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(54) **PROCESS FOR PRODUCING A NONWOVEN MATERIAL, PLANT FOR IMPLEMENTING IT AND NONWOVEN THUS OBTAINED**

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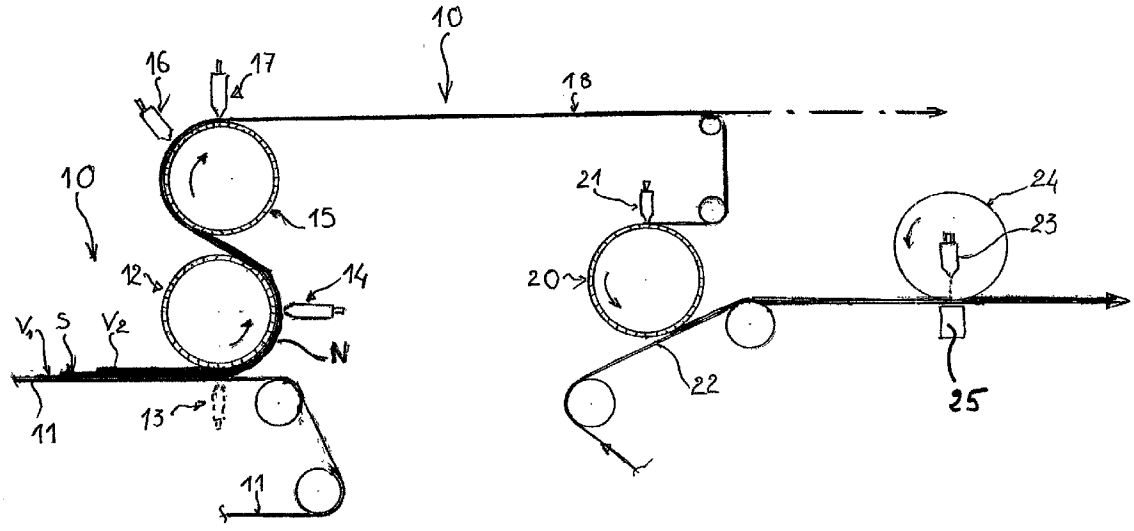
(57) **ABSTRACT**

This invention concerns a method and an installation for producing a spunbonded fabric, characterized in that it consists in: producing a spunbonded lap (**5**) against the surface of which is delivered at least a web (**V1** and/or **V2**) of discontinuous fibers, obtained by carding. The formed complex is compacted by pressing and is continuously transferred onto a line (**10**) for water jet binding treatment, driving the fibers in the direction of thickness, the fibers which are bound together like a splice between and around the continuous filaments while remaining visible at the surface. After drying, the final product is obtained.



