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(54) KNITTED FABRIC

(57) Provided is a knitted fabric, which comprises an odd row and an even row adjacent to each other, wherein the odd row has odd-row courses formed by knitting from a first yarn, and the even row has even-row courses formed by knitting from a second yarn; the even-row courses are intermeshed on the odd-row courses with an interval of a predetermined number of drop stitches; the feeding tension when the odd-row courses are formed by knitting is larger than the feeding tension when the even-row courses are formed; and the first yarn comprises a hydrophobic fiber and the second yarn comprises a cellulose filament.

[Symbol Description Of Representative Drawing]

odd rows (11)
even row (12)
first yarn (20)
hydrophobic fiber (21)
elastic fiber (22)
second yarn (30)
cellulose filament (31)
elastic fiber (32)

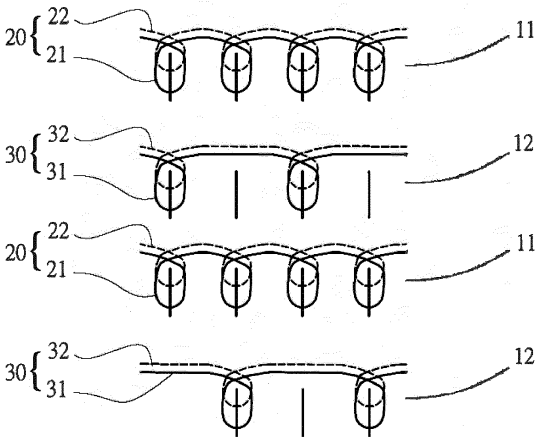

FIG. 1

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Description

[FIELD OF THE INVENTION]

[0001] The present invention relates to textile technology, and more particularly to a knitted fabric which has a good stereoscopic state to achieve a better breathability.

[DESCRIPTION OF THE RELATED ART]

[0002] Cool feeling clothes can reduce the irritable feverish sensation upon wearing. However, hydrophobic materials are largely used as a main component of the fiber, so static charges tend to build up after wearing, causing discomfort during the wearing. Although cellulose filaments such as cotton have a better affinity to human skin, they will cause discomfort in wearing if sweat cannot be properly dissipated after absorption. Therefore, how to use hydrophobic fibers together with cellulose filaments as a yarn structure in, for example, cool feeling clothes still needs to be studied.

[0003] In addition, acrylate is often used as a main component of the fiber in heating clothing, which achieves heat insulation mainly by blocking vapor released from the human body in the clothes, and then trapping the heat released upon condensation of the vapor into water by the fibers. However, if no proper dissipation is achieved after the fiber absorbs moisture, the heating clothing will be wetted, causing an uncomfortable moist sensation in wearing. In contrast, if there is no proper moisture retention, an irritable feverish sensation maybe caused. Therefore, improvements are needed to provide a fabric with moisture-dispelling, heat insulating, and humidity controlling effects.

[SUMMARY OF THE INVENTION]

[0004] Accordingly, a main object of the present invention is to provide a knitted fabric which has a hydrophobic fiber and a cellulose filament as a component of a yarn, and which has an increased stereoscopic state of the fabric itself by a specific knitting method to facilitate the ventilation of air and achieve a cooling effect.

[0005] In order to achieve the above object, the knitted fabric provided in the present invention comprises an odd row and an even row adjacent to each other, where the odd row has odd-row courses formed by knitting from a first yarn, and the even row has even-row courses formed by knitting from a second yarn; the even-row courses are intermeshed on the odd-row courses with an interval of a predetermined number of drop stitches; the feeding tension when the odd-row courses are formed by knitting is larger than the feeding tension when the even-row courses are formed; and the first yarn comprises a hydrophobic fiber and the second yarn comprises a cellulose filament.

[0006] By means of the different feeding tensions when the distinct rows of courses are formed, the odd-row and even-row courses formed are allowed to have a large height difference therebetween, thereby increasing the height difference between protrusions on the surface of the fabric to improve the overall stereoscopic state of the fabric; and the large concave-convex effect between distinct rows can increase the ventilation of air to improve the breathability of the fabric.

[0007] In order to further increase the stereoscopic state of the fabric, the first yarn and/or the second yarn may have an elastic fiber to increase the shrinkage of the courses, further allowing the fabric to obtain a greater three-dimensional concave and convex effect.

[0008] For the feeding tension, it is $\sqrt{\frac{Nd}{10}} \pm 0.3g$ when the odd-row courses are formed, and is $\sqrt{\frac{Nd}{20}} \pm 0.3g$ when the even-row courses are formed. The feeding tension may be between 0.3 g and 0.5 g if no tensile feeder is used.

[0009] In addition, the ratio of the thickness of the first yarn to the second yarn is at a count ratio of the first yarn to second yarn of between 0.5:1 and 1.3:1.

[0010] Furthermore, in order to obtain a high comfort in wearing, the ring of the even-row courses is made larger than the ring of the odd-row courses, so that the knitted state of the second yarn is more loose relative to that of the first yarn.

[0011] Another object of the present invention is to provide a knitted fabric which has a hydrophobic fiber and a cellulose filament as a component of a yarn, and which has an increased stereoscopic state of the fabric itself by a specific knitting method and by napping by a loop sinker, such that the gap between the yarns can retain air to achieve the effect of heat insulation.

[0012] In order to achieve the above object, the knitted fabric provided in the present invention comprises an odd row, having odd-row courses formed by knitting from a first yarn; an even row, adjacent to the odd row and having even-row courses formed by knitting from a second yarn, where the even-row courses are intermeshed on the odd-row courses with an interval of a predetermined number of drop stitches; a third yarn, superposed on the first yarn or the second yarn by a loop sinker, where when the courses are formed by knitting, the ring of the third yarn is correspondingly larger than the ring of the first yarn or the ring of the second yarn; and the first yarn comprises a hydrophobic fiber, the second yarn comprises a cellulose filament, and the third yarn comprises a hydrophobic fiber.

[0013] In order to further increase the stereoscopic state of the fabric, the first yarn and/or the second yarn may have an elastic fiber to increase the shrinkage of the courses, further allowing the fabric to obtain a greater

three-dimensional concave and convex effect.

[0014] For the feeding tension, the feeding tension is $\sqrt{\frac{Nd}{3}} \pm 0.3g$ when the odd-row courses are formed, the feeding tension is $\sqrt{\frac{Nd}{6}} \pm 0.3g$ when the even-row courses are formed, and the feeding tension of the third yarn is $\sqrt{\frac{Nd}{10}} \pm 0.3g$ By means of the different feeding tensions when the distinct rows of courses are formed, the overall stereoscopic state of the fabric is improved; and the large concave-convex effect between distinct rows can increase the ventilation of air to improve the breathability of the fabric.

