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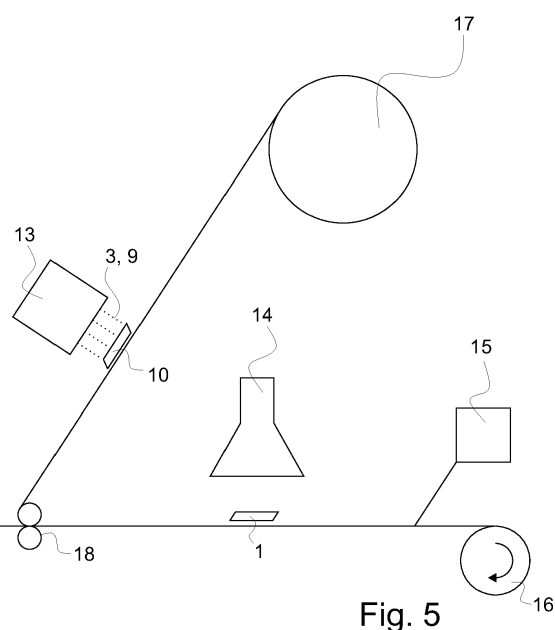
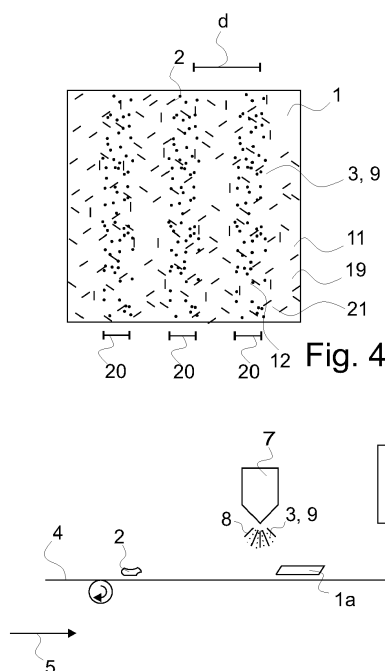
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(54) **METHOD FOR MANUFACTURING AN RTB SHEET COMPRISING A TOBACCO PRODUCT**

(57) The invention relates to a method for manufacturing a reconstituted tobacco binder (RTB) sheet, comprising a raw tobacco material and a binding agent. The raw tobacco material is positioned on a conveyer belt, which moves in a forward direction. The raw tobacco material is formed by at least one forming head to a raw tobacco material layer, wherein the binding agent is subsequently applied on the raw tobacco material layer and

then dried in a drying process, thereby creating the RTB sheet. The method for manufacturing a RTB sheet is characterized in that a tobacco product comprising tobacco particles and a liquid medium is applied on the raw tobacco material layer and/or the RTB sheet during the manufacturing, wherein the tobacco particles are having an average particle size of 30 μm or less.



Description

[0001] The present invention relates to a method for manufacturing a reconstituted tobacco binder sheet (in the following terms "RTB sheet") comprising a raw tobacco material, a binding agent and a tobacco product. The tobacco product ensures an intensive smoking experience with full of a tobacco taste. The invention relates also to an RTB sheet manufactured with the abovementioned method.

[0002] Smoking articles out of the field of heat-not-burn products usually comprise a heated section with an RTB and preferably also tobacco. Most of these use a battery-powered heating system for heating up the tobacco and/or the RTB in the heated section. An RTB sheet used in the heated section is usually formed out of tobacco material and a suitable binder. When heated up to 250°C, the binder evaporates, and the resulting vapor is inhaled by consumer. Due to the low temperature during the smoking experience an incomplete taste results compared to the traditional cigarettes. As a result, the user often criticizes the incomplete taste of the heat-not-burn products. In order to improve the tobacco taste, the RTB sheets, which are used in the heat-not-burn smoking articles, can be flavored with a tobacco taste. The following documents can be found relating to the manufacturing method of an RTB sheet.

[0003] From the document EP0565360B1 a method for manufacturing the RTB comprising tobacco dust and binder is known. The RTB sheets may be prepared by combining tobacco dust with a binder in an aqueous media to create a slurry. Such method is advantageous for manufacturing a uniform RTB sheet.

[0004] Furthermore, JP11103840A relates to a recycled tobacco used as a cigarette tobacco raw material and to a manufacturing apparatus and a manufacturing method for forming the recycled tobacco into a crimped yarn.

[0005] The abovementioned documents disclose methods for manufacturing an RTB sheet. However, these methods provide RTB sheets that are not sufficiently flavored with a tobacco flavor. It would be desirable to provide a method for manufacturing an RTB sheet with a desired tobacco flavor. It would be particularly desirable if such a method could be adapted to the standard manufacturing process of the RTB sheets. Preferably, such a method could use the common handling machines.

[0006] It is therefore the objective of the invention to provide a method for manufacturing an RTB sheet with additional flavor. It is also the objective of the invention to provide an RTB sheet for use in a heat-not-burn smoking article with full of additional tobacco taste.

[0007] The afore mentioned problems are solved by a method for manufacturing a reconstituted tobacco binder sheet (RTB), comprising a raw tobacco material and a binding agent. The raw tobacco material is positioned on a conveyer belt, which moves in a forward direction and

is formed by at least one forming head to a raw tobacco material layer, wherein the binding agent is subsequently applied on the raw tobacco material layer and then dried in a drying process, thereby creating the RTB sheet. The method for manufacturing the RTB sheet is characterized in that a tobacco product comprising tobacco particles and a liquid medium is applied on the raw tobacco material layer and/or the RTB sheet during the manufacturing, wherein the tobacco particles are having an average particle size of 30 μm or less.

[0008] The raw tobacco material preferably comprises of recycled tobacco stems, stalks, scraps, collected dust, and floor sweepings, to which are added gluing agent, chemicals and fillers.

[0009] Tobacco particles having such a small average particle size are providing a high surface area, which could be contacted by the passing aerosol. This allows transfer of the flavoring molecules from the particles into the aerosol stream. The particle size of $\leq 30 \mu\text{m}$ has been found to allow transfer of a plurality of flavoring molecules, which contribute to a full tobacco flavor. The particle size allows migration of bigger and smaller molecules from an internal volume of the particles to their surface from which these molecules could pass over to the aerosol stream.

[0010] In the context of the present invention also the term "tobacco product" refers to a flavoring substance comprising leaf tobacco particles having an average particle size (sD50 laser diffraction) $\leq 30 \mu\text{m}$.

