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(54) MESH FABRIC STRUCTURE FOR TRAMPOLINE AND WEAVING METHOD THEREOF

(57) The present invention relates to a mesh fabric structure for a trampoline and a weaving method thereof, which is mainly used in components of the trampoline including the surround pad, cover, protective post sleeve, protective net, and jumping mat, comprising a plurality of warps made of polypropylene material, and a plurality of wefts also made of polypropylene material. The plurality of warps interweave with the plurality of wefts by being drawn through and inserted over-and-under alternately the wefts to form a mesh fabric structure having a plurality of pores that can enhance the function features of drainage capacity, light-weight, tensile strength, anti-UV, by which the service lifetime of a trampoline is prolonged.

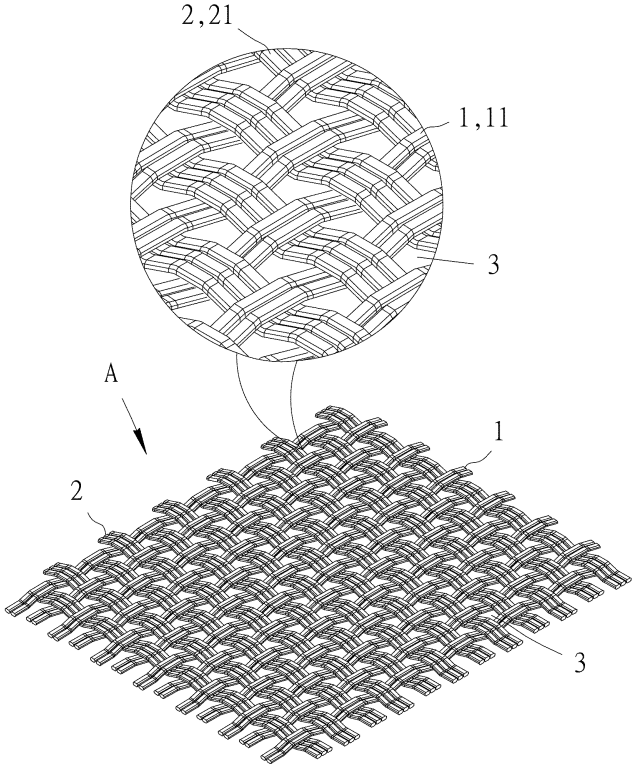

FIG.5

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Description

BACKGROUND OF THE INVENTION

1. Fields of the invention

[0001] The present relates to the technical field of sports equipment, and more specifically a mesh fabric used for surround pads, covers, protective post sleeves, protective nets, and jumping mats of trampolines.

2. Descriptions of Related Art

[0002] Currently, general sports equipment such as trampolines are equipped with a protective surround pad, as disclosed in CN201744108U "Trampoline edge cloth". A layer of surround pad with a thickness is installed on the jumping mat and the springs, fixed to the frame. Thus, during the use of trampolines for exercise, consumers can have better safety protection.

[0003] The surround pads of trampolines on the market nowadays generally use two different fabric materials, polyethylene (PE) or polyvinyl chloride (PVC), as the main material of the surround pads, wherein the PE material is the earliest known fabric used for surround pads. However, surfaces of the PE fabric will become wrinkled and hardened with cracks after being exposed to sunlight and rain in outdoor areas.

[0004] Therefore, after switching to the PVC coated mesh fabric structure 90 in the later period, as shown in Fig. 9, the aforementioned problems of the PE fabric material can be solved effectively, wherein the PVC coated mesh fabric structure 90 is mainly composed of two layers of PVC fabric 91 are separated by, and attached on and underneath a mesh fabric 92 respectively in a sandwich structure to form a surround edge 9 composed of a plurality of pieces of fabric.

[0005] However, one of the causes that affect the service lifetime of the trampoline is stagnant water. Although the surface of the PE and PVC fabrics has good sealability to effectively prevent rainwater from infiltrating into the trampoline, the surround edges, cover, protective post sleeves, protective nets, and jumping mat of the trampoline have to undergo the sewing process using a sewing machine after the fabrics are cut out. When a trampoline is placed outdoors and exposed to rain for a long time, the rainwater will infiltrate into the internal components of the trampoline through the seam lines. If the water is not drained to the outside in time, the problem of stagnant water will occur. When stagnant water remains inside the trampoline for a long period of time, the acidity of the rain water will cause the internal components of the trampoline to rust, corrode, become damaged, and mold will begin to grow.

SUMMARY OF THE INVENTION

[0006] Therefore, in view of the above-mentioned problems that exist in components of trampolines made of PE fabrics and PVC coated mesh fabrics, the inventor of the present invention investigated the aforementioned deficiency and searched intensively for the solutions thereof. After conducting research and many experiments, a mesh fabric structure for a trampoline and a weaving method thereof of the present invention is completed. The main objective of the present invention is to provide a mesh fabric structure, which is mainly used in components of the trampoline including the surround pad, cover, protective post sleeve, protective net, and jumping mat, in order to solve the aforementioned problems of trampolines of the prior art.

[0007] In order to achieve the aforementioned objective, the present invention discloses the following technical solutions: a mesh fabric structure for a trampoline, comprising: a plurality of warps made of polypropylene material, and a plurality of wefts also made of polypropylene material. The plurality of warps interweave with the plurality of wefts by being drawn through and inserted over-and-under alternately the wefts to form a mesh fabric structure having a plurality of pores that can enhance the function features of drainage capacity, light-weight, tensile strength, and anti-UV.

[0008] Preferably, each warp and each weft are set to have a monofilament fiber.

[0009] Preferably, each warp and each weft thread are set to have a plurality of monofilament fibers that are connected adjacently side by side.

[0010] Preferably, the plurality of monofilament fibers of each warp interweave with each weft by the individual monofilament drawn through and inserted over-and-under alternately each weft; on the other hand, a plurality of monofilament fibers of each weft interweave with each warp by the individual monofilament drawn through and inserted over-and-under alternately each warp.

[0011] Preferably, the plurality of monofilament fibers of each warp interweave with each weft by the group of a plurality of monofilaments drawn through and inserted over-and-under alternately each weft; or the plurality of monofilament fibers of each weft interweave with each warp by the group of a plurality of monofilaments drawn through and inserted over-and-under alternately each warp.

[0012] Preferably, the size of the pore is between 0.1 ~ 4mm.

[0013] Furthermore, the weaving method of the mesh fabric for the trampoline of the present invention comprises: a batching step, which intermixes 94% polypropylene by weight with 6% color concentrate as the raw material; a drawing step, which produces bunched monofilament fibers of high tensile strength from the aforementioned polypropylene ingredients through the process of work procedures of extruding, stretching, and processing under the action of a drawing machine at a temperature range of 200 to 280 degrees Celsius (°C) ; a warping step, wherein the diameter of the wound monofilament fiber from the aforementioned drawing step undergoes the warping process according to the diameter value required by the production; a weaving step that interweaves the warp with the weft, drawn from a monofilament fiber or a plurality of monofilament fibers that are connected adjacently side by side, by drawing the warp through to be inserted over-and-under alternately the weft to form a mesh fabric and, at the same time, to form a plurality of pores during the weaving process; and a finishing step, which calenders the surface of the aforementioned mesh fabric to increase the smoothness thereof and, through the finishing procedure, makes the warps and wefts to be fixed firmly together without displacement thus to enhance the overall tensile strength of the mesh fabric.

