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(54) Geotextile comprising interwoven warp guiding lines

(57) The present invention concerns a woven fabric of the type landscape textile or geotextile for covering an area of ground, said woven fabric being made of ends (1 E) extending in the warp direction (X1) which defines a length (L) of the fabric, and of picks (1 P) extending in the weft direction (X2), which defines a width (W) of the fabric, said woven fabric comprising:
(a) At least two main portions (2M) wherein the picks (1 P) are interwoven with ends (1 E) according to a main weaving pattern, said at least two main portions having a main portion width, (WM), measured in the weft direction (X2) and being separated from one another by,
(b)A line portion (2L) extending along the whole warp direction (X1), wherein the picks (1 P) are interwoven with the ends (1 E) according to a line weaving pattern which is different from the main weaving pattern, said line portion having a line portion width, (WL), measured in the weft direction (X2), which is smaller than the main portion width, WL < WM.

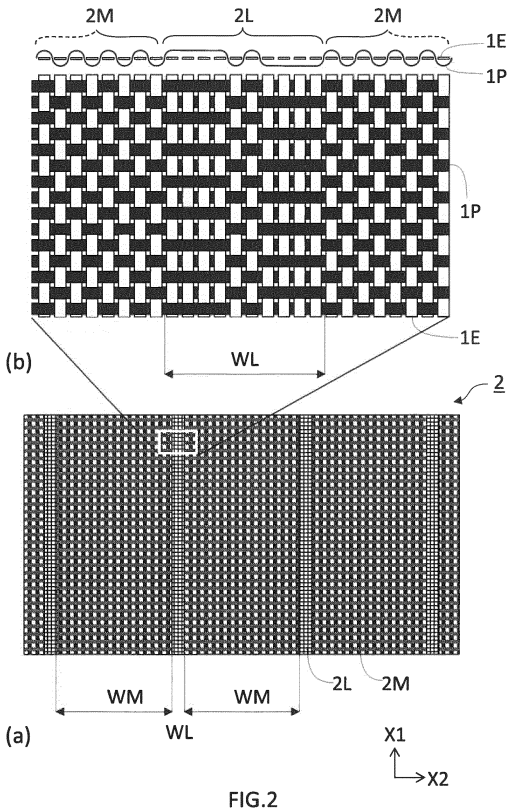

FIG.2

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Description

Technical Field

[0001] The present invention relates to geotextiles and landscape textiles, used for covering an area of ground. It concerns in particular such geotextiles and landscape textiles comprising warp guiding lines which are helpful for laying such fabrics on a given area as well as for planting plants (including the growing of pot plants), poles, or other such items once the fabric covers the ground. Said warp guiding lines are visible to the operators working with such fabrics, but are barely visible to passer-by's.

Background for the invention

[0002] Geotextiles and landscape textiles, commonly referred to herein as "geotextiles", are fabrics, generally woven from thin polymeric tapes made of polypropylene or polyester. They have many applications in the field of civil engineering such as in roads, airfields, railroads, embankments, retaining structures, reservoirs, canals, dams, bank protection, in the field of coastal engineering to control erosion of shorelines, as well as in the fields of agriculture and landscape preservation, for purposes including moisture retention, water conservation, weed or sward suppression, soil warmth retention, and for light reflecting.

[0003] Since geotextiles are usually used to cover large areas of ground, they are often provided with parallel warp guiding lines extending along the length of the fabrics. These lines are also very helpful, once the geotextile is laid in place, for positioning plants, poles and similar items at their required position onto the covered piece of ground. Since most of these operations require piercing holes in the fabric, it is advantageous if the operator can easily find the required position at the first attempt. After all the foregoing operations have been completed, the warp guiding lines have no more use.

[0004] Traditionally, in woven geotextiles comprising ends extending in the warp direction (X1) interwoven with picks extending in the weft direction (X2) normal to the warp direction, the lines are obtained by inserting a series of differently coloured ends at regular intervals. This apparently simple and efficient solution has, however, some drawbacks. First, as mentioned supra, after the geotextile has been laid on a portion of ground, and any plants or artefacts such as poles, have been planted into place, the lines have no use anymore, and have a disturbing visual effect. This may not be an issue in civil engineering applications, but in landscape applications, wherein decorative effects are sought it could be a drawback. Second, the use of ends of different colours involves additional storing and handling requirements; spools of tapes of different colours have to be produced or ordered and stored for forming the ends of the geotextile. Beaming, i.e., winding the warp onto the warp beam, and aligning the tapes in the weaving loom, which are among the most labour intensive operations in the weaving process, require additional attention to include tapes of a different colour at various intervals.

[0005] It can be seen from this review of the current art, that it remains a need in the art for a geotextile comprising warp guiding lines, which are visible to the operator installing said geotextile, but not -or substantially not- to the passer-by's after the installation is completed. At the same time, the growth of weed and the permeability to water and vapour of the geofabric must not be affected by the presence of the warp guiding lines. The geofabric of the present invention meet these requirements and is also easier to produce as henceforth possible. These and other objects of this invention will be evident when viewed in light of the drawings, detailed description, and appended claims.

Summary of the invention

[0006] The present invention is defined in the appended independent claims. Preferred embodiments are defined in the dependent claims. In particular, the present invention concerns a woven fabric of the type landscape textile or geotextile for covering an area of ground, said woven fabric being made of ends extending in the warp direction, X1, which defines a length, L, of the fabric, and of picks extending in the weft direction, X2, which defines a width, W, of the fabric, said woven fabric comprising:

(a) At least two main portions wherein the picks are interwoven with ends according to a main weaving pattern, said at least two main portions having a main portion width, WM, measured in the weft direction, X2, and being separated from one another by,

(b) A line portion extending along the whole warp direction, X1, wherein the picks are interwoven with the ends according to a line weaving pattern which is different from the main weaving pattern, said line portion having a line portion width, WL, measured in the weft direction, X2, which is smaller than the main portion width, WL < WM.

[0007] In a preferred embodiment, all the ends are of the same colour, and all the picks are of the same colour. It can

be advantageous if the number of ends per unit length in the main portions is substantially equal to the number of ends per unit length in the line portion. Similarly, it is preferred that the number of picks per unit length in the main portions be substantially equal to the number of picks per unit length in the line portion. This way, it is possible to have a uniform fabric density and water permeability over the whole area of the geotextile. The water permeability, K_M, measured in m / s according to the constant head method defined in ISO11058/2010 of the main portion of the woven fabric can thus be substantially equal to the water permeability, K_L, of the line portion measured according to the same method on a similar swatch comprising a line portion. The value of the permeability, K_M, K_L, in both main portion and line portion can typically be comprised between 0.005 and 0.020 m / s, preferably between 0.008 and 0.015 m/s. By "substantially equal', it is meant here comprised within the standard deviation of the value of K_M measured on the main portion (2M), which is generally of the order of about 10%.

