(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
27 November 2014 (27.11.2014)

WIPO | PCT

(10) International Publication Number
WO 2014/188302 A1

(51) International Patent Classification:
A61F 13/15 (2006.01) *B05B 7/14* (2006.01)

(21) International Application Number:
PCT/IB2014/061392

(22) International Filing Date:
13 May 2014 (13.05.2014)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
BO2013A000232 20 May 2013 (20.05.2013) IT

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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *with international search report (Art. 21(3))*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

(54) Title: MACHINE AND METHOD FOR MAKING ABSORBENT SANITARY ARTICLES

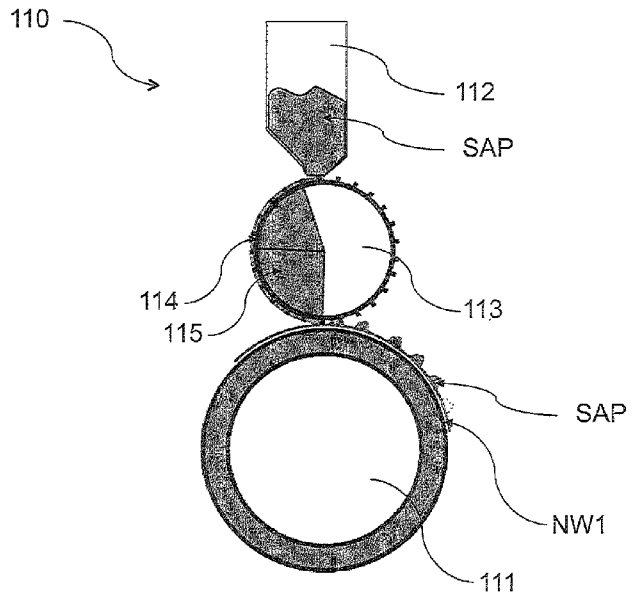

Fig. 1

(57) Abstract: This invention relates to a machine for making absorbent sanitary articles comprising at least an impermeable outer layer and an absorbent pad superposed on the outer layer. The machine comprises at least a feeding line for feeding the outer layer and a forming unit (110) for forming the absorbent pad. The forming unit (110) comprises: first feeding means (111) for feeding a first web (NW1) of non-woven fabric; second feeding means for feeding a second web of non-woven fabric; a joining station for joining the first web (NW1) to the second web of non-woven fabric; a metering and depositing station where at least one distribution of absorbent polymeric material (SAP) is deposited on the first web (NW1) of non-woven fabric; The metering and depositing station comprises: a containing and feeding unit (112) for the absorbent polymeric material (SAP) upstream of the first feeding means (111) for feeding the first web (NW1); metering and transferring means (113) for the absorbent polymeric material (SAP), these metering and transferring means (113) being interposed between the containing and feeding unit (112) and the first feeding means (111) and being provided with a plurality of calibrated cavities (114) on the outer surface. The containing and feeding unit (112) feeds the absorbent polymeric material (SAP) to the metering and transferring means (113) and the calibrated cavities (114) volumetrically meter the absorbent polymeric material (SAP) on the first web (NW1) of non-woven fabric.

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DESCRIPTION

MACHINE AND METHOD FOR MAKING ABSORBENT SANITARY ARTICLES

Technical field

This invention relates to a machine for making absorbent sanitary articles. More specifically, the invention relates to a machine equipped with one or more forming units for forming the absorbent pads for absorbent sanitary articles.

According to another aspect of it, the invention relates to a method for making absorbent sanitary articles. More specifically, the invention relates to a method for forming the absorbent pads for absorbent sanitary articles.

Background art

For convenience, this description will refer to a nappy and to the absorbent pad for the nappy, without limiting the scope of the invention.

As is known, nappies comprise an absorbent pad or padding which is normally sandwiched between an inner layer, permeable to liquids and normally made of non-woven fabric, and an outer layer, impermeable to liquids and normally made of polyethylene.

Absorbent pads of known type comprise an absorbent core made of an absorbent material, such as, for example, granules of superabsorbent polymeric material (SAP) inside a containment and supporting matrix, for example of cellulose pulp (fluff), sandwiched between two layers of non-woven fabric.

Other absorbent pads of known type are made without a containment and supporting matrix and the absorbent material (SAP) is preferably sandwiched between two layers of non-woven fabric. Preferably, the two layers of non-woven fabric are joined by seals which are suitably made in

such a way as to form a plurality of cells containing the absorbent material.

Making the absorbent pad, whether or not it has a stabilizing matrix or other structural elements, involves depositing the absorbent material (SAP) in suitable quantities, according to the absorbency properties required.

Transferring the absorbent material (SAP) onto the layer of fabric is a particularly critical aspect because the SAP must be precisely metered by the forming unit of the machine. Another critical aspect lies in the step of grouping and positioning the SAP according to the required pattern. A yet further critical aspect concerns the difficulty of conveying the SAP and keeping it in the correct position until the step of joining the at least two outer layers constituting the absorbent pad.

Aim of the invention

This invention has for an aim to provide a machine for making absorbent sanitary articles and equipped with forming units for forming the absorbent pads and capable of minimizing the above mentioned critical aspects.

A further aim of the invention is to provide a method for making absorbent sanitary articles capable of minimizing the above mentioned critical aspects during the formation of the absorbent pads.

The above aims are achieved by a machine and a method for making absorbent sanitary articles according to the accompanying claims.

Brief description of the drawings

Further features and advantages of this invention are more apparent in the description below, with reference to preferred, and thus non-limiting embodiments of a machine for making absorbent sanitary articles, as illustrated in the accompanying drawings, in which:

- Figure 1 is a schematic cross section of a first embodiment of a forming

unit for forming the absorbent sanitary pad;

- Figure 2a is a schematic cross section of a second embodiment of a forming unit for forming the absorbent sanitary pad;

- Figure 2b illustrates the forming unit of Figure 2a, for forming the absorbent sanitary pad, where the first feeding means for feeding the first web of non-woven fabric are in the form of a belt;

- Figure 3a is a schematic cross section of a third embodiment of a forming unit for forming the absorbent sanitary pad;

- Figure 3b illustrates the forming unit of Figure 3a, for forming the absorbent sanitary pad, where the first feeding means for feeding the first web of non-woven fabric are in the form of a belt;

- Figure 4 is a schematic cross section of a fourth embodiment of a forming unit for forming the absorbent sanitary pad;

- Figure 5a is a schematic cross section of a fifth embodiment of a forming unit for forming the absorbent sanitary pad;

- Figure 5b illustrates a metering device of the matrix type for the forming unit of Figure 5a;

- Figure 6a is a schematic cross section of a sixth embodiment of a forming unit for forming the absorbent sanitary pad, where the metering and transferring unit is at a first supply position;

- Figure 6b illustrates the forming unit of Figure 6a where the metering and transferring unit is at a second depositing position;

- Figure 7 is a schematic cross section of a seventh embodiment of a forming unit for forming the absorbent sanitary pad;

- Figure 8 is a schematic cross section of an eighth embodiment of a forming unit for forming the absorbent sanitary pad;

- Figure 9 is a schematic cross section of a ninth embodiment of a forming unit for forming the absorbent sanitary pad;

- Figure 10 is a schematic cross section of a tenth embodiment of a forming unit for forming the absorbent sanitary pad;

- Figure 11a is a schematic cross section of an eleventh embodiment of a forming unit for forming the absorbent sanitary pad;
- Figure 11b illustrates the forming unit of Figure 11a equipped with a transfer wheel for transferring the absorbent polymeric material;
- Figure 12 is a schematic cross section of a twelfth embodiment of a forming unit for forming the absorbent sanitary pad;
- Figures 13a-13b are schematic cross sections of a thirteenth embodiment of a forming unit for forming the absorbent sanitary pad;
- Figure 14a is a schematic cross section of a fourteenth embodiment of a forming unit for forming the absorbent sanitary pad;
- Figures 14b-14c illustrates a detail of the metering device of Figura14a in a first and a second operating position;
- Figure 15 is a schematic cross section of a fifteenth embodiment of a forming unit for forming the absorbent sanitary pad.

Detailed description of preferred embodiments of the invention

This description of the machine for making absorbent articles (the machine not being illustrated in its entirety) is limited to the parts necessary for understanding this invention, whereas customary parts known in the state of the art are not described.

An absorbent sanitary article, such as a nappy or the like, for example, comprises at least an outer layer impermeable to liquids and an absorbent pad superposed thereon. Other nappies of known type comprise a further inner layer, that is, a layer in contact with the wearer's body, permeable to liquids and superposed on the absorbent pad.

For convenience, this description refers only to the absorbent pad, without thereby limiting the invention.

The machine for making absorbent sanitary articles thus comprises a forming unit for forming the absorbent pad.

With reference to Figure 1, the absorbent pad forming unit 110 (not

illustrated in its entirety) comprises first feeding means 111 for feeding a first web NW1 of non-woven fabric and second feeding means (not illustrated) for feeding a second web of non-woven fabric (not illustrated). Preferably, there is also a joining station (not illustrated) for joining the first web NW1 to the second web of non-woven fabric after the absorbent polymeric material SAP has been deposited.

The forming unit 110 for forming the absorbent pad also comprises a metering and depositing station for feeding at least one distribution of absorbent polymeric material on the first web NW1 of non-woven fabric. In other embodiments, the metering and depositing station may feed a plurality of distributions of polymeric materials, which may eve differ from each other in quantity and/or properties of the material.

In the embodiment of Figure 1, the metering and depositing station comprises a containing and feeding unit 112 for the absorbent polymeric material (SAP) upstream of the first feeding means 111 for feeding the first web NW1.

Interposed between the containing and feeding unit 112 and the first feeding means 111 there are conveyor means 113 for conveying the absorbent polymeric material SAP. More specifically, in this embodiment, the conveyor means are embodied by a metering and transferring drum 113. In other embodiments, the metering and transferring drum might be substituted for rollers, belts or other devices designed for the same purposes.

The metering and transferring drum 113 has a plurality of calibrated cavities 114 on its outer revolving surface.

In this invention, the term “calibrated cavity” is used to mean a cavity which is able to receive and/or retain a predetermined quantity of material. More specifically, in this invention, the calibrated cavities are able to receive and/or retain maximum predetermined quantities of absorbent polymeric particles. In further embodiments, these cavities are also able

to retain, adherent thereto, the first web NW1 of non-woven fabric.

The containing and feeding unit 112 feeds the absorbent polymeric material SAP to the metering and transferring drum 113. In the embodiment illustrated in Figure 1, feeding is continuous because the containing and feeding unit 112 contains an over-abundant quantity of absorbent polymeric material SAP.

The metering and transferring drum 113 is also equipped with pneumatic means 115. The latter are in the form of suction means 115 which facilitate the transfer of the absorbent polymeric material SAP in the calibrated cavities 114 by allowing it to be retained during rotation.

The transfer of the absorbent polymeric material on the metering and transferring drum might also occur by gravity.

The calibrated cavities 114 allow volumetrically metering the absorbent polymeric material SAP on the first web NW1 of non-woven fabric. Metering is thus automatic and depends on the size of the cavities and/or on the force of the suction means 115.

The calibrated cavities 114 correctly meter, group and place the absorbent polymeric material on the first web NW1 of non-woven fabric.

Figure 2a illustrates a second embodiment of the forming unit 120 for forming the absorbent pad. The metering and depositing station comprises a containing and feeding unit 122 for the absorbent polymeric material SAP upstream of the first feeding means 121 for feeding the first web NW1.

Interposed between the containing and feeding unit 122 and the first feeding means 121 there are conveyor means 123 for conveying the absorbent polymeric material SAP. More specifically, in the embodiment illustrated, the conveyor means are embodied by a metering and transferring drum 123. In other embodiments, the metering and transferring drum might be substituted for rollers, belts or other devices designed for the same purposes.

The metering and transferring drum 123 has a plurality of calibrated cavities 124 on its outer revolving surface.

The containing and feeding unit 122 feeds the absorbent polymeric material SAP to the metering and transferring drum 123. In the embodiment illustrated in Figure 2a, the containing and feeding unit 122 is of a dynamic metering type because the containing and feeding unit 122 can feed an exact, or in any case predetermined, quantity of absorbent polymeric material SAP. More specifically, the containing and feeding unit 122 is embodied by an aerodynamic conveyor.

The metering and transferring drum 123 is also equipped with pneumatic means 125. More specifically, these are in the form of suction means which facilitate the transfer of the absorbent polymeric material SAP in the calibrated cavities 124 by allowing it to be retained during rotation.

The transfer of the absorbent polymeric material SAP on the metering and transferring drum 123 might also be accomplished by gravity. In further embodiments, metering might be accomplished by aerodynamic, electrostatic or magnetic means or combinations thereof.

The calibrated cavities 124 retain the absorbent polymeric material SAP which has already been metered by the metering and transferring drum 123. It is also possible to meter the material volumetrically directly on the first web NW1 of non-woven fabric, as described for the preceding embodiment. In effect, the metering of the absorbent polymeric material SAP on the web NW1 of non-woven fabric may be accomplished by the dynamic metering of the containing and feeding unit 122 and/or by the volumetric metering of the calibrated cavities 124.

Metering is not, therefore, automatic and invariable but is determined by the containing and feeding unit 122.

The calibrated cavities 124, on the other hand, correctly group and place the absorbent polymeric material on the first web NW1 of non-woven fabric.

An alternative embodiment of the forming unit 120' for forming the absorbent pad is illustrated in Figure 2b. This differs from the embodiment it corresponds to, illustrated in Figure 2a, in that the first feeding means 121' for feeding the first web NW1 face the metering and transferring drum 123' along a contact surface which extends for an arc of the selfsame drum 123'. More specifically, in the embodiment described, the first feeding means 121' for feeding the first web NW1 are in the form of a conveyor belt and not of a roller.