[0014] Preferably, in the batching step, 1.5% carbon black of the total weight can be added according to the requirements of anti-UV.

[0015] Preferably, in the weaving step, the process interweaves a monofilament fiber or a plurality of monofilament fibers of each warp with each weft by the individual monofilament fiber or the group of a plurality of monofilament fibers drawn through and inserted over-and-under alternately each weft; or/and the process interweaves a monofilament fiber or a plurality of monofilament fibers of each weft with each warp by the individual monofilament fiber or the group of a plurality of monofilament fibers drawn through and inserted over-and-under alternately each warp; and the size of the pore formed during the weaving process is between 0.1 ~ 4mm.

[0016] In comparison with the prior art, the advantages and effects of the present invention are as follows:

1. The mesh fabric structure of the present invention is provided as the main material of the surround pads, covers, protective post sleeves, and protective nets of current trampolines. Since the mesh fabric of the present invention is a porous woven fabric, the mesh fabric has good drainage performance. According to the test results, the mesh fabric structure of the present invention has an average drainage capacity of at least 67 liters per m2/s. In other words, the mesh fabric of the present invention will not accumulate water when the sky is clear after the rain.
2.The average weight of the mesh fabric of the present invention is 210g/m^2, which is twice lighter than the PVC coated mesh fabric, and can effectively turn the surround pad, cover, protective post sleeve, protective net, and jumping mat of the trampoline into lightweight components to be conducive to packaging and handling.
3.The tensile strength of the mesh fabric of the present invention is 2104 ~ 2000N/5cm in the warp direction and 1297 ~ 1000N/5cm in the weft direction, which is at least 300% or more (that is, three times larger) stronger than that of the PVC mesh fabric. Therefore, the mesh fabric of the present invention has better anti-UV, durability, high tensile and usability in outdoor areas, and can last up to five years without damage when it is frequently used outdoors.

BRIEF DESCRIPTION OF THE DRAWINGS

[0017] The present invention will become more fully understood from the detailed description given herein below for illustration only which thus does not limit the present invention, wherein:

Fig. 1 is a schematic diagram of the mesh fabric structure of the present invention used in the "surround pad, jumping mat" components of the trampoline;
Fig. 2 is a schematic diagram of the mesh fabric structure of the present invention used in the "cover, protective net" components of the trampoline;
Fig. 3 is a schematic diagram of the mesh fabric structure of the present invention used in the "protective post sleeve" component of the trampoline;
Fig. 4 is a schematic diagram of a first embodiment of the mesh fabric structure of the present invention;
Fig. 5 is a schematic diagram of a second embodiment of the mesh fabric structure of the present invention;
Fig. 6 is a schematic diagram of a third embodiment of the mesh fabric structure of the present invention;
Fig. 7 is a schematic diagram of a fourth embodiment of the mesh fabric structure of the present invention;
Fig. 8 is a schematic diagram of the production process steps of the mesh fabric structure of the present invention;
Fig. 9 is a schematic diagram and an enlarged cross-section view of a PVC coated mesh fabric for the surround pad used in a trampoline of the prior art.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0018] First, please refer to Figs. 1 to 3. The present invention relates to a mesh fabric structure for a trampoline and a weaving method thereof, which is mainly used in the fabric materials for components of the trampoline 4 including the

surround pad 41, cover 42, protective post sleeve 43, protective net 44, and jumping mat 45, wherein the first embodiment of the mesh fabric A, as shown in Fig. 4, comprises a plurality of warps 1 wherein each warp has a monofilament fiber 11 made of polypropylene material. The so-called polypropylene (PP) is a colorless, odorless, non-toxic, translucent solid substance. Polypropylene is a polymer with excellent thermoplasticity produced by the addition polymerization of propylene. Polypropylene is a white waxy material with a transparent appearance, thermoplasticity and low density, and is a common plastic in use. Furthermore, polypropylene features chemical resistance, heat resistance, electrical insulation, and high abrasion resistance and good processing performance; is corrosion resistance to acid, alkali, salt solutions and a variety of organic solvents below 80°C. The polypropylene (PP) material is 100% recyclable and can be recycled directly without the need of chemical decomposition treatment.

[0019] Moreover, the mesh fabric A of the present invention further comprises a plurality of wefts 2 wherein each weft has a monofilament fiber 21 also made of polypropylene material. Please refer to Fig. 4. The plurality of warps 1 interweave with the plurality of wefts 2 by being drawn through and inserted over-and-under alternately the wefts 2 to form a mesh fabric structure having a plurality of pores 3 that can enhance the function features of drainage capacity, light-weight, tensile strength, and anti-UV. In particular, the size of the pore 3 is between 0.1 ~ 4 mm.

[0020] Please refer to Fig. 5 for the second embodiment of the mesh fabric A of the present invention, wherein each warp 1 and each weft 2 are set to have a plurality of monofilament fibers 11 and 21 respectively that are connected adjacently side by side. In other words, the mesh fabric A of the second embodiment of the present invention uses different weaving techniques in the weaving procedure, that is, the warp 1, having a plurality of monofilament fibers 11 connected adjacently side by side, interweave with the weft 2, having a plurality of monofilament fibers 21 connected adjacently side by side, by being drawn through and inserted over-and-under alternately each weft 2. Different weaving methods are created by different combination during the process of weaving. For example, weaving methods using the equal coefficients can be decided by a composition of parameters of 2*2/2*3/2*4/2*5/2*6/2*7/2*8/3*2/3*3/3*4/3*5/3*6/3*7/3*8/4*2/4*3/4*4/4*5/4*6/4*7/4*8/5*2/5*3/5*4/5*5/5*6/5*7/5*8/6*2/6*3/6*4/6*5/6*6/6*7/6*8/7*2/7*3/7*4/7*5/7*6/7*7/7*8/8*2/8*3/8*4/8*5/8*6/8*7/8*8 and more, for monofilament fibers of the warp and the weft respectively. In the embodiment illustrated in Fig. 5, a composition of parameters of 2*3 is applied to such weaving method.

[0021] Please refer to Fig. 6 for the third embodiment of the mesh fabric A of the present invention, wherein each warp 1 and each weft 2 are set to have a plurality of monofilament fibers 11 and 21 respectively that are connected adjacently side by side. The plurality of monofilament fibers 11 of the warp 1 interweave with each weft 2 by the individual monofilament drawn through and inserted over-and-under alternately each weft 2; on the other hand, a plurality of monofilament fibers 21 of the weft 2 interweave with each warp 1 by the individual monofilament drawn through and inserted over-and-under alternately each warp 1. Therefore, while the mesh fabric A of the third embodiment of the present invention being woven, different weaving methods are created by combining different procedures during the process of weaving. For example, weaving methods using the alternate crossing coefficients can be decided by a composition of parameters of 2*2/2*3/2*4/2*5/2*6/2*7/2*8/3*2/3*3/3*4/3*5/3*6/3*7/3*8/4*2/4*3/4*4/4*5/4*6/4*7/4*8/5*2/5*3/5*4/5*5/5*6/5*7/5*8/6*2/6*3/6*4/6*5/6*6/6*7/6*8/7*2/7*3/7*4/7*5/7*6/7*7/7*8/8*2/8*3/8*4/8*5/8*6/8*7/8*8 and more, for monofilament fibers of the warp and the weft respectively. In the embodiment illustrated in Fig. 6, a composition of parameters of 7*7 is applied to such weaving method.