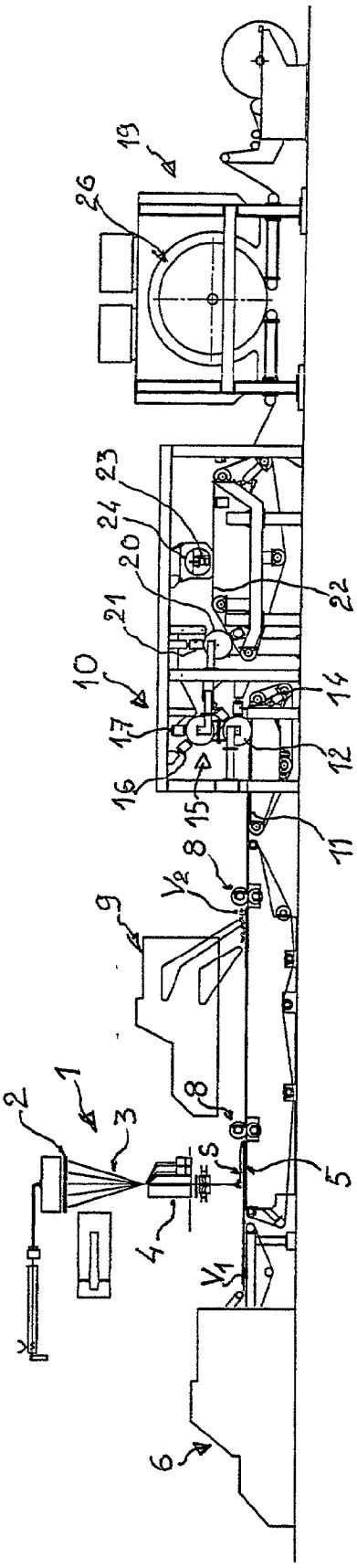
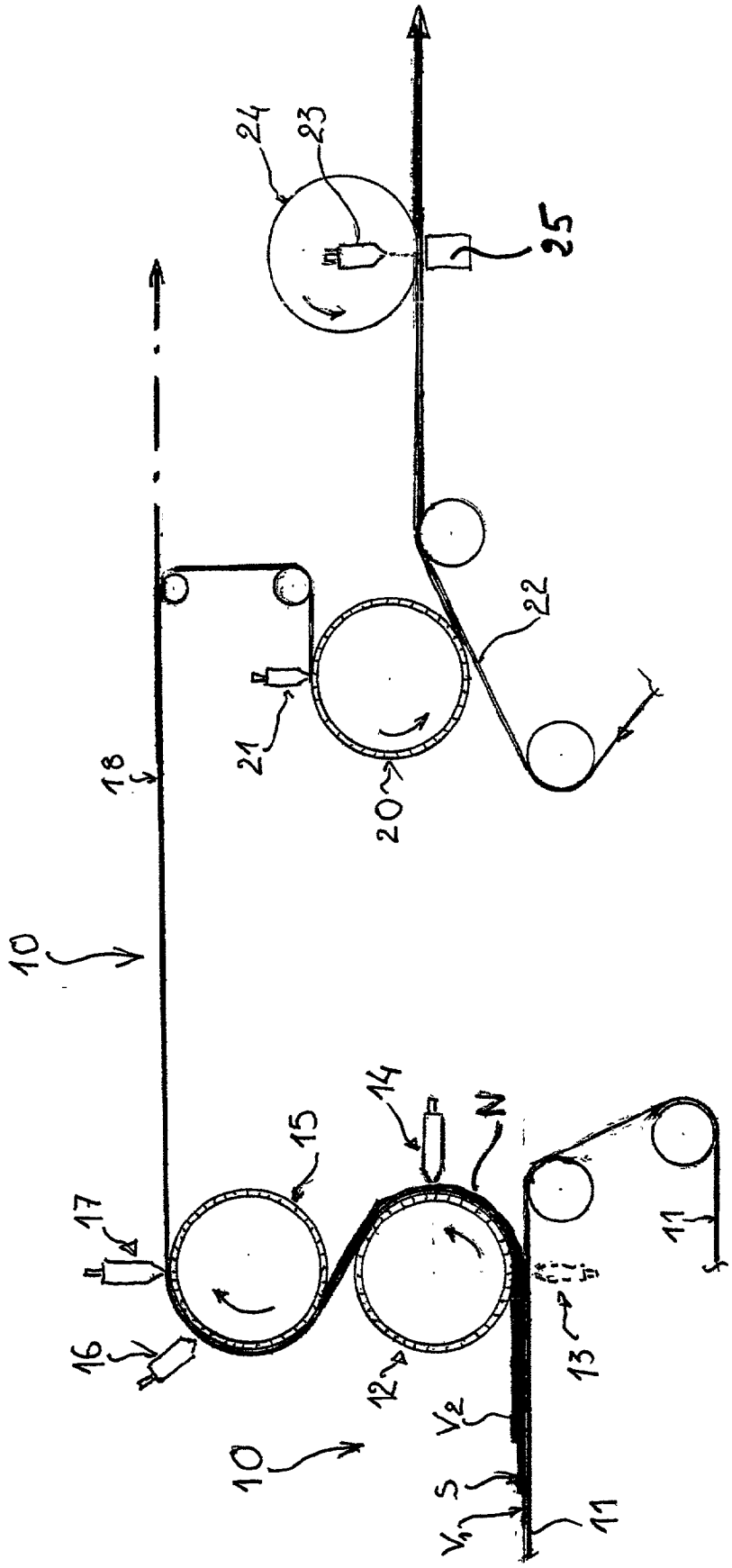