[0011] Also, nicotine can pass over from the tobacco particles to the aerosol in a similar way. Since nicotine has a flavor and is usually a constituent of tobacco, the term "flavoring molecules" also includes nicotine.

[0012] This characteristic of the particles could also be explained by quick heating of the small particles after being contacted by the hot aerosol stream, due to which the migration of the flavoring molecules within the tobacco particles starts. Furthermore, the flavoring molecules could reach the particle surface from which they could pass over to the aerosol stream quickly, independently from its position within the particle.

[0013] Preferably the average size of the tobacco particles (sD50 laser diffraction) is $\geq 1 \mu\text{m}$, preferably $\geq 2.5 \mu\text{m}$, more preferably $\geq 5 \mu\text{m}$, most preferably $\geq 8 \mu\text{m}$. It has been found, that grinding of the tobacco particles to a smaller particle size can affect the flavor. It is believed that some of the flavoring molecules of the tobacco decompose due to the high shear energy. Furthermore, some flavoring molecules could exit very small tobacco particles during the grinding process or during a later handling process. This would result in a depletion of these flavoring molecules in the tobacco particles and a flavor composition different with respect to the full tobacco flavor.

[0014] To avoid decomposing of flavoring molecules during the grinding process, it has been found advantageous to reduce the viscosity of the grinding composition. This could be achieved by adding a solvent to this com-

position. Such a solvent (or "dispersion medium") is preferably selected from a group comprising water, monovalent alcohols, polyvalent alcohols, sugar alcohols, sugars and polyvalent alcohol esters. By using such a dispersion medium, the average particle size of the tobacco can be adjusted to the desired value, without significant changes of the flavor.

[0015] The afore revealed method for manufacturing the RTB sheet is preferably done with a papermaking machine, which comprises the conveyer belt style transport and two consecutive forming heads that add the raw tobacco material to the belt. Using another method of automatic item transportation is also conceivable. Preferably, the raw tobacco material comprises finely cut stems and/or leaves of the tobacco plant. Each forming head preferably comprises a nozzle, which provides a binder to bind raw tobacco material into a sheet. One of the processing stations is preferably a drying unit, which dries the formed RTB. In the last station, preferably in the end of the line, the RTB material is shredded or rolled-up.

[0016] According to another embodiment, the method for manufacturing the RTB sheet is characterized in that the tobacco particles are dispersed in a cold liquid medium at a temperature of 0° to 10°C.

[0017] Beside the tobacco particles with an average particle size of 30 micrometer or less, the tobacco product preferably comprises a liquid medium like alcohol or water, in which the tobacco particles are dispersed.

[0018] In a preferred embodiment, the tobacco particles are dispersed in a liquid medium having a temperature of $\leq 30^{\circ}\text{C}$, preferably $\leq 20^{\circ}\text{C}$, more preferably $\leq 15^{\circ}\text{C}$, most preferably $\leq 10^{\circ}\text{C}$, to prevent decomposition and/or dissipation of the tobacco flavoring. Preferably the liquid medium of the dispersion has a temperature of $\geq -20^{\circ}\text{C}$, preferably $\geq -10^{\circ}\text{C}$, more preferably $\geq -5^{\circ}\text{C}$, most preferably $\geq 0^{\circ}\text{C}$, to facilitate its handling. It has been shown that a cold dispersion having temperatures in the above-mentioned range also prevents nicotine decomposition.

[0019] According to another embodiment, the method for manufacturing the RTB sheet is characterized in that the RTB sheet comprises a fleece, preferably a non-woven cellulose, wherein the fleece is preferably bonded on the RTB sheet.

[0020] Preferably, the fleece comprises a material, which is suitable for burning. The non-woven material preferably comprises fibers, which are formed in a sheet or a web. Such a non-woven material could be for example a paper based non-woven pulp. It is possible that the manufacturing process of the fleece is integrated in the standard manufacturing process of the RTB sheets. In this case the fibers are preferably connected together mechanically, for example by interlocking them with serrated needles, with an adhesive, or thermally, for example by applying a binder onto the fibers and melting the binder by increasing the temperature.

[0021] Preferably, the fleece is bonded to the RTB

sheet after the formation step and before the drying step. The fleece is preferably soaked with a liquid binding agent comprising the tobacco product. In this case the fleece adheres firmly to the RTB sheet after passing the drying step. Preferably, the resulting RTB sheet comprising the fleece is shredded or rolled up. In this case the resulting RTB sheet comprising fleece is processable in later manufacturing steps. It is also possible that the resulting RTB sheet comprising fleece is processed immediately after drying step.

[0022] It is conceivable that the fleece is provided on rolls or bobbins and is prepared for the further processing. The problem of breaking of the RTB sheets during the manufacturing process is preferably solved by adding the fleece to the standard RTB sheet.

[0023] According to another embodiment, the method for manufacturing the RTB sheet is characterized in that the tobacco product is sprayed and/or printed on the RTB sheet and/or the fleece.

[0024] It is possible that the applying step, preferably printing or spraying step, onto the fleece and/or the RTB sheet is a separate processing step. Such separate processing steps are known as offline, what means that the coating of the fleece and is done before the standard manufacturing process of the RTB sheet. It is conceivable that the tobacco product is already applied in a separate applying step onto the fleece. In this case the applying step is preferably executable by spraying or printing the tobacco product onto at least one surface of the fleece. In this case, there is no need to adapt the manufacturing machinery for the applying step. The RTB sheet can thus be processed on the known production machines, wherein the added preprocessed fleece comprising the tobacco product provides the desired increase of the tobacco taste.

[0025] For the applying step, the tobacco product is mixed with carrier liquid, preferably water, propyleneglycol or glycerin, to make it suitable for printing or spraying devices. The specific formulation is dependent on the printing or spraying technology in the manufacturing process used. The printing step is preferably carried out with a conventional printing machinery for printing on continuous materials which are fed through the printing machinery. Preferably the printing machinery comprises a print roller, which is coated with the ink. The print roller rolls over the surface of the continuous material and forms pattern. It is also conceivable to use a screen-printing machinery or inkjet printing machinery.

[0026] The tobacco product is preferably applied during the manufacturing process on the first and/or second surface of the RTB sheet. It is also possible that the tobacco product is applied during the manufacturing process on the first and/or second surface of the fleece. A last process step is preferably cutting the RTB sheet in pieces. It is also conceivable that the tobacco product is applied after the cutting process.