[0022] Please refer to Fig. 7 for the fourth embodiment of the mesh fabric A of the present invention, wherein each warp 1 and each weft 2 are set to have a plurality of monofilament fibers 11 and 21 respectively that are connected adjacently side by side. The plurality of monofilament fibers 11 of each warp 1 interweave with each weft 2 by the group of a plurality of monofilaments drawn through and inserted over-and-under alternately each weft 2; or the plurality of monofilaments 21 of each weft 2 interweave with each warp 1 by the group of a plurality of monofilaments drawn through and inserted over-and-under alternately each warp 1.

[0023] In addition, the weaving method B of the mesh fabric for the trampoline of the present invention that is provided mainly to manufacture the mesh fabric A in the aforementioned first, second, third, and fourth embodiments, as shown in Fig. 8, comprises: a batching step a, a drawing step b, a warping step c, a weaving step d, and a finishing step e. The aforementioned steps are described in detail as follows:

The batching step a intermixes 94% polypropylene by weight with 6% color concentrate as the raw material; the polypropylene and the color concentrate prepared in the specified proportion are mixed uniformly by a mixer to be used as the ingredient for the drawing procedure later. Selections on color concentrates of different colors can be made to produce monofilament fibers 11 and 12 of a variety of colors by the drawing step in order to meet the requirements of different environments and consumer needs.

[0024] The drawing step b produces bunched monofilament fibers 11 and 12 of high tensile strength from the aforementioned polypropylene ingredients through the process of work procedures of extruding, stretching, and processing under the action of a drawing machine at a temperature range of 200 to 280 degrees Celsius (°C) the drawing speed is controlled at 190mpm to ensure the fiber to be drawn uniformly; and, after the drawing step is completed, fibers are wound and ready for the warping step later.

[0025] The warping step c processes the diameters of the wound monofilament fibers 11 and 12 from the aforemen-

tioned drawing step to undergo the warping process according to the diameter values required by the production in order to ensure that the quality and tensile of the polypropylene mesh fabric meet the requirements after the woven fabric is completed.

[0026] The weaving step d interweaves the warp 1 and weft 2, having a monofilament of 11 and 12 respectively or a plurality of drawn monofilaments 11 and 12 respectively that are connected adjacently side by side, by drawing the warp 1 through and inserted over-and-under alternately the weft 2 to form a mesh fabric. In other words, using different weaving techniques applied to the warp and the weft to be drawn through, inserted over-and-under alternately during the weaving procedure, different weaving methods can be created. For example, weaving methods can be decided by a composition of parameters of 2*2/2*3/2*4/2*5 /2*6/2*7/2*8/3*2/3*3/3*4/3*5/3*6/3*7/3*8/4*2/4*3/4*4/ 4*5/4*6/4*7/4*8/5*2/5*3/5*4/5*5/5*6/5*7/5*8/6*2/6*3/ 6*4/6*5/6*6/6*7/6*8/7*2/7*3/7*4/7*5/7*6/7*7/7*8/8*2/ 8*3/8*4/8*5/8*6/8*7/8*8 and more, for monofilament fibers of the warp and weft respectively. Furthermore, in the weaving step, the process interweaves a monofilament fiber or a plurality of monofilament fibers 11 of each warp 1 with each weft 2 by the individual monofilament or the group of a plurality of monofilaments drawn through and inserted over-and-under alternately the weft 2; or/and the process interweaves a monofilament fiber or a plurality of monofilament fibers 12 of each weft 2 with each warp 1 by the individual filament or the group of a plurality of monofilaments drawn through and inserted over-and-under alternately the warp 1, at the same time, forming a plurality of pores 3 during the weaving process, wherein the size of the pore is between 0.1 ~ 4mm.

[0027] The finishing step e calenders the surface of the aforementioned mesh fabric to increase the smoothness thereof. Since the yarns of the woven mesh fabric will slide between each other that can cause the mesh fabric deformed and weaken the strength thereof, therefore, the present invention applies the finishing procedure to make the warps and wefts to be fixed firmly together without displacement thus to enhance the overall tensile strength of the mesh fabric A.

[0028] In particular, in the weaving method B of the mesh fabric of the present invention, 1.5% carbon black of the total weight can be added according to the requirements of anti-UV during the batching step a; in the weaving step d, "a weaving method using the equal coefficients" can be chosen to weave the mesh fabric A as shown in Fig. 5, or "a weaving methods using the alternate crossing coefficients" can be chosen to weave the mesh fabric A as shown in Fig. 6.

[0029] In general, the present invention provides a better choice of fabric for the surround pad 41, cover 42, protective post sleeve 43, protective net 44, and jumping mat 45 of the trampoline 4. The main composition of the mesh fabric A of the present invention is polypropylene (PP). Polypropylene material is a non-toxic, odorless, good tensile, hardness, and heat-resistance material. Polypropylene can be 100% recycled, and can be recycled directly without the need of chemical decomposition treatment. Therefore, the polypropylene woven mesh fabric of the present invention can effectively solve the problems arising from the use of PE and PVC for trampolines. The advantages of the polypropylene mesh fabric A of the present invention are described as follows:

1. Good drainage: The mesh fabric A of the present invention can effectively solve the problem of stagnant water after testing. Since the polypropylene mesh fabric is woven in a mesh form, it has many pores 3 and therefore the stagnant water is discharged to the outside through these pores 3 to reduce damage to the internal components of the trampoline 4. According to the test results, the mesh fabric A of the present invention can achieve an average drainage capacity of more than 67 liters per m2/s; the surface of the mesh fabric A of the present invention is calendered to increase the smoothness that can drain the stagnant water more effectively and achieve a better effect of moisture-proof and mold-proof.
2. Light weight: Because the polypropylene raw material is a lightweight material, it is conducive to the light density of the polypropylene mesh fabric A. The average weight of the PVC coated mesh fabric is 409.8g/m^2 whereas the average weight of the PP material is 210g/m^2. Relatively speaking, polypropylene mesh fabric A is twice lighter than PVC coated mesh fabric. Products made of polypropylene mesh fabric A can be lighter in weight and make handling less effort; in terms of transportation, the loading capacity can be increased and the number of transportations can be reduced, resulting in carbon emission reduction.
3. Good tensile strength: The polypropylene mesh fabric A also has a good performance in tensile strength. The tensile strength of the PVC coated mesh fabric is 609~614N/5cm in the warp direction and 345~350N/5cm in the weft direction whereas the tensile strength of the polypropylene mesh fabric is 2104~ 2000N/5cm in the warp direction and 1297~1000N/5cm in the weft direction, which is far more than 400% (four times) stronger than that of the PVC coated mesh fabric. The aforementioned test data show that the tensile strength for use and durability of components of a trampoline made of polypropylene mesh fabric A increase.
4. Good anti-UV effect: The polypropylene mesh fabric A is proven to be excellent in anti-ultraviolet degradation (anti-UV) test with the value of the surface strength still maintained at 75% of the original scale after 5000 hours of UV exposure. Thus, product accessories made of the polypropylene mesh fabric A can prolong the service lifetime of the trampoline to more than five years.

