July 3, 1928. 1,675,506

E. R. MEINIG

WARP KNIT FABRIC

Filed Dec. 10, 1924

Fig. 1.

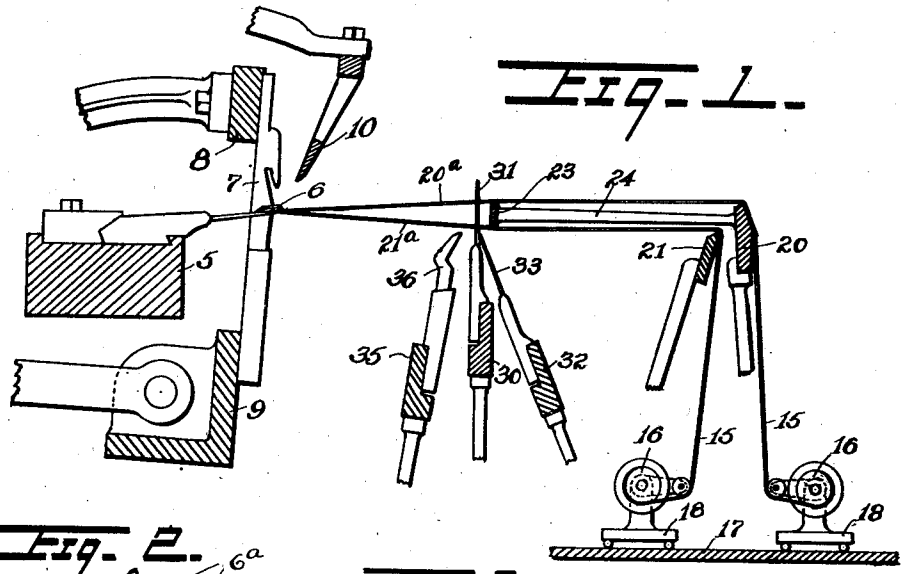


Fig. 2.

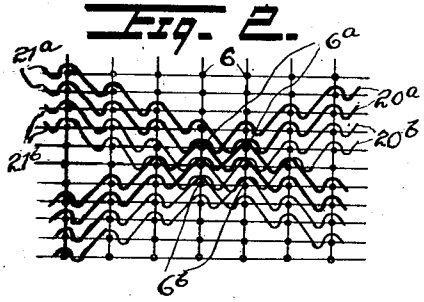


Fig. 3.

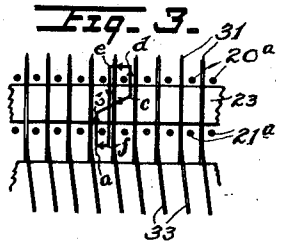


Fig. 4.



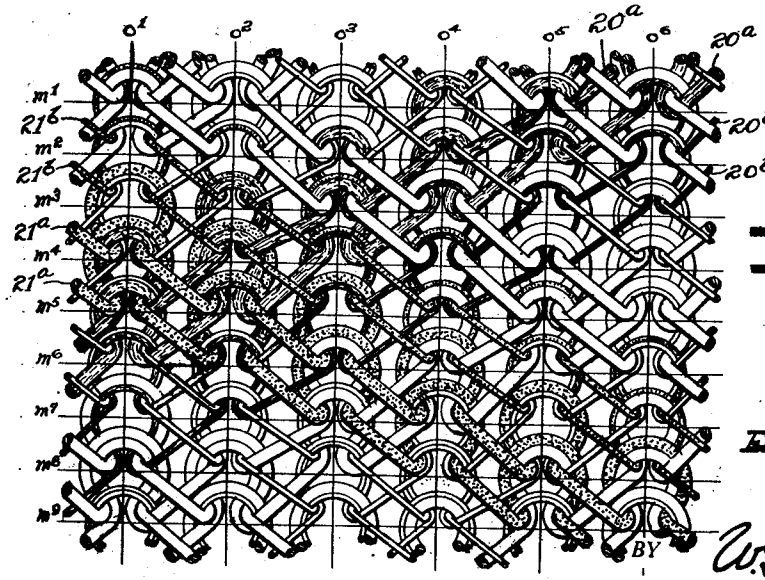


Fig. 5.

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UNITED STATES PATENT OFFICE.

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WARP KNIT FABRIC.

Application filed December 10, 1924. Serial No. 754,901.

My invention relates to a new and improved warp knit fabric produceable on a usual warp knitting machine of the type commonly known as a Milanese machine, my object being to secure a desirable and heretofore unattainable crepe effect in such fabric; and to this end my invention relates more particularly to an improved loop or stitch formation creating uniformly spaced closely arranged raised and depressed stitches giving the desired crepe effect, such stitches being secured by a novel arrangement of warp groups of thick and thin thread and a special manipulation thereof by the usual loop forming machine mechanism as more fully described hereinafter in connection with the accompanying drawings, the novel features thereof being particularly pointed out in the subjoined claims.

Fig. 1 is a diagrammatic cross-sectional elevation indicating essential parts of a usual Milanese warp knitting machine employed in producing my new crepe Milanese cloth.

