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J. P. HOLMES

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WARP KNIT FABRIC

Filed Aug. 16, 1933

Fig. 1..

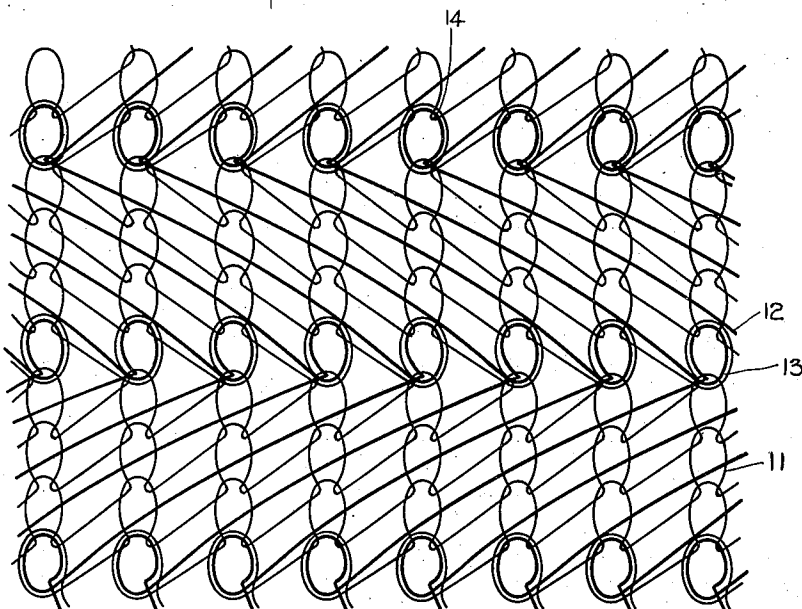


Fig. 2.

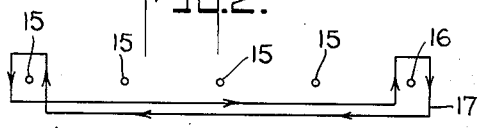


Fig. 3.

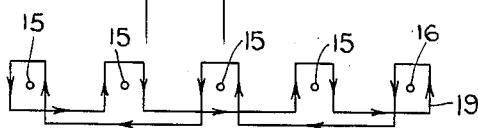


Fig. 4.

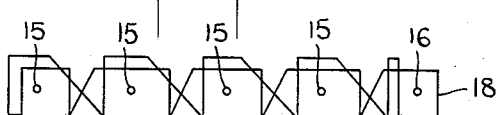


Fig. 5.

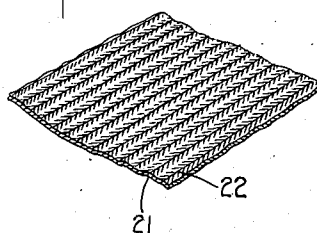
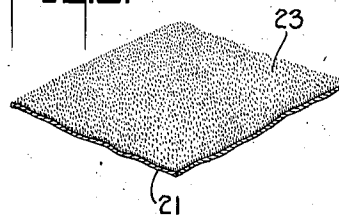


Fig. 6.



INVENTOR
John P. Holmes
BY
J. Seltzer and W. W. Werners
ATTORNEYS

UNITED STATES PATENT OFFICE

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WARP KNIT FABRIC

John Pharr Holmes, Hewlett, N. Y., assignor to
Celanese Corporation of America, a corporation
of Delaware

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18 Claims. (Cl. 66—195)

This invention relates to knitted fabrics and their manufacture, and in particular to a warp knit fabric adapted for the making of napped or brushed fabric.

5 An object of the invention is to produce a napped or brushed fabric of increased strength and durability.

Another object of the invention is a napped or brushed fabric which has substantial wearing properties even when made of a continuous fila-
10 ment yarn such as silk or artificial yarns.