[0015] In addition, the ratio of the thickness of the first yarn to the second yarn is at a count ratio of the first yarn to second yarn of between 1:1 and 1.3:1, and the count ratio of the third yarn to second yarn is between 0.5:1 to 1.3:1.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[0016]

FIG. 1 is a knitted pattern of a first embodiment of the present invention, which shows that the even row is knitted with an interval of 1 drop stitch.

FIG. 2 is a partial rear view of the first embodiment of the present invention.

FIG. 3 is a partial photomicrograph of the first embodiment of the present invention, showing the state of the front side.

FIG. 4 is a partial photomicrograph of the first embodiment of the present invention, showing the state of the rear side.

FIG. 5 is a knitted pattern according to an additional version of the second yarn in FIG. 1, which shows that the cellulose filament of the second yarn is knitted with an interval of 1 drop stitch, and the elastic fiber of the second yarn is directly knitted without drop stitch.

FIG. 6 is a knitted pattern according to an additional version of the second yarn in FIG. 1, which shows that the even row is knitted with an interval of 3 drop stitches.

FIG. 7 is a knitted pattern according to an additional version of the second yarn in FIG. 5, which shows that the cellulose filament of the second yarn is knitted with an interval of 3 drop stitches, and the elastic fiber of the second yarn is directly knitted without drop stitch.

FIG. 8 is a knitted pattern of a second embodiment of the present invention, which shows that a ring with a larger diameter comprised of a third yarn is superposed on the second yarn, and the even row is knitted with an interval of 1 drop stitch.

FIG. 9 is a partial rear view of the second embodiment of the present invention.

FIG. 10 is a partial photomicrograph of the second embodiment of the present invention, showing the state of the front side.

FIG. 11 is a knitted pattern according to an additional version of the second yarn and the third yarn in FIG. 8, which shows that the ring with a larger diameter comprised of the third yarn is superposed on the first yarn, and the cellulose filament of the second yarn is knitted with an interval of 1 drop stitch, and the elastic fiber of the second yarn is directly knitted without drop stitch.

FIG. 12 is a knitted pattern according to an additional version of the second yarn in FIG. 11, which shows that the even row is knitted with an interval of 3 drop stitch.

FIG. 13 is a knitted pattern according to an additional version of the second yarn in FIG. 11, which shows that the cellulose filament of the second yarn is knitted with an interval of 3 drop stitch, and the elastic fiber of the second yarn is directly knitted without drop stitch.

[DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS]

[0017] First, referring to FIGs. 1 to 4, a knitted fabric (10) provided in a first embodiment of the present invention is a weft knitted fabric having a plurality of odd rows (11) and a plurality of even rows (12) sequentially aligned alternately along the warp direction that are intermeshed on each other by rings, where the odd row (11) is knitted from a first yarn (20), and the even row (12) is knitted from a different second yarn (30). The weft knitting method is a conventional technique that is familiar to those of ordinary skill in the art to which the present invention pertains, so such a conventional technique will be not elaborated in the present invention and in the embodiments herein. However, those involving the technical features of the present invention will be described in detail below.

[0018] When the odd row (11) and the even row (12) are respectively knitted from the first yarn (20) and the second yarn (30) by a circular knitting machine, the feeding tension of the first yarn (20) is larger than the feeding tension of the second yarn (30), so that the odd-row courses and the even-row courses formed separately have different degrees of tightness. Specifically, the odd row (11) formed by knitting with a larger feeding tension is structurally relatively tight, and the even row (12) formed by knitting with a smaller feeding tension is structurally relatively loose.

[0019] Meanwhile, in order to avoid that the even-row courses are excessively stacked on the odd-row courses due to the feeding tension difference between the structurally loose even row (12) and the odd row (11), when the even row (12) is formed by knitting, the even row is knitted with an interval of a predetermined number of drop stitches. The number and position of the drop stitch can be varied according to practical needs. For example, 1 to 3 drop stitches are present, and the drop stitch positions on any two closest even rows (12) are staggered, so as to maintain the overall flatness of the knitted fabric and increase the porosity to improve the breathability.

[0020] For the feeding tensions set in this embodiment, a feeding tension of $\sqrt{\frac{Nd}{10}} \pm 0.3g$ is applied to the first yarn when the odd-row courses are formed by a tensile feeder, and a feeding tension of $\sqrt{\frac{Nd}{20}} \pm 0.3g$ is applied to the second yarn when the courses in the even row (12) are formed by the tensile feeder. If no tensile feeder is used, the feeding tension may be between 0.3 g and 0.5 g, and the size of the rings of the even-row courses is greater than the size of the rings of the odd-row courses. In addition, the ratio of the thickness of the first yarn (30) to the second yarn (20) may be restricted to a count ratio of between 0.5:1 and 1.3:1.

[0021] By means of the above technique, the knitted fabric (10) is structurally more stereoscopic than the fabric in the prior art, so that the difference between the protruding highest point and lowest point on the surface of the fabric is between 0.022 mm and 0.44 mm. Moreover, the fabric has concaves and convexes and good breathability by the formation of the even row (12) and the odd row (11).

[0022] Further, it is to be noted that the first yarn (20), may further comprise, in addition to a hydrophobic fiber (21) such as polypropylene, polyethylene terephthalate or nylon, an elastic fiber (22). Similarly, the second yarn (30) may further comprise, in addition to a cellulose filament (31) such as cotton, hemp or rayon, an elastic fiber (32), to prevent the fabric from being too loose. The cellulose filament (31) can adjust the moisture content to prevent the generation of static charges.

[0023] In addition, the number and position of the drop stitch can be changed on the cellulose filament (31) and the elastic fiber (32) included in the second yarn (30) according to practical needs. For example, in FIGs 1 to 6, the number and position of the drop stitch on the cellulose filament (31) and the elastic fiber (32) of the second yarn (30) are the same. After the elastic fiber (32) shrinks, the concaves and convexes on the cellulose filament (31) become obvious, thus improving the overall stereoscopic state and breathability of the fabric. In FIGs. 5 to 7, the elastic fiber (32) of the second yarn (30) is not knitted with an interval of a predetermined number of drop stitches, as does the cellulose filament (31) of the second yarn (30), so that the cellulose filament (31) is in a slightly concave-convex state.

[0024] Accordingly, in the knitted fabric (10) provided in the present invention, a cellulose filament having affinity to human skin is knitted into the fabric, and allowed to have a loose structure relative to other knitted structures, such that these materials are relatively raised on the surface of the fabric in contact with human skin, to achieve a comfortable wearing experience, and also a good breathability.