FIG.1

FIG.2



PROCESS FOR PRODUCING A NONWOVEN MATERIAL, PLANT FOR IMPLEMENTING IT AND NONWOVEN THUS OBTAINED

TECHNICAL FIELD

[0001] For decades proposals have been made to replace conventional textile webs (wovens and knits) with structures called "nonwovens" which, in general, may be classified in three broad categories, resulting from their actual manufacturing process, namely:

[0002] those called "wet-formed" nonwovens, produced using a technology similar to the manufacture of paper;

[0003] those called "dry-formed nonwovens, consisting of discontinuous, natural or chemical fibers obtained by carding, napping or any other textile preparation equipment;

[0004] those called "melt-formed" nonwovens, consisting of continuous chemical filaments and usually referred to by the generic name of "spunbond".

[0005] The present invention relates to a way of improving the technology for producing such nonwoven webs of "spunbond" type and relates more specifically to a process, a plant and a novel type of product obtained by implementing these means, which product has the appearance and the properties, such as the handle, mechanical properties and pliancy, similar to those of a conventional, especially woven, textile.

PRIOR ART

[0006] The production of nonwoven webs of "spunbond" type goes back decades, as is apparent, for example, from patents GB-A-932 482 and U.S. Pat. No. 3,286,896, which are among the earliest documents describing this.

[0007] In general, such a technique consists in:

[0008] extruding an organic polymer melt, or even solution, through a spinneret drilled with holes, so as to form a bundle or curtain of filaments;

[0009] then orienting the extruded filaments, by drawing them by means of one or more devices producing fluid jets, especially compressed-air jets; and

[0010] finally, collecting the bundle of filaments in the form of a web on a moving conveyor belt, which is in general subjected to suction and the speed of which is set according to the characteristics, especially the grammage, that it is desired to obtain.

[0011] After production, and in general in a continuous manner, the web is consolidated, for example by sizing or calendering, preferably hot, so that the individual filaments are bonded together.

[0012] Consequently, such "spunbond" nonwovens, which have very good mechanical properties, equivalent to conventional fabrics, have been widely developed in many technical sectors, for example for the purpose of using them as coating substrates, as reinforcing elements of complexes, especially those used for producing laminates, technical products such as membranes, as anticontamination layers in the field of civil engineering, for many applications as geotextiles, etc.

[0013] By contrast, their use in the field of conventional textile applications, such as clothing, disposable garments, wiping materials, furnishing, interior textiles, etc., has not been developed since bonding by calendering, which causes partial thermal bonding of the fibers, without degrading the mechanical properties of the product, does however destroy the pliancy, the handle and the textile appearance.

[0014] Within the context of the consolidation of "spunbond"

[0015] webs, in addition to a treatment by sizing or calendering as mentioned above, it has also been envisaged to make such webs undergo a needle-punching treatment, either conventionally by means of barbed needles, or by fluid jets.

[0016] Such treatments are frequently used when it is desired to produce complexes consisting of a superposition of discontinuous fibrous webs, possibly including an internal reinforcement, such as a unidirectional or bidirectional woven, knit or web consisting of one or more series of parallel or nonparallel yarns.

[0017] On the other hand, at least to the knowledge of the Applicant, these needle-punching techniques have never been proposed for the purpose of solving the problem of the consolidation of a "spunbond" web as such, while still giving such a web the characteristics of conventional textiles, namely pliancy, handle, etc.

[0018] This is because if a needle-punching treatment using barbed needles were to be applied to a "spunbond" web alone, this might result in the continuous filaments of which such a web is composed being broken and, consequently, this may degrade the mechanical properties, which are one of the main advantages of such materials.

[0019] With regard to the use of a conventional bonding treatment using fluid jets, especially water jets, such a technology has not been adapted since it is well known that, in such spunbond webs consisting of continuous filaments the latter are difficult to move with respect to one another. As a consequence, it is virtually impossible to envisage obtaining, using such a technology, a "spunbond" web having a level of cohesion comparable to that obtained by calendering, and to do so without impairing the mechanical properties of the material.

SUMMARY OF THE INVENTION

[0020] An improved process has now been found, and it is this which forms the subject of the present invention, for producing such "spunbond"-type nonwoven webs which are perfectly bonded, exhibit high mechanical properties (tensile strength, tear strength, etc.) equivalent to "spunbond" webs consolidated by hot calendering, and which moreover have the appearance, handle and pliancy of a conventional textile, such as a woven.