Another object of the invention is a warp knit brushed up fabric made on a machine of the two or more bar type, the back bar forming the Atlas type lap giving a non-running wear-resisting fabric, and the front bars forming the long float type laps supplying the yarns to be partially or completely severed to form a nap which is held well intact in the Atlas type backing. Other
15 objects of the invention will be apparent from the specification and drawing.

Brushed up fabrics wherein the yarns used are of cotton or wool are known, in which case for the most part only the ends of the numerous relatively short staples are raised. Such yarns being rough and also not materially weakened in the brushing action give to the material a certain strength. It is readily apparent however that in attempting to brush up one surface of an ordinary warp knit fabric made from continuous
20 filament yarns some of the filaments must be severed to form the free ends to be brushed up, leaving the fabric greatly weakened.

In accordance with my invention, I prepare brushed up or napped fabrics from warp knitted material comprising yarns of substantially continuous filaments such as natural silk, artificial silk, reconstituted cellulose or organic derivatives of cellulose such as organic esters of cellulose and cellulose ethers. Examples of organic esters of cellulose are cellulose acetate, cellulose formate,
25 cellulose propionate and cellulose butyrate, while examples of cellulose ethers are ethyl cellulose, methyl cellulose and benzyl cellulose.

At least one set of yarns are knitted to form an Atlas cloth or modification thereof of any number of wales to the set, i. e. two-waled, three-waled, four-waled . . . twelve-waled . . . twenty-four-waled, etc. Atlas cloth. Another set of
30 yarns are knitted with long floats on at least the side of the fabric to be brushed. The floats of the second set of yarns when used with a set of yarns knitted into a four-waled cloth, may be run from loop 1 to 3, then 3 to 5, back to 3 and 1, or from
35 loop 1 to 5 and back to 1 or other modifications

according to the length and closeness of the plush or nap desired. My invention also includes the use of three or more sets of yarns wherein two or more sets are knitted with floats of the same or different lengths.

Reference is had to the accompanying drawing which shows one mode of carrying out my invention, wherein

Fig. 1 is a diagrammatic drawing of one form of my invention,

Fig. 2 indicates the motions of a front bar yarn guide between and across the needles in the making of a fabric in accordance with one form of my invention,

Fig. 3 indicates the motions of the back bar yarn guides according to one form of my invention,

Fig. 4 indicates the motion of the back bar yarn guides according to another form of my invention,

Fig. 5 is a perspective view of the front surface of a fabric knitted in accordance with my invention before brushing,

Fig. 6 is a perspective view of the brushed fabric. A warp knit Atlas fabric so modified to adapt
30 it for use for napping or brushing is constructed as a two-bar fabric with the back bar Atlas. The name Atlas designates a type of warp fabric in which the bar or bars move progressively right then left.

The back bar may form any of the Atlas cloth stitches, for example putting a stitch on each needle progressively right then left, for any predetermined number of needles, as for four needles as shown in Figs. 1 and 4. The back bar may
35 form an Atlas cloth stitch for example by moving under 1 over 1 needle progressively right then left for any predetermined number of needles, as for four needles as shown in Figs. 1 and 3. The back bar may form an Atlas cloth stitch by
40 moving under 2 over 2 needles progressively right then left for any number of needles as 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24 and up depending on the tension and strength of the yarn. The back bar may form an Atlas cloth stitch by moving under 2
45 over 1 needles progressively right then left for any number of needles or it may form a stitch by moving under 1 and over 2 needles progressively right then left for any number of needles. The back bar may form any of the Atlas cloth stitches
50 or modified Atlas cloth stitches such that a base is produced for the stitches formed by the front bar.

The front or top bar lays a long stitch over the Atlas base. The front and back bar yarns

however are knitted together by both passing over the same needle at spaced points. However, the front bar has a stitch of its own which may be the same or a different stitch from that of the back bar threads.