[0008] The main weaving pattern can for example be selected from plain weave or basket. The line weaving pattern can be a modified main weaving pattern comprising floating picks floating over at least one more end than in the main weaving pattern. For example, the line weaving pattern may comprise a sequence alternating in the warp direction, wherein said sequence comprises in the weft direction: a first floating portion, wherein one pick floats over (under) at least three ends, preferably at least four ends, adjacent to a plain cloth unit cell wherein said pick goes below (over) one end and over (below) one end, adjacent to a second floating portion wherein one pick floats below (over) at least three ends, preferably at least four ends. The presence of floating picks in the line portion substantially alters the reflection of light by the tapes, thus revealing the presence of a warp guiding line upon close observation, but disappearing when observed from a distance.

[0009] The line portion width (WL) is typically comprised between 3 and 30 mm, preferably between 4 and 15 mm, more preferably between 5 and 10 mm. The main portion width (WM) depends on the application of the geotextile and can be of the order of 100 mm or greater, or of the order of 400 mm or greater, or even greater than 1000 mm for ground portions to be covered of extensive area.

[0010] The picks and ends can be made of any polymer, such as polyolefins, e.g., polyethylene or, preferably, polypropylene, or polyester, or biopolymers. For some applications, they can be made of a biodegradable polymer. Their geometry can be selected from bundles of threads, or single tapes. For example, tapes can be used having a width comprised between 0.5 and 5 mm, preferably between 0.8 and 3 mm. For ease of storage of the tapes used for the weaving and ease of production of the geotextile, it is preferred if all the ends have the same tex and the same shape Similarly it is advantageous if all the picks have the same tex and the same shape. For example, the ends may have the shape of a tape of tex comprised between 30 and 520 tex, preferably between 40 and 160 tex, and the picks may have the shape of a tape of tex comprised between 30 and 440 tex, preferably between 70 and 130 tex. The ends and picks may, but not necessarily, be identical in any of their shape, size, colour, or any combinations thereof.

[0011] Of course, a fabric according to the present invention may comprise more than one line portion, and be provided with several parallel warp guiding lines. This is achieved by repeating the same sequence of two main portions separated by a line portion several times in the weft direction (X2) yielding a woven fabric with several line portions extending in the warp direction (X1) and equidistantly distributed over the weft direction.

[0012] In a preferred embodiment, the woven fabric of the present invention further comprises weft guiding lines extending in the weft direction, normal to the warp guiding lines, wherein said weft guiding lines are formed by band portions having a band weaving pattern different from the main weaving pattern and from the line weaving pattern. This way, the warp and weft guiding lines form a checked or tartan pattern which can be useful when positioning plants, poles or other objects over the fabric according to a predetermined pattern. In this embodiment, it is preferred that the main weaving pattern be selected from plain weave or basket, and the band weaving pattern be defined as either:

(a) An alteration of the picks alternating pattern in the warp direction between adjacent picks, for as many adjacent picks as required to reach the desired band width, WB, or

(b)a sequence alternating in the weft direction, wherein said sequence comprises in the weft direction: a first floating portion, wherein one end floats over (under) at least two picks, preferably at least three picks, more preferably at least four picks, adjacent to a plain cloth unit cell wherein said end goes below (over) one pick and over (below) one pick, adjacent to a second floating portion wherein one end floats below (over) at least two picks, preferably at least three picks, more preferably at least four picks.

[0013] The present invention also concerns the use of a woven fabric as defined supra for covering a portion of ground with an apparently optically uniform geo-textile or landscape textile layer and yet providing reference lines to help in the proper laying of said fabric and in the alignment of plants (including the growing of pot plants) or poles on said portion of ground.

Brief description of the Figures

[0014] For a fuller understanding of the nature of the present invention, reference is made to the following detailed description taken in conjunction with the accompanying drawings in which:

Figure 1: shows an example of landscape application wherein, besides helping in properly laying the woven fabric in the right position, the warp guiding lines are also helpful for planting plants, shrubs, or trees, as well as poles for a fence.

Figure 2: shows an example of geotextile according to the present invention with the main weaving pattern being plain cloth and the line portion comprising picks floating over four ends.

Figure 3: shows two other embodiments, wherein the main weaving pattern is a basket weave.

Figure 4: shows how the permeability can be measured on the line portion.

Figure 5: shows a photograph of a geotextile according to the present invention (top view).

Figure 6: shows two embodiments of geotextiles according to the present invention further comprising interwoven band portion extending normal to the line portions.

Figure 7: shows an example of application of a geotextile according to Figure 6.

Figure 8: shows a geotextile comprising interwoven band portions extending in the weft direction with no line portions.

Detailed description of the invention

[0015] As shown in Figures 1, a geotextile (2) or landscape textile (2) according to the present invention is generally supplied in a roll (2) and is simply unrolled to cover an area of ground. The portion of ground to be covered can be a flower bed of a few tens of cm of sides or it can be a whole field or meadow of several tens of metres of sides. The present invention can be applied to geotextiles of any size, but is particularly advantageous for geotextiles of large area. The geotextile of the present invention must comprise warp guiding lines (2L) running parallel to a length, L, of the fabric, as such warp guiding lines are much appreciated by the operators laying such fabrics and planting poles, plants, etc. These warp guiding lines, however, after the fabric has been put in place and all accessories planted in their place, become useless and can break the harmony of the landscape. It is an object of the present invention to provide a geotextile comprising warp guiding lines for the operators comfort and yet which do not show after the installation is completed. This object is achieved in the following manner.

[0016] A geotextile according to the present invention is a woven fabric made of ends (1 E) extending in the warp direction (X1) which defines a length (L) of the fabric, and of picks (1 P) extending in the weft direction (X2), which defines a width (W) of the fabric. The picks (1 P) and ends (1 E) of the woven fabric are preferably made of any polymer, such as polyolefins, e;g., polyethylene or, preferably, polypropylene, or polyester, or biopolymers, or any mixture thereof. For some applications, they can be made of a biodegradable polymer. If tapes are used, their width may be comprised between 0.5 and 5 mm, preferably between 0.8 and 3 mm. Depending on the type of application, the tapes in the warp direction (X1) may have the same width as or a different width than the tapes in the weft direction (X2). For ease and economy of production, it is preferred that all ends (1 E) are similar both in geometry and colour. For example, all ends (1 E) may be polypropylene tapes of a given colour (e.g., black) and given width as discussed above. For example the tapes of the ends can be characterized by a title comprised between 30 and 520 tex, preferably between 40 and 240 tex, more preferably between 50 and 160 tex. Similarly, all the picks (1 P) are preferably similar both in geometry and colour. For example, all picks (1 P) may be polypropylene tapes of a given colour (e.g., dark green) and given width as discussed above and characterized by a title comprised between 30 and 440 tex, preferably between 70 and 130 tex, more preferably between 90 and 110 tex.

