Jan. 8, 1963 M. KURZ 3,071,951

KNITTED MESH FABRIC

Filed Dec. 14, 1960

FIG. 1

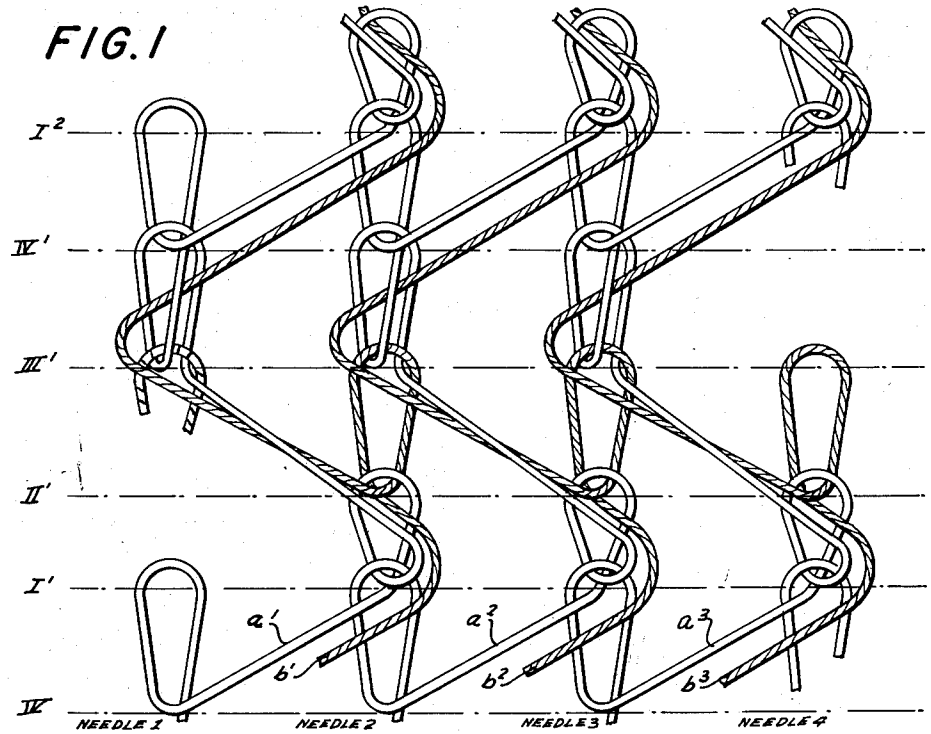
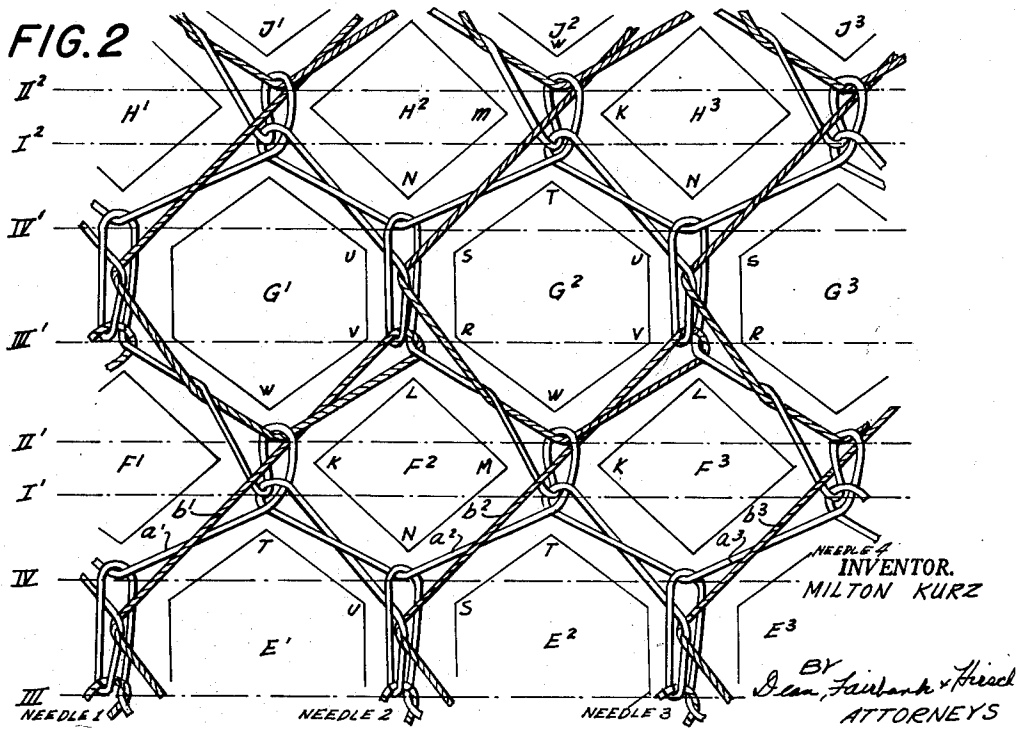