[0030] A comparison table of aforementioned functions of the mesh fabric A of the present invention and the PVC

coated mesh fabric is provided in Table 1.

[Table 1]

Test item	Unit	Mesh fabric of the present invention	PVC coated mesh fabric	Comparison result
Weight	g/m^2	210	409.8	The weight of the present invention is 100% relatively lighter
Tensile strength	Warp: N/ 5cm	2104~2000	609~614	The strength of the present invention is 400% stronger or more
	Weft: N/ 5cm	1297~1000	345~350	The strength of the present invention is 400% stronger or more
Drainage capacity (m^2/s)	Liter (L)	67	0	PVC coated mesh fabric cannot drain the water
Outdoor durability	year	More than 5 years	More than 1 year	PVC coated mesh fabric is poor in anti-UV. and ages easily.

[0031] In summary, the present invention relates to "a mesh fabric structure for trampolines and a weaving method thereof", which provides a better choice of fabric for the surround pad, cover, protective post sleeve, protective net, and jumping mat of the trampoline that can achieve better performance in drainage capacity, light weight, tensile strength, anti-UV. In addition, the composite structure and method of each embodiment of the present invention have never been disclosed in books, publications nor available to public, and the present invention meets the key requirements of patentability. Therefore, the patent application is hereby respectfully submits to patent officers/examiners of the Patent and Trademark Office to be approved for granting a patent.

[0032] The examples described above are a few preferred embodiments and applications of the technology of the present invention. Alternative embodiments will become apparent to those skilled in the art to which the present invention described in the patent specification and the appended claims pertains without departing from its spirit and scope.

Claims

1. A mesh fabric structure for a trampoline, comprising:

a plurality of warps, made of polypropylene material; and
a plurality of wefts, also made of polypropylene material;
wherein the plurality of warps interweave with the plurality of wefts by being drawn through and inserted over-and-under alternately the wefts to form a mesh fabric structure having a plurality of pores that can enhance the function features of drainage capacity, light-weight, tensile strength, and anti-UV.

2. The mesh fabric structure for a trampoline as claimed in claim 1, wherein each warp and each weft are set to have a monofilament fiber.

3. The mesh fabric structure for a trampoline as claimed in claim 1, wherein each warp and each weft are set to have a plurality of monofilament fibers that are connected adjacently side by side.

4. The mesh fabric structure for a trampoline as claimed in claim 3, wherein the plurality of monofilament fibers of each warp interweave with each weft by the individual monofilament drawn through and inserted over-and-under alternately each weft; on the other hand, a plurality of monofilament fibers of each weft interweave with each warp by the individual monofilament drawn through and inserted over-and-under alternately each warp.

5. The mesh fabric structure for a trampoline as claimed in claim 3, wherein the plurality of monofilament fibers of each warp interweave with each weft by the group of a plurality of monofilaments drawn through and inserted over-and-under alternately each weft; or the plurality of monofilament fibers of each weft interweave with each warp by the group of a plurality of monofilaments drawn through and inserted over-and-under alternately each warp.

6. The mesh fabric structure for a trampoline as claimed in claim 1, wherein the size of the pore is between 0.1 ~ 4mm.

7. The mesh fabric structure for a trampoline as claimed in claim 1, wherein the mesh fabric layer has an average drainage capacity of at least 67 liters per m2/s, an average weight of 210g/m2, a tensile strength of 2104~2000N/5cm in the warp direction, a tensile strength of 1297~1000N/5cm in the weft direction; and the mesh fabric layer can last up to five years when it is used outdoors.

8. A weaving method of the mesh fabric for the trampoline, comprising:

a batching step, which intermixes 94% polypropylene by weight with 6% color concentrate as the raw material;
a drawing step, which produces bunched monofilament fibers of high tensile strength from the aforementioned polypropylene ingredients through the process of work procedures of extruding, stretching, and processing under the action of a drawing machine at a temperature range of 200 to 280 degrees Celsius (°C);
a warping step, wherein the diameter of the wound monofilament fiber from the aforementioned drawing step undergoes the warping process according to the diameter value required by the production;
a weaving step, which interweaves the warp with the weft, drawn from a monofilament fiber or a plurality of monofilament fibers that are connected adjacently side by side, by drawing the warp through to be inserted over-and-under alternately the weft to form a mesh fabric and, at the same time, to form a plurality of pores during the weaving process; and
a finishing step, which calenders the surface of the aforementioned mesh fabric to increase the smoothness thereof and, through the finishing procedure, makes the warps and wefts to be fixed firmly together without displacement thus to enhance the overall tensile strength of the mesh fabric.

9. A weaving method of the mesh fabric for the trampoline as claimed in claim 8, wherein, in the batching step, 1.5% carbon black of the total weight can be added according to the requirements of anti-UV.

10. A weaving method of the mesh fabric for the trampoline as claimed in claim 8, wherein, in the weaving step, the process interweaves a monofilament fiber or a plurality of monofilament fibers of each warp with each weft by the individual monofilament fiber or the group of a plurality of monofilament fibers drawn through and inserted over-and-under alternately each weft; or/and the process interweaves a monofilament fiber or a plurality of monofilament fibers of each weft with each warp by the individual monofilament fiber or the group of a plurality of monofilament fibers drawn through and inserted over-and-under alternately each warp; and the size of the pore formed during the weaving process is between 0.1 ~ 4mm.