[0027] According to another embodiment, the method for manufacturing the RTB sheet is characterized in that

the applied tobacco product on at least one surface of the RTB sheet and/or the fleece forms a pattern.

[0028] Applying the tobacco product to at least one surface of the RTB sheet and/or the fleece offers a further possibility of dosing the tobacco taste. Depending on the different tobacco product types added to the smoking article, the tobacco taste is increased or decreased. There is also the option of moistening the RTB sheet and/or the fleece on one or both surfaces with tobacco product, wherein the moistening of one surface of the RTB sheet and/or the fleece results a milder tobacco taste then the moistening of both surfaces of the RTB sheet and /or the fleece.

[0029] In general, the pattern refers to visible surface drawings or surface structures. Preferably, the pattern comprises a minimum of repetitions (periodicity) and symmetries of coated and uncoated sections. The periodicity of coated and uncoated sections preferably varies dependent on the desired enhancement of the tobacco taste. Preferably, the tobacco product is applied on the RTB sheet and/or the fleece and results in the coated sections. Preferably, the tobacco product comprising visible ink is applied on the coated sections of the RTB sheet and/or the fleece.

[0030] The RTB sheet and/or the fleece is preferably printed with the ink comprising the tobacco product. The smoking article with the RTB sheet and/or the fleece comprising the tobacco product allows preferably to intensify the tobacco taste during the smoking experience. Preferably the ink comprising the tobacco product, which is used for printing on the RTB sheet and/or the fleece, is visible or invisible. Also preferably, the ink comprising the tobacco product comprises the same components as the usual ink for printing on the RTB sheet and/or the fleece.

[0031] It is also conceivable that the tobacco product is sprayed on at least one of the surfaces of the RTB sheet and/or the fleece. In this case the whole surface is coated with the ink comprising the tobacco product. The ink comprising the tobacco product on at least one surface of the carrier material portion is preferably applied in at least one section. The coated and uncoated sections preferably form a pattern.

[0032] The RTB sheet and/or the fleece, which is provided with the tobacco product on one of the surfaces, is useful for some applications. For example, if a decorated smoking article is required. The RTB sheet comprising fleece preferably has an increased structural integrity, wherein the further operations, for example cutting and/or slicing, for forming the RTB sheet of the heat-not-burn smoking article become much more predictable and efficient.

[0033] According to another embodiment, the method for manufacturing the RTB sheet is characterized in that the binding agent and the tobacco product on the RTB sheet are applied in one manufacturing step.

[0034] Preferably, the tobacco product is applied onto the material at the same time as the binding agent. It is

possible that this step is carried out by spraying the tobacco product on the raw tobacco material by at least one additional tobacco product spray nozzle. It is also possible that the raw tobacco material layer or the raw tobacco material are soaked with the tobacco product and the binding agent. In this embodiment the RTB sheet is preferably especially evenly impregnated with the tobacco product.

[0035] It is conceivable that the tobacco product is mixed in with the binder in an additional processing step. In this case the tobacco product is applied, preferably sprayed, together with the binder. Preferably, at least one binder spray nozzle can be used for the tobacco product and binder mixture. The additional tobacco product spray nozzle is in this case not required. This embodiment has an advantage of being easily integrated into a standard RTB manufacturing method. The resulting RTB sheet is preferably deeply embedded with tobacco product throughout the sheet structure. In case of different flavors of the applied tobacco product on the RTB sheet, new ways to enhance the tobacco taste are possible by using different tobacco products. If the RTB sheet comprising the tobacco product is processed into a final smoking article, the delivery of the flavor is preferably constant over the duration of the vaping session.

[0036] According to another embodiment, the method for manufacturing the RTB sheet is characterized in that a drying unit is drying the RTB sheet and/or fleece after or before applying the tobacco product on the RTB sheet and/or fleece.

[0037] The dry content of the RTB sheet and/or the fleece entering the drying step is preferably leaving up to 70 %, also preferred 90 %, dryness. Preferably, the RTB sheet and/or the fleece runs through a number of steam-heated drying cylinders. It is conceivable that a smoothing step is required after the drying step.

[0038] It is possible that the drying step of the RTB sheet and/or the fleece is practicable before applying the tobacco product onto the RTB sheet and/or fleece. This is particularly advantageous when a selective application of the tobacco product is desired. In such cases, for example if a pattern is required, the tobacco product is preferably colored.

[0039] It is also possible that the drying step of the RTB sheet and/or the fleece is practicable after applying the tobacco product onto the RTB sheet and/or the fleece. This is particularly advantageous when a homogeneous application of the tobacco product is desired. In such cases the tobacco product is preferably uncoloured. The tobacco product is then applied on the outside of the RTB sheet.

[0040] According to another embodiment, the method for manufacturing the RTB sheet is characterized in that an additional wetting step after or before applying the tobacco product on the fleece.

[0041] In case of using a RTB sheet comprising woven materials, the loose fibers are soaked with a liquid preferably comprising the tobacco product. The soaked to-

bacco product is preferably soaked up by the structure through capillary action. For the effective soaking with the liquid comprising the tobacco product, a bath submersion is preferably used in the manufacturing process.

[0042] According to another embodiment, the method for manufacturing the RTB sheet is characterized by a shredding or a rolling up step as a last manufacturing step for a further processing, wherein the RTB sheet is shredded or rolled up.

[0043] If the required RTB sheet form is a strip, the shredding step as the last manufacturing step is necessary. In this case, preferably the shredding step is integrated into a standard manufacturing process of the RTB sheet. It is also conceivable that the shredding step is not necessary, in this case the processed RTB sheet comprising tobacco product is preferably rolled up. The rolled up RTB sheet comprising tobacco product is preferably provided on spools or bobbins.

[0044] According to another embodiment, the method for manufacturing the RTB sheet is characterized in that the tobacco product has a viscosity in the range of 50 and 350 dPas.

[0045] A viscosity of the tobacco product preferably between 30 and 60 dPas, also preferred 50 and 350 dPas, wherein the viscosity is measured with falling-rod viscometer at 25 °C.

[0046] According to another embodiment, the method for manufacturing the RTB sheet is characterized in that the tobacco product has a density in the range of 0.8 g/cm³ and 1.5 g/cm³.