The modes of metering, partitioning and transferring the absorbent polymeric material SAP are the same as those described for the embodiment of Figure 2a.

A feature peculiar to the absorbent pad forming unit 120' is that the absorbent polymeric material SAP is transferred to the first web NW1 along the entire contact arc between the drum 123' and the first feeding means 121'. More specifically, the transferring of the SAP material is accomplished by closing the calibrated cavities 124' by means of the first web NW1 as soon as they have been formed by filling with the metered quantity of SAP material.

Figure 3a illustrates a third embodiment of the forming unit 130 for forming the absorbent pad. In this embodiment, the containing and feeding unit is integrated in conveyor means 133 for conveying the absorbent polymeric SAP material. More specifically, in the embodiment illustrated, the conveyor means are embodied by a metering and transferring drum 133. In other embodiments, the metering and transferring drum might be substituted for rollers, belts or other devices designed for the same purposes.

The metering and depositing station may be made according to either of the embodiments described previously. Thus, the calibrated cavities 134 may be filled by volumetric metering or by aerodynamic metering by application of a calibrated thrust on the absorbent polymeric material

SAP, for example by pneumatic means. Preferably, the absorbent polymeric material SAP is fed to the first web NW1 by pneumatic means and/or by electromagnetic means and/or by gravity. The absorbent polymeric material SAP is moved from the inside to the outside of the drum 133 into the calibrated cavities 134 through openings (not illustrated) formed on the outer surface of the metering and transferring drum 133.

The first feeding means 131 for feeding a first web NW1 of non-woven fabric are also in the form of a drum. In the same way, the feeding means 131 may be embodied in different ways, such as rollers or belts (as illustrated by way of example in Figure 3b) or other devices designed for the same purposes.

Figure 4 illustrates a fourth embodiment of the forming unit 140 for forming the absorbent pad. In this embodiment, a metering and depositing station comprises a containing and feeding unit 142 for the absorbent polymeric material SAP. More specifically, this unit is in the form of an aerodynamic conveyor. That way, the quantities of SAP material can be metered accurately according to requirements.

The metering and depositing station further comprises conveyor means 143 for conveying the absorbent polymeric material SAP. More specifically, in the embodiment illustrated, the conveyor means correspond to a metering and transferring drum 143. In other embodiments, the metering and transferring drum might be substituted for rollers, belts or similar devices.

The metering and transferring drum has a plurality of calibrated cavities 144 on its outer surface.

The metering and transferring drum 143 is equipped with pneumatic means (not illustrated) also designed to transport the first web NW1. More specifically, the pneumatic means allow the web NW1 to adhere to the calibrated cavities 144. This adhering action is achieved preferably before

the metered quantities of SAP material are deposited in the selfsame calibrated cavities 144.

The containing and feeding unit 142 feeds the absorbent polymeric material SAP to the metering and transferring drum 143 on the first web NW1 adhering to the calibrated cavities 144.

The calibrated cavities 144 divide the first web NW1 into cells. More specifically, this is obtained by lining the calibrated cavities 144 with the first web NW1. Further, the calibrated cavities 144 allow volumetrically metering the absorbent polymeric material SAP in the cells. The metering of the absorbent polymeric material SAP may also be accomplished by means of the aerodynamic conveyor 142, as described for the embodiment illustrated in Figure 2.

Correct metering of the SAP material is accomplished by means of the aerodynamic conveyor 142 (dynamic metering). Grouping and positioning of the SAP material, on the other hand, are accomplished by means of the calibrated cavities 144 .

Figure 5a illustrates a fifth embodiment of the forming unit 150 for forming the absorbent pad. In this embodiment, the metering and depositing station comprises a containing and feeding unit 152 for containing the absorbent polymeric material SAP and feeding it to the first feeding means 151 for feeding the first web NW1. The containing and feeding unit 152 is also equipped with an intermittent metering unit 155 for the absorbent polymeric material. This is preferably of the point or matrix type, as illustrated by way of example in Figure 5b. In alternative embodiments, the containing and feeding unit 152 might be equipped with a plurality of metering devices. The forming unit might also be equipped with a plurality of containing units, each equipped with a one or more metering devices.

The metering device 152 feeds the absorbent polymeric material SAP onto the first web NW1 according to a predefined pattern, such as that

illustrated in Figure 5b.

Both the metering and the grouping of the SAP material are accomplished by the metering device 152. The transferring of the metered SAP material is made possible by the first feeding means 151 which move the first web NW1. In the embodiment illustrated in Figure 5a these are in the form of a drum. Feeding means in a different form might also be used. To help keep the metered SAP material in position on the first web NW1, the feeding means 151 may be equipped with pneumatic means for applying suction to the first web NW1. The suction keeps the first web NW1 adherent to the surface of revolution, or of other movement, of the feeding means 151 while at the same time allowing the SAP material to be held correctly in the required grouping position.

Figures 6a and 6b illustrate a sixth embodiment of the forming unit 160 for forming the absorbent pad. In this embodiment, the metering and depositing station comprises a containing and feeding unit 162 for the absorbent polymeric material SAP. More specifically, the containing and feeding unit 162 for the absorbent polymeric material (SAP) is upstream of the first feeding means 161 for feeding the first web NW1. In the embodiment illustrated, the containing unit 162 is preferably of a fixed type and is in the form of an open container.

The forming unit 160 further comprises a metering and transferring unit 163 for the absorbent polymeric material SAP. More specifically, the metering and transferring unit 163 is mobile between the containing unit 162 and the first feeding means 161. The metering and transferring unit is provided with metering means 165 on an outer surface. In the embodiment illustrated, the metering means are embodied by a plurality of calibrated cavities 165 formed on the underside surface of the metering and transferring unit 163.

Preferably, the metering and transferring unit 163 is also equipped with pneumatic means for controlling the SAP material to be metered. More

specifically, the pneumatic means are designed to hold by suction and to release the SAP material to guarantee the required metering by the metering means 165.

The metering and transferring unit 163 moves to the containing unit 162. The pneumatic means this unit is equipped with allow the SAP material to be held by suction to the metering means 165. Suction may be such that the metered quantity is correct or it may fill the containing unit 162 with an excess quantity. In both cases, the SAP material is metered dynamically according to requirements. Once the required quantity of SAP material has been collected, the metering and transferring unit 163 moves to the first feeding means 161. The metering and transferring unit 163 then deposits the metered quantity of SAP material on the first web NW1, moving together with the first feeding means 161 in such a way as to cancel the relative speed. The pneumatic means, if provided, release the material so as to facilitate its deposition.

The metering means 165, and more specifically, the calibrated cavities embodying them, deposit the absorbent polymeric material SAP on the first web NW1 of non-woven fabric according to a predefined pattern.

Figure 7 illustrates a seventh embodiment of the forming unit 170 for forming the absorbent pad. This is similar to the embodiment illustrated in Figures 6a-6b and differs therefrom in that the containing unit for the absorbent polymeric material SAP is integrated in the metering and transferring unit 173.

The metering and transferring unit 173 is also equipped with intermittent feeding means 175 for feeding the absorbent polymeric material SAP. Preferably, the feeding means 175 comprise pneumatic means (not illustrated) for controlling the metering of the absorbent polymeric material SAP. These allow the SAP material to be metered as required to the first feeding means 171 and more specifically, directly onto the first web NW1.

The metering and transferring means 173 are movable relative to the first

feeding means 171. More specifically, the metering and transferring means 173 move in such a way as to cancel the relative speed with respect to the first feeding means 171 to allow the SAP material to be deposited during the in line movement of the first web NW1.

To optimize deposition the intermittent feeding means 175 can be configured between a first closed position, where the absorbent polymeric material SAP is metered according to the predefined pattern, and a second open position, where the absorbent polymeric material is deposited on the first web NW1 according to the predefined pattern. In the embodiment illustrated, the feeding means 175 comprise two parallel perforated plates capable of relative movement. The movement of the plates thus allows obtaining the first closed position to allow metering and grouping of the SAP material according to the pattern defined by the plates themselves. In the same way, the subsequent movement of the plates allows obtaining the second open position to allow the metered quantity of SAP material to be transferred onto the first web NW1. Metering and grouping may thus be performed automatically.

The deposition of the SAP material onto the first web NW1 may occur by allowing the material to drop by gravity from the perforated plates when these are at the second open position or with the aid of auxiliary means, for example pneumatic or electrostatic means.

Figure 8 illustrates an eighth embodiment of the forming unit 180 for forming the absorbent pad. The unit 180 comprises a metering and depositing station where at least one distribution of absorbent polymeric material SAP is deposited on the first web NW1 of non-woven fabric.

In this embodiment, the metering and depositing station comprises a containing unit 181 for the absorbent polymeric material SAP. More specifically, the containing unit 181 for the absorbent polymeric material (SAP) is downstream of the first feeding means 183 for feeding the first web NW1. In the embodiment illustrated, the containing unit 181 is

preferably of a fixed type and is in the form of an open container.

The SAP material is picked up and transferred onto the first web NW1 as the feeding means 183 move with the web NW1 adhering to them.

A metering and transferring unit 183 for the absorbent polymeric material SAP is integrated in the first feeding means 183. In the embodiment illustrated, the metering means are embodied by a plurality of calibrated cavities 185 formed on the underside surface of the metering and transferring unit 183. In effect, the latter is in the form of a drum but might equally be made in a different form.

Preferably, the metering and transferring unit 183 is also equipped with pneumatic means (not illustrated) for controlling the SAP material to be metered. More specifically, the pneumatic means are designed to hold the SAP material by suction to guarantee the required metering in the calibrated cavities 185.

Preferably, the first web NW1 is conveyed on the drum 183 adhering to the revolving surface thereof in such a way as to adhere to the surface of the calibrated cavities 185.

The pneumatic means provided on the drum 183 allow the SAP material to be held by suction in the calibrated cavities 185 covered by the first web NW1. The suction is such as to allow correct metering of the SAP material. More specifically, the combined action of the suction and the force of gravity allows metering of the SAP material to be controlled.

Since it is provided with calibrated cavities 185, the forming unit 180 allows grouping and automatic partitioning of the cells of SAP material. The aid provided by the pneumatic means, on the other hand, allows dynamic control of metering.

Figure 9 illustrates a ninth embodiment of the forming unit 190 for forming the absorbent pad. The unit 190 comprises a metering and depositing station where at least one distribution of absorbent polymeric material SAP is deposited on the first web NW1 of non-woven fabric.

The pad forming unit 190 comprises a metering station 195 for the SAP material. This is embodied preferably as an endless conveyor belt. The SAP material is fed in the form of pre-metered absorbent polymer agglomerate of coated or uncoated type.

The first feeding means 191 for feeding the first web NW1 are in the form of a drum but they might equally be in other forms, for example in the form of a belt, without modifying the inventive concept of this invention.

The metering station 195 feeds the agglomerates according to the correct spacing in such a way as to define the required pattern. Thus, the packaging of the SAP material allows performing the steps of metering and grouping upstream, even off the machine. Metering and grouping can thus be modified according to product requirements without interfering with the operations of the forming unit 190.

The operative connection between the metering station 195 and the feeding means 191 only effects the transfer of the SAP material onto the first web NW1.

Figure 10 illustrates a tenth embodiment of the forming unit 210 for forming the absorbent pad. In this embodiment, the metering and depositing station comprises a containing and feeding unit 211 for the absorbent polymeric material SAP upstream of the first feeding means 213 for feeding the first web NW1.

Metering means for metering the absorbent polymeric material SAP are integrated in the feeding means 213 which, preferably, are in the form of a drum.

The drum 213 has a plurality of calibrated cavities 215 on its outer revolving surface. The drum is preferably equipped with pneumatic means for applying suction to the calibrated cavities 215.

The containing and feeding unit 211 is capable of depositing on the first web NW1, which is moving on the drum 213, the required metered quantity of SAP material.

Grouping and partitioning of the first web NW1 are performed subsequently on the drum 213 with the aid of the pneumatic means. In effect, the force of suction allows the first web NW1 to adhere to the calibrated cavities 215 and at the same time retains the correct metered quantity of SAP material deposited thereon.

Optionally, the drum 213 may be equipped with mechanical means for moving the SAP material placed on the surface layer of the first web NW1. More specifically, these mechanical means might allow vibrating the SAP material in particle form.

Figure 11a illustrates an eleventh embodiment of the forming unit 220 for forming the absorbent pad. In this embodiment, the metering and depositing station comprises a containing and feeding unit 221 for the absorbent polymeric material SAP upstream of the first feeding means 222 for feeding the first web NW1.

Downstream of the first means 222 there are metering means 223 for the deposited SAP material.

More specifically, in the embodiment described and without limiting the invention, the first feeding means 222 and the metering means 223 are each embodied by a drum. The metering drum 223 has a plurality of calibrated cavities 225 made on its outer surface. Preferably, the calibrated cavities 225 reproduce in the negative the grouping to be obtained as clusters of the SAP material deposited on the first web NW1.

The containing and feeding unit 221 deposits the absorbent polymeric material SAP on the first web NW1, moved in rotation by the first feeding means 222. The SAP material is deposited in an over-abundant amount and uniformly over the whole of the first web NW1 compared to the amount needed to obtain the required pattern. The calibrated cavities 225 provided on the drum 223 then volumetrically meter the absorbent polymeric material SAP on the first web NW1 of non-woven fabric by removing the quantity of SAP material deposited in excess.

The SAP material removed is then returned into the containing and feeding unit 221 so it can be deposited again.