[0021] In general, the process according to the invention for obtaining a nonwoven of "spunbond" type having the appearance and the properties of a conventional textile, consists in continuously:

[0022] producing a web of "spunbond" type, the bundle of continuous filaments, which is extruded and drawn, being collected in the form of a non-bonded web on a moving conveyor belt;

[0023] delivering, against at least one face of the "spunbond" web thus formed, a sheet of natural and/or artificial and/or synthetic, discontinuous fibers, obtained by carding and having a grammage of between 10 g/m^2 and 50 g/m^2;

[0024] compacting the complex thus formed by pressing it;

[0025] transferring, still continuously, said complex onto a treatment line for bonding it by means of water jets which act against the surface or surfaces of the complex consisting of discontinuous fibers and entrain said fibers in the thickness direction, which fibers bond together in the manner of a splice between and around the continuous filaments, while still remaining visible on the surface;

[0026] carrying out a drying treatment;

[0027] and then collecting the finished product.

[0028] It should be noted that, in accordance with the invention, before the water-based bonding operation is carried out, a compacting operation is performed by pressing the assembly consisting of the superposition of the discontinuous-fiber layer or layers which cover or sandwich the "spunbond" web produced.

[0029] Such compacting, which may be carried out by any suitable means, such as in particular by means of a press roll, can in no way be likened to a calendering operation given that it is carried out cold.

[0030] In accordance with the invention, a single sheet of discontinuous fibers may be combined with the "spunbond"-type web, it being possible for said sheet of discontinuous fibers to be delivered either upstream of the zone in which the "spunbond" web is formed and to be taken onto the conveyor belt on which the filaments coming from the "spunbond" plant are deposited, which filaments are therefore distributed over the surface of this sheet, or delivered downstream of the zone in which the web of continuous filaments is formed.

[0031] According to one actual embodiment, the web of "spunbond" type is covered on both its faces with a sheet of discontinuous fibers, one sheet being produced upstream of the zone in which the "spunbond" web is formed and the other sheet being produced downstream, the web of continuous fibers therefore being sandwiched between the two sheets of discontinuous fibers.

[0032] In such a case, the complex, consisting therefore of three layers, is, after compacting by pressing, transferred, still continuously, onto a treatment line for bonding it by means of water jets, which jets act successively against the surfaces of said complexes and entrain the discontinuous fibers in the thickness direction, which fibers bond together in the manner of a splice between and around the continuous filaments, while still being visible on both external faces.

[0033] Moreover, after the water-jet bonding operation and before drying, it is possible to carry out a complementary "textiling" treatment (carried out for example in accordance with the teachings of the patent EP-059 608), consisting in transferring the bonded complex onto a conveyor made of a coarse fabric and in subjecting the web to the action of water jets which are obtained by means of a unit essentially comprising a perforated rotary drum inside which an injector fed with pressurized water is placed, this unit producing jets which reorient the fibers, a suction unit for removing the water being provided beneath the conveyor.

[0034] The invention also relates to a plant allowing the aforementioned process to be implemented continuously.

[0035] In general, such a plant comprises, arranged in line:

[0036] a unit for forming, on a conveyor belt, a web of continuous filaments of "spunbond" type;

[0037] at least one carding machine for delivering, against at least one face of the "spunbond" web produced, a sheet of discontinuous fibers having a grammage of between 10 g/m^2 and 50 g/m^2;

[0038] means for pressing the complex formed, followed by a zone for treatment by means of fluid jets, which act at least against the surface covered with discontinuous fibers and entrain said fibers in the thickness direction, which fibers bond together in the manner of a splice between and around the continuous fibers, while still being visible on the surface;

[0039] means for drying and collecting the bonded complex.

[0040] Optionally, such a plant includes, between the water-jet bonding means and the drying means, a textiling unit producing jets which reorient the fibers.

[0041] Compared with the "spunbond" webs produced previously, the article obtained is characterized in that the continuous filaments of which it is composed are combined with discontinuous fibers, which fibers cover the continuous-filament-based web and penetrate the interior of the latter, by becoming bonded around said filaments.