[0017] The warp guiding lines are defined by line portions (2L) having a line portion width, WL, separating two main portions (2M) having a main portion width, WM, wherein WL < WM. Widths are always measured herein in the weft direction, X2, and lengths are always measured herein in the warp direction, X1. The line portion width (WL) may for example be comprised between 3 and 15 mm, preferably between 4 and 8 mm. By contrast, the main portion width, WM, is substantially larger than the line portion width, WL (WL << WM). The magnitude of the main portion width, WM, depends of course on the end application of the geotextile. For example, for fabrics covering flower beds, the main portion width can be of the order of 100 mm or more, such as 100 to 300 mm. For geotextiles for covering ground portions of larger area, the main portion width, WM, can be much larger, such as greater than 400 mm, preferably greater than 600 mm or even than 1000 mm.

[0018] The length, L, of the geotextile (measured in the warp direction) is only limited by the length of the ends (1 E) used, and by the maximum diameter of the storing roll (2R) considered admissible for handling. The width, W, of the geotextile (measured in the weft direction) is only limited by the size of the loom used for the weaving thereof. Looms spanning several metres in width are available on the market. A woven geofabric can be cut on line to yield rolls of smaller width. Of course, by comparing the main portion width, WM, and the geotextile width, W, it is clear that a geotextile

according to the present invention generally comprises more than one warp guiding line (2L) so that the same sequence of two main portions (2M) separated by a line portion (2L) is repeated several times in the weft direction (X2) yielding a woven fabric with several line portions (2L) extending over the whole length of the fabric in the warp direction (X1) and usually but not necessarily equidistantly distributed over the weft direction (X2).

[0019] In the main portions (2M), the picks (1 P) are interwoven with the ends (1 E) according to a main weaving pattern, In the line portions, the picks (1 P) are interwoven with the ends (1 E) according to a line weaving pattern which is different from the main weaving pattern. It is the difference in weaving patterns in the main portions (2M) and in the line portions (2L) which makes the warp guiding lines visible to an operator when working with the eyes close to the fabric, but nearly invisible from a distance. Since the geofabrics according to the present invention are used for covering portions of ground, the discreet visual appearance of the line portions (2L) over the main portions (2M) is based on the reflection of light, and not on the light transmission through the fabric. In many applications, it would actually be a disadvantage to have a visual difference in transmission as such difference would normally be associated with a higher water permeability of the regions of highest light transmission compared with a lower permeability in regions of lowest light transmission, since both parameters -light transmission and water permeability- depend on the size and distribution of openings between interwoven tapes (1 E, 1P). In many applications, the geotextile is used to control water / vapour exchange between the ground and the atmosphere, and it is desirable to have a water permeability which is substantially uniform over the whole area of the geotextile fabric.

[0020] For this reason, it is preferred that the water permeability, K_M, of the main portion (2M) of the woven fabric be substantially equal to the water permeability, K_L, of the line portion (2L), The water permeability can be measured in m / s according to the constant head method defined in ISO 11058/2010 on a square swatch of standardized area as illustrated in Figure 4(b). If the line portion width, WL, is smaller than the swatch edge dimensions, the main portions (2M) flanking either side of a line portion (2L) can be covered with a tape impervious to water, as illustrated in Figure 4(a). The value thus measured must of course be corrected according to the actual area of the line portion (2L) exposed to water percolation. The permeability (K_M, K_L) in both main portion (2M) and line portion (2L) can for example be comprised between 0.005 and 0.015 m / s, preferably between 0.008 and 0.012 m/s.

[0021] A uniform water permeability and fabric density in both main portions (2M) and line portions (2L) can easily be obtained by ensuring that the the type and number of ends (1 E) per unit length in the main portions (2M) is substantially equal to the type and number of ends (1 E) per unit length in the line portion (2L) and, similarly that the type and number of picks (1 P) per unit length in the main portions (2M) is substantially equal to the type and number of picks (1 P) per unit length in the line portion (2L).

[0022] As discussed above, in order to reduce the visibility of line portions (2L) when laid on a portion of ground, it is preferred that the ends (1 E) in the line portions (2L) be of the same colour than the ends (1 E) in the main portions (2M). This also has the advantage to facilitate the storage management of tape spools since a single colour is sufficient, and to facilitate the mounting of the ends (1 E) on the beaming machine and on the weaving loom, which is one of the most labour intensive operations in a nowadays highly automated weaving process. Similarly, the picks (1 P) are preferably all of a same colour, which simplifies the type of weaving loom used. The picks (1 P) and ends (1 E) may or may not have the same colour, depending on the type of application, and the resulting visual effect desired. The line portions (2L) will be more visible to the naked eye if two different colours are used for the ends and for the picks, respectively, but they remain very discreet. In case ends and picks are all of the same colour, the line portions (2L) are still visible from close observation, due to the differing reflections of the light on the tapes woven according to the main weaving pattern and on the tapes woven according to the line weaving pattern.

[0023] For example, the main portion (2M) of geotextiles according to the present invention is typically woven according to a main weaving pattern selected from a plain cloth (one up-one down, cf. (2M) in Figure 2(b)) or basket (two ups-two downs, cf. (2M) in Figure 3(a)&(b)). In order to get an enhanced difference in light reflection between the tapes (1 E, 1 P) in the main portion (2M) and the tapes in the line portion (2M), regardless of whether or not the ends and picks are of the same colour, it is preferred that the line weaving pattern comprises floating picks floating over at least one more end (1 E) than in the main weaving pattern. For example, in Figure 5, the main weaving pattern is plain cloth (one up-one down) and the line weaving pattern comprises picks floating over two ends (i.e., over one more end than in the main weaving pattern). In Figure 2(b), the main weaving pattern is plain cloth (one up-one down) and the line weaving pattern comprises picks floating over four ends (i.e., over three more ends than in the main weaving pattern). In Figure 3, two examples are given wherein the main weaving pattern is basket (two ups-two downs) and the line weaving pattern comprises picks floating over four ends (i.e., over two more ends than in the main weaving pattern). In the embodiments of Figures 2(b), 3(a) and 5, the line weaving pattern is a modified main weaving pattern differing in that it comprises floating picks floating over at least one more end (1 E) than in the main weaving pattern. In the embodiment of Figure 4(b), the line weaving pattern substantially differs from the main weaving pattern, in that the latter the sequence alternates with every pair of adjacent picks, which follow the same pattern (basket), whilst in the line portion (2L), the sequence alternates with every pick.