A density of the tobacco product is preferably comprised between 0.5 g/cm³ and 0.9 g/cm³, also preferred 0.8 g/cm³ and 1.5 g/cm³. Preferably the ink used for printing step in the manufacturing process comprises the tobacco product. This ink comprises preferably solvents, pigments, dyes, resins, lubricants, solubilizers, surfactants, particulate matter and/or fluorescents. If the fluorescents are used, they are all food safe.

[0047] The objective is also reached by a reconstituted tobacco binder (RTB) sheet, comprising at least a raw tobacco material and a binding agent, wherein the RTB sheet comprises the shape of a layer, characterized in that the RTB sheet further comprises a tobacco product comprising tobacco particles and a liquid medium, wherein the tobacco particles are having an average particle size of 30 µm or less.

[0048] The obtained RTB sheet is used for any typical application. The heat-not-burn consumable comprises preferably a section with RTB. Preferably the section comprises strips made out of RTB sheets. Applying the tobacco product comprising tobacco particles to the RTB sheet, which are preferably used in the heated section of a heat-not-burn smoking article, enhances the tobacco taste experience of a customer. When the RTB sheet is heated, the tobacco particles are released and flavor the actual tobacco aerosol. This creates an additional strengthening of the tobacco taste. Preferably, the enhancement of the tobacco taste by adding the tobacco

product is adjustable by the amount of the tobacco product.

[0049] Applying the tobacco product on the first surface of the RTB sheet is advantageous if the RTB sheet of the smoking article preferably should be decorated. In this case, the tobacco product is visible for the customer, wherein the tobacco taste is preferably additionally enhanced. It is possible that the first surface of the RTB sheet is coated at least in part with tobacco product. Preferably, the tobacco product is sprayed on the first surface of the RTB sheet. It is also conceivable that the tobacco product is printed on the first surface of the RTB sheet. Preferably, the ink for a printing device comprises the tobacco product and colored substances. It is also conceivable that the applied tobacco product on the first surface of the RTB sheet is invisible. In this case the ink for the printing device is transparent.

[0050] It is also conceivable that the tobacco product is applied on the first and second surface of the RTB sheet. Depending on requirements, the tobacco product is preferably with or without colored substances. Preferably, the applied tobacco product on the surface is tangible when touched. More preferably, the surface of the RTB sheet comprises letters written as a braille with the ink comprising tobacco product.

[0051] According to another embodiment, the RTB sheet is characterized in that the tobacco product comprises ground tobacco, wherein a weight amount of the ground tobacco is in the range of 1-50%.

[0052] The tobacco product is mixed with a carrier liquid, preferably water, propyleneglycol or glycerine, to make suitable for printing and/or spraying devices. The specific formulation is dependent on the printing and/or the spraying technology used. The ink comprises an amount of ground tobacco, which is preferably between 1 and 50 weight %, also preferred more than 50 weight %. With such an amount of ground tobacco in the mixture a sufficient color intensity is ensured.

[0053] To improve a hiding power, the color intensity and the color itself, the ink preferably comprises dyes, resins and/or particulate matter. By adding solvents, resins, lubricants, solubilizers and/or surfactants a rheology of the ink is preferably optimized for the printing process. Such an optimization is special interest for adapting the ink to specific printing machinery. By adding the fluorescent, the print is preferably readable under irradiation with UV-light.

[0054] The color intensity of the ink is preferably adapted by selection of the tobacco type and concentration. The higher the concentration of the tobacco product in the ink, the darker the color of the ink. By using a darker type of tobacco, it is preferably obtained a darker ink color. Such darker tobacco types preferably are Burley tobacco, dark fire-cured tobacco and dark air-cured tobacco. With such darker tobacco types, a darker ink color and also higher contrast to a light-colored fleece is preferably obtained.

[0055] According to another embodiment, the RTB

sheet is characterized in that a weight amount of the tobacco product comprised in the RTB sheet is in the range of 0.1 to 1%, preferably 0.05 to 2%, more preferred 0.01 to 3%.

[0056] Preferably, the weight amount of the tobacco product comprised in the RTB sheet is dependent on the required tobacco taste in the smoking article. It is conceivable that in case of required strong tobacco taste, the RTB sheet comprises a higher weight amount of tobacco product. Preferably the weight amount of the tobacco product comprised in the RTB sheet for stronger tobacco taste is in range of 2 - 3 %, also possible more than 3%. In case of required fine tobacco taste, the RTB sheet comprises a lower weight amount of tobacco product. Preferably the weight amount of the tobacco product comprised in the RTB sheet for finer tobacco taste is in range of 0.1 - 1 %, also possible 1 - 2%.

[0057] According to another embodiment, the RTB sheet is characterized in that a weight amount of the binder agent comprised in the RTB sheet is in the range of 2 to 3%, preferably 1 to 4%, more preferred 0.1 to 5%, wherein binder agent comprises a liquid carrier, preferably water and/or glycerine and/or propylene glycol and/or butylene glycol and/or sorbitol and/or trimethylene-glycol.

[0058] Preferably, the binder is in range of up to 5 % by weight in the form of a humectant. A binder preferably comprises glycol, glycerine, propylene glycol, butylene glycol, sorbitol, trimethylene-glycol and/or other humectant.

[0059] Further advantages, objectives and features of the present invention will be described, by way of example only, in the following description with reference to the appended figures. In the figures, like components in different embodiments can exhibit the same reference symbols.

[0060] The figures show:

- Fig. 1 a flow chart of a first embodiment of a method for manufacturing a RTB sheet comprising tobacco product;
- Fig. 2 a flow chart of a second embodiment of a method for manufacturing a RTB sheet with fleece comprising tobacco product;
- Fig. 3 a flow chart of a method for third embodiment of a manufacturing a RTB sheet with a drying step as a last manufacturing step;
- Fig. 4 a schematic view of a RTB sheet comprising tobacco material;
- Fig. 5 a schematic view of a papermaking RTB machine with a printed fleece;
- Fig. 6 a schematic view of a papermaking RTB machine without adding a fleece;

Fig. 7 a schematic view of a papermaking RTB machine with adding a fleece.