[0042] Such a product retains all the mechanical strength characteristics of conventional spunbond webs whose cohesion is given by a calendering treatment, the product obtained also having properties, such as handle and pliancy, and an appearance which are comparable to a conventional textile.

[0043] It should be noted that the discontinuous fibers, which are combined with the spunbond web, may be of any type, natural or chemical, hydrophobic or hydrophilic, depending on the applications for which the product is intended, the length of said fibers being between 5 mm and 60 mm and their titer being between 0.8 dtex and 6.6 dtex.

[0044] With regard to the grammage of the sheets(s) of discontinuous fibers which are combined with the spunbond web, this may vary depending on the applications but will advantageously be between 10 g/m^2 and 50 g/m^2, a sheet having a grammage of less than 10 g/m^2 not allowing the spunbond web to be correctly bonded, whereas a sheet

having a grammage greater than 50 g/m2 reduces the economic benefit of the process.

BRIEF DESCRIPTION OF THE DRAWINGS

[0045] The invention and the advantages that it affords will however be more clearly understood thanks to the following description which is illustrated by the appended figures in which:

[0046] **FIG. 1** illustrates, seen from the side, an entire production line for implementing the process according to the invention;

[0047] **FIG. 2** is also a side view, showing in greater detail the way in which the bonding operation is carried out by means of water jets and the optional complementary textiling treatment.

MANNER OF REALIZING THE INVENTION

[0048] With reference to the appended figures, the invention therefore relates to a process and a plant which make it possible to produce, in a continuous manner, a novel type of "spunbond" web consisting of continuous synthetic filaments, which web not only retains the mechanical strength properties (elongation, tensile strength, tear strength, etc.) equivalent to conventional "spunbond" webs consolidated by hot calendering but which also exhibit the appearance, handle and pliancy of a conventional textile such as a woven.

[0049] In accordance with the invention, a nonwoven web of "spunbond" type is produced, on a plant denoted by the overall reference (1), using the conventional technique consisting in extruding an organic polymer melt through a spinneret (2) drilled with holes so as to form a bundle or curtain of filaments (3).

[0050] After cooling, allowing the extruded filaments (3) to undergo at least surface solidification, said filaments are oriented and drawn by means of one or more fluid-jet devices (4) and, on leaving the latter, they are distributed in the form of a web (S) over a collecting surface.

[0051] In accordance with the invention, in order to consolidate the "spunbond" web (S) thus formed and give this web cohesion and high mechanical properties, namely tensile strength and tear strength, while still giving it the appearance, handle and pliancy of a conventional textile, the "spunbond" web (S) is collected not directly at the surface of a conveyor belt (5) subjected to suction but on a sheet (V1) of discontinuous fibers—natural and/or artificial and/or synthetic fibers—which is produced immediately upstream of the "spunbond" plant (1).

[0052] This sheet (V1) is, for example, produced by means of a conventional unit (6) consisting of a carding machine optionally combined with a card web spreader unit, the sheet (V1) produced being delivered onto the conveyor belt (5) of the "spunbond" plant by a feed unit also consisting of a conveyor belt (7).

[0053] The two superposed textile layers (V1) and (S) then pass, still being held on the conveyor belt (5), through a first unit (8) consisting, for example, of two rollers allowing said textile layers to be compacted.

[0054] A second sheet (V2) of discontinuous fibers is delivered onto the surface of the spunbond web (S) by means of a second unit (9), such as a carding machine or equivalent machine, the three superposed individual textile layers (V1, S and V2) being again compacted by being pressed between two rollers (8).

[0055] The compacted assembly is then taken, still continuously, onto a treatment line illustrated in greater detail in **FIG. 2** and denoted by the overall reference (10), for subjecting said complex to a bonding treatment by means of water jets which act in succession against the two surfaces of said complex.

[0056] In the embodiment described, such a treatment unit (10) consists of a water-based bonding unit of the "Jetlace 2000" type sold by the Applicant and employing the teachings of FR-A-2 730 246 (U.S. Pat. No. 5,718,022) and FR-A-2 734 285 (U.S. Pat. No. 5,768,756) in the name of the Applicant.

[0057] Such a bonding unit is essentially composed of a conveyor (11) along which the fibrous structure consisting of the three superposed layers (V1, S and V2), is transferred.

