming(s), which are normally generated when the log L is divided into individual rolls. In the conventional art, a head trimming and a tail trimming are generated in each log to eliminate the two outer edges of the web material, which can have irregularities. In the method of the present invention it would also be possible to eliminate an intermediate trimming in the area between the portions PA and PB of each log L, to eliminate any areas in which there is a quantity of wet strength agent not determined precisely, i.e. an uncertain or possibly variable quantity along the extension of the web material.

[0061] It is understood that the drawing only shows an example provided by way of a practical arrangement of the finding, and that said finding can vary in forms and arrangement without however departing from the scope of the concept on which the finding is based.

Claims

1. A system for converting tissue paper or other cellulose web material, comprising a path for said cellulose product, at least one unwinder to unwind at least one reel of cellulose material and, downstream of said unwinder, at least one converting machine, to convert the cellulose material fed from said unwinder, **characterized in that** along said path there is disposed at least one applicator to apply at least one wet strength agent to said tissue paper

2. A system according to claim 1, **characterized in that** said applicator is disposed between said unwinder and said converting machine.
3. A system according to claim 1 or 2, **characterized in that** said applicator is arranged and designed to apply said wet strength agent to a longitudinal portion of the cellulose material fed from said reel, of lesser width than the overall width of said cellulose material.
4. A system according to claim 1, 2 or 3, **characterized in that** said converting machine is a rewinder.
5. A system according to claim 4, **characterized in that** said rewinder comprises means to distribute the wet strength agent directly in the winding area.
6. A system according to one or more of the previous claims, **characterized in that** it comprises a drying device disposed downstream of said applicator.
7. A system according to claim 6, **characterized in that** said drying device is disposed upstream of said converting machine.
8. A system according to one or more of the previous claims, **characterized by** comprising: a device for dividing said cellulose material delivered from said reel into at least two longitudinal portions, and separate paths for said at least two portions, along each of said separate paths there being disposed at least one respective converting machine to convert said two portions into different products.
9. A system according to claim 8, **characterized in that** in said two separate paths there are disposed different converting machines for the two paths.
10. A method for producing tissue paper products, comprising the steps of:
- unwinding at least one ply of cellulose material from a reel;
 - applying at least one wet strength agent to said at least one ply;
 - converting said at least one ply into said products.
11. A method according to claim 10, wherein said ply is converted into rolls.
12. A method according to claim 10 or 11, wherein said wet strength agent is applied to a longitudinal portion of said ply, of lesser width than the overall width of said ply.
13. A method according to one or more of claims 10 to 12, wherein said ply is divided longitudinally into at least two portions, said wet strength agent being applied to a first of said portions and said wet strength agent not being applied to a second portion; and wherein said first and said second longitudinal portions are converted into products of different type.
14. A method according to claim 13, wherein said first and said second longitudinal portion of the ply are separated and fed to distinct sections of the system.
15. A method according to claim 13 or 14, wherein said first portion of the ply is converted into rolls of kitchen towel and said second portion of the ply of tissue paper is converted into toilet paper.
16. A method according to one or more of claims 13 to 15, wherein said first portion of the ply has a width approximately corresponding to a first multiple of a base length and said second portion of the ply has a width approximately corresponding to a second multiple of said base length.
17. A method according to one or more of claims 10 to 16, wherein said ply is dried after application of the wet strength resin.
18. A method according to one or more of claims 10 to 17, wherein said wet strength agent is a wet strength resin.
19. A method according to one or more of claims 10 to 18, wherein said at least one ply contains at least one wet strength agent and wherein during converting a further wet strength agent is added to at least one portion of the ply.
20. A method according to one or more of claims 10 to 19, wherein said cellulose material is tissue paper.
21. A pack of tissue paper cellulose products comprising at least two types of products, **characterized by** different wet strength characteristics, obtained through a different content of wet strength agents.
22. A pack according to claim 21, comprising at least one roll of kitchen towel and at least one roll of toilet paper.
23. A pack according to claim 22, comprising a number of rolls of toilet paper equivalent to double or to an even multiple of the number of rolls of kitchen towel.
24. A pack according to claim 22 or 23, wherein the roll or rolls of toilet paper have an axial length equivalent to approximately half the axial length of the rolls of kitchen towel.