[0061] Figure 1 shows a flow chart of a first embodiment of a method for manufacturing a RTB sheet 1. The method may start with positioning 100 the raw tobacco material 2 on the conveyor belt 4. The next processing step is forming 101 the raw tobacco material 2 to a raw tobacco material layer 1a. It is conceivable that the positioning 100 and forming 101 steps are carried out in one step. After the forming 101 step there is a nozzle 7 that applies 102 the binding agent 8 onto the raw tobacco material layer 1a. The next processing step is a drying step 103, wherein the raw tobacco material layer 1a is dried and becomes an RTB sheet. The last step is the applying step 104 of the tobacco product 3 onto the RTB sheet 1.

[0062] It is conceivable that the applying step 104 is a spraying and/or printing step 104a. In the embodiment with the applying step 104 the RTB sheet 1 is preferably soaked with the tobacco product 3. It is possible that the tobacco product 3 is applied using another application method. In the embodiment with the spraying and/or printing step 104a the tobacco product 3 is preferably printed and/or sprayed onto at least one surface 19 the RTB sheet 1. For the spraying 104a, the tobacco product 3 is applied to at least one surface 19 of the RTB sheet 1 with a spraying nozzle 7. If the tobacco product 3 is applied 104a by spraying on at least one surface 19 of the RTB sheet 1, it is conceivable that a pattern 12 arises. The pattern 12 is either achieved by placing a mask between the spraying nozzle 7 and the surface 19 or by moving the spraying nozzle 7 with respect to the surface 19 of the RTB sheet 1, following the desired pattern 12.

[0063] If the tobacco product 3 is applied 104 on the surface 19 of the RTB sheet 1 by printing 104a, the tobacco product 3 is applied to the surface 19 of the RTB sheet 1 preferably with a print roller. The print roller may comprise recessed surface parts. Preferably, the recessed surface parts form a negative of the pattern 12 in which the tobacco product 3 is desired to be applied 104a onto the surface 19 of the RTB sheet 1. It is conceivable that after the last step the RTB sheet 1 is rolled up or shredded 106. After the RTB sheet 1 has been rolled up, it is usually stored in bobbins or spools for further processing.

[0064] Figure 2 shows a flow chart of a second embodiment of a method for manufacturing a RTB sheet 1 with a fleece 10 comprising tobacco product 3. It is conceivable that the positioning 100, forming 101 and applying of binding agent 102 step are identical to the method presented in figure 1. After applying 102 the binding agent 8 onto the raw tobacco material layer 1a, the fleece 10 is applied 105 onto the RTB sheet 1. The next step is preferably the drying 103 step, wherein the raw tobacco material layer 1a and the fleece 10 are dried with a drying unit 14. The last step is preferably the applying 104, printing or spraying 104a step. It is also conceivable that after

the last step the RTB sheet 1 comprising the fleece 10 is rolled up or shredded 106.

[0065] Figure 3 shows a flow chart of a third embodiment of a method for manufacturing a RTB sheet with a drying step as a last manufacturing step. The first step is identical to the first and second embodiment of the method for manufacturing a RTB sheet. The positioning step 100 and the forming step 101 are preferably carried out in one step. After forming 101 the raw tobacco material 3 to a raw tobacco material layer 1a, it is conceivable that the applying step 104 or printing or spraying step 104a is following. In the applying 104, printing or spraying 104a step the raw tobacco material layer 1a is preferably coated with tobacco product 3. The next step is applying 102 the binding agent 8 on the raw tobacco material layer 1a. It is possible that the order of applying 102 the binding agent 8 step and applying 104, 104a the tobacco product step is reversed. It is also possible that the applying steps 102 and 104 of tobacco product 3 and the binding agent 8 are carried out in one step. After applying 102 and 104 steps the standard manufacturing process of the RTB sheet can be continued. The standard manufacturing process of the RTB sheet preferably comprises the drying step 103 and the shredding or rolling up step 106.

[0066] It is conceivable that the applying 104 or 104a of the tobacco product 3 is not carried out on the raw material layer 1a. In this case the raw tobacco material layer 1a stays uncoated with tobacco product 3 and the fleece 10 is coated with tobacco product 3. The applying step 104 or 104a on the fleece is preferably identical to applying step 104 or 104a on the raw tobacco material layer 1a. After applying 102 the binding agent 8 onto the raw tobacco material layer 1a, the fleece 10 is applied 105 onto the raw tobacco material layer 1a. The fleece 10 is preferably bonded to the raw tobacco material layer 1a in the bonding step (not shown here). Preferably, the bonding step is integrated in the applying step 105. In this case the standard manufacturing process of the RTB sheet can be retained until the drying step 103. The applying step 104 of the tobacco product 3 on the fleece is preferably a separate process and is done offline. It is also possible that the uncoated fleece 10 is provided and the applying 104, printing or spraying 104a step is carried out online during the manufacturing process of the raw tobacco material layer 1a. After applying 104 or 104a the tobacco product 3 on the fleece, the raw tobacco material layer 1a comprising the fleece 10 is dried in the drying step 103. The shredding or rolling up step 106 is preferably a last step of the method for manufacturing the RTB sheet 1.

[0067] Figure 4 shows a schematic view of an RTB sheet comprising tobacco material. The tobacco product 3 is applied on at least one surface 19 of the RTB sheet 1. The tobacco product 3 is preferably applied in sections 20, wherein the coated sections 20 are distanced to each other by the distance d and thereby forming a pattern 12. It is conceivable that the coated sections 20 differ in the thickness in such a way, that the thickness of the whole

RTB sheet 1 and/or the fleece 10 is inconstant. It is also possible that the thickness of the whole RTB sheet 1 and/or the fleece 10 is constant. It is also possible that both surfaces 19 of the RTB sheet 1 and/or the fleece 10 are also coated with the tobacco product (not shown). Preferably the thickness (not shown here) of the coated section 20 perpendicular to the surface 19 is constant. Also preferably, the thickness of one coated section 20 is in range 0.5-5 mm. It is conceivable that the thickness of the coated section 20 varies dependent on the desired tobacco taste enhancement. The RTB sheet 1 and/or the fleece 10 as shown in figure 4 is arrangeable in a heat not burn smoking article.

[0068] The pattern 12 may include hexagonal shapes, concentric squares, rectangles, or circles, zigzagging, a checkerboard pattern, a chaotic distribution of squares or pixels or meandering lines and/or parallel straight or curved lines (not shown here). In alternative or in addition to the different thickness, it is also conceivable to increase or decrease the amount of tobacco product 3 deposited per unit area of the surfaces 19 by increasing or decreasing the density of the pattern 12.