[0058] Thus, as is more particularly apparent from **FIG. 2**, the structure is compacted between the conveyor (11) and a first suction roll (12), preferably coated with a microperforated jacket whose holes are arranged randomly, as described in French patent 2 734 285.

[0059] In another embodiment, this roll may be coated with a metal wire mesh.

[0060] Optionally, in the compacting zone between the surface of the conveyor (11) and that of the roll (12), the complex web (V1/S/V2), denoted in the rest of the description by the reference (N), may receive a first wetting treatment by means of a spray rail (13), illustrated in dotted lines in **FIG. 2**, which delivers a curtain of water which passes through the conveyor belt (11) and through the superposed webs.

[0061] However, such a wetting operation is not essential.

[0062] The compacted complex, supported by the suction drum (12), is then subjected to the action of water jets coming from an injector (14), the jets therefore acting against the surface consisting of the fibrous sheet (V1) and forcing the constituent fibers of this sheet into the complex.

[0063] The spray rail or injector (14) placed parallel to a generatrix of the roll (12) is a conventional spray rail which is used to create water jets or needles having a diameter of 100 to 170 microns, the jets being spaced apart by a distance of between 0.5 and 2.2 mm, the feed pressure itself being between 50 and 150 bar depending on the grammage of the complex.

[0064] Optionally, it may be envisaged to carry out a second jet treatment on this first roll (12) by means of a second injector.

[0065] On leaving this roll (12), the treated complex is taken onto the surface of a second roll (15), identical to the previous suction roll, which is associated with one or two series of injectors (16, 17) delivering water jets which therefore act on the face of the web (N) consisting of the sheet (V2).

[0066] During this second consolidation treatment, the rails (16, 17) create water jets or needles having a diameter

of 100 to 170 microns, said jets being spaced apart as previously by between 0.5 and 2.4 mm, and the feed pressure being between 50 bar and 400 bar.

[0067] The action of the injectors (16, 17) therefore allows the fibers of the sheet (V1) to be entrained into the thickness of the web (N), said fibers surrounding the continuous filaments and bonding to them.

[0068] On leaving this unit, the spun-bonded web, denoted by the reference (18) may be taken directly into the drying unit (19) by passing over a conventional heating drum (26) before being collected.

[0069] Optionally, and as is apparent in the appended figures, a third water-based bonding treatment may be carried out by means of a third suction drum (20) associated with a rail of injectors (21) whose jets act against the face which consisted of the sheet (V1).

[0070] After the latter treatment, a complementary textiling treatment may optionally be carried out. Such a treatment consists, as is more particularly apparent from FIG. 2, in transferring the "spun"-bonded web (18) onto a unit produced in accordance with, for example, the teachings of the patent EP 059 608.

[0071] In general, such a unit consists of a transporter wire mesh (22) of the "Fourdrinier" type, used in the papermaking field. The spun bond (18), held against this wire, is subjected to the action of a series of water jets obtained by means of a rail (23) spraying a curtain of water against the internal surface of a perforated rotary drum (24), these jets reorienting the fibers.

[0072] A suction unit (25) for removing the water is, of course, provided beneath the conveyor (22).

[0073] By virtue of such a plant, it is possible either to produce complexes in which the "spunbond"-type nonwoven web is combined with two sheets consisting of discontinuous fibers, all the means described above being used, or to produce articles in which the "spunbond"-type web is combined with a single sheet of discontinuous fibers, which can be delivered either upstream or downstream of the zone in which the "spunbond" web is formed.

EXAMPLE 1

[0074] This example describes the production of a complex in which the "spunbond" web is sandwiched between two sheets of discontinuous fibers.

[0075] Such a product was produced in accordance with the invention in the following manner.

[0076] A sheet of fibers (V1), weighing 30 g/m^2 and composed 100% of 1.7 dtex viscose fibers 38 mm in length, was produced by means of a conventional carding machine (6).

[0077] This sheet was produced at a rate of 100 m/minute.

[0078] On leaving the carding machine (6), the sheet (VI) was transferred onto the receiving belt (5) of the plant (1) for producing a "spunbond"-type web (S).

[0079] The "spunbond" web produced was obtained from polypropylene and was spread over the sheet (V1) so as to form a web consisting of filaments having a titer of 1.7 dtex, weighing 40 g/m^2.