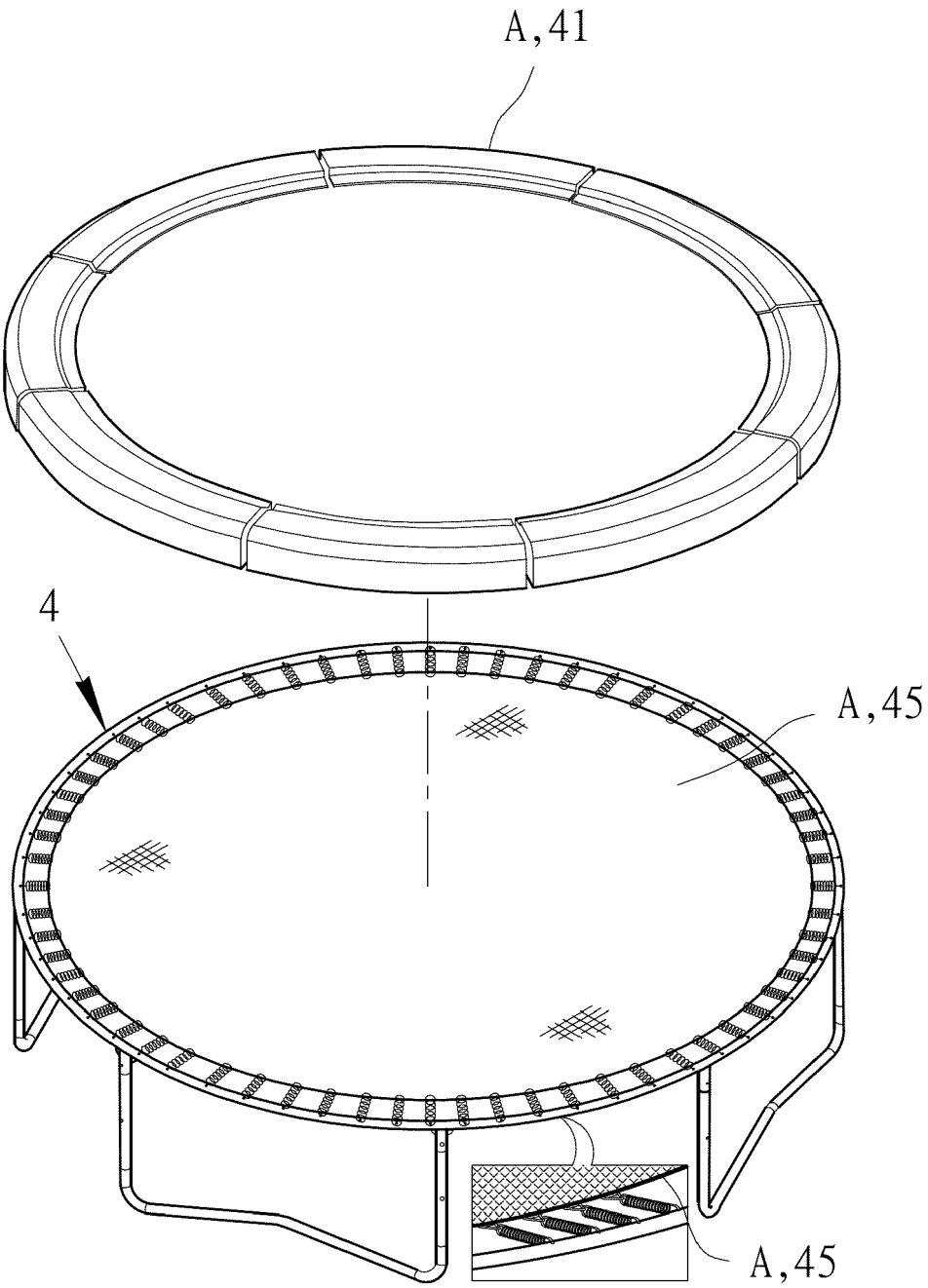

FIG.1

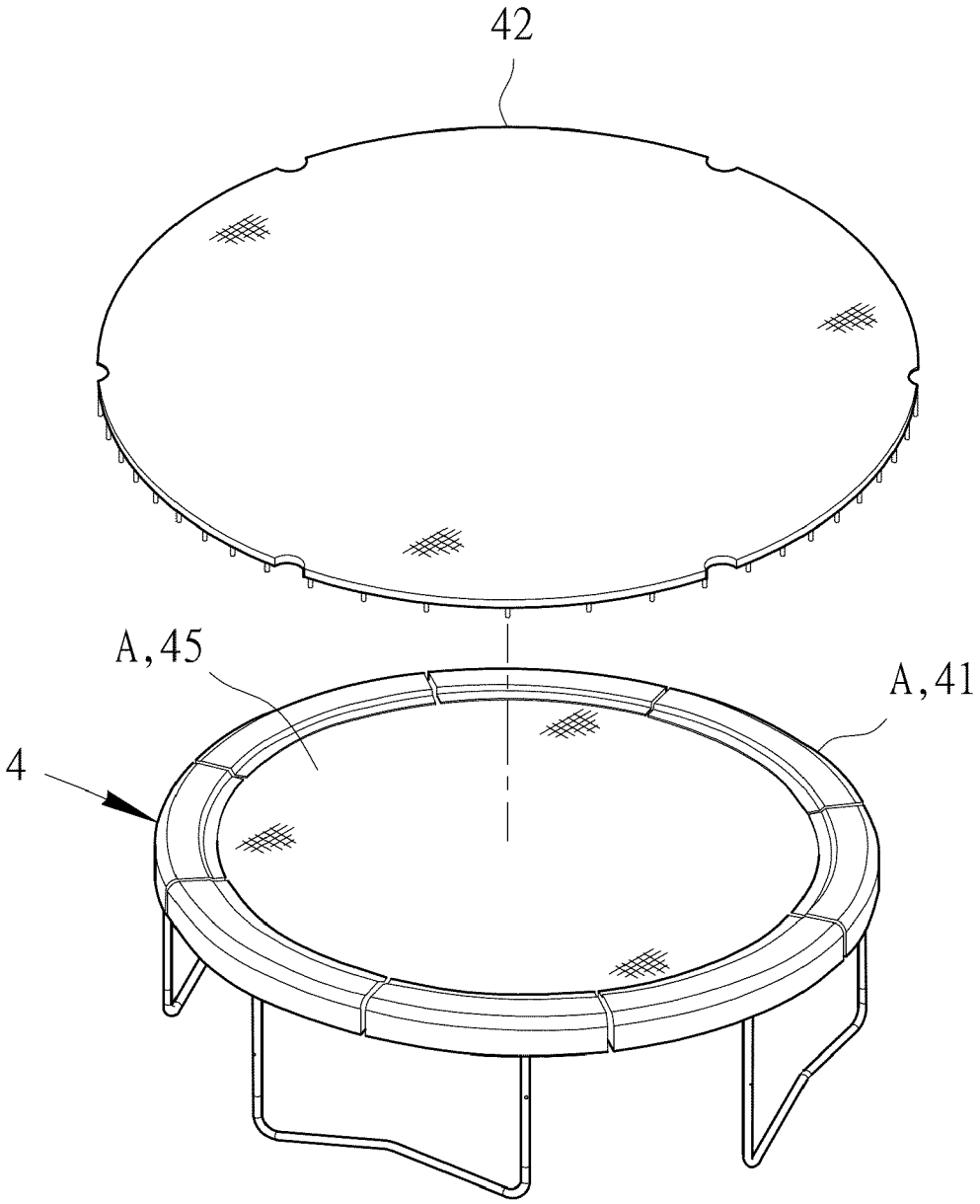

FIG.2

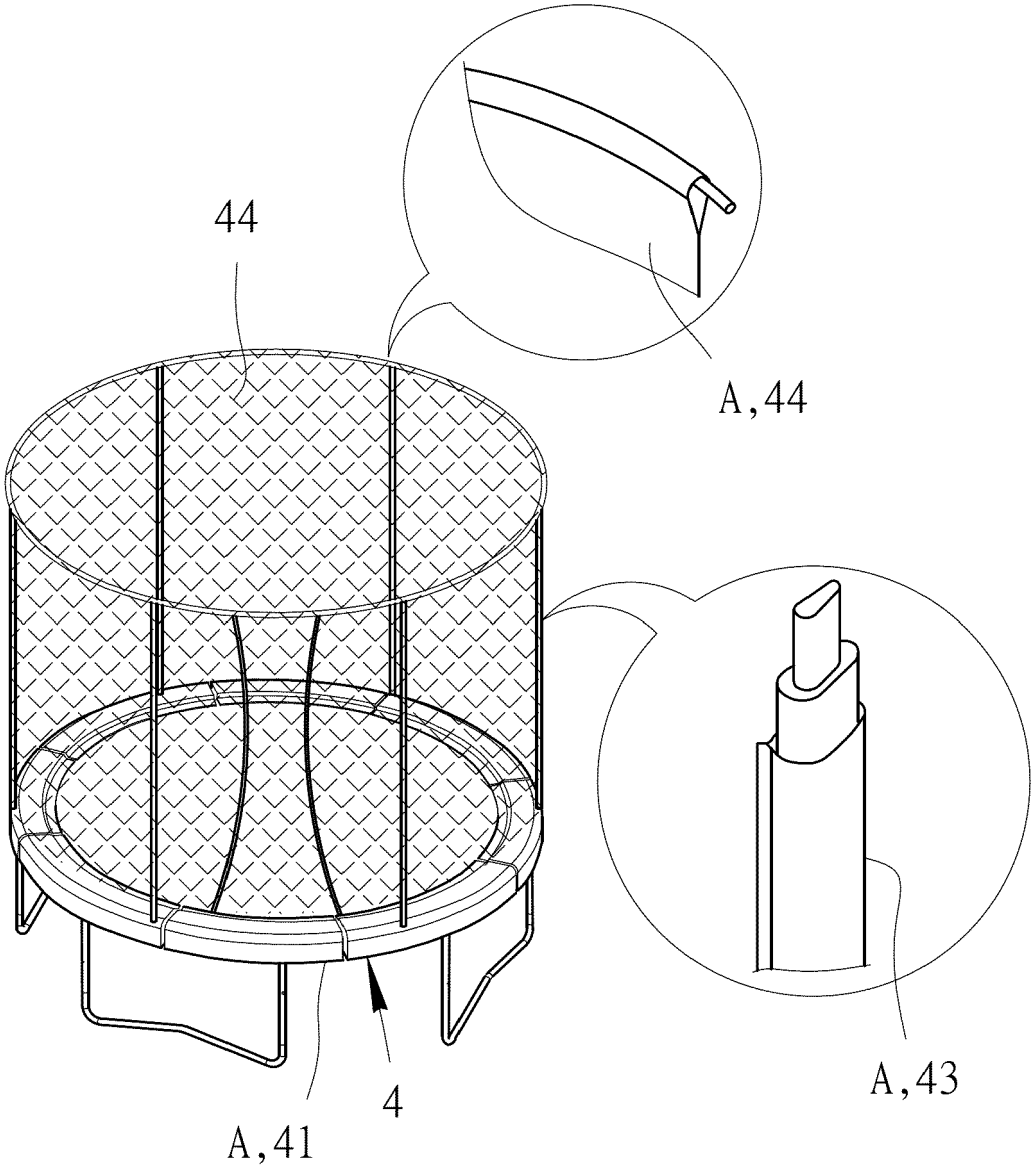

FIG.3

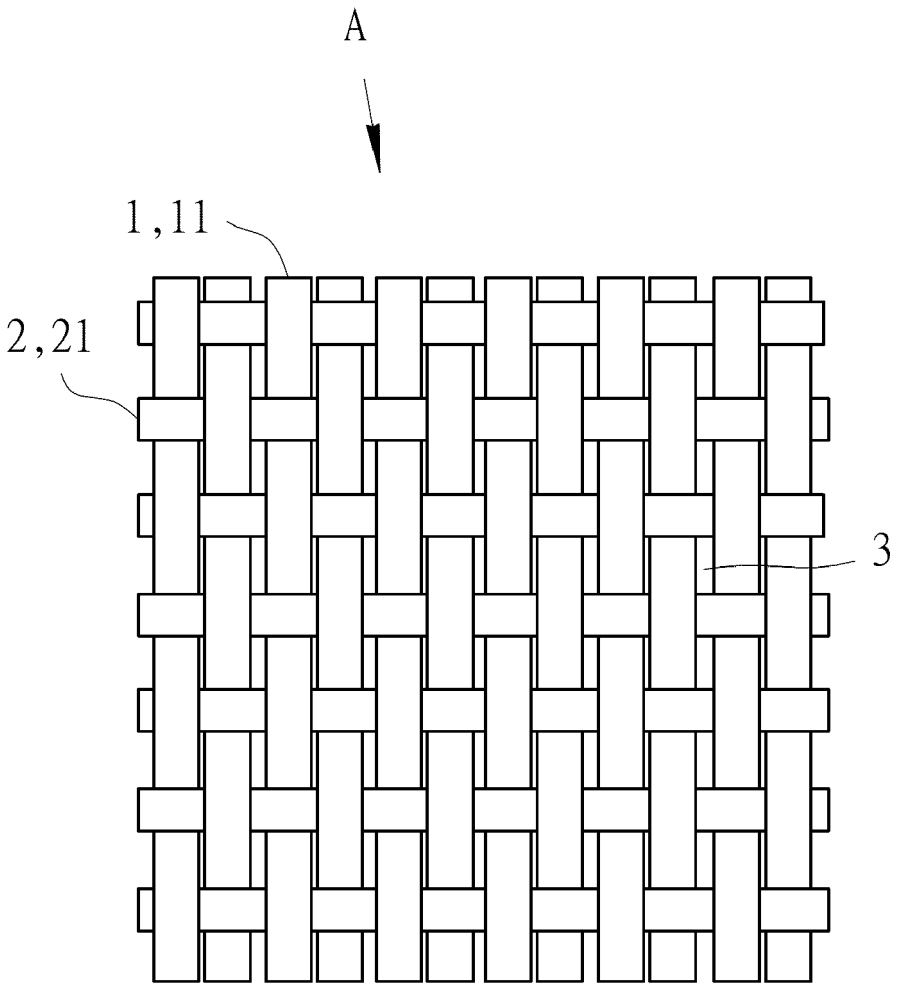

FIG.4