[0069] Figures 5, 6 and 7 show a schematic view of a papermaking RTB machine. In figures 5, 6 and 7 a raw tobacco material 2 is applied on the conveyer belt 4 and is moved in the forward direction 5. Preferably, the raw tobacco material 2 comprises leaves, stems and/or other components of the tobacco plant. It is possible that the raw tobacco material 2 also comprises flammable or smoldering components.

[0070] In figure 5 a binding agent 8 is applied on the raw tobacco material 2. The tobacco product 3 is applied on the raw tobacco material 2 at the same step. The simultaneous application of tobacco product 3 and binding agent 8 can be done by using a nozzle 7. It is conceivable that the spraying nozzle is a plain-orifice nozzle, a shaped-orifice nozzle, a surface-impingement single-fluid nozzle, a pressure-swirl single-fluid nozzle, a solid-cone single-fluid nozzle, a compound nozzle or another nozzle 7. In this case the binding agent 8 and the tobacco product 3 are preferably mixed together. It is also conceivable that the spraying nozzle 7 is a two-fluid nozzle.

[0071] After spraying, a forming head 6 is forming the raw tobacco material 2. Preferably, the forming head 6 comprises two rolls (not shown here), which drain and form the raw tobacco material 2 to the raw tobacco material layer 1a. It is conceivable that the forming step with the forming head 6 is carried out together or before the spraying step with the nozzle 7. It is also possible that there are at least two forming heads 6 as shown in figure 6.

[0072] After the forming step, the fleece 10 is preferably added to the raw tobacco material layer 1a. It is conceivable that the manufacture of the fleece 10 is part of the process. Preferably a bobbin with fleece 17 is rolled up on the conveyer belt 4. A printer 13 applies the tobacco product 3 to the fleece. It is possible that the tobacco product 3 is applied as a pattern 12. It is conceivable that

the tobacco product 3 is not applied onto the fleece 10 and the unprocessed fleece 10 is added to the raw tobacco material layer 1a.

[0073] After applying the tobacco product 3 on the fleece, the fleece 10 is prepared for connection to the raw tobacco material layer 1a with a bonding unit 18. The bonding unit 18 is preferably a pressure unit, wherein the fleece 10 is pressed into the raw tobacco material layer 1a.

[0074] After that a drying unit 14 dries the raw tobacco material layer 1a comprising the fleece. Preferably, the drying unit 14 is a series of internally steam-heated cylinders that evaporate the moisture. It is also conceivable that the drying unit 14 is another method for drying the moisture out of the material. It is conceivable that the tobacco product 3 is printed onto the RTB sheet 1 after the drying step with a printer 13 (not shown here). In this case the printed tobacco product 3 preferably forms a pattern 12 on the surface of the RTB sheet (not shown here).

[0075] The dried raw tobacco material layer 1a with or without the fleece 10 is a RTB sheet. In the last step the RTB sheet 1 is preferably shredded by a shredding unit 15. It is conceivable that the shredding unit 15 cuts the RTB sheet into a required size. It is also possible that the RTB sheet 1 is rolled up into bobbins. Such a storage method is especially beneficial for a transport of the RTB sheet 1. From this process step, the RTB sheet 1 is ready for use preferably in a heat not burn smoking article.

[0076] In figures 6 and 7 the binding agent 8 is applied on the raw tobacco material 2, after or during the forming step with the forming head 6. The binding agent 8 is sprayed on the raw tobacco material layer 1a with a nozzle 7. Preferably, the nozzle 7 as shown in figures 6 and 7 is a spraying nozzle, also preferably the nozzle 7 is identical to the nozzle 7 as shown in figure 5. The binding agent 8 and the tobacco product 3 are applied in separate steps. It is possible that the nozzle 7 used for applying the tobacco product 3 on the raw tobacco material layer 1a is identical to the nozzle 7 used for applying the binding agent 8. In this case at least two nozzles 7 spray the binding agent 8 and the tobacco product 3 separately onto the raw tobacco material layer 1a as shown in figures 6 and 7.

[0077] Figure 6 shows an additional forming step with a second forming head 6 after applying the tobacco product 3 on the raw tobacco material layer 1a and before applying the binding agent 8. The fleece 10 is not added to the raw tobacco material layer 1a. In this case the raw tobacco material layer 1a is available for further processing. In this case the raw tobacco material layer 1a is dried with a drying unit 14 creating thereby a RTB sheet 1, which is rolled up with a rolling up unit 16 in the last processing step. It is conceivable that instead of the rolling up unit 16 the shredding unit 17 is used (not shown here).

[0078] In figure 7 the applying steps of the binding agent 8 and the tobacco product 3 are carried out one

after the other. It is possible that the binding agent 8 is applied before or after applying the tobacco product 3 on the raw tobacco material layer 1a. After the applying the binding agent 8 and the tobacco product 3 the fleece 10 is applied onto the raw tobacco material layer 1a. It is conceivable that the tobacco product 3 is applied onto the fleece 10 with a nozzle 7. The bonding unit 18 connect the raw tobacco material layer 1a with the fleece 10 after applying the tobacco product onto the fleece 10. After connecting the fleece 10 with the raw tobacco material layer 1a, the drying unit 14 dries the raw tobacco material layer 1a comprising the fleece 10 creating thereby the RTB sheet 1. The manufactured RTB sheet is preferably shredded with a shredding unit 15 in the last step.

[0079] The applicant reserves his right to claim all features disclosed in the application document as being an essential feature of the invention, as long as they are new, individually or in combination, in view of the prior art. Furthermore, it is noted that in the figures features are described, which can be advantageous individually. Someone skilled in the art will directly recognize that a specific feature being disclosed in a figure can be advantageous also without the adoption of further features from this figure. Furthermore, someone skilled in the art will recognize that advantages can evolve from a combination of diverse features being disclosed in one or various figures.