5 It is preferred that the front bar lay a long stitch over the back bar stitches. It may form a long stitch by moving under 4 over 1 needle right then under 4 over 1 needle left, as shown in Figs. 1 and 2. This stitch is preferable when used on a four-waled back bar stitch. The front bar may shag the thread across any number of wales, for example 2, 3, 4, 5, 6, 7 . . . 20 etc. according to the nap or plush-like effect desired.

10 To construct the finished fabric when the material has been knitted the top face is cut and/or brushed, the filament ends of the brushed long stitch yarns of the front bar stand giving the plush effect which may be trimmed to a desired length. This leaves a single bar fabric, formed by the back bar, substantially intact and unweakened thereby forming a durable long-wearing plush-like or brushed fabric even though it be made in part or entirely of continuous filament yarns.

15 The napping or brushing sever or only partially sever the yarns of the front bar stitch according to the desired product. In either case there will remain a single bar fabric to give strength and durability to the fabric.

20 The brushing or napping of the cloth to form a napped or plush-like fabric may be done by any of the known processes for example by passing the front face of the cloth in contact with a cylinder rotated at a high speed the surface of which is covered with spaced pin or knife points projecting from the surface thereof. The projections on the cylinder sever certain of the filaments forming the yarn of the front face. The severed ends of the yarn may then be raised to form the naps or plush-like surface which may then be singed or sheared to give a desired effect.

25 It is advisable to run the back and front bars the same number of needles to the right and left, it being understood however that this is not necessary to the formation of a successful fabric. The invention is not limited to any particular front bar stitch knitted with any particular back bar stitch but includes the knitting of any long front bar stitch with any of the Atlas cloth back bar stitches.

30 In the drawing, reference being had especially to Fig. 1, there is shown in accordance with my invention a warp knitted fabric consisting of two sets of yarns the yarns 11 formed by the back bar being shown in light lines while the yarn 12 of the front bar are shown in heavy lines. This particular fabric consists of a four-waled Atlas cloth formed by the yarns 11 having the yarns 12 knitted therewith at the loops 13 and 14 of the severing of the yarns of the back bar. This cloth may be formed on a two-bar type warp knitting machine the back bar moving its set of yarns progressively over four needles right then reversing and over four needles left, while the front bar moves its set of yarns under four needles over 1 needle right then under four over 1 needle left.

35 In Fig. 2 is shown the movement of the front bar yarn guides which may be used with the same back bar yarn guide movement as used to produce the back bar stitch shown in Fig. 1. The front bar guides the yarns under four needles 15 right over one needle 16 and then left under four needles and over one needle as shown

diagrammatically by line 17. When used with the back bar stitch shown in Fig. 1 this movement of the front bar stitch would cause the front yarn to follow the back yarn but only being knitted and then concurrently with the back bar yarn at the loop of reversal.

Fig. 4 shows diagrammatically the movement of the back bar guide in knitting the back bar stitch of the fabric shown in Fig. 1. The back bar moves progressively over four needles 15 right then reversing on needle 16 and over four needles 15 left as shown by line 18.

A modified stitch for the back or front bar is shown in Fig. 3, the movement of the guide being shown by line 19.

15 By knitting two or more sets of yarn on a warp machine there is formed a warp knit fabric Fig. 5 having a warp knit back 21 having knitted therewith a separate warp knit front composed of long floats 22 which may be brushed to any desired degree partially severing or totally severing the yarn of the long floats. The ends of the filaments formed by the severing are raised in the brushing action to form a plush-like surface or nap 23.

20 It is to be understood that the foregoing detailed description is merely given by way of illustration and many alterations may be made therein without departing from the spirit of my invention.

25 Having described my invention, what I desire to secure by Letters Patent is:

30 1. A warp knitted fabric comprising at least two sets of warp yarns, at least one of which is knitted into the fabric at every course, the yarns of another set being knitted with the first set in certain courses, and crossing other courses to form long floats between the points at which they are so knitted, said floats forming an essential part of the finished fabric, at least part of the filaments forming the yarns being severed in such floats and raised to form a nap.