[0025] As shown in FIGs. 8 to 9, a second embodiment of the present invention differs from the first embodiment in that a knitted fabric (10A) further includes a third yarn (40) comprising a hydrophobic fiber, which is superposed on a first yarn (20A) or a second yarn (30A) by a loop sinker, and has a ring that is correspondingly larger than that of the first yarn (20A) or the second yarn (30A) when courses are formed by knitting. Specifically, the third yarn (40) and the first yarn (20A) are combined with each other to form the odd-row courses by neighboring connection or enwind connection; or the third yarn (40) and the second yarn (30A) are combined with each other to form the even-row courses by neighboring connection or enwind connection. In this embodiment, the ring having a larger outer diameter comprised of the third yarn (40) is superposed on the second yarn (30A) and knitted to form even-row courses.

[0026] Furthermore, when the even-row courses are formed by knitting with a circular knitting machine, the ring of the third yarn (40) is correspondingly larger than the ring of the second yarn (30A), and the size of the ring can be adjusted according to actual needs. The ring of the second yarn (30A) structurally serves to intermesh and fix the yarns, and the ring of the third yarn (40) serves to increase the bulkiness of the knitted fabric (10A) . Specifically, there is a large height difference between any two rings closest to each other, that is, part of the ring of the third yarn (40) is relatively far from the plane of the ring of the second yarn (30A), thereby increasing the height difference between protrusions on the surface of the fabric to improve the overall stereoscopic state of the fabric; and gaps for retaining air are increased between the yarns to improve the effect of heat insulation. In other embodiments, the ring having a larger outer diameter comprised of the third yarn (40) is superposed on the first yarn (20A), and knitted to form the odd-row courses. The ring of the third yarn (40) is correspondingly larger than that of the first yarn (20A), which is also used to increase the overall stereoscopic state of the fabric to improve the heat insulation. Moreover, the first yarn (20A) comprises a hydrophobic fiber (21A) and an elastic fiber (22A); and the number and position of the drop stitch on a hydrophobic fiber (31A) and an elastic fiber (32A) included in the second yarn (30A) can also be varied according to practical needs (as shown in FIGs. 11 to 13).

[0027] For the feeding tensions set in this embodiment,

a feeding tension of $\sqrt{\frac{Nd}{3}} \pm 0.3g$ is applied to the first yarn (20A) when the odd-row courses are formed by a tensile feeder, and a feeding tension of $\sqrt{\frac{Nd}{6}} \pm 0.3g$ is applied to the second yarn (30A) when the even-row courses are formed by the tensile feeder. If no tensile feeder is used, the feeding tension may be between 0.3 g and 0.5 g, and the feeding tension of the third yarn is $\sqrt{\frac{Nd}{6}} \pm 0.3g$. In this way, the size of the rings of the even-row courses and the rings of the odd-row courses can be changed according to actual needs.

[0028] As for the thickness of the yarns, the count ratio of the first yarn (20A) to the second yarn (30A) is from 1:1 to 1.3:1, and the count ratio of the third yarn (40) to the second yarn (30A) is from 0.5:1 to 1.3:1.

[0029] Accordingly, in the knitted fabric (10A) provided in the present invention, a cellulose filament having affinity to human skin is knitted into the fabric, and a bulky and breathable structure is formed by napping by a loop sinker, such that the materials are relatively raised on the surface of the fabric in contact with human skin, to achieve a comfortable wearing experience, and the gaps between yarns can retain air to have both good heat insulation and moisture-dispelling and controlling effects.

[SYMBOL DESCRIPTION]

[0030]

knitted fabric (10) (10A)
odd rows (11)
even row (12)
first yarn (20) (20A)
hydrophobic fiber (21) (21A)
elastic fiber (22) (22A)
second yarn (30) (30A)
cellulose filament (31) (31A)
elastic fiber (32) (32A)
third yarn (40)

Claims

1. A knitted fabric, comprising:

an odd row, having odd-row courses formed by knitting from a first yarn;
an even row, adjacent to the odd row and having even-row courses formed by knitting from a second yarn, wherein the even-row courses are intermeshed on the odd-row courses with an interval of a predetermined number of drop stitches;
the first yarn comprises a hydrophobic fiber and the second yarn comprises a cellulose filament; and when the odd-row courses and the even-row courses are formed by knitting, the feeding tension when the odd-row courses are formed is larger than the feeding tension when the even-row courses are formed.

2. The knitted fabric according to claim 1, wherein the feeding tension when the odd-row courses are formed by knitting is $\sqrt{\frac{Nd}{10}} \pm 0.3g$.

3. The knitted fabric according to claim 1 or 2, wherein the feeding tension when the even-row courses are formed by knitting is $\sqrt{\frac{Nd}{20}} \pm 0.3g$.

4. The knitted fabric according to claim 1 or 2, wherein the feeding tension when the even-row courses are formed by knitting is between 0.3 g to 0.5 g.

5. The knitted fabric according to claim 1, wherein the difference between the protruding highest point and the protruding lowest point on the surface of the fabric is between 0.022 mm and 0.44 mm.

6. The knitted fabric according to claim 1, wherein the count ratio of the first yarn to the second yarn is from 0.5:1 to 1.3:1.

7. The knitted fabric according to claim 1, wherein the ring of the even-row courses is larger than the ring of the odd-row courses.

8. The knitted fabric according to claim 1, wherein the first yarn further comprises an elastic fiber.

9. The knitted fabric according to claim 1, wherein the second yarn further comprises an elastic fiber.

10. The knitted fabric according to claim 1, 7 or 8, wherein the odd-row courses are spaced by a predetermined number of drop stitches.

11. The knitted fabric according to claim 1, wherein the even-row courses are spaced by 1, 2 or 3 drop stitches.

12. A knitted fabric, comprising:

an odd row, having odd-row courses formed by knitting from a first yarn;
an even row, adjacent to the odd row and having even-row courses formed by knitting from a second yarn, wherein the even-row courses are intermeshed on the odd-row courses with an interval of a predetermined number of drop stitches; and
a third yarn, superposed on one of the first yarn or the second yarn by a loop sinker, wherein when the courses are formed by knitting, the ring of the third yarn is correspondingly larger than the ring of the first yarn or the ring of the second yarn; and
the first yarn comprises a hydrophobic fiber, the second yarn comprises a cellulose filament, and the third yarn comprises a hydrophobic fiber;

13. The knitted fabric according to claim 12, wherein the feeding tension of the third yarn is $\sqrt{\frac{Nd}{10}} \pm 0.3g$.

14. The knitted fabric according to claim 12 or 13, wherein the feeding tension when the odd-row courses are formed by knitting is $\sqrt{\frac{Nd}{10}} \pm 0.3g$.

15. The knitted fabric according to claim 12 or 13, wherein the feeding tension when the even-row courses are formed by knitting is $\sqrt{\frac{Nd}{20}} \pm 0.3g$.