List of reference symbols

[0080]

1	RTB sheet
1a	raw tobacco material layer
2	raw tobacco material
3	tobacco product
4	conveyer belt
5	forward direction
6	forming head
7	nozzle
8	binding agent
9	tobacco particles
10	fleece
11	surface
12	pattern
13	printer
14	drying unit
15	shredding unit
16	rolling up unit
17	bobbin with fleece
18	bonding unit
19	surface of the RTB sheet / the fleece
20	coated section
21	uncoated section
100	positioning the raw tobacco material on the conveyer belt
101	forming the raw tobacco material to a raw tobacco material layer

- 102 applying the binding agent on the raw tobacco material layer
- 103 drying the raw tobacco material layer
- 104 applying the tobacco product onto the RTB sheet and/or the fleece
- 104a spraying or printing the tobacco product onto the RTB sheet and/or the fleece
- 105 applying the fleece onto the raw tobacco material layer or the RTB sheet
- d distance

Claims

1. A method for manufacturing a reconstituted tobacco binder (RTB) sheet (1), comprising a raw tobacco material (2) and a binding agent (8), wherein the raw tobacco material (2) is positioned on a conveyer belt (4), which moves in a forward direction (5), and the raw tobacco material (2) is formed by at least one forming head (6) to a raw tobacco material layer (1a), wherein the binding agent (8) is subsequently applied on the raw tobacco material layer (1a) and then dried in a drying process, thereby creating the RTB sheet (1),
characterized in that
a tobacco product (3) comprising tobacco particles (9) and a liquid medium is applied on the raw tobacco material layer (1a) and/or the RTB sheet (1) during the manufacturing, wherein the tobacco particles (9) are having an average particle size of 30 μm or less.
2. The method according to claim 1,
characterized in that
the tobacco particles (9) are dispersed in a cold liquid medium at a temperature of 0° to 10°C.
3. The method according to any of the preceding claims,
characterized in that
the RTB sheet (1) comprises a fleece (10), preferably a non-woven cellulose, wherein the fleece is preferably bonded on the RTB sheet (1).
4. The method according to any of the preceding claims,
characterized in that
the tobacco product (3) is sprayed and/or printed on the RTB sheet (1) and/or the fleece (10).
5. The method according to any of the preceding claims,
characterized in that
the applied tobacco product (3) on at least one surface (11) of the RTB sheet (1) and/or the fleece (10) forms a pattern (12).
6. The method according to any of the preceding

claims,
characterized by
applying the binding agent (8) and the tobacco product (3) on the RTB sheet (1) in one manufacturing step.

7. The method according to any of the preceding claims,
characterized in that
a drying unit is drying the RTB sheet (1) and/or fleece (10) after or before applying the tobacco product (3) on the RTB sheet (1) and/or fleece (10).

8. The method according to claims 3 - 5 and 7,
characterized by
an additional wetting step after or before applying the tobacco product (3) on the fleece (10).

9. The method according to any of the preceding claims,
characterized by
a shredding or a rolling up step as a last manufacturing step for a further processing, wherein the RTB sheet (1) is shredded or rolled up.

10. The method according to any of the preceding claims,
characterized in that
the tobacco product (3) has a viscosity in the range of 50 and 350 dPas.

11. The method according to any of the preceding claims,
characterized in that
the tobacco product (3) has a density in the range of 0.8 g/cm³ and 1.5 g/cm³.

12. A reconstituted tobacco binder (RTB) sheet (1), comprising at least a raw tobacco material (2) and a binding agent (8), wherein the RTB sheet (1) comprises the shape of a layer,
characterized in that
the RTB sheet (1) further comprises a tobacco product (3) comprising tobacco particles (9) and a liquid medium, wherein the tobacco particles (9) are having an average particle size of 30 μm or less.

13. The RTB sheet (1) according to claim 12,
characterized in that
the tobacco product (3) comprises ground tobacco, wherein a weight amount of the ground tobacco is in the range of 1-50%.

14. An RTB sheet (1) according to claims 12-13,
characterized in that
a weight amount of the tobacco product (3) comprised in the RTB sheet is in the range of 0.1 to 1%, preferably 0.05 to 2%, more preferred 0.01 to 3%.

15. The RTB sheet (1) according to claims 12-14,

characterized in that

a weight amount of the binder agent (8) comprised
in the RTB sheet (1) is in the range of 2 to 3%, pref-
erably 1 to 4%, more preferred 0.1 to 5%, wherein
binder agent (8) comprises a liquid carrier, preferably
water and/or glycerine and/or propylene glycol
and/or butylene glycol and/or sorbitol and/or trimeth-
ylene-glycol.

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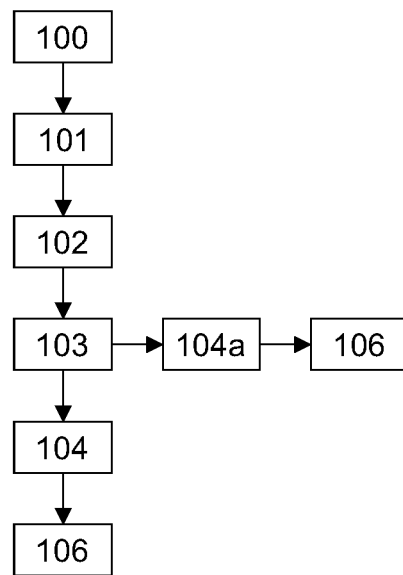