[0080] The two superposed layers (V1) and (S) were compressed by means of a press roller unit (8) and a second sheet of fibers (V2), produced in a similar manner to the sheet (V1), weighing 30 g/m^2, was delivered onto the surface of the "spunbond" web (S), the superposed layers then being subjected to a new compacting treatment, also by means of a press roller unit.

[0081] The complex formed was taken continuously onto a treatment line comprising a water-based bonding unit (10) of the "Jetlace 2000" type sold by the Applicant.

[0082] Such a plant basically comprises a conveyor belt (11) and three jet treatment units comprising suction rolls (12, 15, 20) having a diameter of 516 mm and coated with a microperforated jacket whose holes are randomly distributed, as described in French patent 2 634 285. Associated with these suction drums (12, 15, 20) were injector rails (14, 16, 17, 21) which acted against the surfaces of the complex (N) consisting of the superposition of the sheet (V1), the spunbond (S) and the sheet (V2).

[0083] The arrangement of these injectors is such that they act in succession against the opposed faces of the complex (N).

[0084] The rails (14, 16, 17, 21) produced altogether 1666 jets per meter and were controlled in the following manner.

Spray rails	Jet diameter (μm)	Jet velocity (m/s)	Feed pressure (bar)	Speed of the rolls (m/min)
14: jets against V1	120	144	100	12:1.102
16: jets against V2	120	170	150	15:1.102
17: jets against V2	120	220	250	15:1.104
21: jets against V1	120	220	250	20:1.105

[0085] Placed downstream of the final water-based bonding system (20) was a textiling unit consisting of a conveyor belt (22) made in the form of a polyester wire mesh associated with the actual textiling unit, which consisted of a perforated rotary drum (24) inside which an injector (23) fed with water at 150 bar was placed.

[0086] This injector (23) produced water jets 130 μm in diameter which reoriented the fibers. The water coming from the injector (23) was recovered by means of the suction system (25) placed beneath the conveyor (22).

[0087] By carrying out the process under the aforementioned conditions, a web according to the invention was obtained from the plant, which web, after being dried over a heating drum, weighed 95 g/m^2.

[0088] This web was perfectly well bonded and had a high pliancy, a handle, an appearance and mechanical properties comparable to those of a conventional textile of equivalent grammage obtained using fibers of the same type.

EXAMPLE 2

[0089] This example illustrates the implementation of the process according to the invention for producing a structure composed of a "spunbond"-type web combined with a single fibrous sheet which, in this embodiment, was formed upstream of the zone in which the "spunbond"web was formed.

[0090] In accordance with the invention, the process was carried out in the following manner.

[0091] A sheet of fibers (V1) weighing 20 g/m^2 and composed 100% of 1.7 dtex viscose fibers 38 mm in length, was produced by means of a conventional carding machine (6).

[0092] This sheet was produced at a rate of 150 m/min.

[0093] On leaving the carding machine (6), the sheet (V1) was transferred onto the receiving belt (5) of the spunbond unit.

[0094] A spunbond web (S) consisting of polypropylene filaments was deposited on the sheet (V1).

[0095] This 25 g/m^2 spunbond web consisted of 2 dtex filaments.

[0096] The two superposed layers (V1) and (S) were compressed by means of a press roller (8) thus forming a 45 g/m^2 complex which was continuously transferred onto a water-based bonding unit (10) of the "Jetlace 2000" type sold by the Applicant.

[0097] This plant included a conveyor belt (11) and two water-jet treatment units consisting of suction rolls (12) and (15) followed by a final conveyor (22) on which a patterning/textiling device was placed.

[0098] The two rolls (12) and (15) were covered with a microperforated jacket whose holes were randomly arranged, as described in French patent 2 634 285.

[0099] Associated with these rolls were injector rails (14), (16), (17).

[0100] The arrangement of these injectors was such that both faces of the complex were successively acted upon.

[0101] The injectors produced altogether 1666 water jets 120 microns in diameter per meter and the water pressure in these injectors was 60, 80 and 110 bar, respectively.

[0102] The textiling of the complex bonded on the previous rolls was carried out by a perforated drum (23), as described in the previous example, the injector of which was fed at a water pressure of 80 bar.