FIG. 2



INVENTOR.
MILTON KURZ

BY
Dean, Fairbank & Hirsch
ATTORNEYS

United States Patent Office

3,071,951

Patented Jan. 8, 1963

3,071,951

KNITTED MESH FABRIC

Milton Kurz, Cedarhurst, N.Y.

Filed Dec. 14, 1960, Ser. No. 75,820
11 Claims. (Cl. 66—195)

As conducive to an understanding of the invention, it is noted that unless knitted mesh fabrics, after stretching and finishing as by the appplication of resin thereto, do not distort, and retain their mesh design and formation, the fabric will be unattractive in appearance and hence unsaleable.

It is accordingly among the objects of the invention to provide a knitted mesh fabric having a unique stitch formation that may be made on a conventional knitting machine, which stitch formation will provide a fabric having a much greater degree of stabilization when treated in conventional manner as with a resin finish than similar fabrics made at the same cost of manufacture.

The fabric according to the invention is made on a machine having a minimum of two guide bars and one needle bar such as the conventional "Kidde Knitter" made by Kidde Textile Machinery Corp. of Bloomfield, N.J.

The machine is set with each of the plurality of guides on the guide bars threaded and equal to the number of needles knitting and the guide bars are actuated so as to cause the threads on one guide bar not to be engaged by the needles when the threads on the other guide bar are engaged by the needles.

In the accompanying drawings in which is shown one of various possible embodiments of the several features of the invention

FIG. 1 is a plan view of a portion of the knitted fabric prior to stretching, and

FIG. 2 is a view similar to FIG. 1 of the fabric after stretching.

Referring now to the drawings, a plurality of pairs of threads *a*, *b* are used to make the fabric. One thread of each pair is always knitting and one thread of each pair is always laying in and not knitting.

In FIG. 1 the plurality of pairs is shown by the threads a^1, b^1, a^2, b^2, a^3, b^3, and the needle positions are shown by numerals **1**, **2**, **3**, and **4**, which form wales as is well known in the art. The beginning of each stitch is marked by lines and numbered IV (I^1, II^1, III^1, IV^1) I^2, it being apparent that four courses are used for each repeat.

In FIG. 1, stitch I^1 is made by threads a^1, a^2, a^3, knitting respectively on needles **2**, **3**, **4** and by the threads b^1, b^2, b^3, laying in on the right side of needles **2**, **3**, **4** respectively.

In FIG. 1 stitch II^1 is made by threads b^1, b^2, b^3, knitting on needles **2**, **3**, **4** respectively and threads a^1, a^2, a^3, laying in on the left side of needles **2**, **3**, **4**, respectively.

In FIG. 1 stitch III^1 is made by threads a^1, a^2, a^3, knitting respectively on needles **1**, **2**, **3**, and threads b^1, b^2, b^3, laying in on the left side of needles **1**, **2**, **3** respectively.

It is important to note at this point the movement of the plurality of pairs of threads *a*, *b* between stitch II^1 to stitch III^1. In stitch II^1 the threads a^1, b^1, a^2, b^2, a^3, b^3, are laying in and knitting respectively on needles **2**, **3**, **4**. Then in stitch III^1 the threads a^1, b^1, a^2, b^2, a^3, b^3, knit and lay in on needles **1**, **2**, **3** respectively. This movement of the plurality of pairs from needles **2**, **3**, **4**, to needles **1**, **2**, **3**, is necessary to develop the mesh fabric.

In FIG. 1 stitch IV^1 is made by the threads a^1, a^2, a^3, knitting on needles **1**, **2**, **3**, respectively, and the threads b^1, b^2, b^3, laying in on the right of the needles **1**, **2**, **3**, respectively.

In FIG. 1 stitch I^2 is made by the threads a^1, a^2, a^3, knitting on needles **2**, **3**, **4**, respectively and threads b^1, b^2, b^3, laying in on the right of needles **2**, **3**, **4**, respectively.