16. The knitted fabric according to claim 12 or 13, wherein the feeding tension when the even-row courses are formed by knitting is between 0.3 g to 0.5 g.

17. The knitted fabric according to claim 12, wherein the difference between the protruding highest point and the protruding lowest point on the surface of the fabric is between 0.022 mm and 0.44 mm.

18. The knitted fabric according to claim 12, wherein the count ratio of the first yarn to the second yarn is from 1:1 to 1.3:1, and the count ratio of the third yarn to the second yarn is from 0.5:1 to 1.3:1.

19. The knitted fabric according to claim 12, wherein the first yarn further comprises an elastic fiber.

20. The knitted fabric according to claim 12, wherein the second yarn further comprises an elastic fiber.

21. The knitted fabric according to claim 12, 18 or 19, wherein the odd-row courses are spaced by a predetermined number of drop stitches.

22. The knitted fabric according to claim 12, wherein the even-row courses are spaced by 1, 2 or 3 drop stitches.

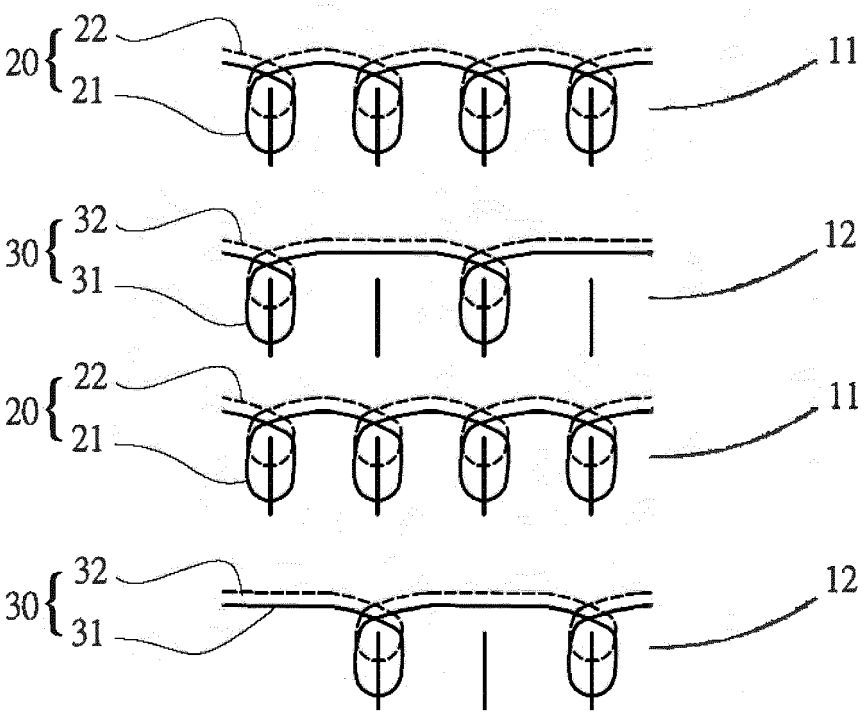


FIG. 1

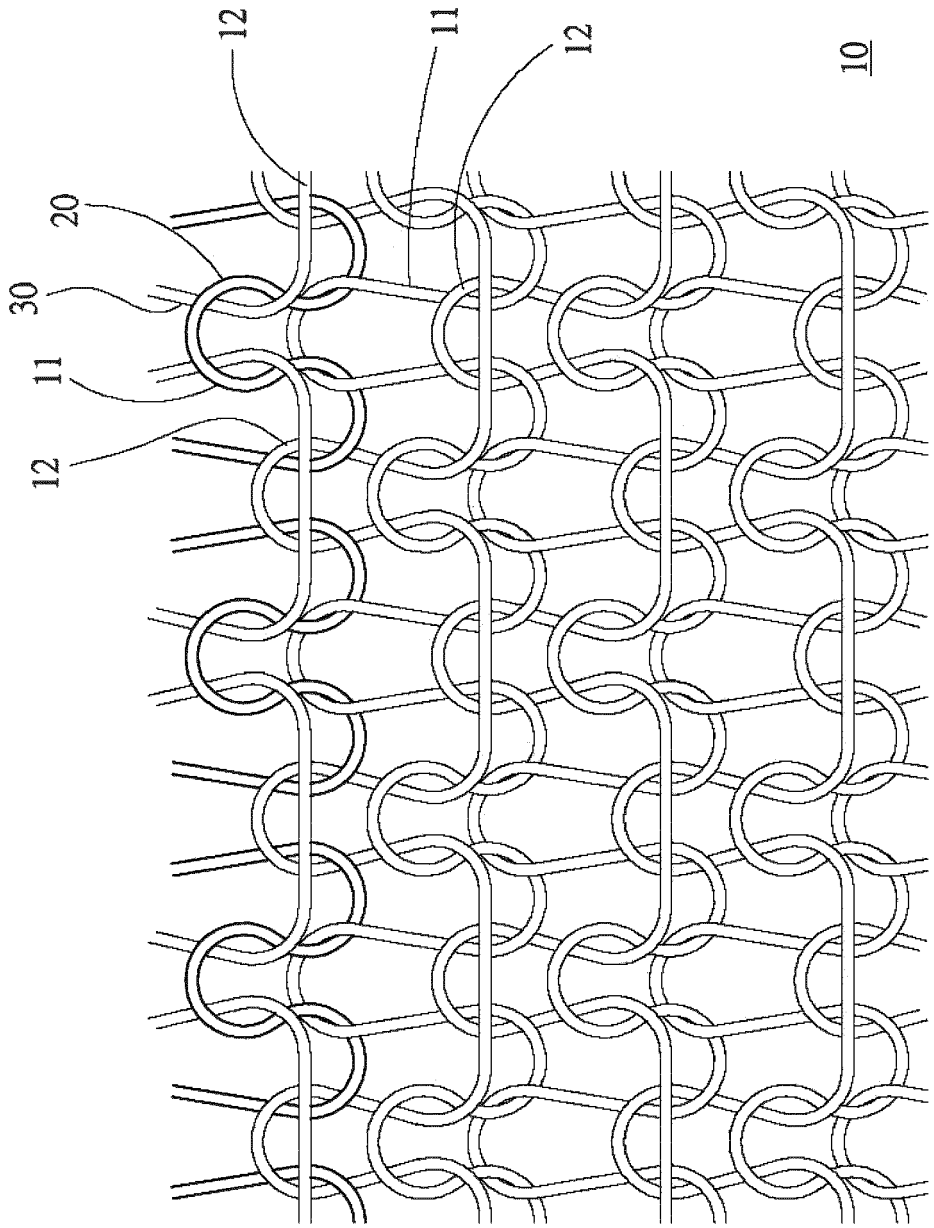


FIG. 2

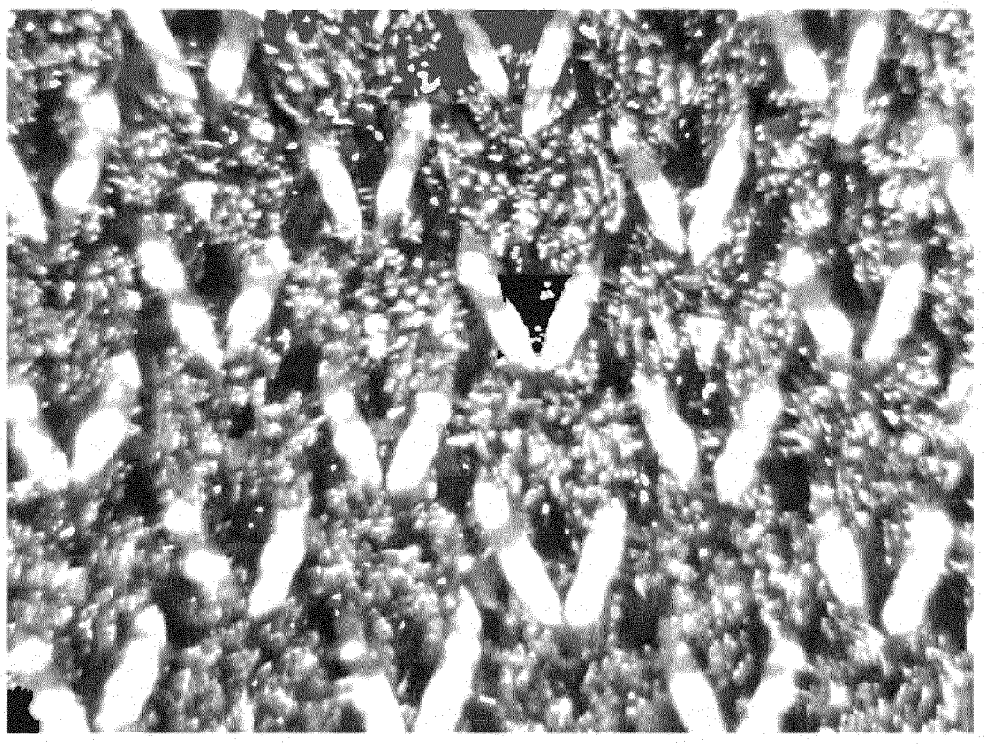


FIG. 3

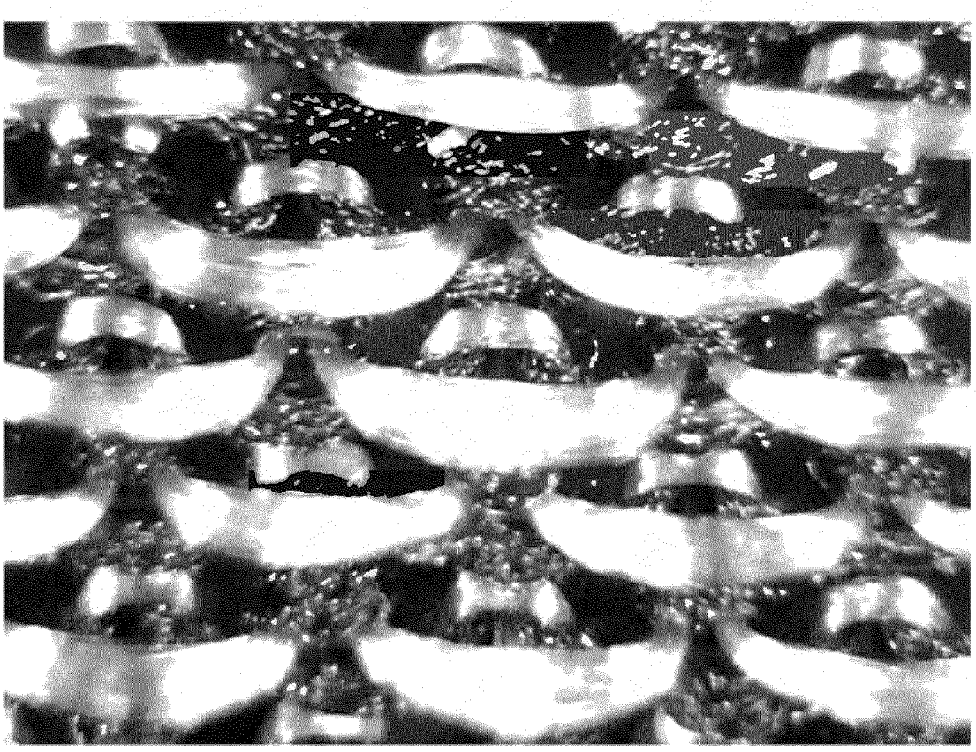
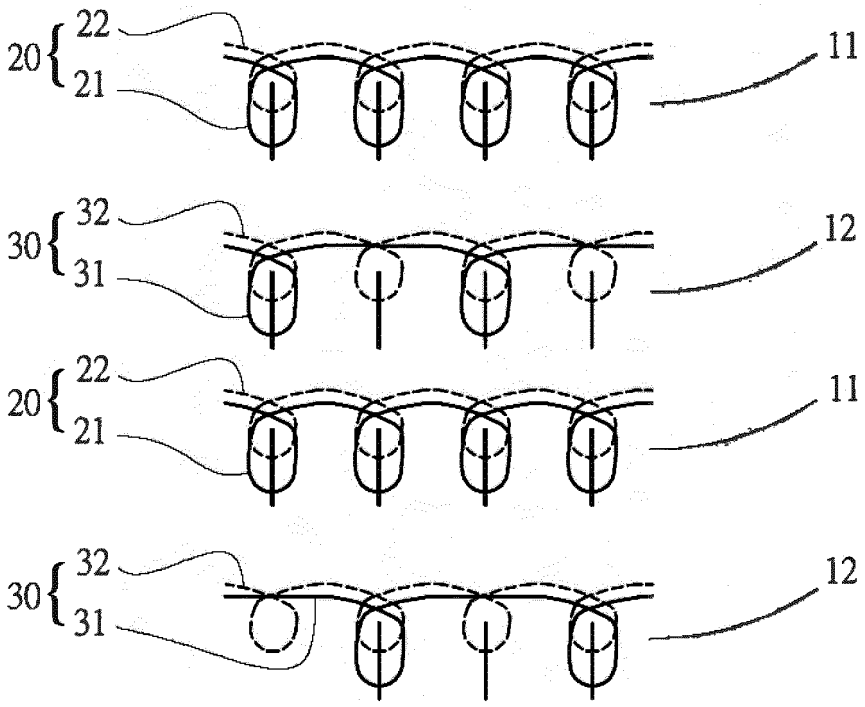