[0024] One pick (1 P) in a given line portion (2L) may be floating over several ends more than once. In such case it

is preferred that two adjacent floating regions be separated by a plain cloth weaving unit cell (i.e., one up, one down), in order to stabilize the weave at the line portions. For examples, the embodiments shown in Figures 2(b), 3, and 5 show line weaving patterns comprising a sequence alternating in the warp direction, wherein said sequence comprises in the weft direction: a first floating portion, wherein one pick floats over (under) at least two, preferably at least three ends, more preferably at least four ends, adjacent to a plain cloth unit cell wherein said pick goes below (over) one end and over (below) one end, adjacent to a second floating portion wherein one pick floats below (over) at least two (cf. Figure 5), preferably at least three ends, more preferably at least four ends (cf. Figures 2&3). In particular, the line weaving pattern shown in Figure 2(b) can be defined as two mirror 5H satin unit cells facing each other. With line weaving patterns as discussed above, a geotextile according to the present invention provides lines which are visible from close by, but quite invisible from a distance and, at the same time, ensures substantially uniform density and water permeability over the whole area of the fabric, with no local mechanical weakness. The warp lines (2L) are preferably continuous, but they can also be dashed lines, wherein the line weaving pattern is interrupted at intervals by the main weaving pattern.

[0025] In some applications it may be advantageous to have weft guiding lines (2B) extending in the weft direction, normal to the warp guiding lines (2L) extending in the warp direction. An example of such application is illustrated in Figure 7 allowing plants or poles to be distributed over an area according to a predetermined pattern (here in staggered rows). Such checked or tartan pattern can be obtained by interweaving the picks (1 P) in such way as to create band portions (2B) extending in the weft direction, as illustrated in Figure 6. A band portion (2B) can be formed by altering the alternating pattern of the weft between adjacent picks (1 P), for as many adjacent picks as required to reach the desired band width, WB. In Figure 6(a), a one to one alternating pattern is altered and two adjacent picks repeat the same pattern, thus creating a band portion which has a band width, equivalent to the width of two picks. Figure 6(b) shows the same alteration of the picks pattern, extending over three adjacent picks (1 P) yielding a broader band width, WB, than in Figure 6(a). The band portion (WB) may have other band weaving patterns. For example, all the weaving patterns discussed with respect to the line portion (2L) can be applied mutatis mutandis to the band portion (2B), by inverting the ends and picks.

[0026] For example, the band weaving pattern can be a modified main weaving pattern comprising floating ends floating over at least one more picks (1 P) than in the main weaving pattern. In particular, the main weaving pattern can be selected from plain weave or basket, and the band weaving pattern may comprise a sequence alternating in the weft direction, wherein said sequence comprises in the weft direction: a first floating portion, wherein one end floats over (under) at least two picks, preferably at least three picks, more preferably at least four picks, adjacent to a plain cloth unit cell wherein said end goes below (over) one pick and over (below) one pick, adjacent to a second floating portion wherein one end floats below (over) at least two picks, preferably at least three picks, more preferably at least four picks.

[0027] In some applications, it may be desirable to have weft guiding lines (2B) in the weft direction only with no warp guiding lines (2L). In this case, it suffices to interweave the picks (1 P) as explained supra, but without any line portions (2L), an example of which is illustrated in Figure 8. All the embodiments described supra with reference to warp guiding lines (2L) can be applied mutatis mutandis to the weft guiding lines (2B) by changing all references to ends into picks, and all references to picks into ends.

[0028] The use of a woven fabric as defined in the present invention for covering a portion of ground has the following advantages over the prior art geotextiles:

- the warp guiding lines (2L) are only visible from close observation, as would be required by an operator laying it or positioning items such as plants or poles over its surface;
- from a distance of one or more metres, the warp guiding lines (2L) are nearly invisible;
- the permeability, colour, and density is uniform over the whole area of the fabric, regardless of whether measured on the main portions (2M) or on the line portions (2 L)
- the storage of the tapes or filaments used for the weaving of the fabric is simplified since no colour difference is required to obtain the warp guiding lines (2L);
- the preparation of the weaving loom by positioning the ends is greatly simplified since the ends (of the same colour) can be aligned equidistantly from one another;
- a simple weaving loom with a single shuttle can be used as the picks can all be of the same colour and type;
- the only difference with the weaving of a geotextile absent any warp guiding line is the programming of two weaving patterns depending on whether the picks are being interwoven with ends in the main portion (2M) or in the line portion (2L), which is a basic option in any weaving loom;
- any type of filaments or tapes commonly used for manufacturing geotextiles can be used in the present invention.

[0029] It can be seen from the above list of advantages, that not only the geotextile of the present invention is advantageous over existing geotextiles having warp guiding lines of a different colour, in that the warp guiding lines are not visible from a given distance, but it is even simpler and cheaper to produce.

REF	FEATURE
1E	ends (warp direction)
1P	picks (weft direction)
2	geotextile
2B	band portion (in the weft direction)
2L	line portion (in the warp direction)
2M	main portion
2R	geotextile roll
K_L	water permeability of the line portion (ISO 11058/2010)
K_M	water permeability of the main portion (ISO 11058/2010)
L	geotextile length in warp direction
W	geotextile width in weft direction
WB	width of band portion (2B)
WL	width of line portion (2L)
WM	width of main portion (2M)
X1	warp direction
X2	weft direction

Claims

1. Woven fabric of the type landscape textile or geo-textile for covering an area of ground, said woven fabric being made of ends (1E) extending in the warp direction (X1) which defines a length (L) of the fabric, and of picks (1 P) extending in the weft direction (X2), which defines a width (W) of the fabric, said woven fabric comprising:

(a) At least two main portions (2M) wherein the picks (1 P) are interwoven with ends (1 E) according to a main weaving pattern, said at least two main portions having a main portion width, (WM), measured in the weft direction (X2) and being separated from one another by,
(b)A line portion (2L) extending along the whole warp direction (X1), wherein the picks (1 P) are interwoven with the ends (1 E) according to a line weaving pattern which is different from the main weaving pattern, said line portion having a line portion width, (WL), measured in the weft direction (X2), which is smaller than the main portion width, WL < WM.

2. Woven fabric according to claim 1, wherein the number of ends (1 E) per unit length in the main portions (2M) is substantially equal to the number of ends (1 E) per unit length in the line portion (2L), and the number of picks (1 P) per unit length in the main portions (2M) is substantially equal to the number of picks (1 P) per unit length in the line portion (2L).

3. Woven fabric according to claim 1 or 2, wherein all the ends (1 E) are of the same colour, and all the picks (1 P) are of the same colour.

4. Woven fabric according to any of the preceding claims, wherein the water permeability, K_M, measured in m / s according to the constant head method defined in ISO11058/2010 on square swatch of standardized area of the main portion (2M) of the woven fabric is substantially equal to the water permeability, K_L, of the line portion (2L) measured according to the same method on a similar swatch comprising a line portion (2L) flanked on either side by a main portion (2M), and on which the main portions (2M) on either side of the line portion are covered with a tape impervious to water, and after correction for the reduced area of the line portion (2L).

5. Woven fabric according to the preceding claim, wherein the permeability, K_M, K_L, in both main portion (2M) and line

portion (2L) is comprised between 0.005 and 0.020 m / s, preferably between 0.008 and 0.015 m/s.