Stitch I^2 is a repeat of stitch I^1 stated above but it is repeated to show the complete cycle of this mesh fabric and to demonstrate a very important movement of the plurality of pairs between stitch IV^1 and stitch I^2.

In FIG. 1 at stitch IV^1 threads a^1, a^2, a^3, are knitting respectively on needles **1**, **2**, **3**, and threads b^1, b^2, b^3, are laying in on the right side of needles **1**, **2**, **3**, respectively: and in stitch I^2 threads a^1, a^2, a^3, are knitting on needles **2**, **3**, **4** respectively and threads a^1, a^2, a^3, are laying in on the right side of needles **2**, **3**, **4**. This movement completes the cycle to develop the mesh fabric.

At this point it must be noted that even though a plurality of pairs of threads have shifted to the left between stitch II^1 and stitch III^1; and the plurality of pairs of threads have shifted to the right between stitch IV^1 and stitch I^2, a continuous chain knitting occurs on all needles to make a fabric; necessary selvage threads being used here as in all other warp knitting.

FIG. 2 shows the mesh fabric in its stretched form after being knitted as described above. The beginning of each stitch is shown by full lines and marked with stitch numbers III, IV, I^1, II^1, III^1, IV^1, I^2, II^2.

FIG. 2 shows the formation of hexagon meshes E, G, J, in lateral rows and the diamond meshes F, H, in lateral rows: the lateral rows of meshes alternately being hexagonal and diamond shaped.

In FIG. 2 schematic hexagons and diamonds are drawn in more clearly to illustrate the different parts of the mesh.

The hexagons have vertices R, S, T, U, V, W and sides RS, ST, TU, UV, VW, WR, and the diamonds have vertices K, L, M, N, and sides KL, LM, MN, NK. The hexagon meshes are labeled G^1, G^2, G^3, E^1, E^2, E^3, J^1, J^2, J^3 and diamond meshes are labeled F^1, F^2, F^3, H^1, H^2, H^3.

Hexagon mesh G^2 has its vertex T formed by the juncture of threads a^3, a^2, and b^2 at the beginning of stitch I^2. This juncture is also the vertex of diamond meshes H^2 at M and H^3 at K and vertex of hexagon mesh J^2 at W.

Vertex W of hexagon mesh G^2 is formed by the juncture of threads a^3, a^2, and b^2 at the beginning of stitch I^1. It is also the vertex of diamond meshes F^2, at M and F^3 at K: and hexagon mesh E^2 at T.

The side ST of hexagon mesh G^2, is formed by threads b^2, and a^2 at the end of stitch III^1 and through stitch IV^1. This also is the side MN of diamond mesh H^2.

The side SR of hexagon mesh G^2 is formed by the juncture of threads a^2, b^2, b^1. This also forms the UV side of hexagon mesh G^1 and also makes the vertices of diamond meshes H^2 at N and F^2 at L. This occurs at stitch III^1 through beginning of stitch IV^1.

The side RW of hexagon mesh G^2 is formed by the threads a^2, and b^2 in stitch II^1. This side is also the side LM of diamond mesh F^2.

The side WV of hexagon mesh G^2 is formed by thread b^2 forming an elongated loop in stitch II^1. It is also side KL of diamond mesh F.

Side UV of hexagon mesh G^2 is formed by threads a^3, b^3, b^2, in stitch III^1 through the beginning of stitch IV^1. It is also side SR of hexagonal mesh G^3, the vertex N of diamond mesh H^3 and the vertex L of diamond mesh F^3.

Side TU of hexagon mesh G^2 is formed by threads a^3 forming an elongated loop in stitch IV^1. This is also side KN of diamond mesh H^3.

The elongated loop formed on the back bar in stitch II^1 and the elongated loop formed on the front bar in stitch IV^1 give the mesh fabric its stabilized characteristic.

Although the fabric of the type generally described having the desired characteristics could be made by any

number of formulas, for the particular structure the following could be employed:

Front chain—02 00 24 24
Back chain—00 20 44 22

The following is a description of the parts of diamond mesh F^2.

Vertex L of diamond mesh F^2 is formed by the juncture of threads b^1 and a^2 at the beginning of stitch III^1.

Vertex N of diamond mesh F^2 is formed by the juncture of a^2 with itself at stitch IV.

Vertex K of diamond mesh F^2 is formed by the juncture of threads a^1, a^2, and b^1 at the beginning of stitch I^1. It also is the vertex W of hexagon mesh G^1, vertex T of hexagon mesh E^1; and vertex M of diamond mesh F^1.