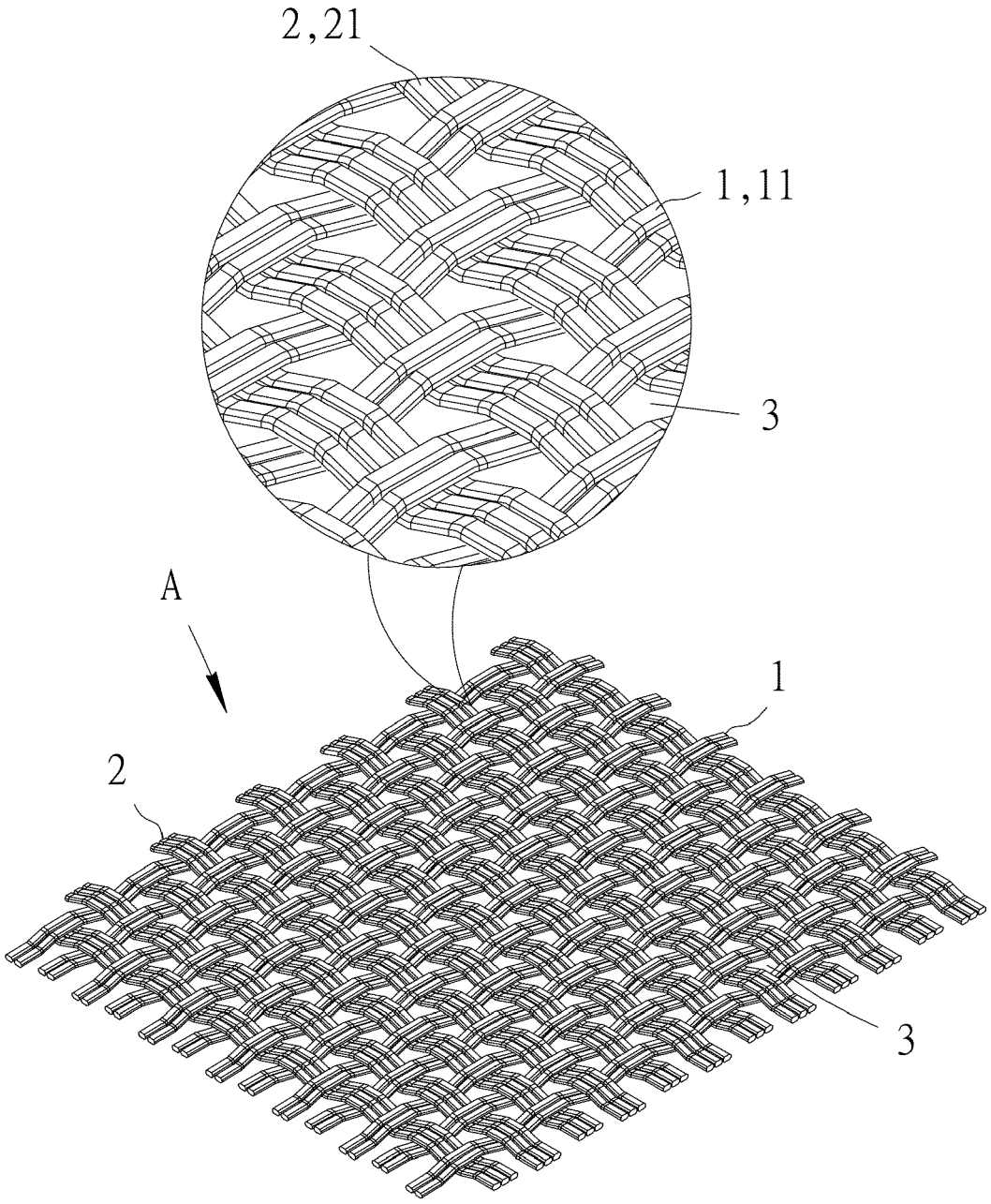

FIG.5

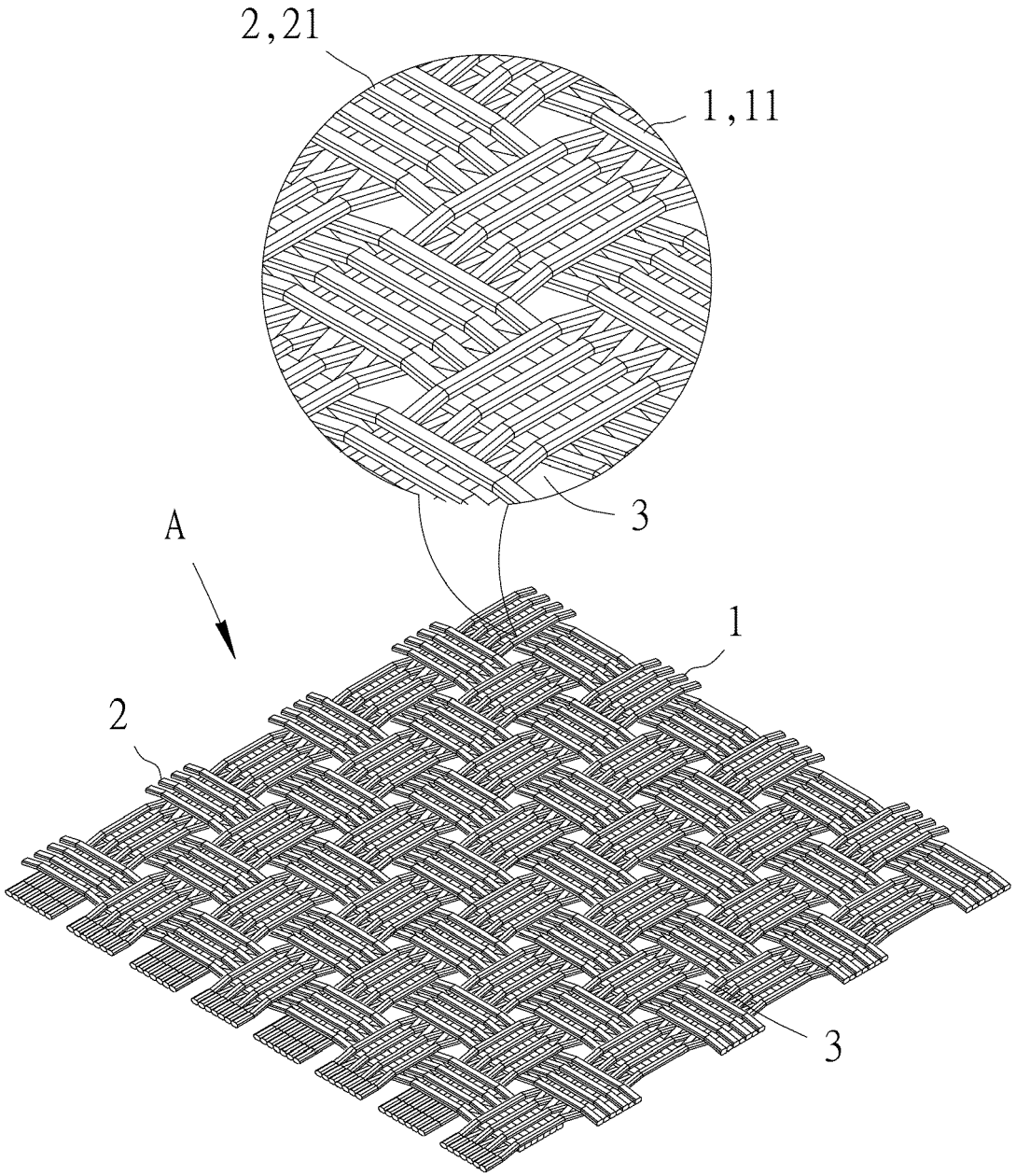

FIG.6

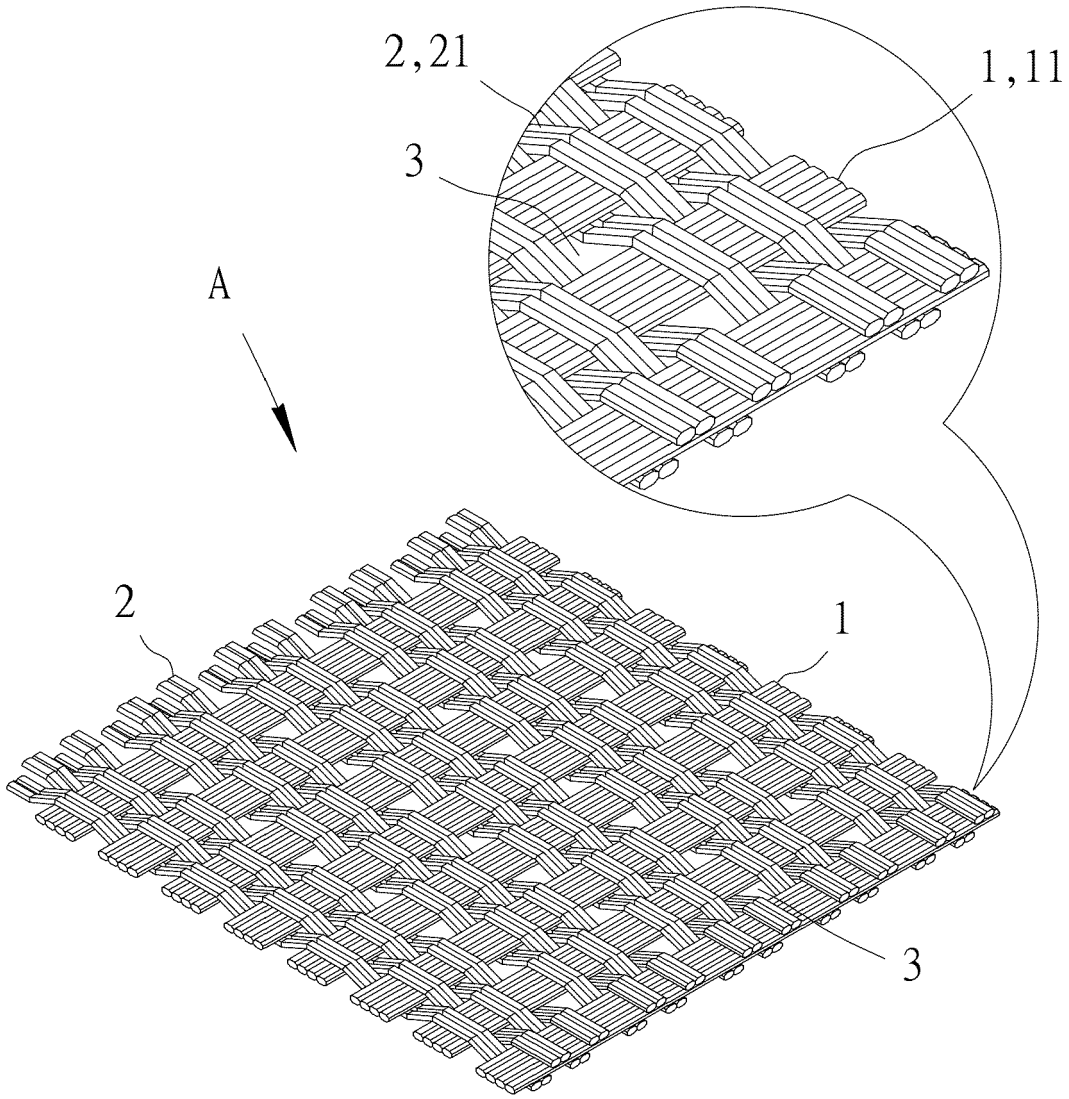

FIG.7

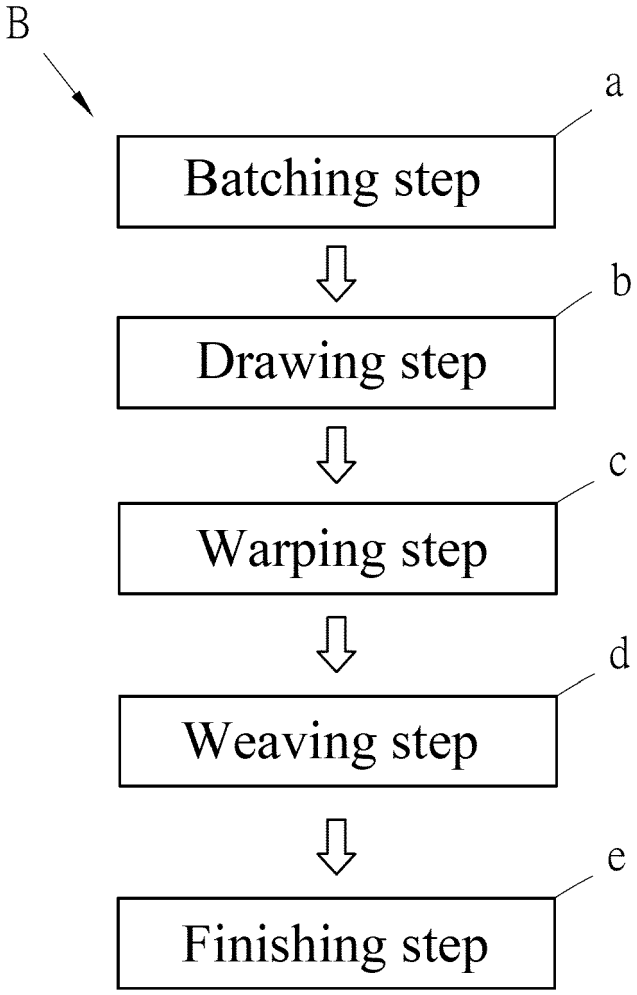
B
a