An alternative embodiment of the forming unit 220' is illustrated in Figure 11b. This embodiment has the same features as those described above for the forming unit 220 of Figure 11a but differs from the latter in the different embodiment of the first feeding means 222' for feeding the first web NW1. Another difference is the presence of the transferring means 222'' for transferring the SAP material as it comes out of the containing unit 221.

Preferably, the first feeding means 222' are in the form of a linear conveyor belt, whilst the transferring means 222'' are in the form of a drum.

The containing unit 221' deposits a uniform but controlled quantity of SAP material on the transferring drum 222''. This transfers the quantity of SAP material on the first web NW1 onto a linear conveyor belt 222' as the web advances.

After deposition by the drum 222'' there are metering means 223' for metering the deposited SAP material. These are preferably in the form of a drum. The metering drum 223' has a plurality of calibrated cavities 225' made on its outer surface. Preferably, the calibrated cavities 225' reproduce in the negative the grouping to be obtained as clusters of the SAP material deposited on the first web NW1.

As described for the preceding embodiment, the calibrated cavities 225' provided on the drum 223' then volumetrically meter the absorbent polymeric material SAP on the first web NW1 of non-woven fabric by removing the quantity of SAP material deposited in excess.

The SAP material removed is then returned into the containing and feeding unit 221' so it can be deposited again.

Figure 12 illustrates a twelfth embodiment of the forming unit 230 for forming the absorbent pad. In this embodiment, the metering and

depositing station comprises a containing and feeding unit 231 for the absorbent polymeric material SAP upstream of the first feeding means 232 for feeding the first web NW1.

The forming unit 230 is further provided with a transferring drum 233 for transferring the absorbent polymeric material SAP and interposed between the containing and feeding unit 231 and the first feeding means 232.

Further, interposed between the first feeding means 232 and the transferring drum 233 there are metering means 234 for metering the absorbent polymeric material SAP. The metering means 234 are embodied preferably as a predefined template capable of reproducing a predetermined application pattern.

The transferring drum 233 is preferably provided with a plurality of calibrated cavities 235 on its outer revolving surface.

The containing and feeding unit 231 feeds the absorbent polymeric material SAP to the transferring drum 233. The calibrated cavities 235 allow the SAP material to be volumetrically metered. In the same way, it is possible to feed the SAP material continuously from the containing unit 231 to the transferring drum 233 without metering by means of the calibrated cavities 235. In such a case, metering of the SAP material is effected at a later stage by the metering means 234, as described below.

The metering means 234 are interposed between the first web NW1 and the transferring drum 233. These metering means may be of a mobile type, rotating in the same direction as, or in the opposite direction to, that of the transferring drum 233, or they may be of a fixed type. The metering means 234 allow depositing the absorbent polymeric material SAP on the first web NW1 of non-woven fabric according to a predefined pattern. More specifically, the pattern is defined by the meshwork of the grilles which make it up. The excess SAP material is retained by the transferring drum 233, whereas the correctly metered quantity passes through the

metering grilles 234 and is deposited onto the first web NW1.

Figures 13a and 13b illustrate a thirteenth embodiment of the forming unit 240 for forming the absorbent pad. In this embodiment, the metering and depositing station comprises a feeding unit (not illustrated) for feeding the absorbent polymeric material SAP to the first feeding means 242 for feeding the first web NW1. Preferably, the first feeding means 242 are in the form of a linear conveyor belt, as shown by way of example in Figures 13a and 13b.

The forming unit 240 further comprises first metering means 234 for metering the absorbent polymeric material SAP. As shown by way of example in the drawings, these first metering means preferably comprise means 235 for generating an electrostatic field. This allows retaining the required quantity of absorbent polymeric material SAP, as described below.

The forming unit 240 also comprises second metering means 234. As shown by way of example in the drawings, these second metering means preferably comprise pneumatic means 234 capable of removing the excess quantity of absorbent polymeric material SAP.

The SAP material is thus fed and handled directly on the conveying surface of the first feeding means 242. The quantity of SAP material deposited on the surface 242 is greater than the required quantity and can be varied dynamically.

As illustrated in Figure 13a, the electrostatic means 235 allow the required quantity of SAP material to be retained securely on the surface 242. Next, the pneumatic means 234 operate with sufficient force to remove the absorbent polymeric material SAP not subjected to the electrostatic field, or subjected to it with a very weak retaining force.

Figure 13b illustrates a variant where the SAP material in excess is removed also by gravity.

Further metering means may be used to retain and/or remove the excess

particles without thereby modifying the inventive concept the invention is based on.

Figure 14a illustrates a fourteenth embodiment of the forming unit 250 for forming the absorbent pad. In this embodiment, the metering and depositing station comprises a containing and feeding unit 251 for the absorbent polymeric material SAP upstream of the a joining station 252 for joining the first web NW1 to the second web NW2 of non-woven fabric. More specifically, the containing unit 251 comprises a metering device 251'. The latter is mobile between a first operating position, illustrated in Figure 14b, and a second operating position, illustrated in Figure 14c. At the first operating position, the metering device 251' allows the material SAP to be fed out according to a predetermined pattern. At the second operating position, the metering device 251' prevents the material SAP from being fed out onto the webs NW1, NW2.

The joining station 252 comprises first feeding means 252' and second feeding means 252'' for feeding the first web NW1 and the second web NW1 of non-woven fabric, respectively. These feeding means are preferably embodied as a pair of opposed rollers which rotate in opposite directions.

The containing unit 251 is located above the portion where the two rollers 252', 252'' are closest together. The containing and feeding unit 251 deposits the absorbent polymeric material SAP at the portion of the first web NW1 joined to, that is, in contact with, the second web NW2. Preferably, the two webs NW1, NW2 are joined to each other by one or more ultrasound devices. The metering and/or grouping of the absorbent polymeric material SAP is accomplished by the intermittent depositing action. This is determined by interrupting feed upstream, in the containing unit 251 of the metering device 251', as illustrated in Figures 14b-14c. Alternatively, or concurrently, the metering, grouping or partitioning of the SAP material may be accomplished by varying the joining pattern in the

joining station 252. In such case, this will be determined by the depositing matrix formed on at least one of the two rollers 252', 252''.

Figure 15 illustrates a fifteenth embodiment of the forming unit 260 for forming the absorbent pad. In this embodiment, the metering and depositing station comprises a joining station 254 for joining the first web NW1 to the second web NW2 of non-woven fabric. Preferably, the joining station 254 is equipped with an ultrasound device for sealing the webs NW1, NW2.

The forming unit 260 further comprises a metering and depositing station 253. Preferably, this station is equipped with a plurality of applicator means 253' on the outer revolving surface. In the embodiment illustrated, the applicator means 253' comprise a plurality of equidistant needles along the entire surface perimeter.

The joining station 254 makes a plurality of empty pockets 254' by joining the first web NW1 of non-woven fabric to the second NW2. More specifically, the pockets 254' are made by joining together the two webs NW1, NW2 by ultrasound sealing at predetermined constant spacing. That way, partitioning and grouping of the SAP material is accomplished beforehand by the pockets 254', thereby avoiding the risk of the material migrating within the pad and without using supporting matrices.

The containing and feeding unit 253, downstream of the joining station 254, feeds the absorbent polymeric material SAP to the empty pockets 254' made. Feeding is preferably accomplished using the plurality of needles 253', that is to say, by injection.

The embodiments described herein may be combined in different ways to obtain further embodiments not illustrated but falling within the scope of the inventive concept.

CLAIMS

1. A machine for making absorbent sanitary articles, said articles comprising at least an impermeable outer layer and an absorbent pad superposed on said outer layer, said machine comprising at least a feeding line for feeding the outer layer and a forming unit (110) for forming the absorbent pad, the forming unit (110) comprising:

- first feeding means (111) for feeding a first web (NW1) of non-woven fabric;
- second feeding means for feeding a second web of non-woven fabric;
- a joining station for joining the first web (NW1) to the second web of non-woven fabric;
- a metering and depositing station where at least one distribution of absorbent polymeric material (SAP) is deposited on the first web (NW1) of non-woven fabric;

said machine being characterized in that said metering and depositing station comprises:

- a containing and feeding unit (112) of said absorbent polymeric material (SAP) upstream of said first feeding means (111) of said first web (NW1);
- metering and transferring means (113) of said absorbent polymeric material (SAP), these metering and transferring means (113) being interposed between the containing and feeding unit (112) and the first feeding means (111) and being provided with a plurality of calibrated cavities (114) on the outer surface;

said containing and feeding unit (112) feeding the absorbent polymeric material (SAP) to the metering and transferring means (113), the calibrated cavities (114) volumetrically metering of said absorbent polymeric material (SAP) on said first web (NW1) of non-woven fabric.

2. A machine for making absorbent sanitary articles, said articles comprising at least an impermeable outer layer and an absorbent pad

superposed on said outer layer, said machine comprising at least a feeding line for feeding the outer layer and a forming unit (140) for forming the absorbent pad, said forming unit (140) comprising:

- first feeding means (143) for feeding a first web (NW1) of non-woven fabric;
- second feeding means for feeding a second web of non-woven fabric;
- a joining station for joining the first web (NW1) to the second web of non-woven fabric;
- a metering and depositing station where at least one distribution of absorbent polymeric material (SAP) is deposited on the first web (NW1) of non-woven fabric;

said machine being characterized in that said metering and depositing station comprises:

- a containing and feeding unit (142) of said absorbent polymeric material (SAP);
- metering and transferring means (143) for the absorbent polymeric material (SAP), these metering and transferring means (143) being located downstream of the containing and feeding unit (142) and being provided with a plurality of calibrated cavities (144) on the outer surface;

said containing and feeding unit (142) being provided with pneumatic means able to feed the first web (NW1) adhering to the calibrated cavities (144), the containing and feeding unit (142) feeding the absorbent polymeric material (SAP) to the metering and transferring means (143) on the first web (NW1), the calibrated cavities (144) dividing the first web (NW1) into cells and volumetrically metering the absorbent polymeric material (SAP) into the cells.

3. A machine for making absorbent sanitary articles, said articles comprising at least an impermeable outer layer and an absorbent pad superposed on the outer layer, said machine comprising at least a feeding

line for feeding the outer layer and a forming unit (150) for forming the absorbent pad, said forming unit (150) comprising:

- first feeding means (151) for feeding a first web (NW1) of non-woven fabric;
- second feeding means for feeding a second web of non-woven fabric;
- a joining station for joining the first web (NW1) to the second web of non-woven fabric;
- a metering and depositing station where at least one distribution of absorbent polymeric material (SAP) is deposited on the first web (NW1) of non-woven fabric;

said machine being characterized in that said metering and depositing station comprises at least a containing and feeding unit (152) for containing the absorbent polymeric material (SAP) and feeding it to the first feeding means (151) for feeding the first web (NW1) of non-woven fabric, the containing and feeding unit (152) being provided at least with an intermittent metering unit (155) of the point or matrix type for the absorbent polymeric material (SAP) and able to feed the absorbent polymeric material (SAP) on the first web (NW1) in a predefined pattern.

4. A machine for making absorbent sanitary articles, said articles comprising at least an impermeable outer layer and an absorbent pad superposed on the outer layer, the machine comprising at least a feeding line for feeding the outer layer and a forming unit (160) for forming the absorbent pad, said forming unit (160) comprising:

- first feeding means (161) for feeding a first web (NW1) of non-woven fabric;
- second feeding means for feeding a second web of non-woven fabric;
- a joining station for joining the first web (NW1) to the second web of non-woven fabric;

- a metering and depositing station where at least one distribution of absorbent polymeric material (SAP) is deposited on the first web (NW1) of non-woven fabric;

said machine being characterized in that said metering and depositing station comprises:

- a containing unit (162) for containing the absorbent polymeric material (SAP) and located upstream of the first feeding means (161) for feeding the first web (NW1), the containing unit (162) being of the fixed type;
- a metering and transferring unit (163) for the absorbent polymeric material (SAP) mobile between said containing unit (162) and said first feeding means (161), said metering and transferring unit (163) being provided with metering means (165) on an outer surface;

the metering and transferring unit (163) feeding the absorbent polymeric material (SAP) to the first feeding means (161), the metering means (165) arranging the absorbent polymeric material (SAP) on the first web (NW1) of non-woven fabric according to a predefined pattern.

5. A machine for making absorbent sanitary articles, the articles comprising at least an impermeable outer layer and an absorbent pad superposed on the outer layer, the machine comprising at least a feeding line for feeding the outer layer and a forming unit (190) for forming the absorbent pad, the forming unit (190) comprising:

- first feeding means (193) for feeding a first web (NW1) of non-woven fabric;
- second feeding means for feeding a second web of non-woven fabric;
- a joining station for joining the first web (NW1) to the second web of non-woven fabric;
- a metering and depositing station (195) where at least one distribution of absorbent polymeric material (SAP) is deposited on the first web (NW1) of non-woven fabric;

said machine being characterized in that said metering and depositing station (195) feeds said absorbent polymeric material (SAP) to said first web (NW1) of non-woven fabric in the form of pre-metered agglomerate of the coated or uncoated type.