Fig. 2 is a diagrammatic view indicating my special laying of the threads always over the needles, and also indicating two heavy and two light threads of the upper warp tier crossing two heavy and two light threads of the lower warp tier; the vertically disposed dots representing successive needle courses of the one row employed, and the repeated showings being merely to disclose the passage of the threads.

Fig. 3 is a diagrammatic view showing the spaced warp tiers and still bar points, and indicating in heavy lines the cooperative movement of the traverse bar points.

Fig. 4 is an enlarged diagrammatic showing of the fabric, the thick warp being indicated by heavy lines and the interlooping of meeting heavy upper and lower tier warps being shown by heavy dots, to indicate the close and regular spacing of the raised stitches peculiar to my new fabric.

Fig. 5 is a much enlarged showing of my fabric disclosing clearly the special loop stitch formation thereof.

Warp knitting machines are well known in the art and those in which the warp threads of the two parallel tiers are traversed so as to extend continuously throughout the length of the fabric in crossing diagonal interlooped lines reaching from fabric edge to fabric edge, are commonly known as Milanese warp machines, and their product, a fine closely knitted, elastic material, usually of silk, is known as Milanese cloth. My invention, as stated, relates to such machines, and particularly to producing such cloth having a crepe effect.

To those skilled in the art, the diagrammatic cross sectional view of Fig. 1 will sufficiently disclose such known Milanese machine and enable them to readily understand the changes in the operation thereof required to produce my new crepe fabric.

Referring to Fig. 1, 5 indicates the usual straight needle bar having a single row of closely set fine gauge spring beard needles 6 adapted to receive the traversed warp threads and interloop the same in successive rows or courses of stitches in well known manner. Between each needle, as usual, sinkers 7 are employed, held by upper and lower sinker bars 8 and 9, and moved by the latter to cooperate with said needles 6 in forming, holding, and knocking off the successive rows or courses of warp stitches. A needle presser bar 10, suitably operated in well known manner, acts on the needle beards to close the hooked ends of the latter over a newly formed course of loops to permit the knocking-off of the previously formed row of loops.

The warp threads 15, as usual in Milanese machines, are wound on bobbins or spools 16, and the latter are traversed in an endless path on the bed plate 17 in well known manner, as by carriages 18; such path comprising parallel straight-way portions extending the width of the machine with their ends united by half-circle bends. The warp threads 15, 15 are carried to the needles 6 over upper tier bar 20 and lower tier bar 21, each one receiving the warps of the bobbins in one of said straight-way portions, and a usual divider bar 23, supported by brackets 24 from upper tier bar 20, maintains the warps in spaced relation intermediate the needles and tier bars as heretofore.

Adjacent said divider bar 23 is the usual still point bar 30, having points 31 projecting between the warps in the usual manner, and moved vertically only as heretofore. The traverse bar 32, having points 33 adapted to engage with points 31, is moved both vertically and transversly, as well under-

stood, to reversely traverse the warps of said upper and lower tier; the usual traverse in Milanese machines being a distance of four needles to the right and back two needle distance, and again two needle distance when out of engagement with the warps. In carrying the traversed warps to the needles the usual picker point bar 35, having comb points 36, acts in the known manner to properly lay the crossed loops on the needles 6, the ordinary Milanese lay being over every other needle and under the intermediate ones. It will be understood that, while not shown, the usual broad points and hooks are employed to carry the traversed warps from the end of one tier to the beginning of the parallel tier bar, as the bobbins round the half-circle bends uniting the ends of the parallel straight-way portions of their endless path on the bed plate 17.

The fabric produced on such Milanese machine, above set forth, is close and smooth surfaced, and has no semblance of crepe appearance. After many and varied experiments I have discovered that by arranging the warps of different weights or thicknesses of threads set in a particular relation to one another, and readjusting and timing the machine movements and warp traverse so that heavy warps of the upper tier will meet the reversely traversed heavy warps of the lower tier on the same needles, and likewise the light warps of the upper tier will meet the light warps of the lower tier on adjacent needles, I can produce a Milanese cloth having raised and depressed stitches uniformly spaced and giving the sought for crepe effect which is the object of my invention.

In accomplishing my purposes, the warp threads, which are materially different in thickness, are arranged throughout the endless lay of the warp in alternate groups of thick and thin, said groups preferably having the same number of threads; the best results, with the usual gauge of needles employed, being secured, I find, by equal groups of two thick warps alternating with two thin warps. And I also find that the usual warp traverse of over one under one needle, common in Milanese machines, will not accomplish my purpose, and I therefore reduce such warp traverse so that each thread will lap over every needle and never under any. This traverse is clearly indicated in Fig. 2, the successive courses or row of stitches being indicated by repeating the row of needles 6, and such figure also indicates the meeting on the needles, 6^a, 6^a, of the two heavy threads of the upper warp tier 20^a and lower warp tier 21^a, and the like meeting on needles 6^b, 6^b, of the thin threads of said upper and lower tiers. The movement of traverse bar points 33 to secure this lay of the warp threads always over every needle is indicated by heavy black lines in Fig. 3, 20^a indicates the warps of the upper tier 21^a the warps of the lower tier, 30 and 31 the still bar and its points projecting through said upper and lower tiers which are held separated by divider bar 23. Following the heavy black lines in said Fig. 3, and beginning at a, the traverse points 33 rise through the lower warp tier 21^a to b, said points are then traversed a distance of two needles to the right to c, they then rise to d to engage the warps of upper tier 20^a, again they are traversed, but to the left a distance of one needle to e, at which point the picker points 36 act, and traverse points 33 sink to f below both warp tiers, and then idly traverse back to a, the beginning of their cycle of movement.