Vertex M of diamond F^2 is formed by the juncture of threads a^2, a^3, and b^2 at the beginning of stitch I^1. It is also the vertex K of diamond mesh F^3 and vertex W of hexagon mesh G^2, and vertex T of hexagon mesh E^2.

The side LM of diamond mesh F^2 is formed by the juncture of threads b^2 and a^2 in stitch II^1. It is also the side RW of hexagon mesh G^2.

The side LK of diamond mesh F^2 is made by the elongated loop of thread b^1 at stitch II^1. It is also the side WV of hexagon mesh G^1.

The side KN of diamond mesh F^2 is made by the elongated loop of thread a^2 in stitch IV. It also is the side TU of hexagon mesh E^1.

Side MN of diamond mesh F^2 is formed by the juncture of threads a^2 and b^2 in stitch IV. It also is the side ST of hexagon mesh E^2.

The knitted mesh fabric above described which is made by a four course repeat resulting in rows of hexagonal and diamond shaped openings, is extremely stable and will not readily distort.

As many changes could be made in the above article and many different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above descripion or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. As an article of manufacture a mesh fabric comprising a plurality of pairs of threads knitted to form a plurality of parallel rows and parallel columns of mesh openings extending respectively transversely across the width of the fabric and longitudinally of the length thereof, alternate rows and columns having hexagonal and diamond shaped openings respectively, said openings being defined by a four stitch repeat of said plurality of pairs of threads.

2. The combination set forth in claim 1 in which one of the vertices of each diamond mesh opening is one of the vertices of an adjacent diamond mesh opening and two hexagon mesh openings adjacent said two diamond mesh openings.

3. The combination set forth in claim 1 in which the transversely aligned vertices of each diamond mesh opening is respectively one of the vertices of adjacent laterally spaced diamond mesh opening and the two hexagon mesh openings arranged longitudinally between each of said pairs of adjacent diamond mesh openings.

4. The combination set forth in claim 1 in which one of the sides of each diamond mesh opening is also one of the sides of the adjacent hexagon mesh opening.

5. The combination set forth in claim 1 in which the four sides of each diamond mesh opening is one of the sides of the adjacent hexagon mesh opening.

6. The combination set forth in claim 1 in which each of the traversely aligned vertices of each diamond mesh opening is respectively one of the vertices of the adjacent laterally spaced diamond mesh openings and the two hexagon mesh openings arranged longitudinally between each of said pairs of adjacent diamond mesh openings and the four sides of each of the diamond mesh openings is one of the sides of the adjacent hexagon mesh opening.

7. The combination set forth in claim 1 in which one of the vertices of each hexagon mesh opening is one of the vertices of the adjacent longitudinally aligned hexagon mesh openings.

8. The combination set forth in claim 1 in which the longitudinally aligned vertices of each hexagon mesh opening is respectively one of the vertices of the adjacent longitudinally spaced diamond mesh opening and one of the vertices of each of the adjacent diamond mesh openings in the transverse row on each side of the row containing said hexagon mesh opening.

9. The combination set forth in claim 1 in which the pair of adjacent sides of each hexagon mesh opening near each of the longitudinally aligned vertices of said hexagon mesh opening is one of the sides of each adjacent diamond mesh opening in the transverse row on each side of the row containing said hexagon mesh opening and the transversely aligned sides of said hexagon mesh opening is one of the sides of the adjacent hexagon mesh opening in the same transverse row.

10. The combination set forth in claim 1 in which two of the sides of each hexagon mesh opening is defined by an associated elongated loop which also defines one side of each of the two adjacent longitudinally aligned diamond mesh openings.

11. In a lace-like knitted fabric having parallel rows and parallel columns of mesh openings extending respectively transversely across the width of the fabric and longitudinally of the length thereof, alternate rows and columns having hexagonal and diamond-shaped openings, said hexagonal openings having two sides defined by elongated loops each within a given wale and two sides defined by elongated loops extending between two wales respectively and two sides having an underlap and an inlay from wale to wale of the previous extended loop from wale to wale, said diamond-shaped opening having two sides defined by the elongated loops from wale to wale and two sides defined by the underlap and inlay from wale to wale of the previous extended loop from wale to wale.

References Cited in the file of this patent

FOREIGN PATENTS

565,754 Great Britain ---------- Nov. 27, 1944

OTHER REFERENCES

Textbook: "Lehrbuch fur Anfanger auf der Raschelmaschine" by Kunze and Knobloch. Published in 1925 in Apolda, Germany by Deutscher Wirker-Zeitung. Only page 54 is required.