6. Woven fabric according to any of the preceding claims, wherein the main weaving pattern is selected from plain weave or basket, and wherein the line weaving pattern is a modified main weaving pattern comprising floating picks floating over at least one more end (1 E) than in the main weaving pattern.

7. Woven fabric according to the preceding claim, wherein the line weaving pattern comprises a sequence alternating in the warp direction, wherein said sequence comprises in the weft direction: a first floating portion, wherein one pick floats over (under) at least two ends, preferably at least three ends, more preferably at least four ends, adjacent to a plain cloth unit cell wherein said pick goes below (over) one end and over (below) one end, adjacent to a second floating portion wherein one pick floats below (over) at least two ends, preferably at least three ends, more preferably at least four ends,

8. Woven fabric according to any of the preceding claims, wherein the line portion width (WL) is comprised between 3 and 15 mm, preferably between 4 and 8 mm, and wherein the main portion width (WM) is greater than 100 mm, preferably greater than 400 mm.
Woven fabric according to any of the preceding claims, wherein the picks (1 P) and ends (1 E) are made of one or more of polyethylene, polypropylene, polyester, or biopolymer tapes having a width comprised between 0.5 and 5 mm, preferably between 0.8 and 3 mm.

9. Woven fabric according to any of the preceding claims, wherein all the ends (1 E) have the same tex and the same shape and wherein all the picks (1 P) have the same tex and the same shape,

10. Woven fabric according to the preceding claim, wherein the ends (1 E) have the shape of a tape of ucomprised between 30 and 520 tex, preferably between 40 and 160 tex, and wherein the picks (1 P) have the shape of a tape of title comprised between 30 and 440 tex, preferably between 70 and 130 tex.

11. Woven fabric according to any of the preceding claims, wherein the same sequence of two main portions (2M) separated by a line portion (2L) is repeated several times in the weft direction (X2) yielding a woven fabric with several line portions (2L) extending in the warp direction (X1) and equidistantly distributed over the weft direction (X2).

12. Woven fabric according to any of the preceding claims, further comprising weft guiding lines (2B) extending in the weft direction, normal to the warp guiding lines (2L), wherein said weft guiding lines (2B) are formed by band portions (2B) having a band weaving pattern different from the main weaving pattern and from the line weaving pattern.

13. Woven fabric according to the preceding claim, wherein the main weaving pattern is selected from plain weave or basket, and the band weaving pattern is defined as either:

(a) An alteration of the picks alternating pattern in the warp direction between adjacent picks (1 P), for as many adjacent picks as required to reach the desired band width, WB, or
(b) a sequence alternating in the weft direction, wherein said sequence comprises in the weft direction: a first floating portion, wherein one end floats over (under) at least two picks, preferably at least three picks, more preferably at least four picks, adjacent to a plain cloth unit cell wherein said end goes below (over) one pick and over (below) one pick, adjacent to a second floating portion wherein one end floats below (over) at least two picks, preferably at least three picks, more preferably at least four picks.

14. Use of a woven fabric according to any of the preceding claims for covering a portion of ground with an apparently optically uniform geo-textile or landscape textile layer and yet providing reference lines to help in the proper laying of said fabric and in the alignment of plants or poles on said portion of ground.