35 2. A warp knitted fabric comprising at least two sets of warp yarns, at least one of which is knitted into the fabric at every course, the yarns of another set comprising substantially continuous filaments and being knitted with the first set in certain courses, and crossing other courses to form long floats between the points at which they are so knitted, said floats forming an essential part of the finished fabric, at least part of the filaments forming the yarns being severed in such floats and raised to form a nap.

40 3. A warp knitted fabric comprising at least two sets of warp yarns, at least one of which is knitted into the fabric at every course and proceeds from one wale to the next in successive courses, crossing alternately at least three wales to the right and an equal number to the left, the yarns of another set being knitted with the first set in certain courses, and crossing other courses to form long floats between the points at which they are so knitted, said floats forming an essential part of the finished fabric, and at least part of the filaments forming the yarns being severed in said floats and raised to form a nap.

45 4. A warp knitted fabric comprising at least two sets of warp yarns, at least one of which is knitted into the fabric at every course and proceeds from one wale to the next in successive courses, crossing alternately four wales to the right and an equal number to the left, the yarns of another set being knitted with the first set in certain courses, and crossing other courses to form long floats between the points at which

they are so knitted, said floats forming an essential part of the finished fabric and at least part of the filaments forming the yarns being severed in said floats and raised to form a nap.

5 5. A warp knitted fabric comprising at least two sets of warp yarns, at least one of which is knitted into the fabric at every course and proceeds from one wale to the next in successive courses, crossing alternately four wales to the
10 right and an equal number to the left, the yarns of another set being knitted with the first set at the extreme ends of its crossing motion to the left and right, and crossing the other courses to form long floats between the points at which
15 they are so knitted, said floats forming an essential part of the finished fabric and at least part of the filaments forming the yarns being severed in said floats and raised to form a nap.

20 6. A warp knitted fabric comprising two sets of warp threads, one of which is knitted into the fabric at every course, the yarns of another set being knitted with the first set in certain courses, and crossing other courses to form long floats
25 said floats forming an essential part of the finished fabric, at least part of the filaments forming the yarns being severed in such floats and raised to form a nap.

30 7. A warp knitted fabric comprising two sets of warp yarns, one of which is knitted into the fabric at every course and crosses from one wale to the adjacent wale between successive courses, moving alternately at least three wales to the
35 right and an equal number to the left, the yarns of another set comprising substantially continuous filaments and being knitted with the first set at the extreme positions of such set to the right or left, and crossing the other courses to form long
40 floats between the points at which they are so knitted, at least part of such continuous filaments being severed in such floats and raised to form a nap.

45 8. A process of producing a fabric, which comprises warp knitting at least one set of warp yarns into successive courses, knitting the yarns of at least one further set into certain of such
50 courses, and crossing them over the remainder of such courses to form long floats between the points at which they are knitted, severing at least part of the filaments forming the yarns of the second set at such floats and raising the
severed filaments to form a nap.

55 9. A process of producing a fabric which comprises warp knitting at least one set of warp yarns into successive courses, knitting the yarns of at least one further set into certain of such
60 courses, and crossing them over the remainder of such courses to form long floats between the points at which they are knitted, and brushing the knitted fabric on the face where such floats are formed, whereby at least part of the filaments of the yarn comprising the floats are severed and raised to form a nap.

65 10. A process of producing a fabric, which comprises warp knitting at least one set of warp yarns into successive courses, and knitting yarns containing substantially continuous filaments, and knitting a further set of warp yarns into
70 certain of such courses, and crossing them over the remainder of such courses to form permanently retained long floats between the points at which they are knitted and brushing the knitted fabric on the face where said floats are formed whereby
75 at least part of the filaments of the yarn comprising the floats are severed and raised to form a nap.