6. A machine for making absorbent sanitary articles, said articles comprising at least an impermeable outer layer and an absorbent pad superposed on the outer layer, said machine comprising at least a feeding line for feeding the outer layer and a forming unit (220) for forming the absorbent pad, said forming unit (220) comprising:

- first feeding means (222) for feeding a first web (NW1) of non-woven fabric;
- second feeding means for feeding a second web of non-woven fabric;
- a joining station for joining the first web (NW1) to the second web of non-woven fabric;
- a metering and depositing station where at least one distribution of absorbent polymeric material (SAP) is deposited on the first web (NW1) of non-woven fabric;

said machine being characterized in that said metering and depositing station comprises:

- a containing and feeding unit (221) for the absorbent polymeric material (SAP) upstream of the first feeding means (222) for feeding the first web (NW1);
- metering means (223) for the absorbent polymeric material (SAP), these metering means (223) being located downstream of the first feeding means (222) and being provided with a plurality of calibrated cavities (225) on the outer surface;

the containing and feeding unit (221) feeding the absorbent polymeric material (SAP) to the first web (NW1) and the calibrated cavities (225) volumetrically metering the absorbent polymeric material (SAP) on the

first web (NW1) of non-woven fabric by removing the amount of absorbent polymeric material (SAP) fed in excess.

7. A machine for making absorbent sanitary articles, said articles comprising at least an impermeable outer layer and an absorbent pad superposed on the outer layer, said machine comprising at least a feeding line for feeding the outer layer and a forming unit (230) for forming the absorbent pad, said forming unit (230) comprising:

- first feeding means (232) for feeding a first web (NW1) of non-woven fabric;
- second feeding means for feeding a second web of non-woven fabric;
- a joining station for joining the first web (NW1) to the second web of non-woven fabric;
- a metering and depositing station where at least one distribution of absorbent polymeric material (SAP) is deposited on the first web (NW1) of non-woven fabric;

said machine being characterized in that said metering and depositing station comprises:

- a containing and feeding unit (231) for the absorbent polymeric material (SAP) upstream of the first feeding means (232) for feeding the first web (NW1);
- transferring means (233) for the absorbent polymeric material (SAP), these transferring means (233) being interposed between the containing and feeding unit (231) and the first feeding means (232) and being provided with a plurality of calibrated cavities (235) on the outer surface;
- metering means (223) for metering the absorbent polymeric material (SAP) and being interposed between the transferring means (233) and the first web (NW1);

said containing and feeding unit (231) feeding the absorbent polymeric material (SAP) to the transferring means (233), the calibrated cavities

(235) volumetrically metering the absorbent polymeric material (SAP), and the metering means (223) allowing the absorbent polymeric material (SAP) to be deposited on the first web (NW1) of non-woven fabric according to a predefined pattern by removing the amount of absorbent polymeric material (SAP) fed in excess.

8. A machine for making absorbent sanitary articles, said articles comprising at least an impermeable outer layer and an absorbent pad superposed on the outer layer, said machine comprising at least a feeding line for feeding the outer layer and a forming unit (240) for forming the absorbent pad, the forming unit (240) comprising:

- first feeding means (242) for feeding a first web (NW1) of non-woven fabric;
- second feeding means for feeding a second web of non-woven fabric;
- a joining station for joining the first web (NW1) to the second web of non-woven fabric;
- a metering and depositing station where at least one distribution of absorbent polymeric material (SAP) is deposited on the first web (NW1) of non-woven fabric;

said machine being characterized in that said metering and depositing station comprises:

- a feeding unit for feeding the absorbent polymeric material (SAP) on the first feeding means (242) for feeding the first web (NW1);
- first metering means (235) for metering the absorbent polymeric material (SAP) by creating an electrostatic field able to retain the desired amount of the absorbent polymeric material (SAP);
- second metering means (234) able to remove the amount of the absorbent polymeric material (SAP) fed in excess, preferably by pneumatic means able to remove the absorbent polymeric material (SAP) not subjected to the electrostatic field.

9. A machine for making absorbent sanitary articles, said articles comprising at least an impermeable outer layer and an absorbent pad superposed on the outer layer, said machine comprising at least a feeding line for feeding the outer layer and a forming unit (250) for forming the absorbent pad, the forming unit (250) comprising:

- first feeding means (252') for feeding a first web (NW1) of non-woven fabric;
- second feed means (252'') for feeding a second web (NW2) of non-woven fabric;
- a joining station (252) for joining the first web (NW1) to the second web (NW2) of non-woven fabric;
- a metering and depositing station where at least one distribution of absorbent polymeric material (SAP) is deposited on the first web (NW1) of non-woven fabric;

said machine being characterized in that said metering and depositing station comprises a containing and feeding unit (251) for containing and feeding the absorbent polymeric material (SAP) upstream of the joining station (252) for joining the first web (NW1) to the second web (NW2) of non-woven fabric;

the containing and feeding unit (251) depositing the absorbent polymeric material (SAP) at the portion of the first web (NW1) joined to the second web (NW2);

the metering of said absorbent polymeric material (SAP) being accomplished by the intermittent depositing action and/or by the joining pattern in the joining station (252).

10. A machine for making absorbent sanitary articles, said articles comprising at least an impermeable outer layer and an absorbent pad superposed on the outer layer, the machine comprising at least a feeding line for feeding the outer layer and a forming unit (260) for forming the absorbent pad, the forming unit (260) comprising:

- first feeding means for feeding a first web (NW1) of non-woven fabric;
- second feeding means for feeding a second web (NW2) of non-woven fabric;
- a joining station (254) for joining the first web (NW1) to the second web (NW2) of non-woven fabric;
- a metering and depositing station (253) where at least one distribution of absorbent polymeric material (SAP) is deposited on the first web (NW1) of non-woven fabric;

said machine being characterized in that the joining station (254) makes a plurality of empty pockets (254') by joining the first web (NW1) to the second web (NW2) of non-woven fabric;

said metering and depositing station (253) comprises a containing and feeding unit for the absorbent polymeric material (SAP) downstream of the joining station (254) and able to feed the absorbent polymeric material (SAP) to the empty pockets (254') by injection.