Batching step
b
Drawing step
c
Warping step
d
Weaving step
e
Finishing step

FIG.8

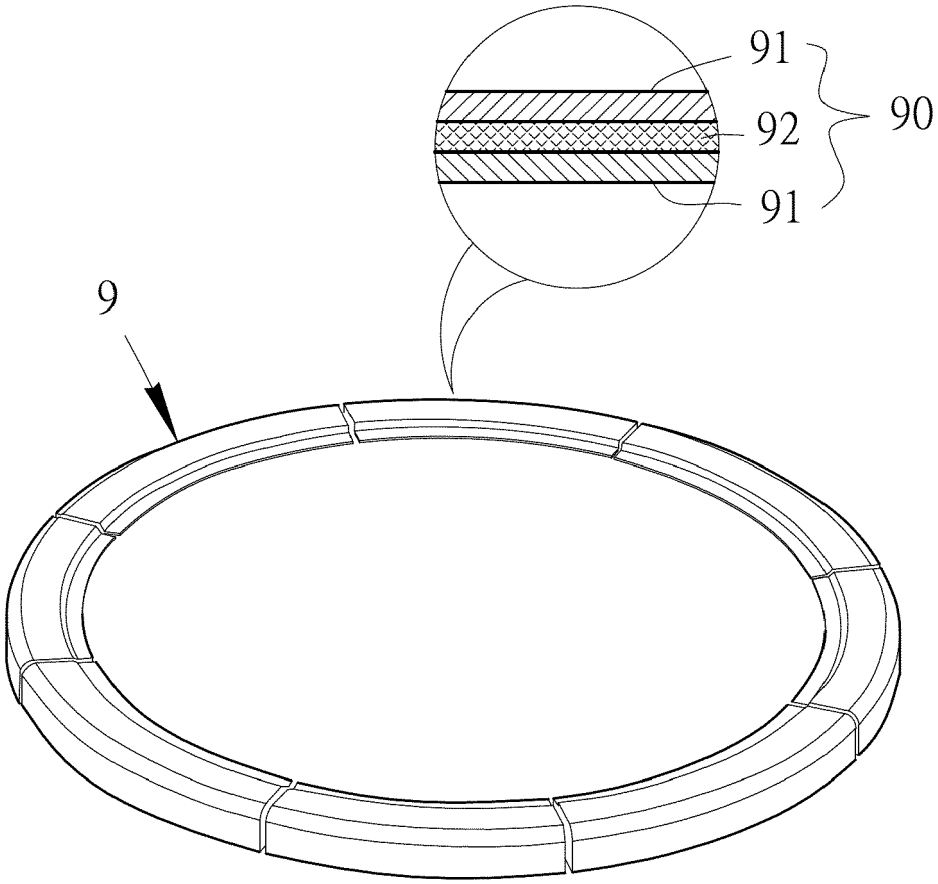

FIG.9
PRIOR ART

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EUROPEAN SEARCH REPORT

Application Number
EP 21 17 3591

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 October 2021	Louter, Petrus

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