Fig. 1

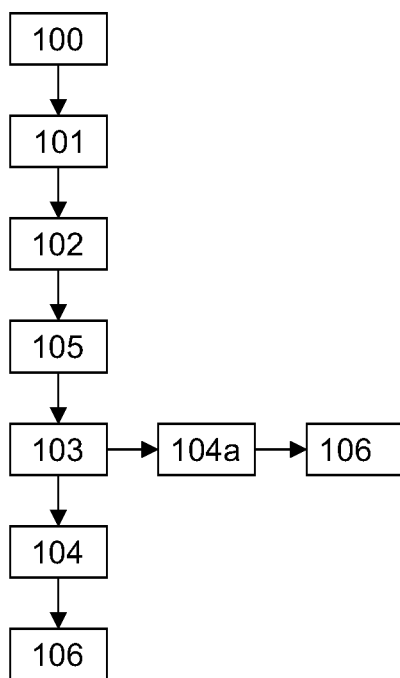


Fig. 2

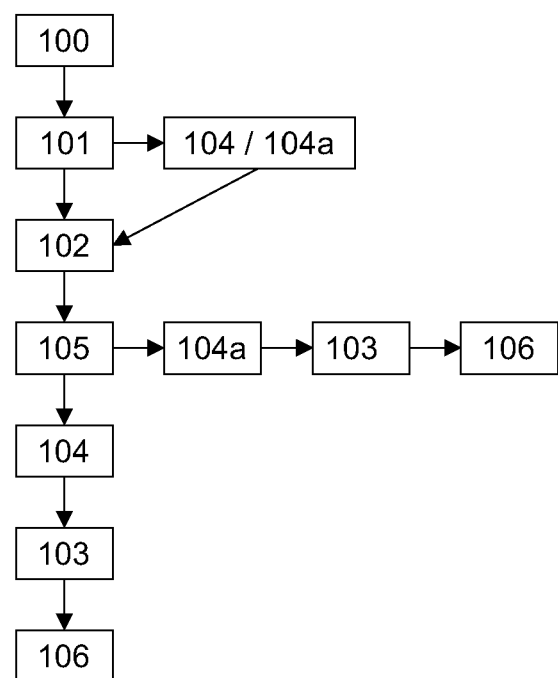
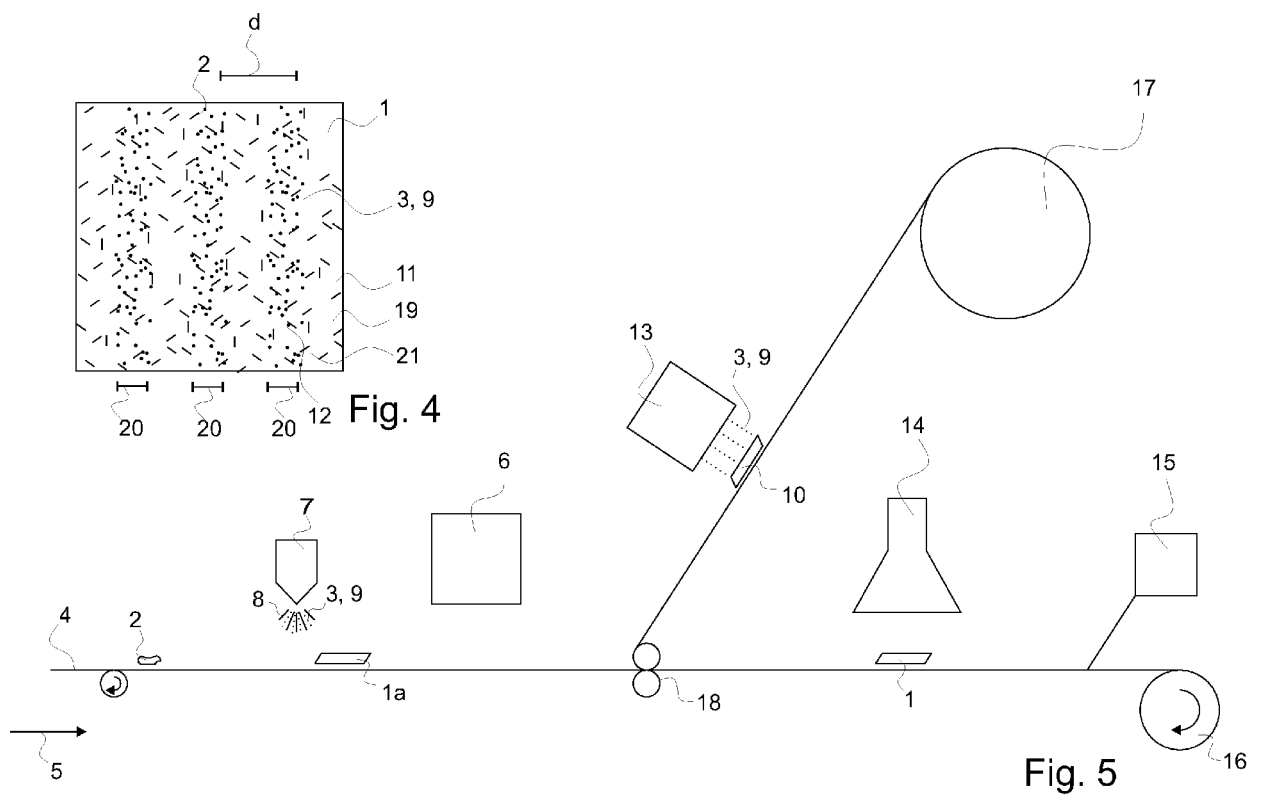
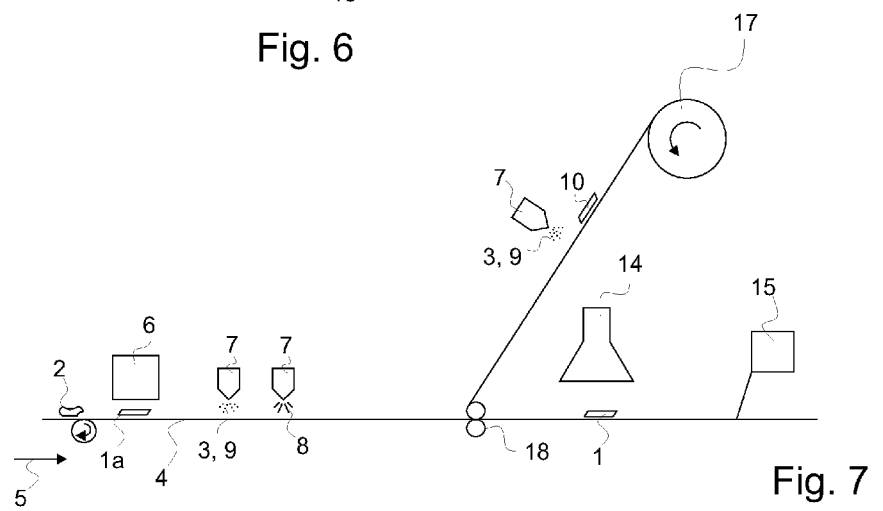
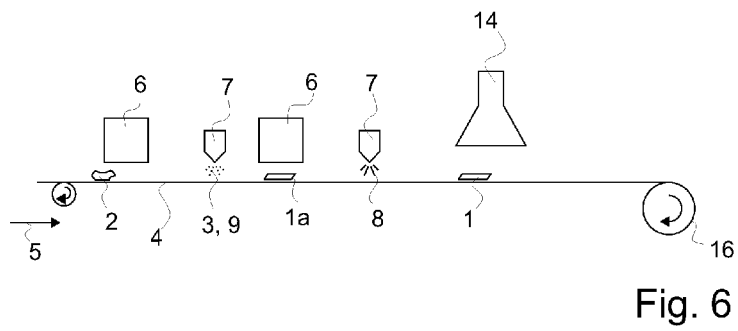


Fig. 3







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