[0103] After drying, the final product, weighing 45 g/m^2, possessed excellent mechanical properties, superior to those of a spunlace web consisting of fibers of the same type.

[0104] The appearance and pliancy of the web were also noteworthy, these being greatly superior to those of a polypropylene or polyester spunbond of equivalent grammage bonded by calendering.

1. A process for the production of a nonwoven of "spunbond" type having mechanical properties equivalent to spunbond webs consolidated by hot calendering and having the appearance, the handle and the pliancy of a conventional textile, which consists in continuously:

producing a web (S) of "spunbond" type, the bundle of continuous filaments, which is extruded and drawn, being collected in the form of a nonbonded web on a moving conveyor belt;

delivering, against at least one face of the "spunbond" web thus formed, a sheet (V1 and/or V2) consisting of natural and/or artificial and/or synthetic, discontinuous fibers, obtained by carding and having a grammage of between 10 g/m^2 and 50 g/m^2;

compacting the complex thus formed by cold pressing it;

transferring, still continuously, said complex onto a treatment line (10) for bonding it by means of water jets which act against the surface or surfaces of the complex consisting of discontinuous fibers and entrain said fibers in the thickness direction, which fibers bond together in the manner of a splice between and around the continuous filaments, while still remaining visible on the surface;

carrying out a drying treatment;

and then collecting the finished product.

2. The process as claimed in claim 1, characterized in that the web (5) of "spunbond" type is covered on both its faces with a sheet (V1/V2) of discontinuous fibers, one lap (V1) being produced directly upstream of the zone in which the "spunbond" web is formed and being taken onto the conveyor belt (11) on which the filaments coming from the "spunbond" plant are deposited, said filaments therefore being distributed over the surface of this sheet (V1), the second lap (V2) being delivered downstream of the zone in which the web of continuous filaments is formed, which web is thus sandwiched between the two fibrous layers (V1, V2).

3. The process as claimed in either of claims 1 and 2, characterized in that, after the water-jet bonding operation and before drying, a complementary "textiling" treatment is carried out which consists in transferring the bonded complex onto a coarse fabric (22) and in subjecting the web to the action of water jets which are obtained by means of a unit essentially comprising a perforated rotary drum (24) inside which an injector (23) fed with pressurized water is placed, this unit producing jets which reorient the fibers, a suction unit (25) for removing the water being provided beneath the conveyor.

4. A plant for producing a nonwoven of "spunbond" type, comprising, arranged in line:

a unit (1) for forming, on a conveyor belt (5), a web (S) of continuous filaments of "spunbond"type;

at least one carding machine (6 and/or 9) for delivering, against at least one face of the "spunbond" web produced, a sheet (V1 and/or V2) of discontinuous fibers and having a grammage of between 10 g/m^2 and 50 g/m^2;

means for cold pressing the complex formed, followed by a zone (10) for treatment by means of fluid jets, which act at least against the surface covered with discontinuous fibers and entrain said fibers in the thickness direction, which fibers bond together in the manner of a splice between and around the continuous fibers, while still being visible on the surface;

means for drying and collecting the bonded web, characterized in that it includes, between the water-jet bonding means (10) and the drying means, a textiling unit delivering a coarse fabric (22) which is intended to support the bonded complex and is associated with a perforated rotary drum inside which an injector (23) fed with pressurized water is placed, this unit producing jets which reorient the fibers, a suction unit (25) for removing the water being placed beneath the conveyor.

5. The plant as claimed in claim 4, characterized in that it includes, upstream and downstream of the zone in which the "spunbond" web is formed, means (**6**, **9**) for producing a sheet of fibers, the sheet (**V1**) produced upstream being delivered onto the conveyor belt (**5**) of the "spunbond" line, the bundle of filaments, which is extruded and drawn, being collected directly on said sheet, the second sheet (**V2**) being placed downstream of the zone in which the "spunbond" web is formed and being delivered onto the surface of the latter.

6. A nonwoven obtained by implementing the process as claimed in one of claims 1 to 3, characterized in that it is composed of a web produced from continuous filaments combined with discontinuous fibers, which fibers cover at least one face of the continuous-filament-based web and penetrate the interior of the latter, by becoming bonded around said filaments.

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