FIG. 4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12

FIG. 5

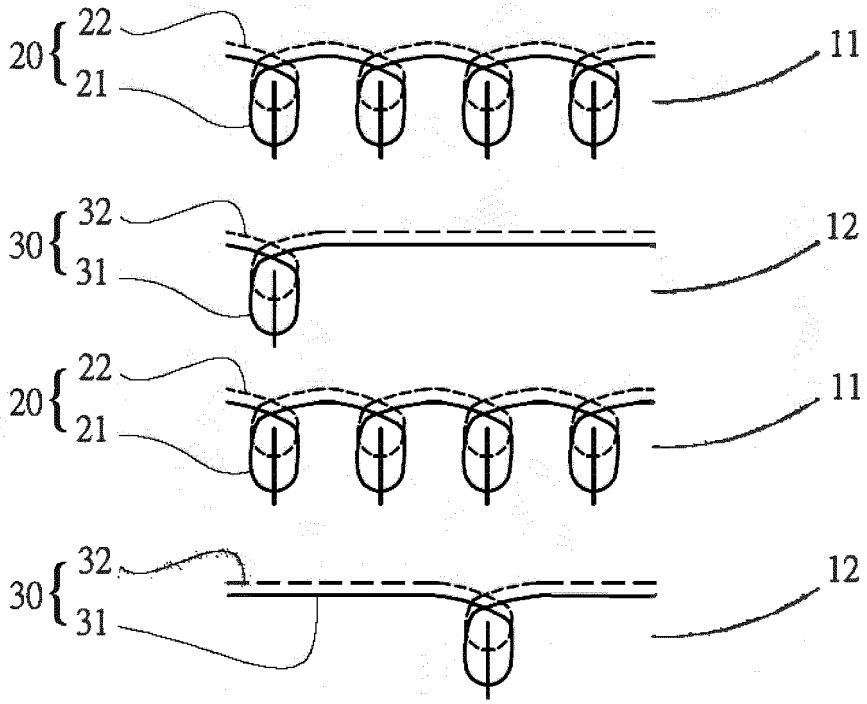
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FIG. 6