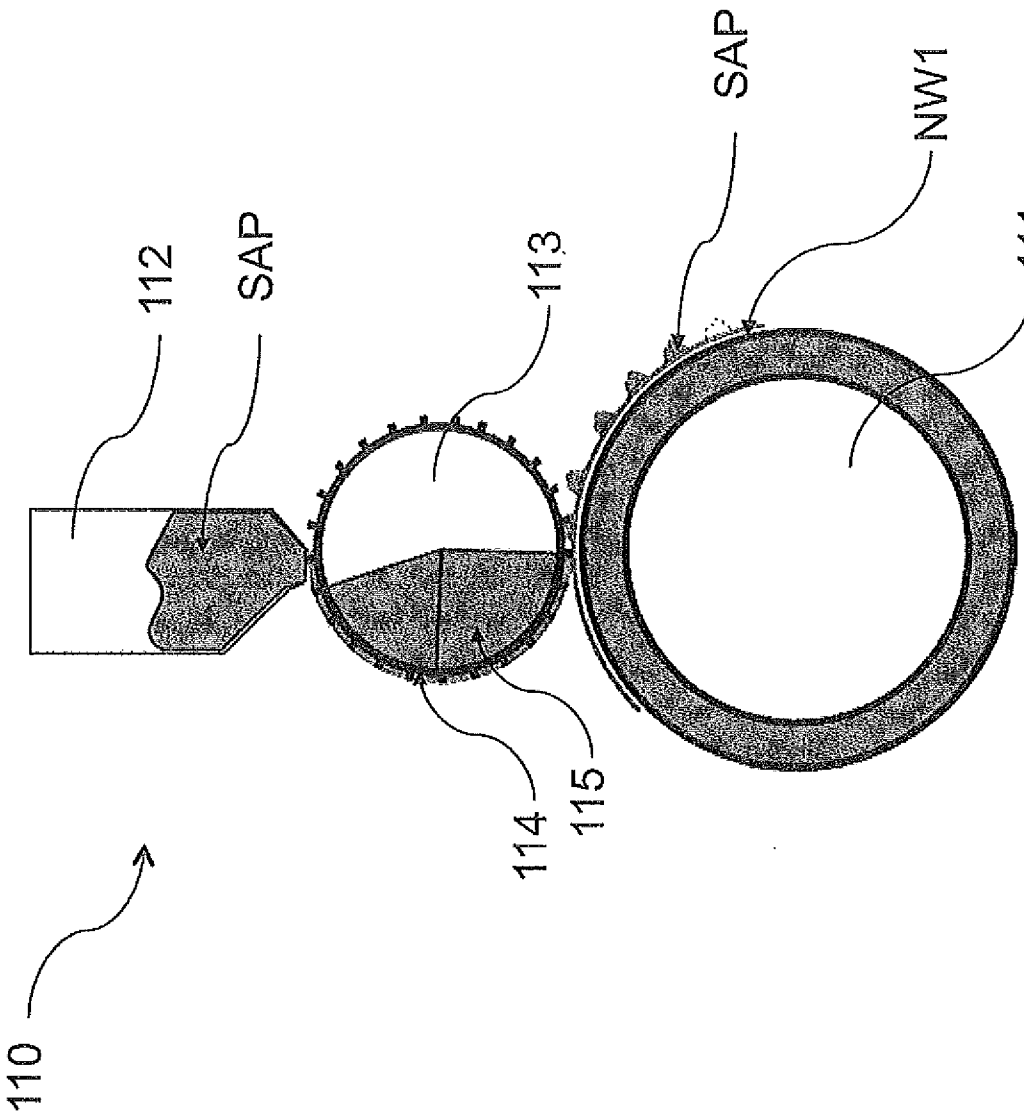

Fig. 1

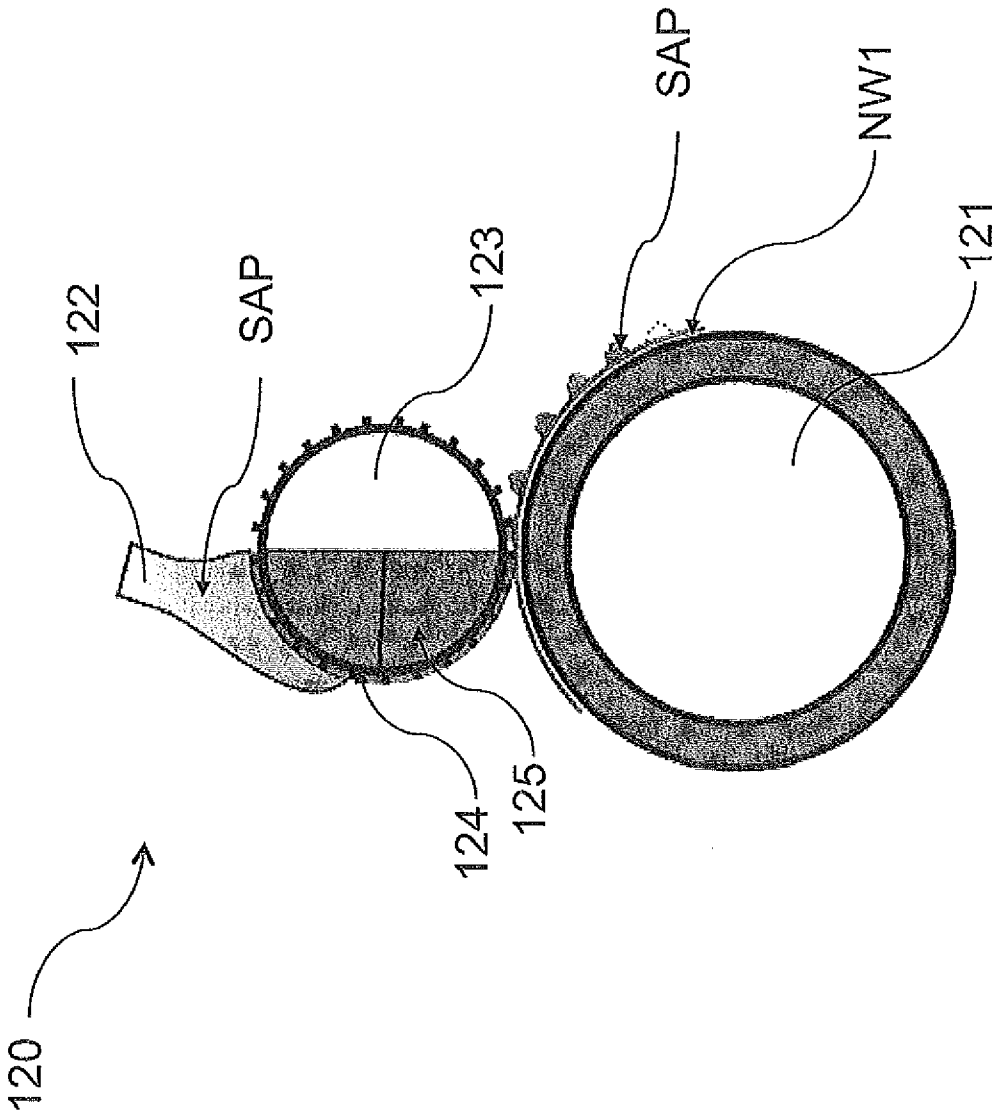

Fig. 2a

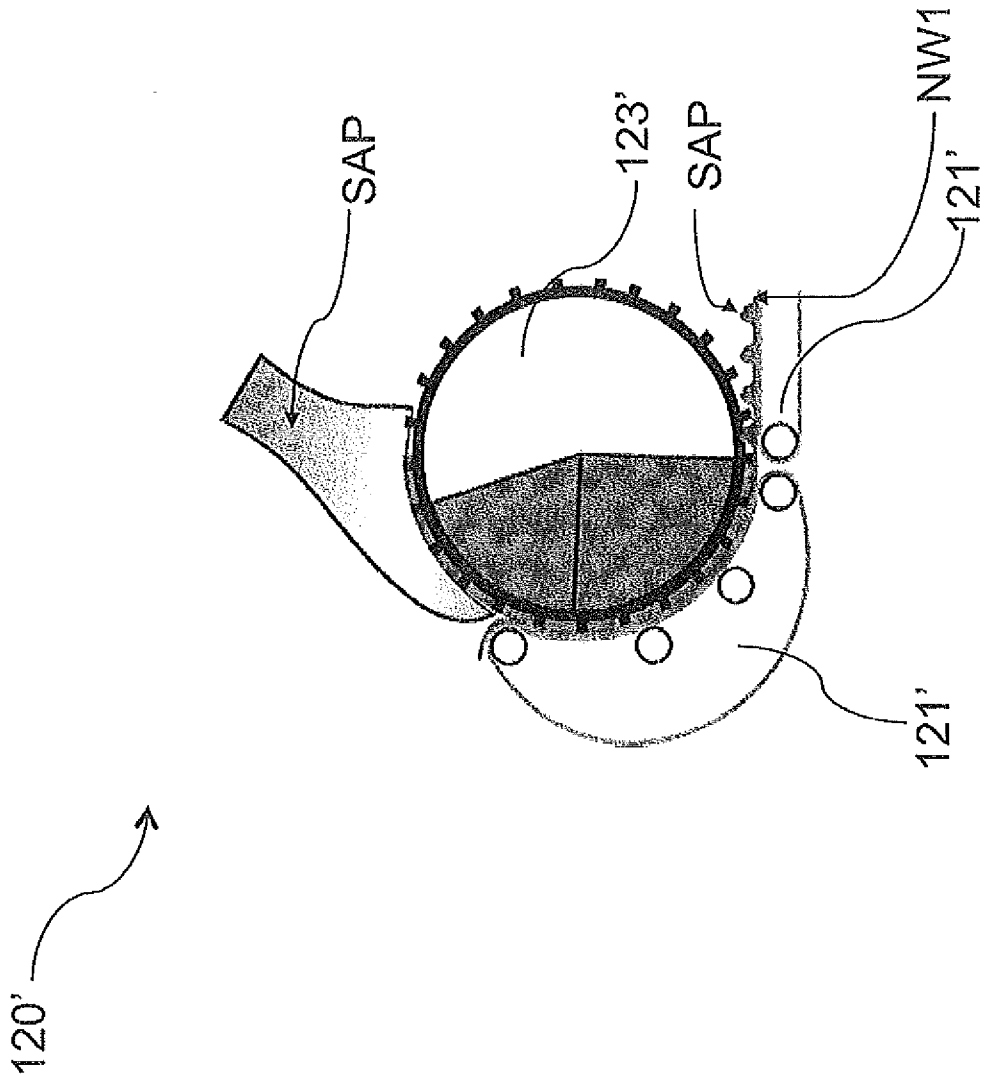

Fig. 2b

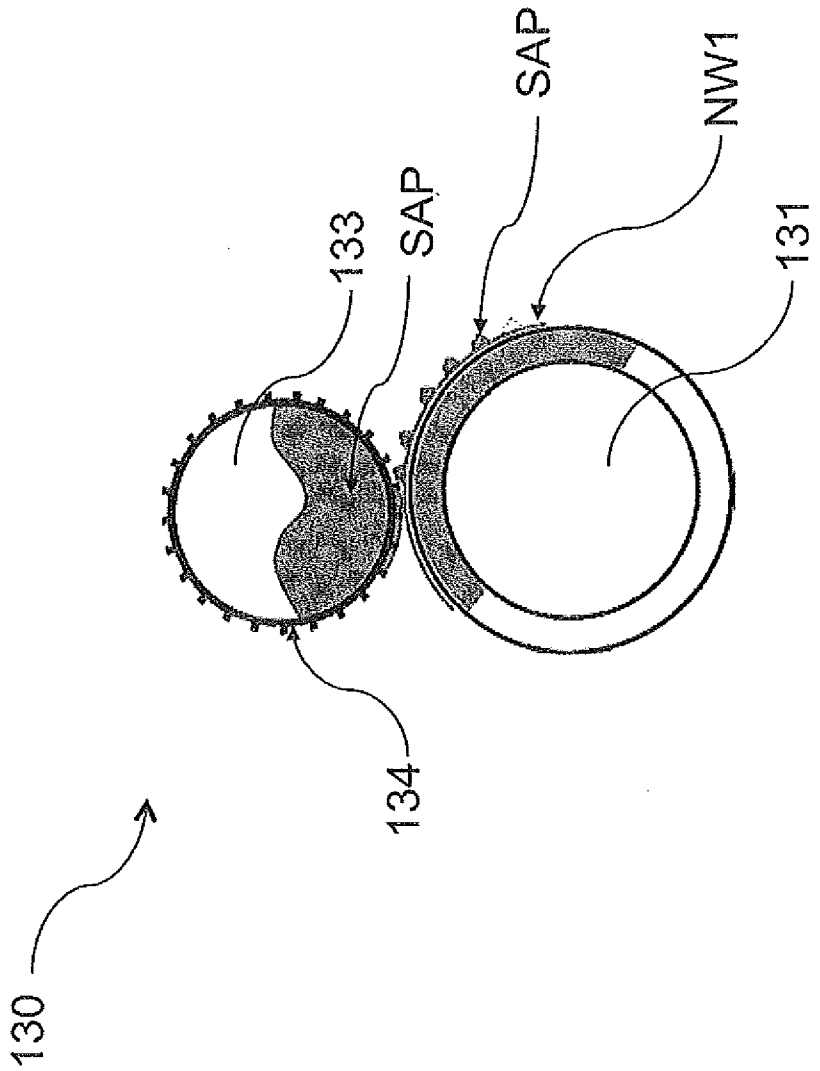

Fig. 3a

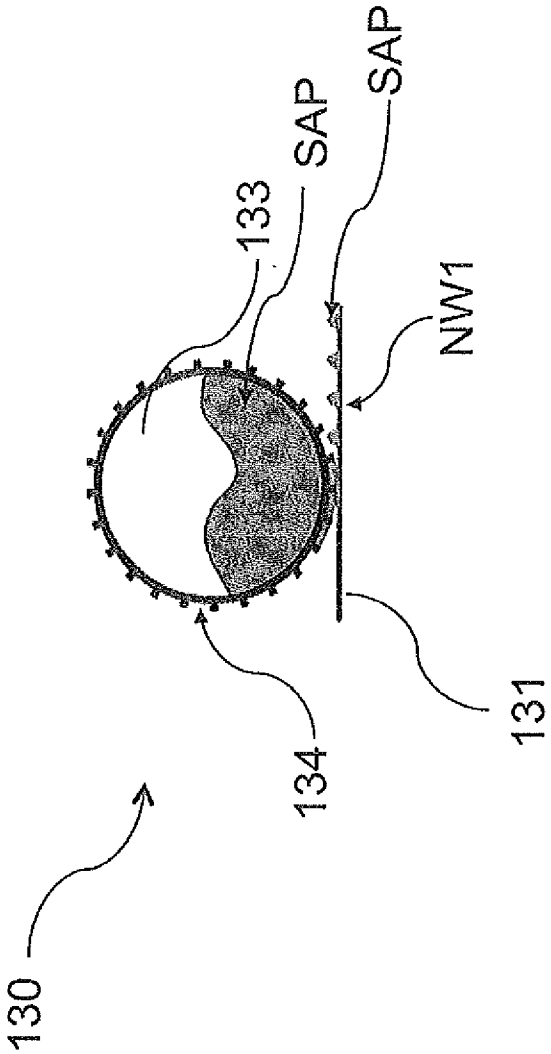

Fig. 3b

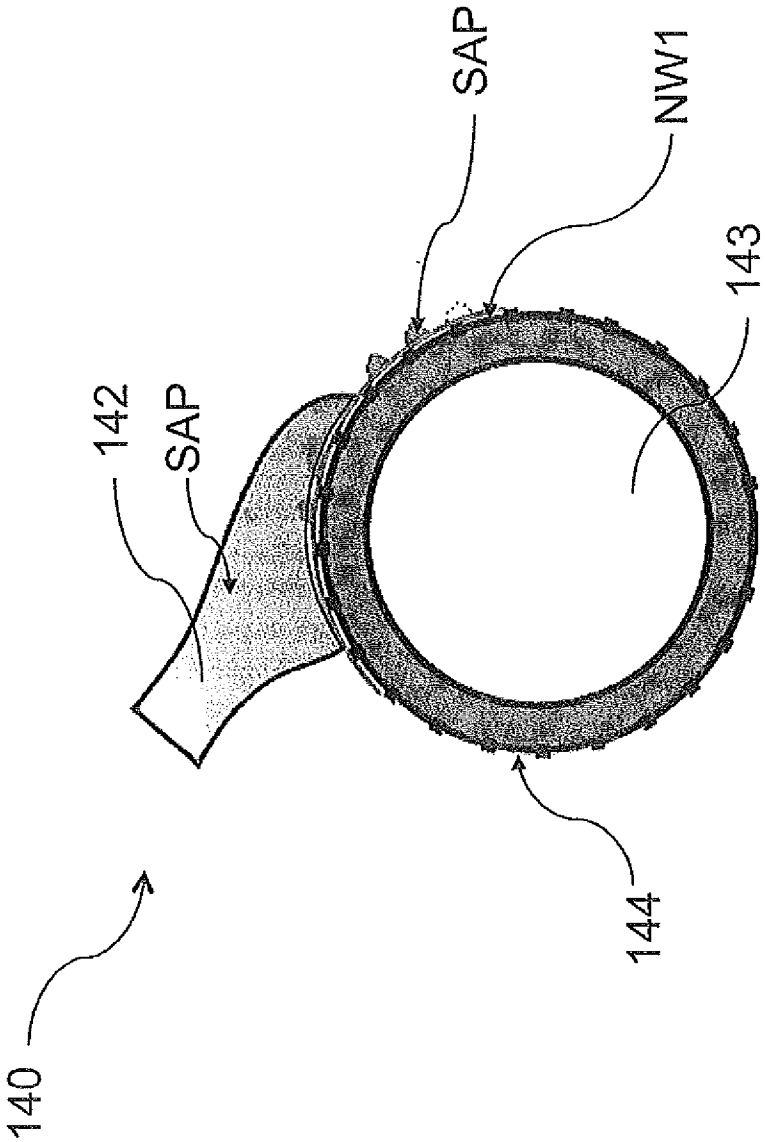

Fig. 4

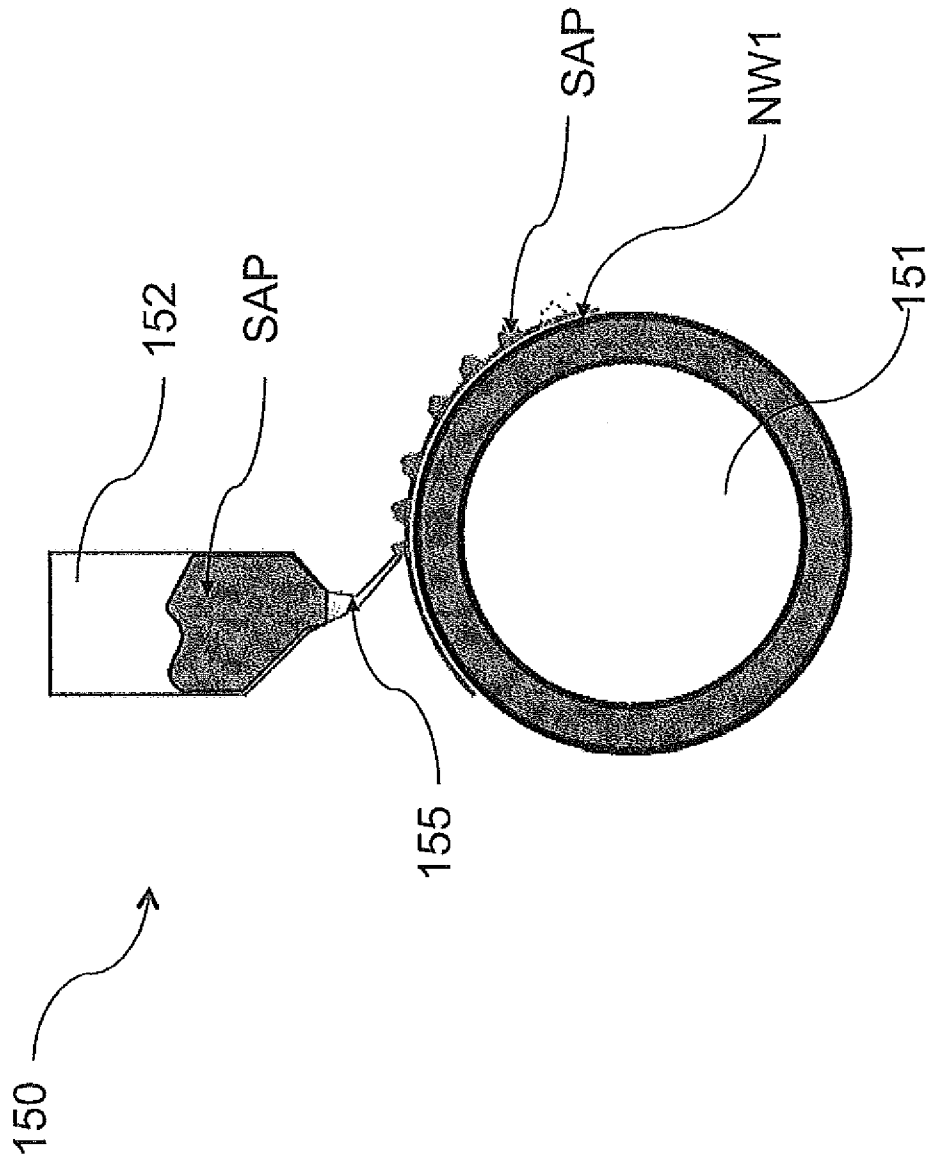

Fig. 5a

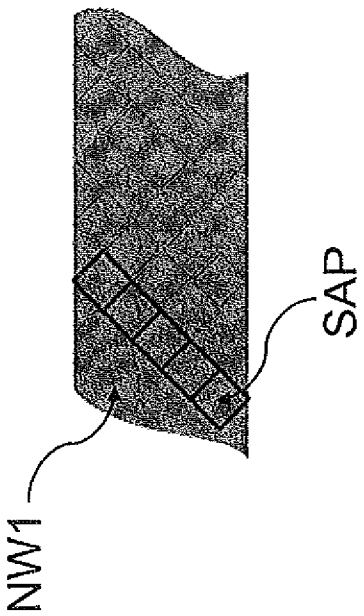

Fig. 5b

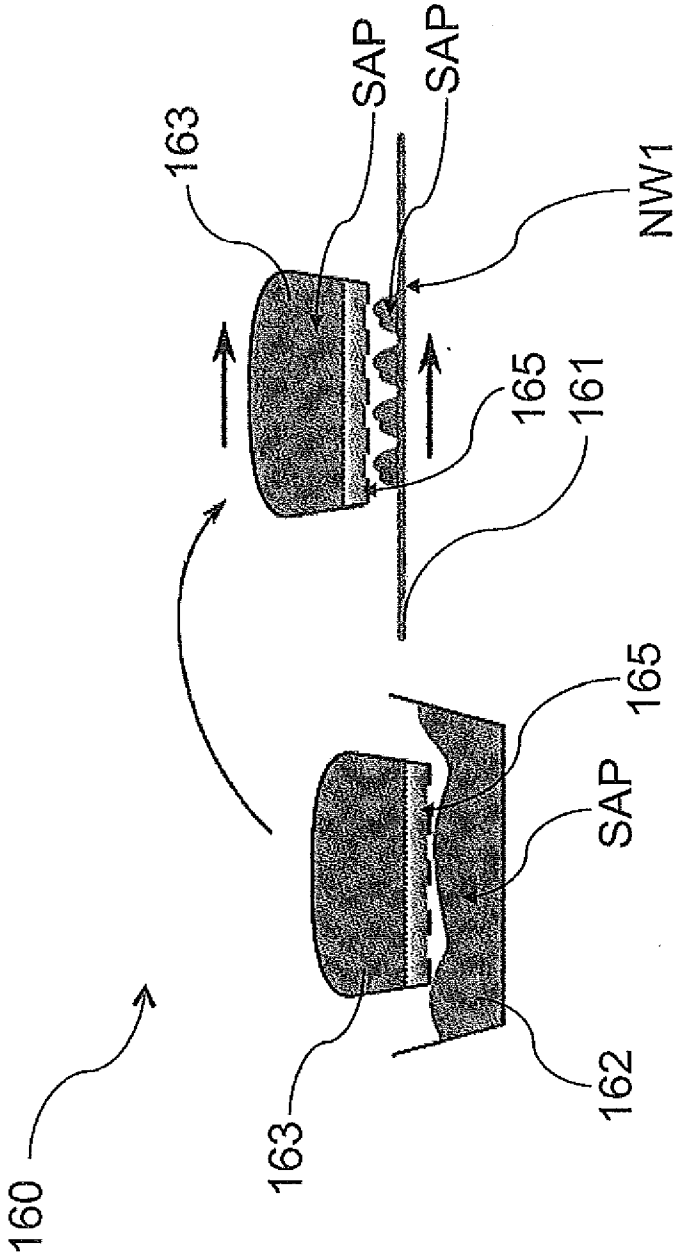

Fig. 6b

Fig. 6a

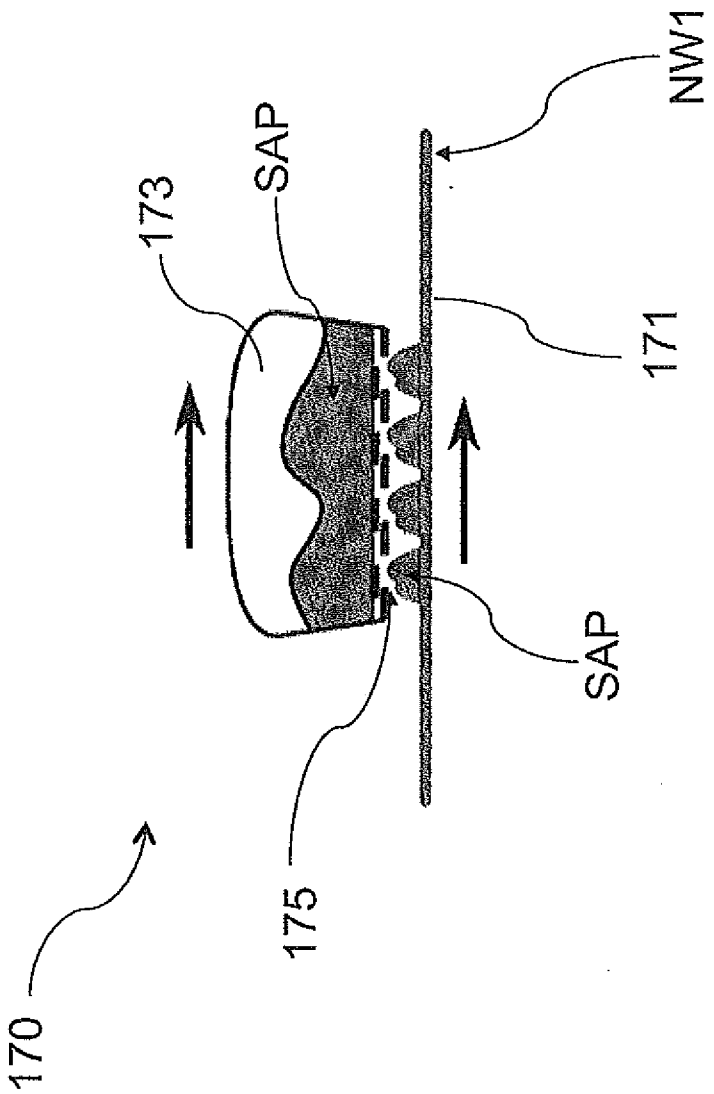

Fig. 7

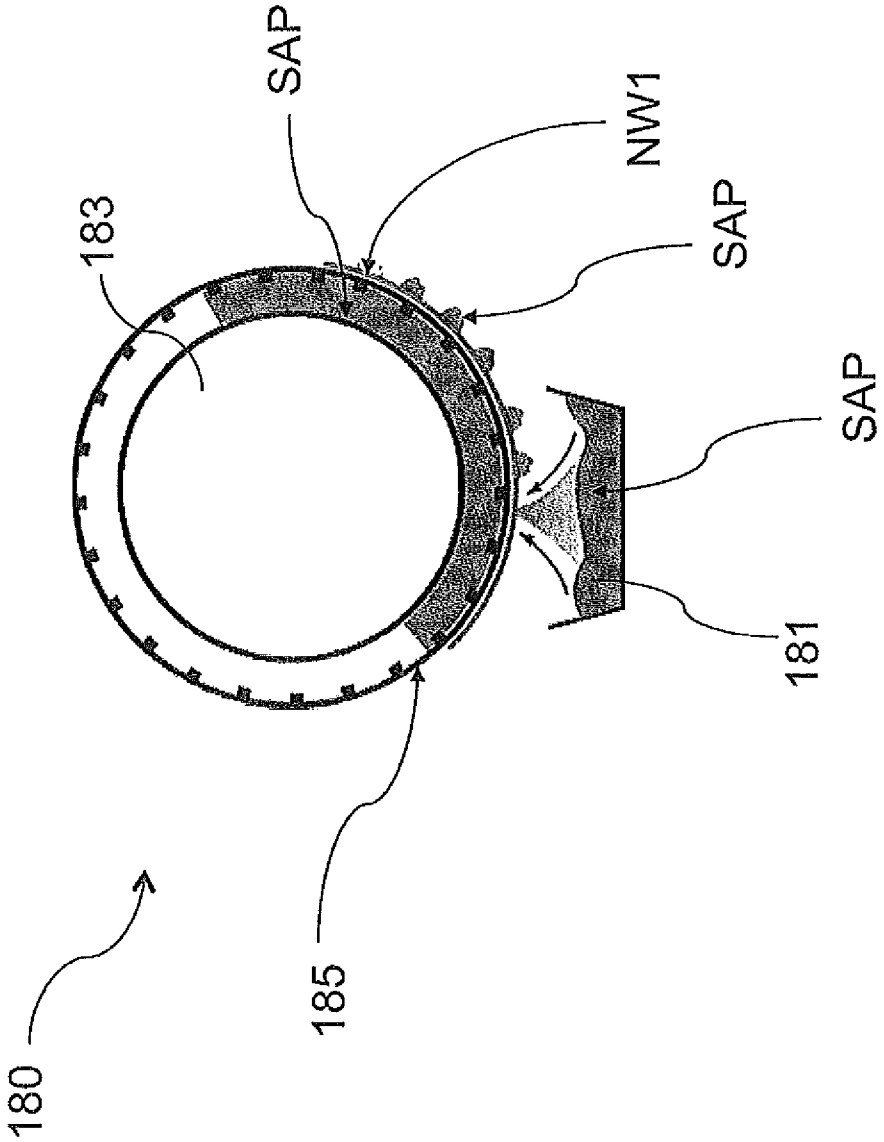

Fig. 8

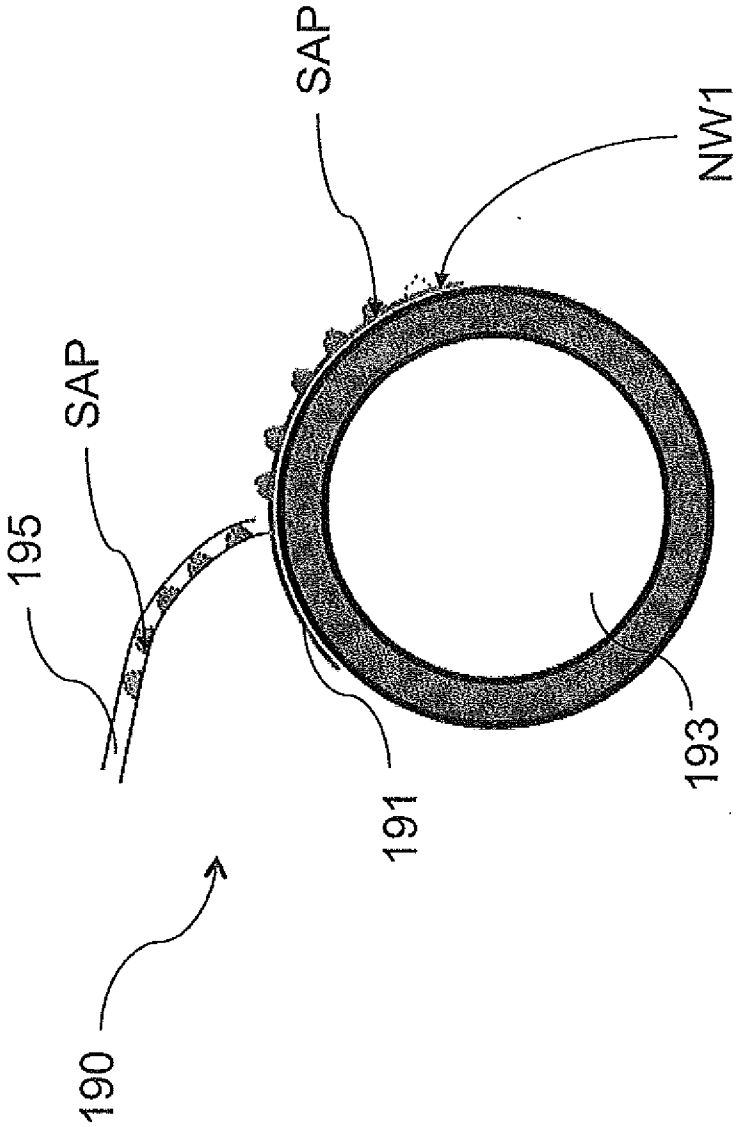

Fig. 9

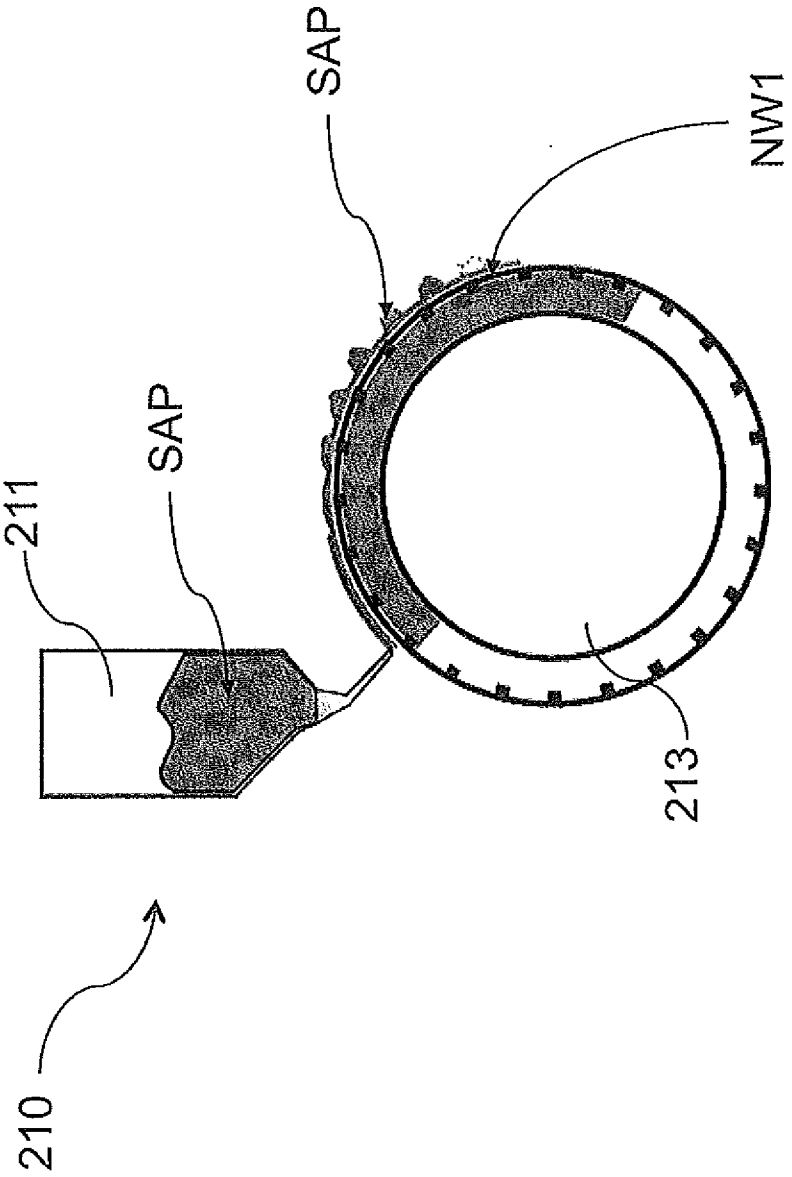

Fig. 10

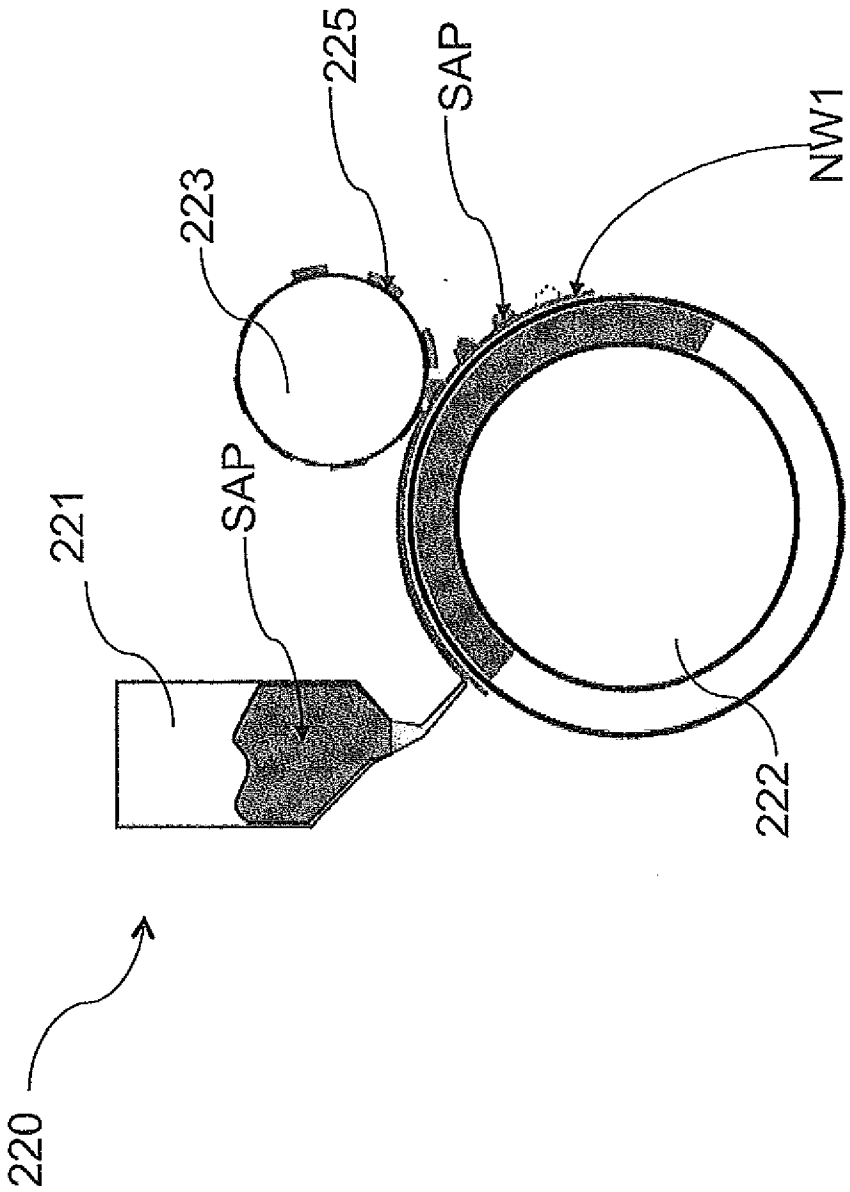

Fig. 11a

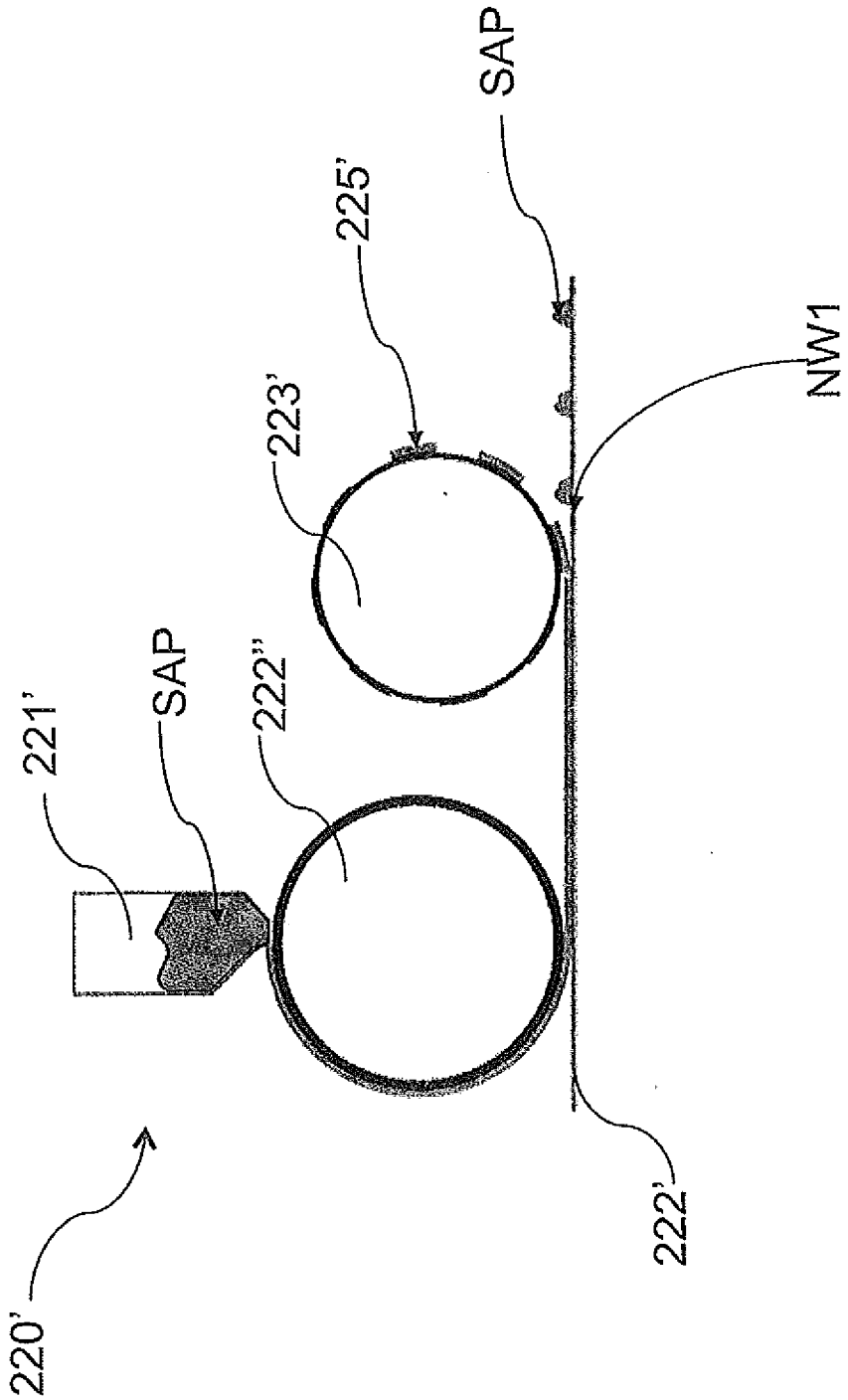

Fig. 11b

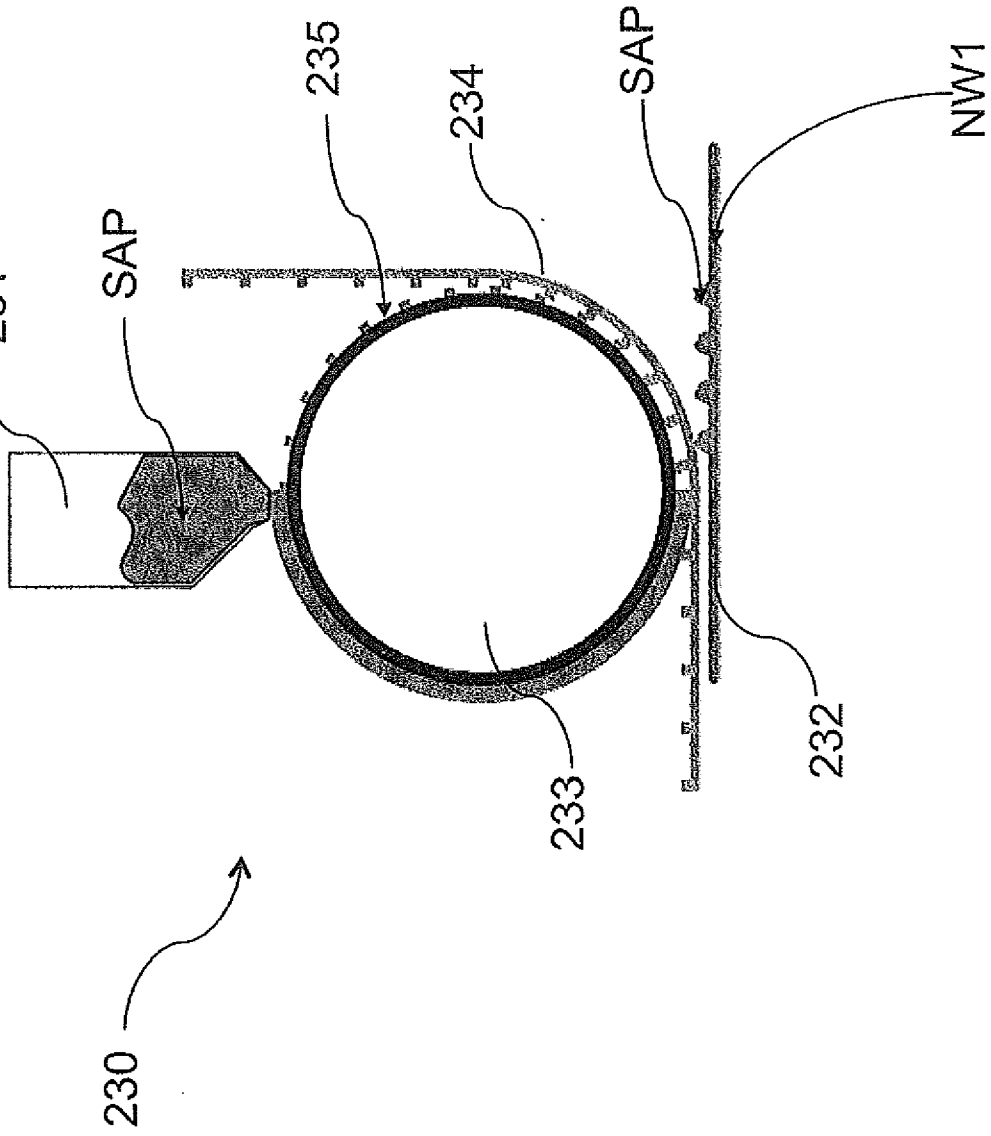

Fig. 12

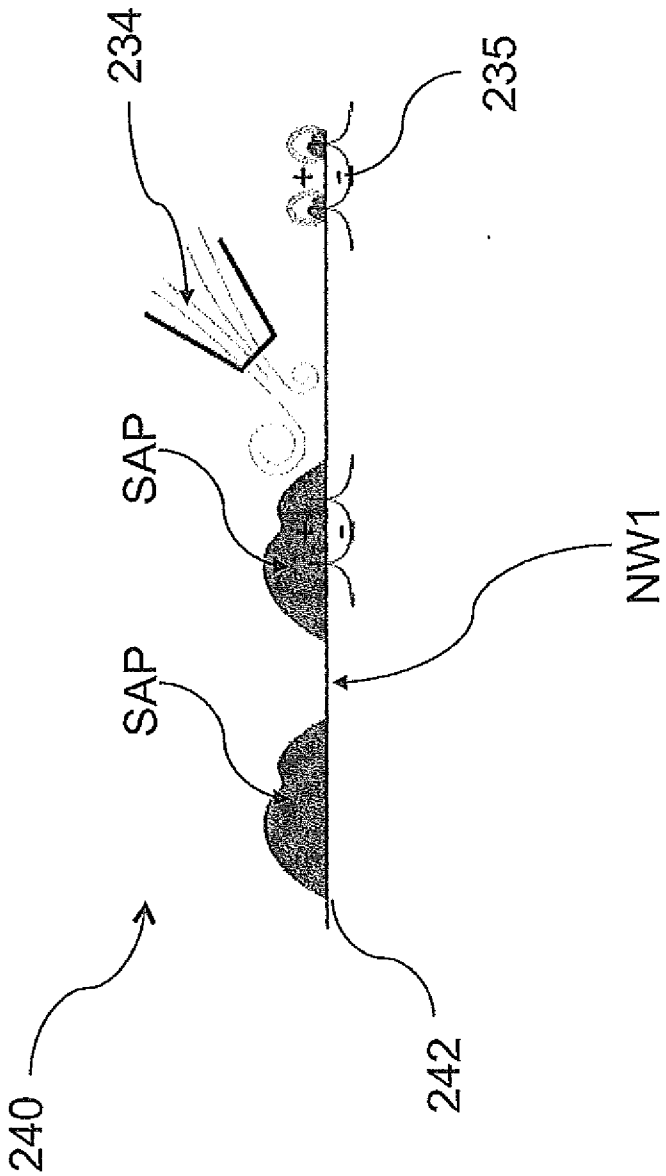

Fig. 13a

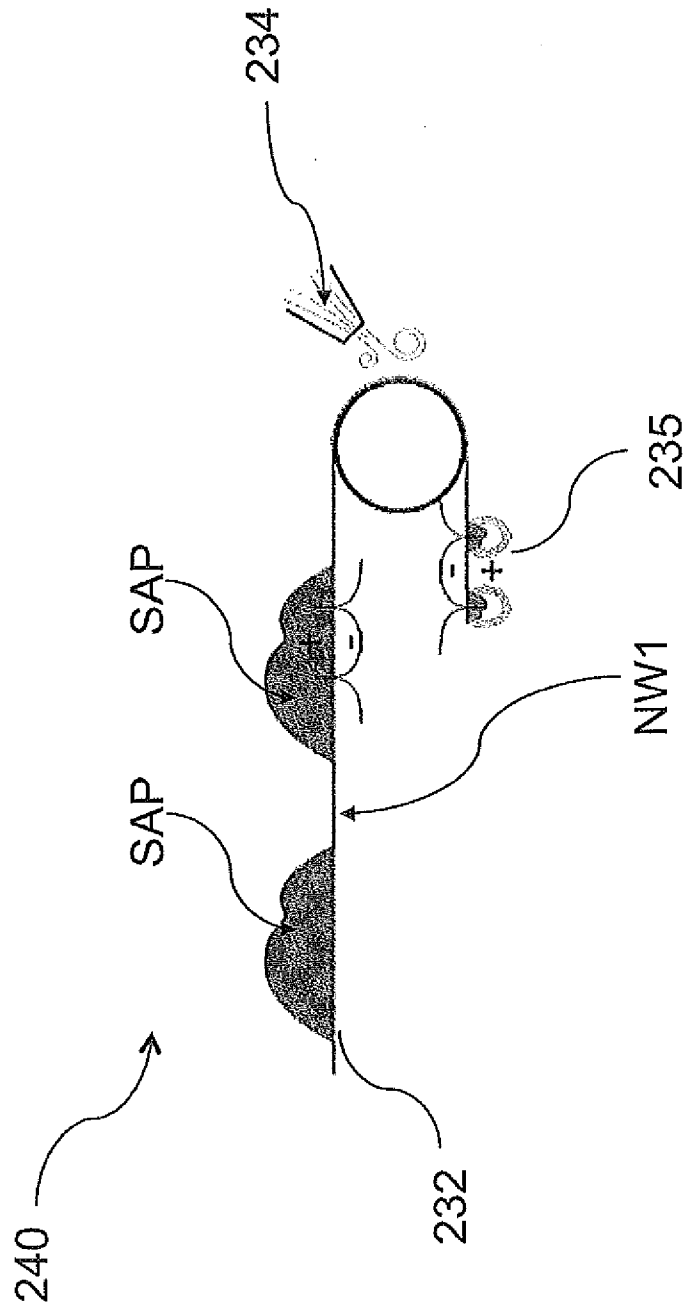

Fig. 13b

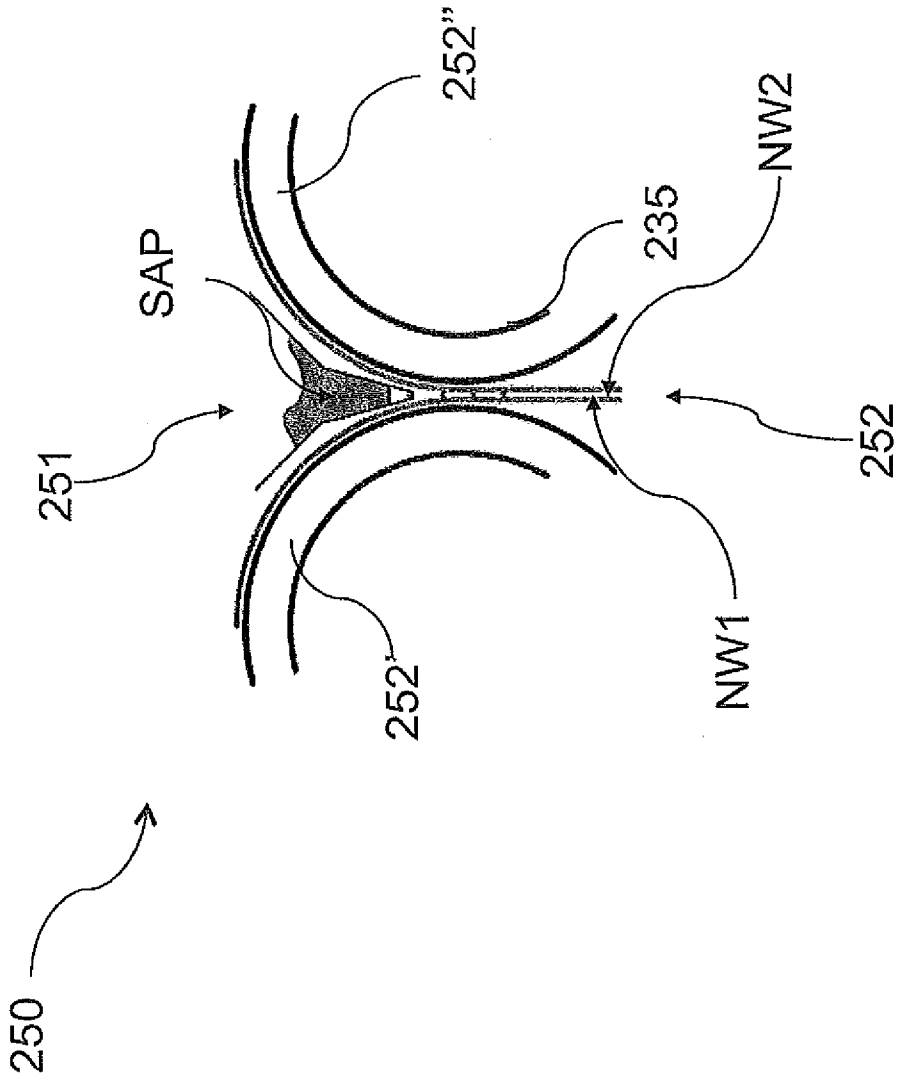

Fig. 14a