11. A process of producing a fabric, which comprises warp knitting at least one set of warp yarns into successive courses, causing such yarns between such courses to cross to the adjacent
5 wales, crossing alternately at least three wales in succession to the right and an equal number to the left and knitting the yarns of at least one further set into certain of such courses, and crossing them over the remainder of such courses to form
10 permanently retained long floats between the points at which they are knitted and brushing the knitted fabric on the face where said floats are formed whereby at least part of the filaments of the yarn comprising the floats are severed and
15 raised to form a nap.

12. A process of producing a fabric, which comprises warp knitting at least one set of warp yarns into successive courses, causing such yarns between such courses to cross to the adjacent
20 wales, crossing alternately at least three wales in succession to the right and an equal number to the left and knitting the yarns of at least one further set into certain of such courses, and crossing them over the remainder of such courses
25 to form permanently retained long floats between the points at which they are knitted, such further set being caused to cross alternately in opposite directions over the same number of wales as the first set and brushing the knitted
30 fabric on the face where said floats are formed whereby at least part of the filaments of the yarn comprising the floats are severed and raised to form a nap.

13. A process of producing a fabric, which
35 comprises warp knitting at least one set of warp yarns into successive courses, causing such yarns between such courses to cross to the adjacent wales, crossing alternately at least three wales in succession to the right and an equal number
40 to the left and knitting the yarns of at least one further set of warp threads with the yarns of such first set at the extreme positions of such first set to the left or right, and crossing such yarns over the remaining courses to form per-
45 manently retained long floats between the points at which they are knitted and brushing the knitted fabric on the face where said floats are formed whereby at least part of the filaments of the yarn comprising the floats are severed and
50 raised to form a nap.

14. A process of producing a fabric, which comprises warp knitting at least one set of warp yarns into successive courses, causing such yarns between such courses to cross to the adjacent
55 wales, crossing alternately four wales in succession to the right and an equal number to the left and knitting the yarns of at least one further set into certain of such courses, and crossing them over the remainder of such courses to
60 form permanently retained long floats between the points at which they are knitted and brushing the knitted fabric on the face where said floats are formed whereby at least part of the filaments of the yarn comprising the floats are
65 severed and raised to form a nap.

15. A process of producing a fabric, which comprises warp knitting at least one set of warp yarns into successive courses, causing such yarns between such courses to cross to the adjacent
70 wales, crossing alternately four wales in succession to the right and an equal number to the left and knitting the yarns of at least one further set of warp threads with the yarns of such first set at the extreme positions of such first set
75

to the left or right, and crossing such yarns over the remaining courses to form permanently retained long floats between the points at which they are knitted and brushing the knitted fabric on the face where said floats are formed whereby at least part of the filaments of the yarn comprising the floats are severed and raised to form a nap.

16. A process of producing fabric, which comprises warp knitting a set of warp yarns into successive courses, knitting the yarns of a further set into certain of such courses, crossing them over the remainder of such courses to form long floats between the points at which they are knitted, and brushing the face of the fabric on the side where such floats are formed, whereby at least part of the filaments of the yarn comprising the floats are severed and raised to form a nap.

17. A process of producing a fabric, which comprises warp knitting simultaneously two sets of yarns, one set moving successively to the right from wale to adjacent wale for four courses and then moving successively to the left for four

courses, while the other is knitted in every fourth course only and is floated over four wales and four courses between the point at which it is knitted to form permanently retained long floats and brushing the knitted fabric so produced on the face over which the yarns of such second set are floated, whereby at least part of the filaments of the yarn comprising the floats are severed and raised to form a nap.

18. A process of producing fabric, which comprises warp knitting simultaneously two sets of yarns, one set moving successively to the right from wale to adjacent wale for four courses and then moving successively to the left for four courses to form permanently retained long floats, while the other is knitted in alternate courses only, and is traversed completely over one course and one wale between the points at which it is knitted, and brushing the fabric so produced on the face over which the yarns of such second set are floated, whereby the filaments of the yarn comprising the floats are severed and raised to form a nap.

JNO. P. HOLMES.