Fig. 1

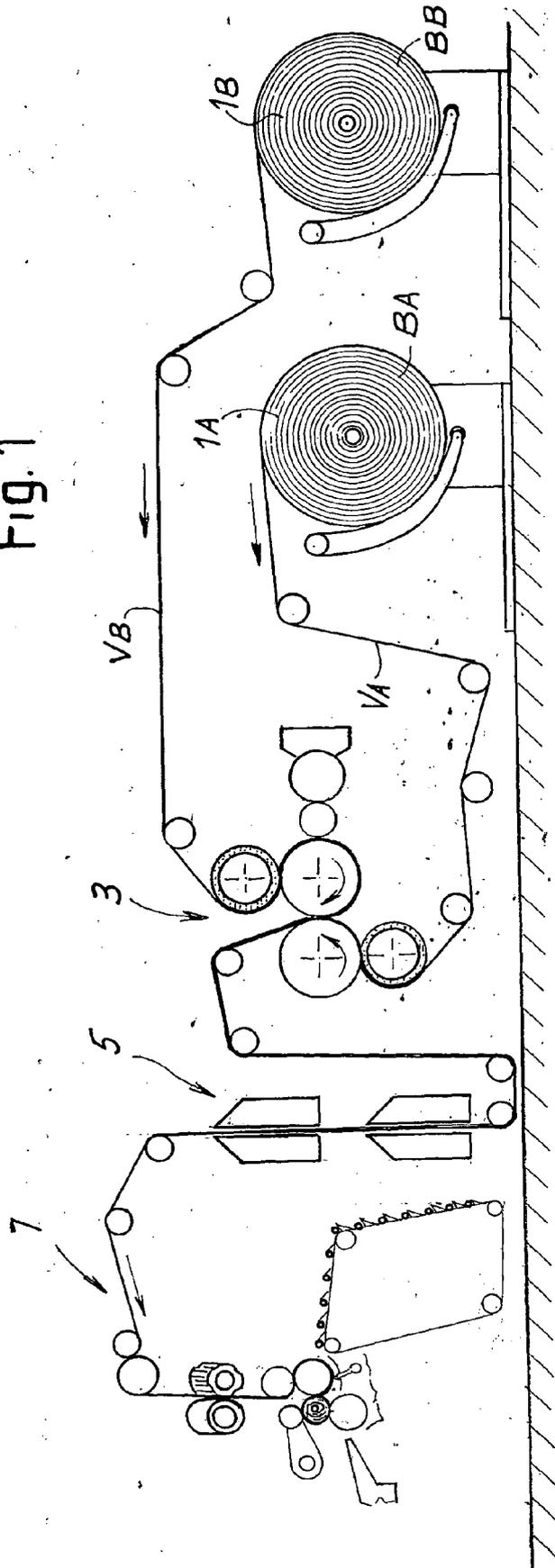


Fig. 2

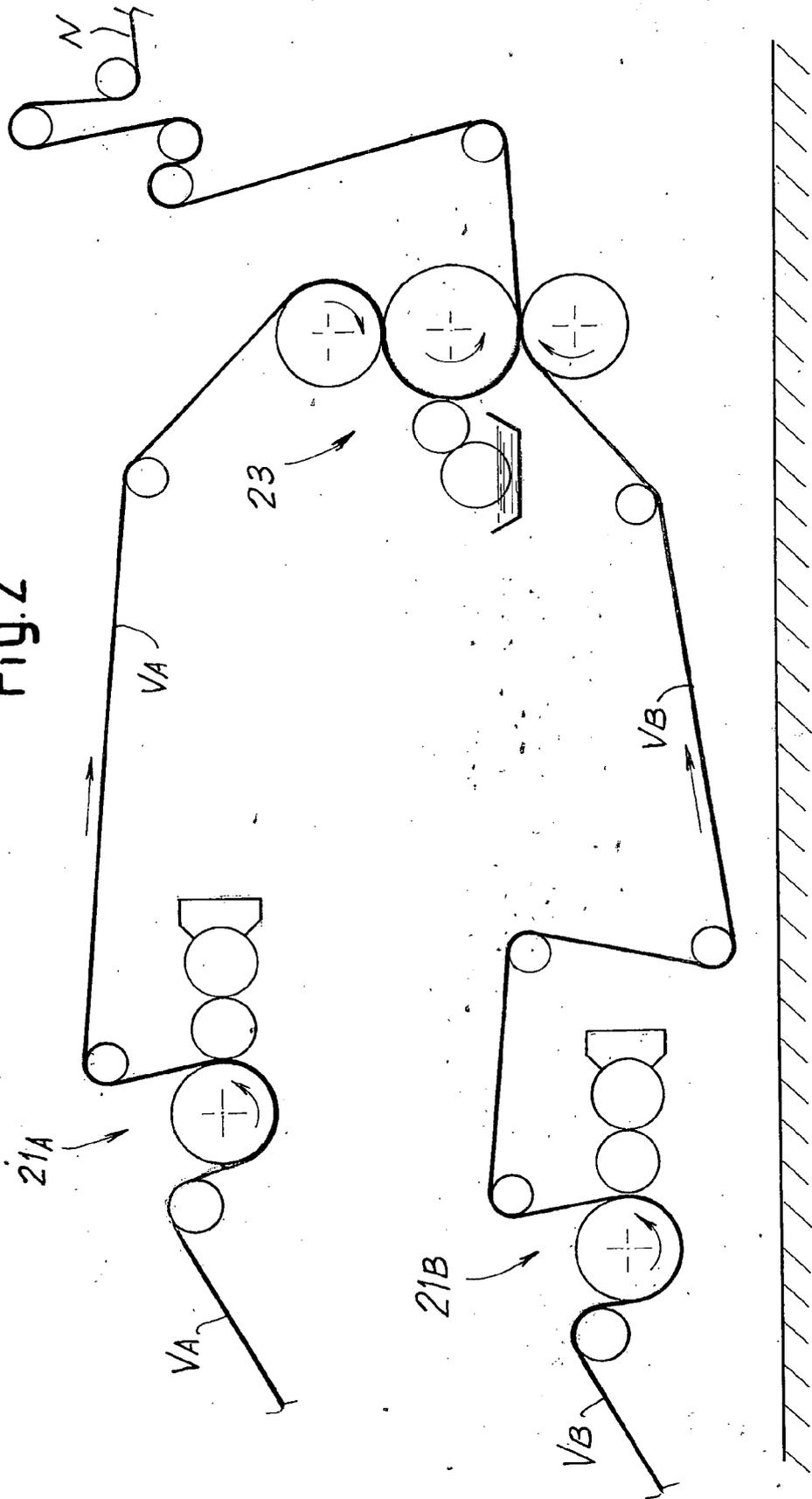


Fig. 3