The picker bar 36 now combs the warp tiers 20^a, 21^a thus traversed and lays the same over the needles 6 for their usual knitting operation in cooperation with sinkers 7 and needle presser bar 10, the result being a fabric having raised uniformly disposed stitches located at the meeting points of said heavy pairs of the warp tiers as indicated in Fig. 4.

Referring to Fig. 5, the stitch formation producing my novel crepe effect is clearly seen, and in this figure the light horizontal lines m^1, m^2, m^3 &c. represent successive rows or courses of stitches, the light vertical lines o^1, o^2, o^3 &c. the wales produced by each needle, 20^a the heavy or thick warps and 20^b the light or thin warp threads of the upper tier and 21^a and 21^b the corresponding warp threads of the lower tier.

In order to more readily follow the threads of the two tiers, I have marked one pair of thick threads 20^a 20^a and the adjacent pair of thin threads 20^b, 20^b of the upper tier with longitudinal dash lines, and two corresponding adjacent pairs of the lower tier 21^a, 21^a and 21^b, 21^b with stipple markings. It will be noted that the thick pair 20^a, 20^a of the upper tier cross the thick pair 21^a, 21^a of the lower tier in wales o^1, o^2 row m^4, and the corresponding pairs of thin threads of said two courses, 20^b, 20^b and 21^b, 21^b cross each other in wales o^3, o^4 row m^4. The pair 20^a, 20^a cross the pair of thick warps adjacent to 21^a, 21^a in wales o^3, o^4, row m^6, while the pair of thin warps 20^b, 20^b cross the pair of thin warps adjacent 21^b, 21^b in wales o^1, o^2 row m^6. The crossing of the thick threads produces raised fabric dots uniformly spaced throughout the fabric, and it is these raised portions combined with the depressed crossings of the thin threads, that gives the desired crepe effect sought for, in the specific arrangement thus fully shown and described.

Other combinations in the warp groupings may be employed, but from extensive experi-

ments so far made, and with the usual needle spacings, I find the best results are obtained by the use of alternately arranged pairs of heavy or thick thread with light or thin thread, as above specifically set forth and described as the preferred arrangement.

It is obvious that by varying the degree of difference in the thick and thin warp threads, modification as to the degree of crepe effect will result, and other changes and modifications of the specific arrangement and manipulation may be discovered within the spirit of my invention as defined in the claims.

What I claim is:—

1. As a new article of manufacture, a warp knitted fabric formed of reversely traversed warp rows each having thick and thin warps, the respective thick warps of said rows interlooping at their crossing points to form laterally and longitudinally separated thickened fabric stitches.

2. As a new article of manufacture, a warp knitted fabric formed of reversely traversed warp rows each having thick and thin warps, like thickness warps of said rows interlooping at their crossing points to form raised and depressed warp stitches spacedly arranged both laterally and longitudinally.

3. A warp knitted fabric formed of stitches of two reversely traversed rows of warps, the latter arranged in alternate groups of thick and thin warps, and like groups of one row looping with like groups of the other row, and said loop groups alternating in successive courses to form uniformly spaced thick and thin fabric stitches.

4. A warp knitted fabric formed of loops of two reversely traversed rows of warps, the latter arranged in alternate pairs of thick and thin warps, and like pairs of one row looping with like pairs of the other row, and said loop pairs alternating in successive courses to form uniformly spaced thick and thin fabric stitches.

5. The method of producing a crepe fabric on a traverse warp knitting machine having a single row of needles and two reversely traversed rows of warps engaged thereby, which consists in arranging the warps in alternating groups of thick and thin threads, traversing the same so as to lap over each separate needle, engaging like warp groups of the respective rows on the same needles to form alternate groups of thick and thin stitches, and alternating said groups in successive courses to form uniformly spaced thick and thin fabric.

6. The method of producing a crepe fabric on a traverse warp knitting machine having a single row of needles and two reversely traversed rows of warps engaged thereby, which consists in arranging the warps in alternating pairs of thick and thin threads, traversing the same so as to lap over each separate needle, engaging like pairs of warps of the respective rows on the same pairs of needles to form alternate pairs of thick and thin stitches, and alternating said loop pairs in successive courses to form uniformly spaced thick and thin fabric.

In testimony whereof I affix my signature.

ERNST RICHARD MEINIG.