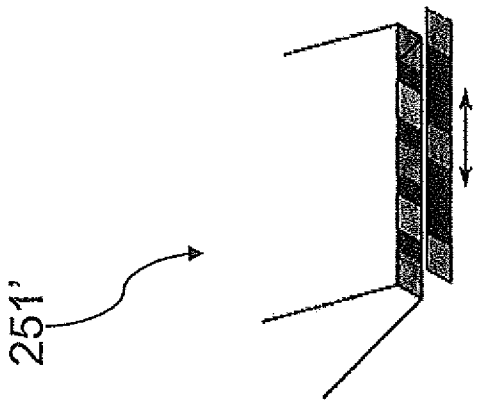

Fig. 14b

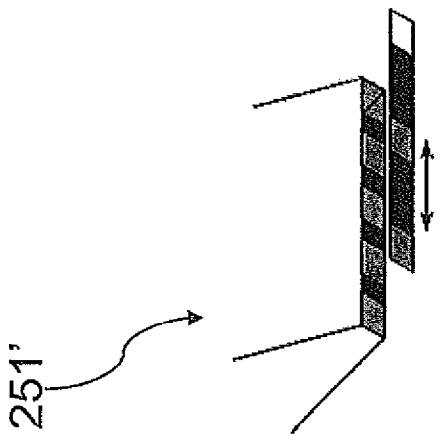

Fig. 14c

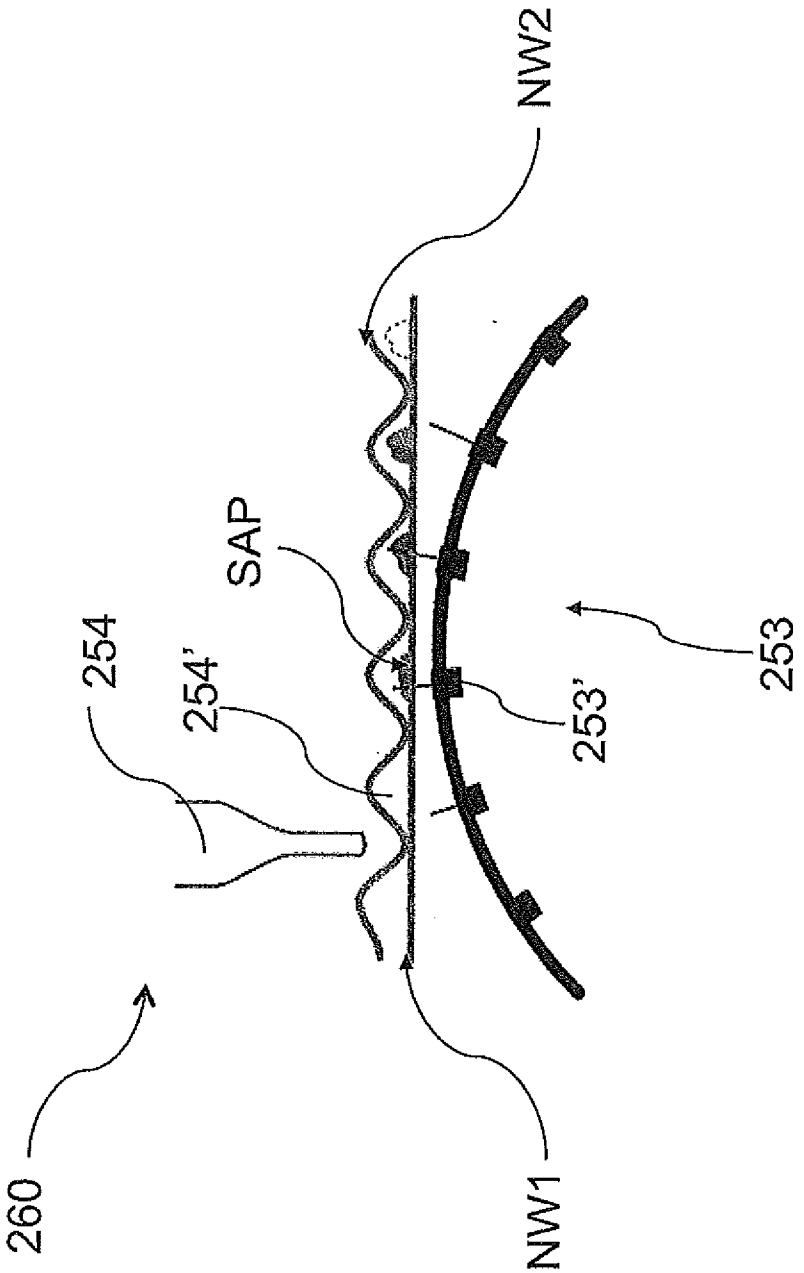

Fig. 15

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2014/061392

A. CLASSIFICATION OF SUBJECT MATTER
INV. A61F13/15 B05B7/14
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A61F B05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 412 346 A1 (UNI CHARM CORP [JP]) 1 February 2012 (2012-02-01) paragraphs [0025] - [0053]; figures -----	1,6
X	EP 1 621 165 A1 (PROCTER & GAMBLE [US]) 1 February 2006 (2006-02-01) paragraphs [0018] - [0040]; figures -----	1,6

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
15 July 2014	08/10/2014

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Boccignone, Magda

INTERNATIONAL SEARCH REPORT

International application No.
PCT/IB2014/061392

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1, 6

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.

☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1, 6

machine for making absorbent articles comprising a feeding unit upstream of feeding means and comprising metering means with a plurality of cavities

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2. claim: 2

machine for making absorbent articles comprising metering means downstream of a feeding unit; wherein the feeding unit is provided with pneumatic means

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3. claim: 3

machine for making absorbent articles comprising a feeding unit provided with at least an intermittent metering

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4. claim: 4

machine for making absorbent articles comprising metering means providing a predefined pattern of SAP

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5. claim: 5

machine for making absorbent articles comprising a depositing station which deposits the SAP as a pre-metered agglomerate

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6. claim: 7

machine for making absorbent articles comprising a feeding unit upstream of feeding means; transferring means provided with a plurality of cavities; metering means interposed between said transferring means and the first web

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7. claim: 8

machine for making absorbent articles comprosing a feeding unit; first and second metering means

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8. claim: 9

machine for making absorbent article having a metering and depositing station comprising a storing and feeding unit

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FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

9. claim: 10

machine for making absorbent article which has a joining station which provides a plurality of empty pockets

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IB2014/061392

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