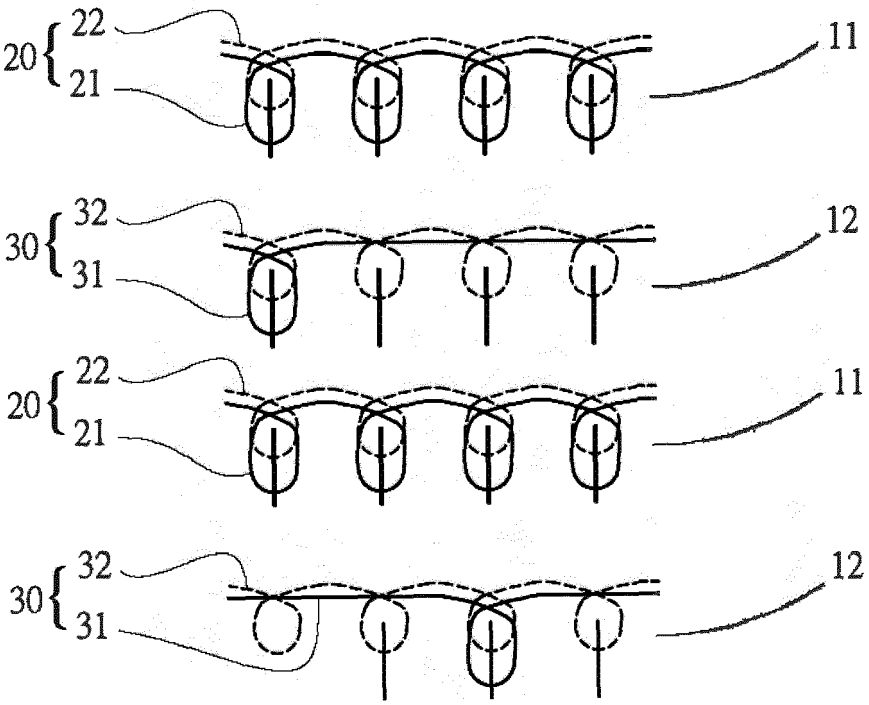

FIG. 7

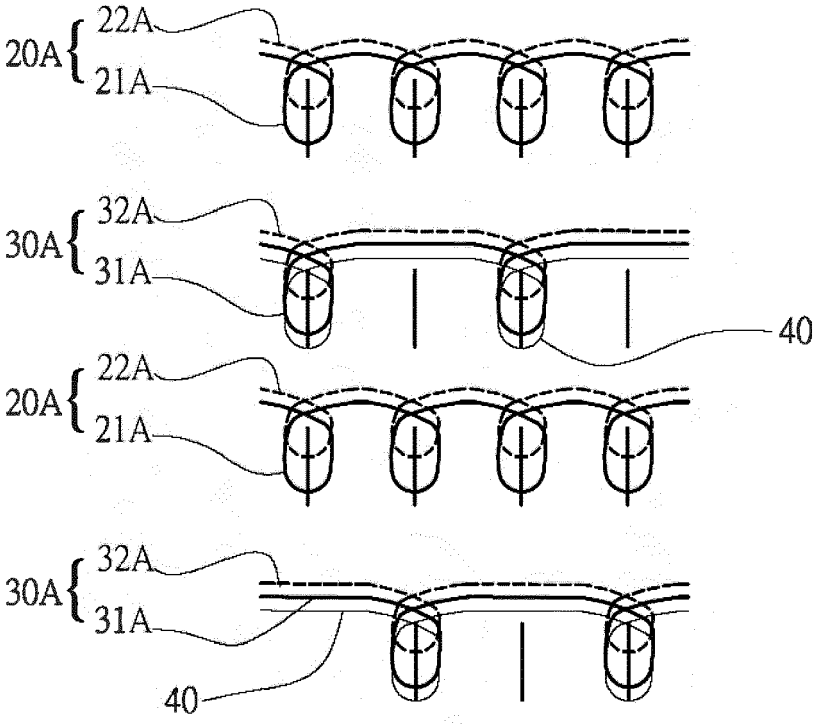

FIG. 8

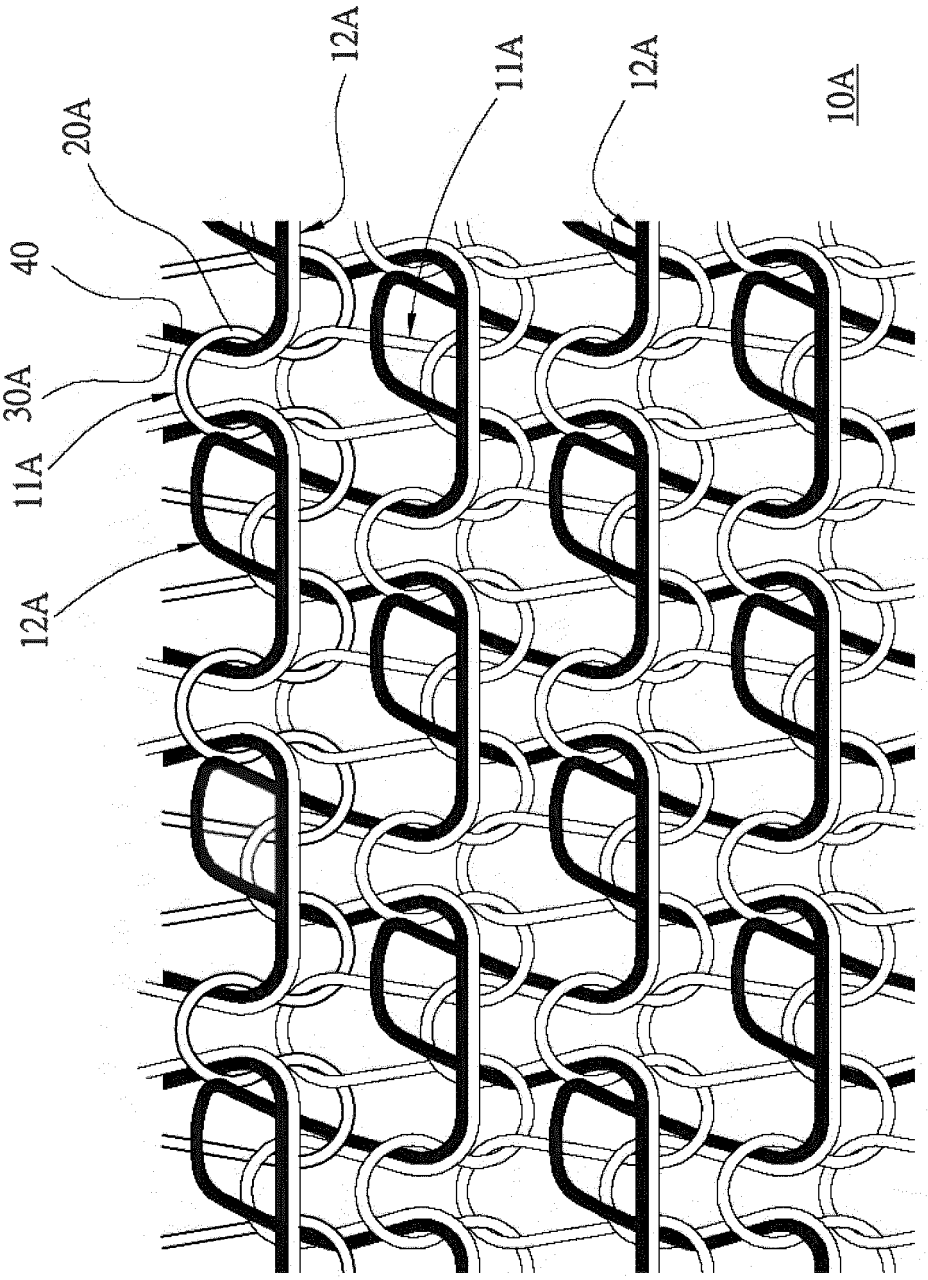

FIG. 9

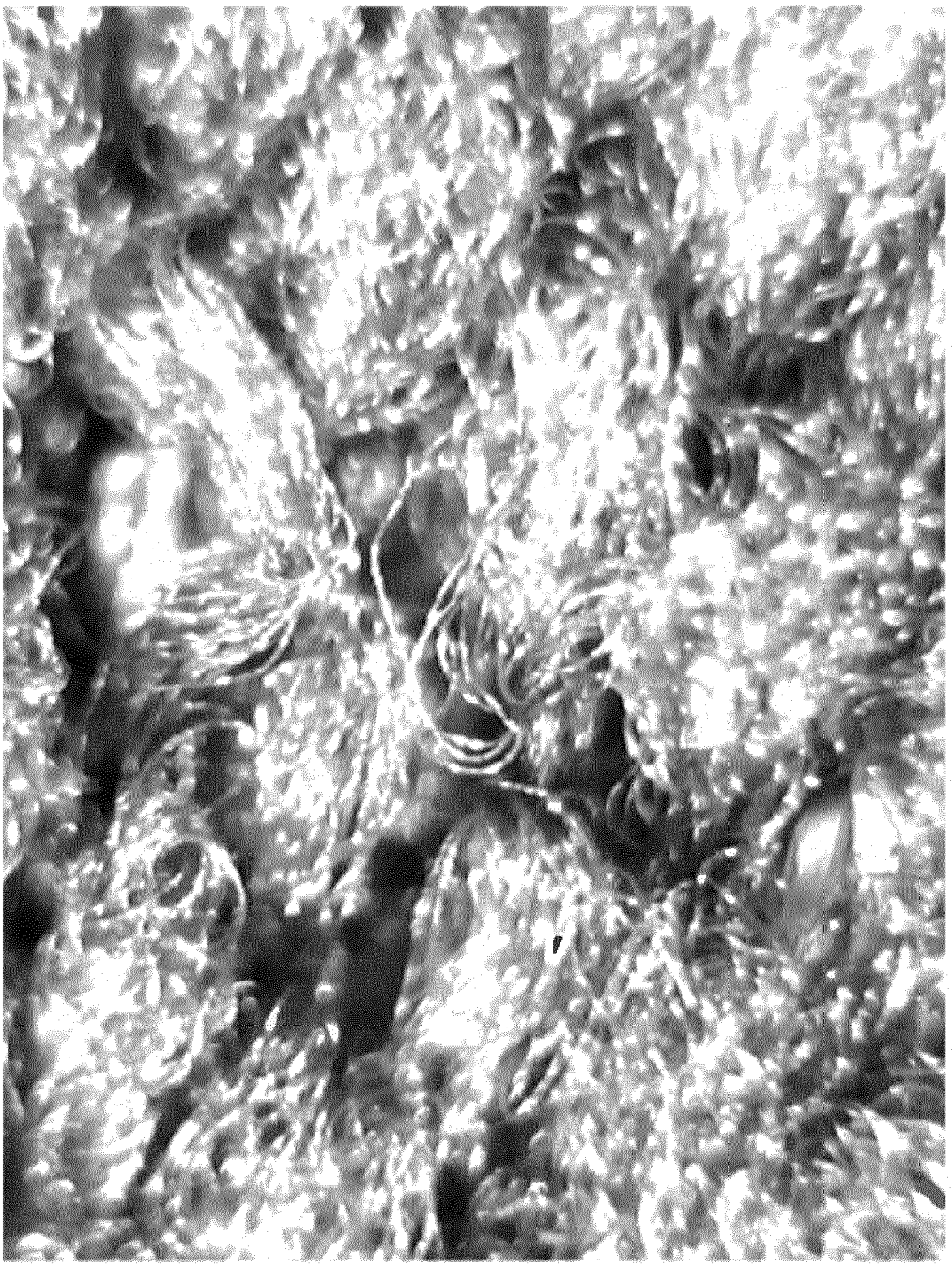

FIG. 10

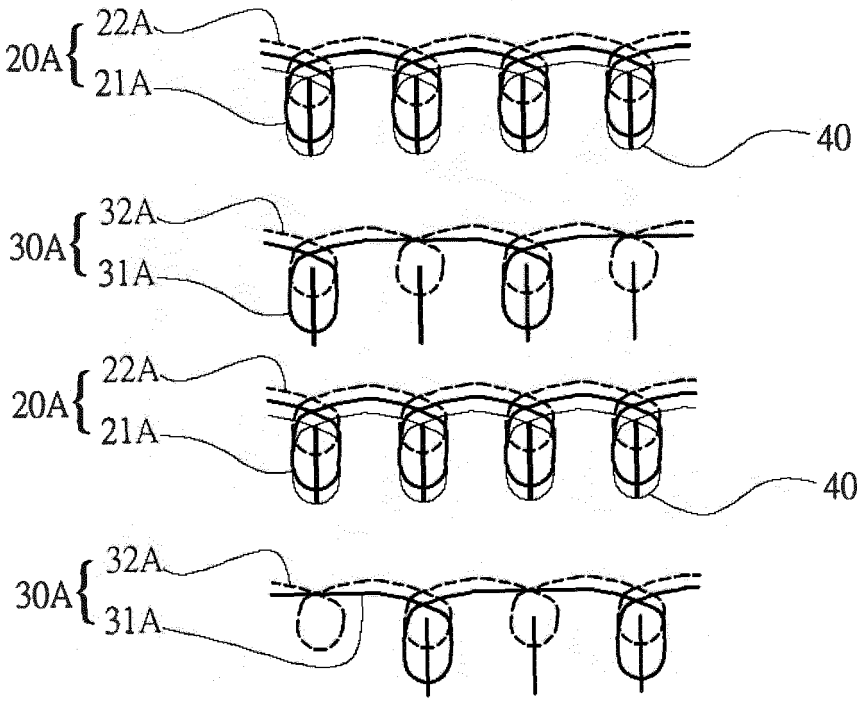