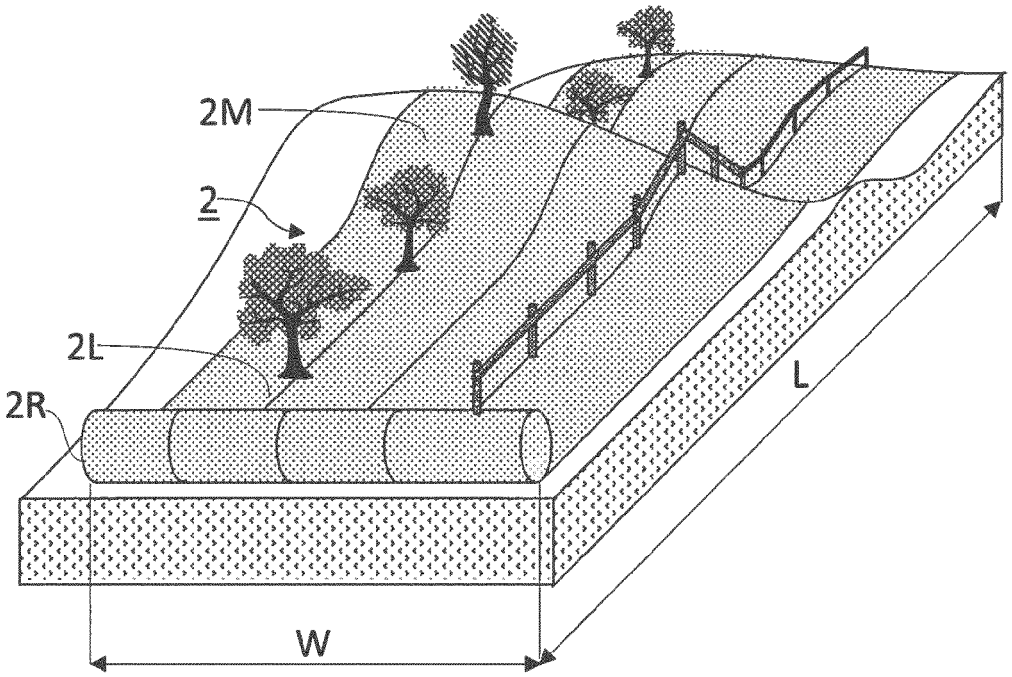

FIG.1

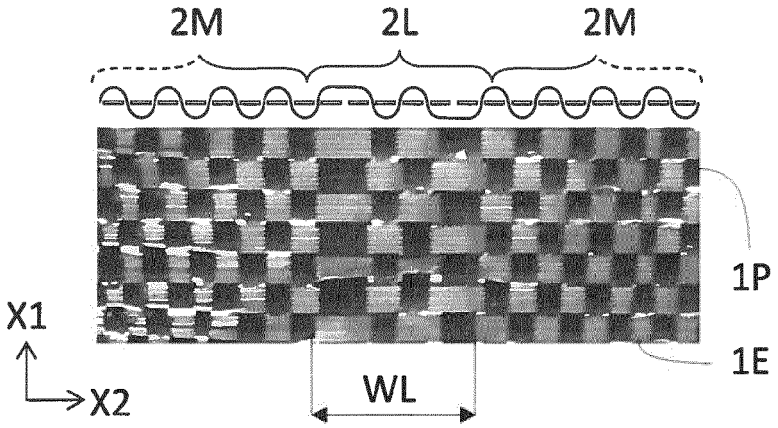

FIG.5

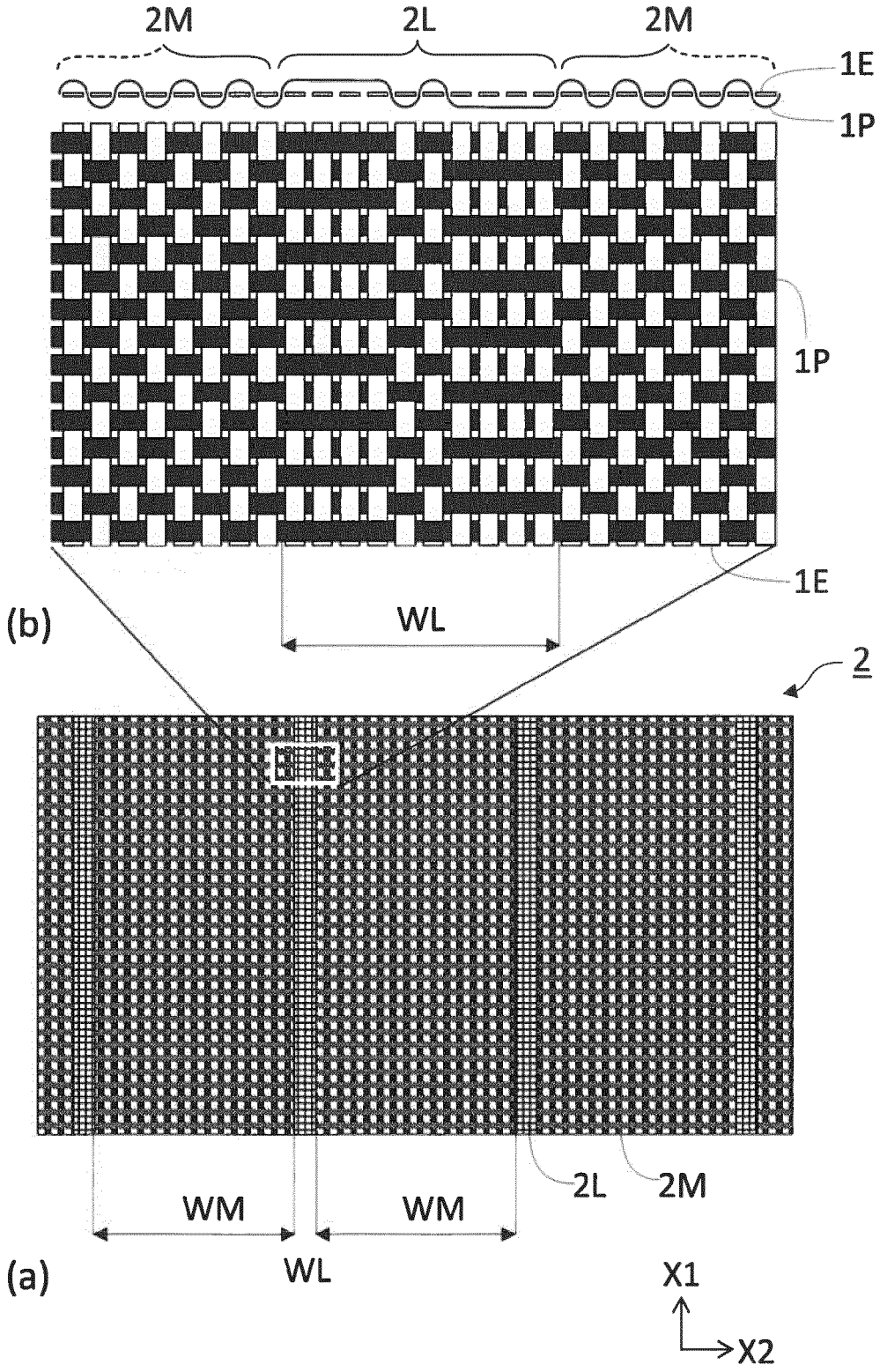

FIG.2

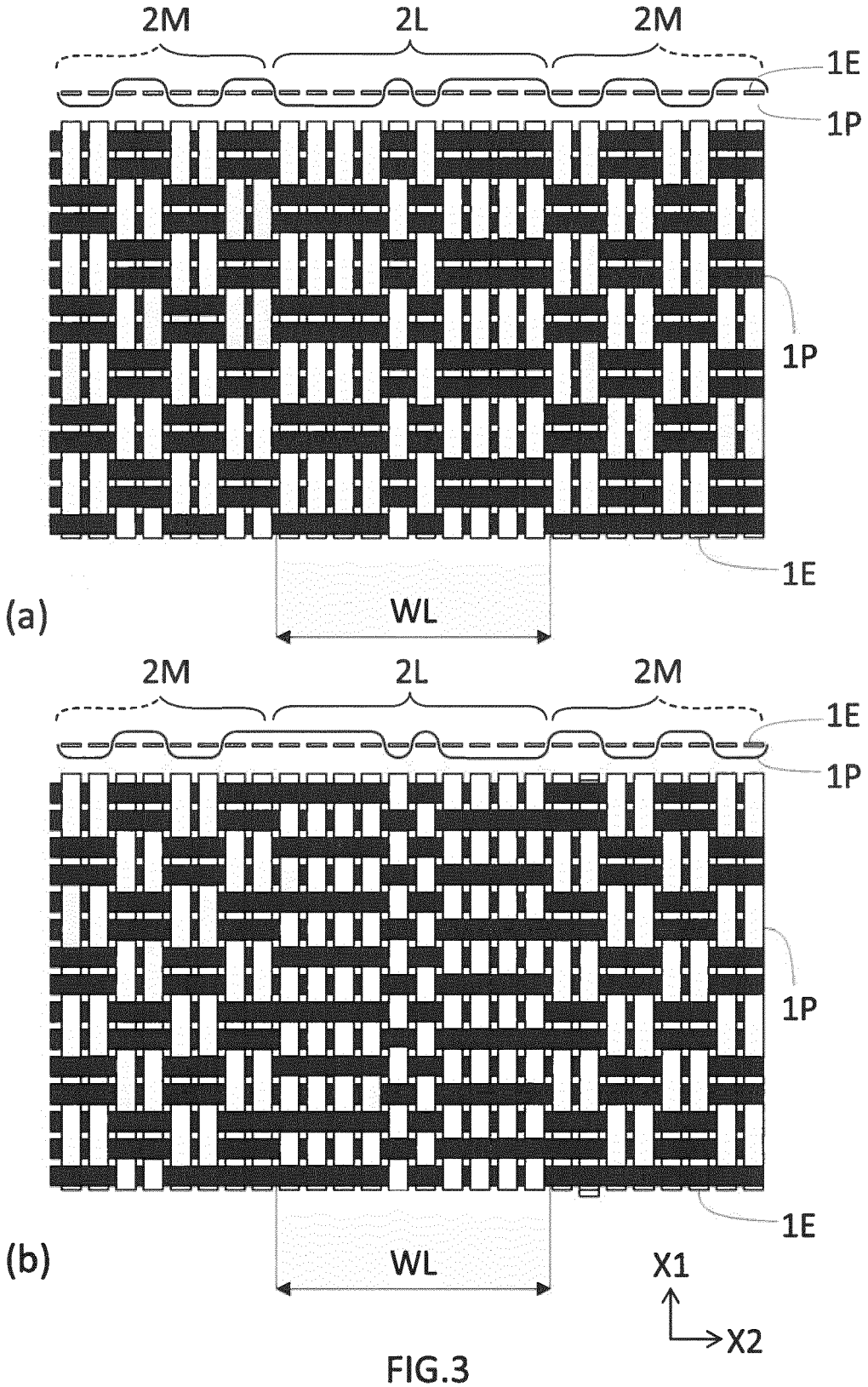

FIG.3

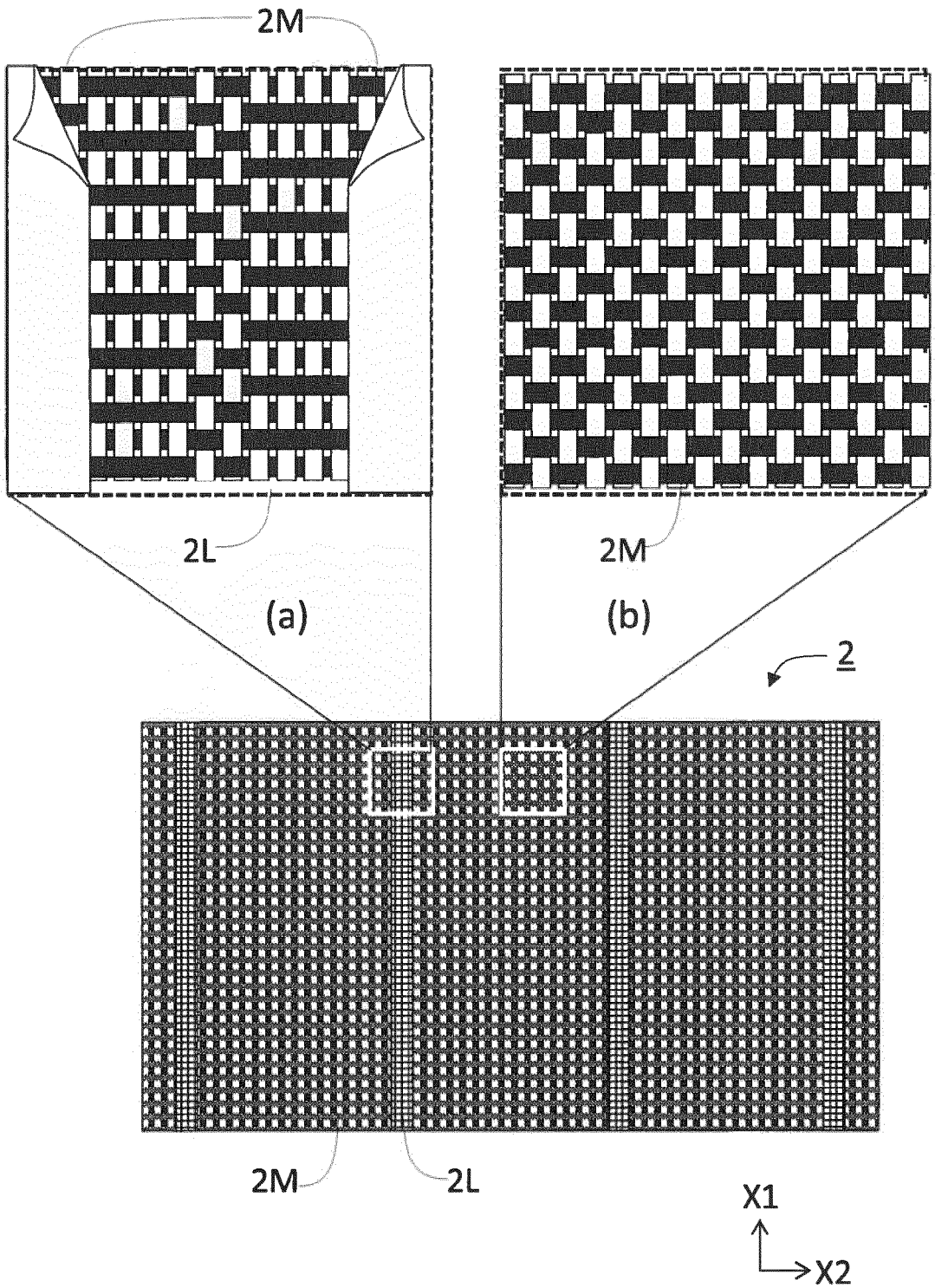

FIG.4

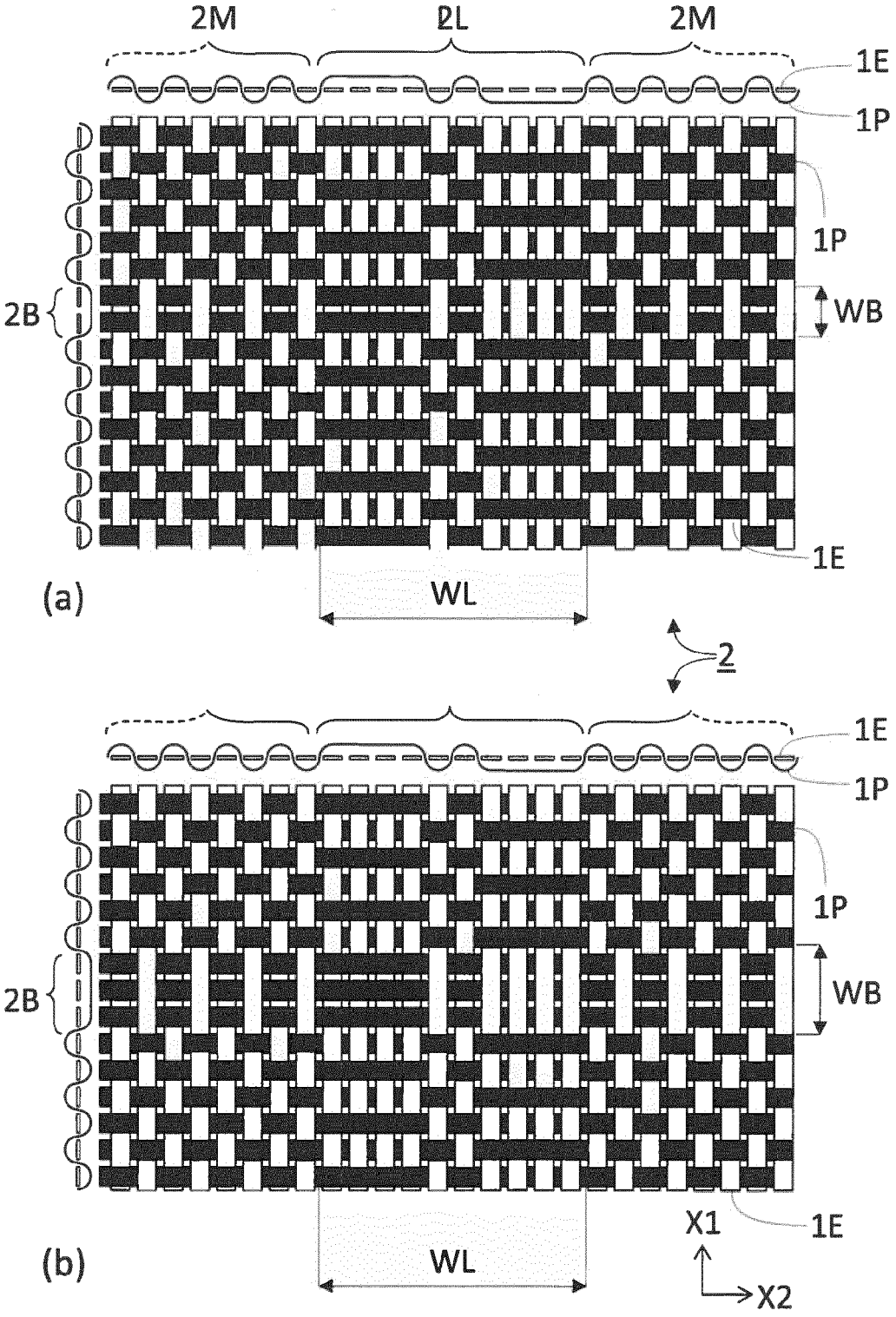

FIG.6

(b)

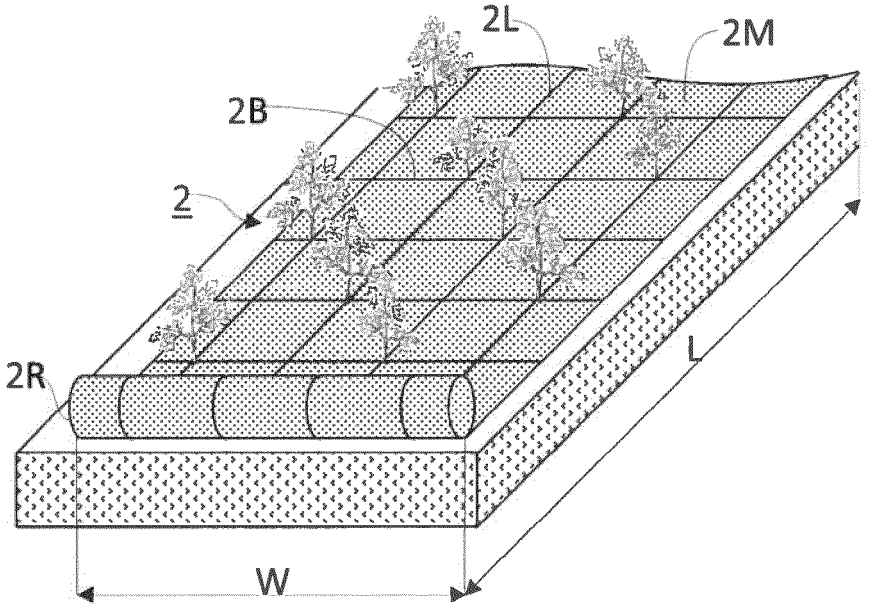

FIG.7

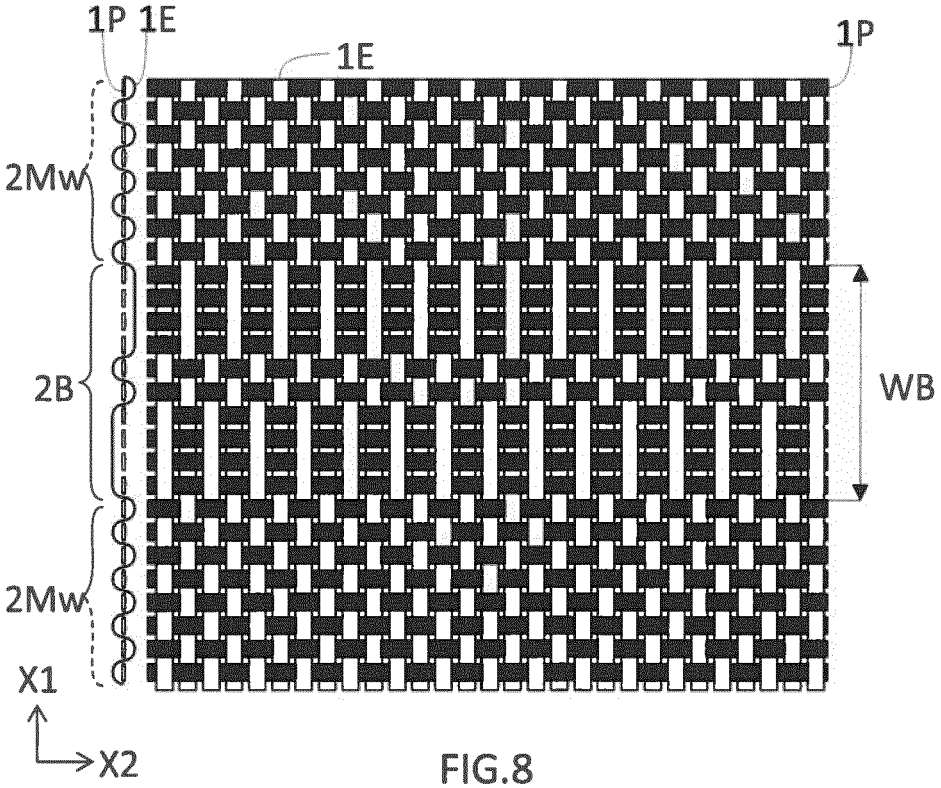

FIG.8

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EUROPEAN SEARCH REPORT

Application Number
EP 14 19 6096

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 2013/092281 A1 (SUTTON ALAN [US] ET AL) 18 April 2013 (2013-04-18) * figure 1 * * paragraph [0037] - paragraph [0038] *	1-3,9, 10,12, 13,15 4-8,11, 14	INV. D03D1/00 D03D13/00 D03D15/00
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A	US 2014/241817 A1 (JONES DAVID MICHAEL [US] ET AL) 28 August 2014 (2014-08-28) * figures 1-4 * * paragraph [0009] - paragraph [0014] * * table 1 *	1-15	
A	WO 2013/033719 A1 (5 11 INC [US]; MORALES FRANCISCO J [US]) 7 March 2013 (2013-03-07) * abstract; figure 1 *	1-15	TECHNICAL FIELDS SEARCHED (IPC) D03D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 May 2015	Hausding, Jan

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06-05-2015

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