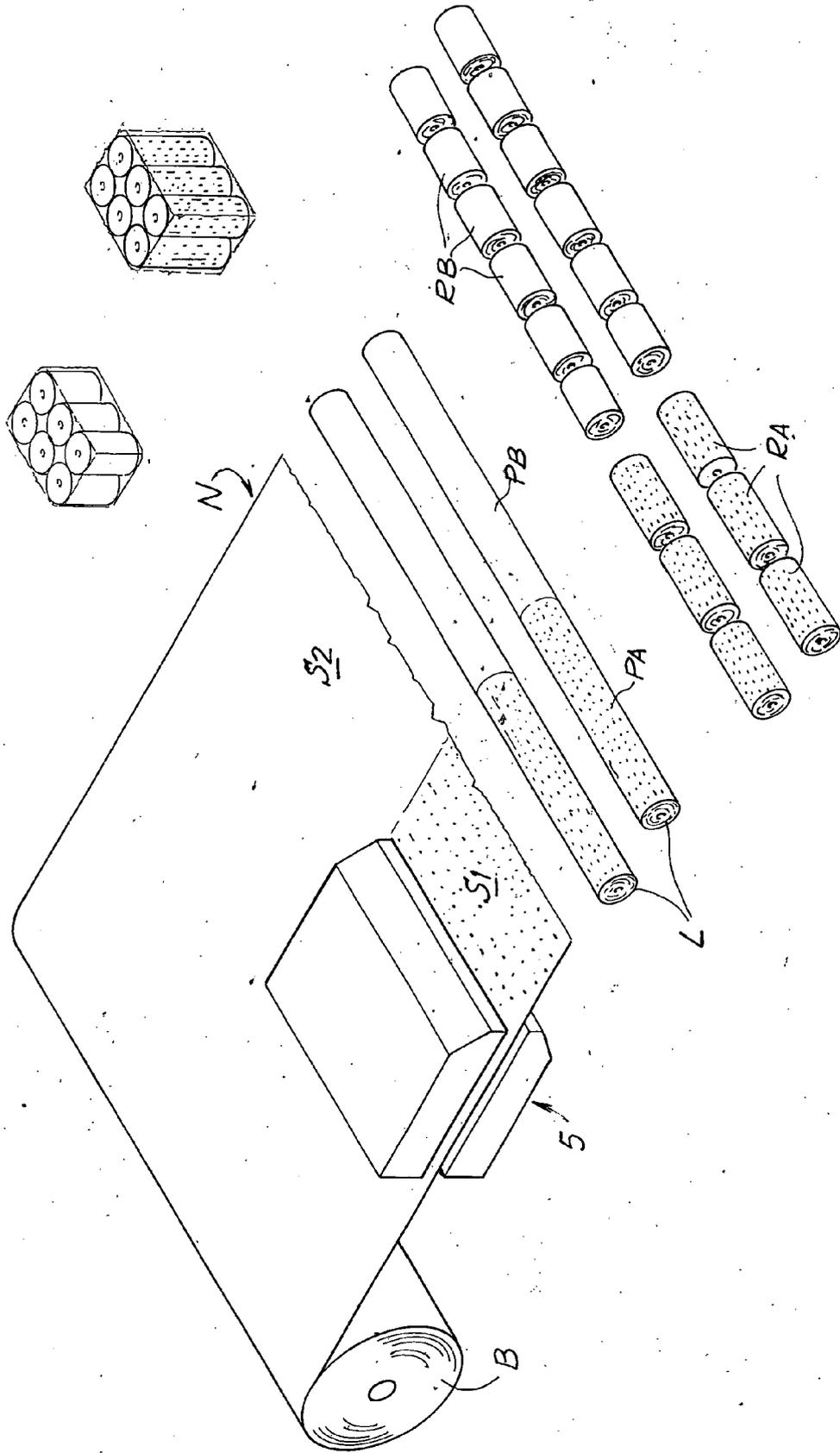


Fig. 5

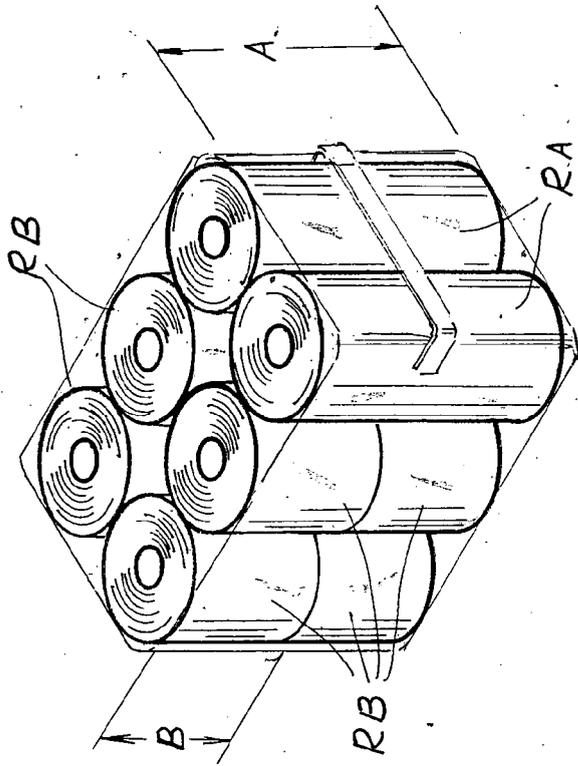
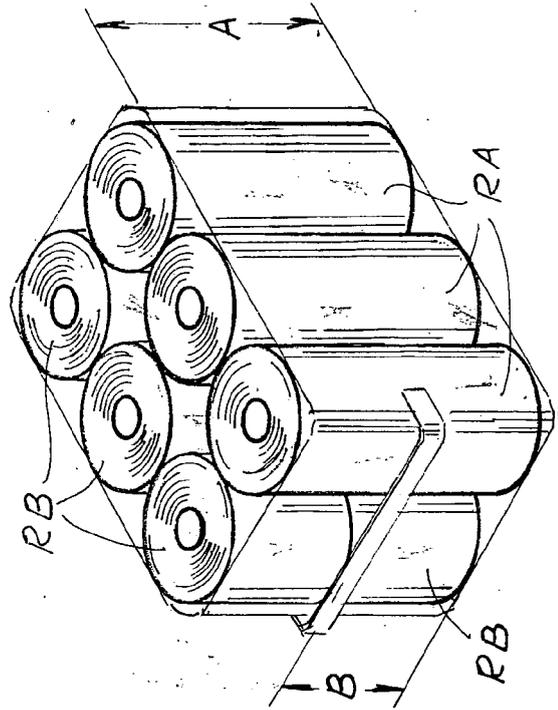


Fig. 4



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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