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FIG. 11

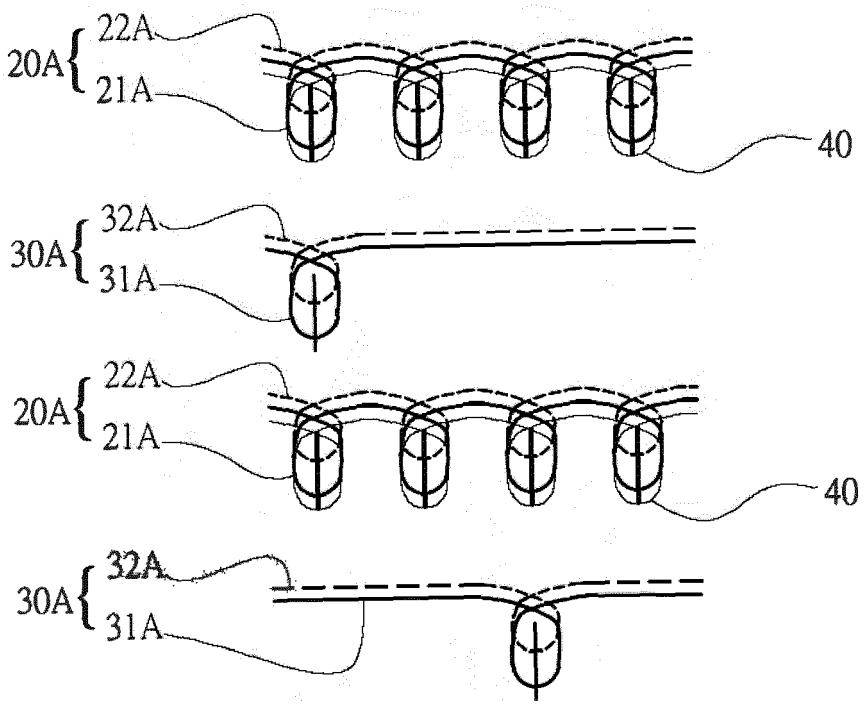
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FIG. 12

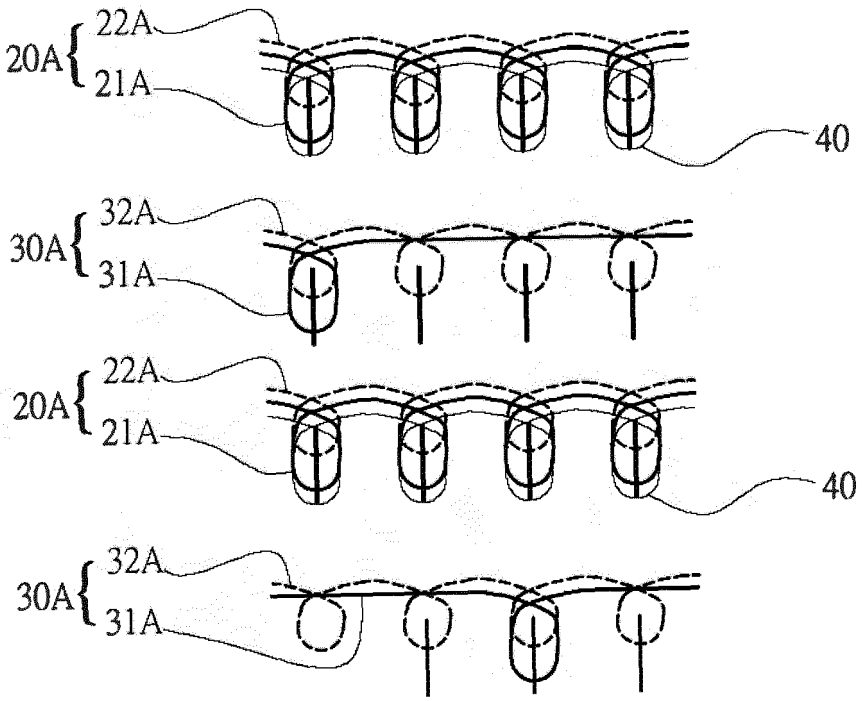

FIG. 13