

July 16, 1929.

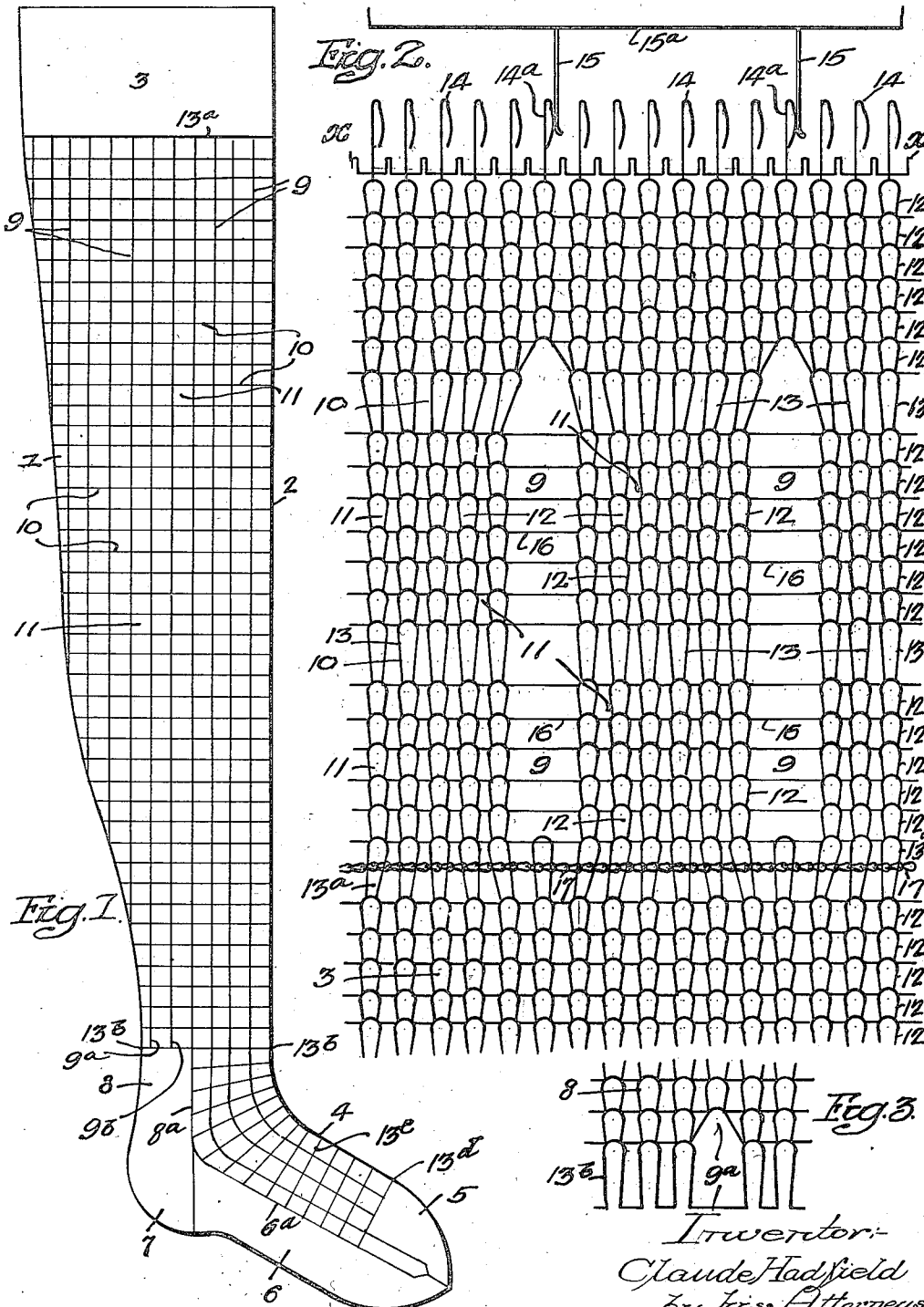
C. HADFIELD

1,721,390

KNITTED FABRIC

Filed Dec. 12, 1928

2 Sheets-Sheet 1



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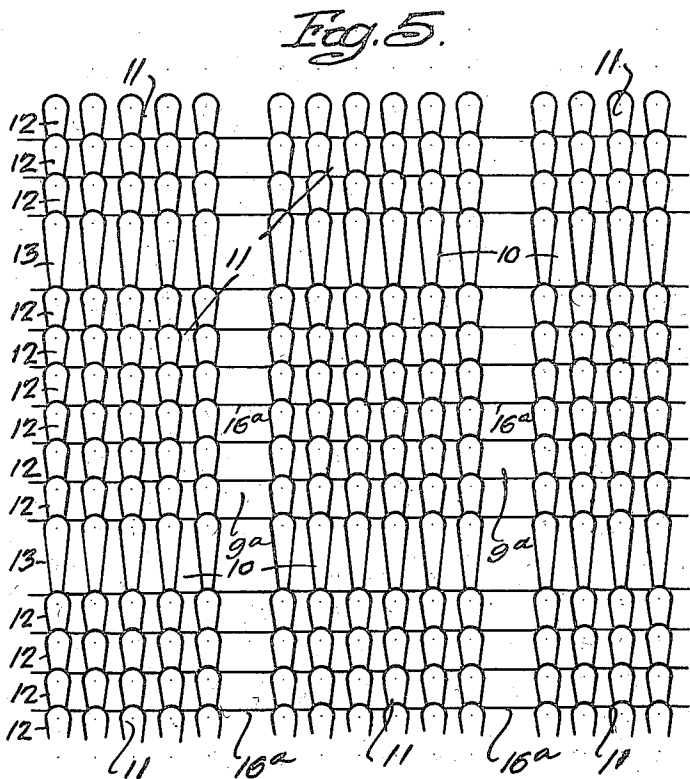
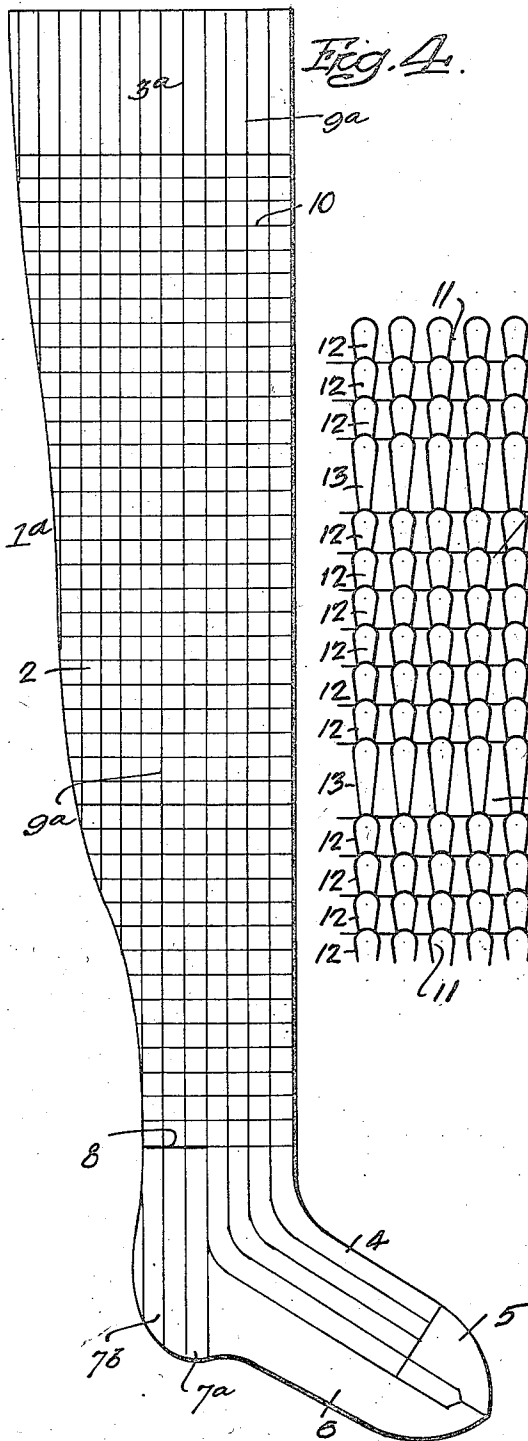
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UNITED STATES PATENT OFFICE.

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KNITTED FABRIC.

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This invention relates to knitted fabric and especially to hosiery. The object of the invention is to produce a knitted fabric having a plurality of substantially parallel lines extending longitudinally or walewise of the fabric and a plurality of substantially parallel lines extending transversely or coursewise of the fabric, the said longitudinal and transverse lines co-operatively defining a plurality of rectangular blocks throughout the fabric.

The construction of the fabric and the process by which the block defining lines are formed will be fully disclosed hereinafter, reference being had to the accompanying drawings, of which:

Fig. 1 is a diagrammatic side view of a stocking made in accordance with the principles of my invention;

Fig. 2 is an enlarged diagrammatic view illustrating the stitch formation of the fabric shown in Fig. 1;

Fig. 3 is an enlarged diagrammatic view of a portion of the fabric;

Fig. 4 is a view similar to Fig. 1, showing a modification of the invention; and

Fig. 5 is a view somewhat similar to Fig. 2 showing the stitch formation of the fabric shown in Fig. 4.

In Fig. 1, I have illustrated a fabric made in accordance with the principles of my invention and in the form of a stocking 1. The stocking 1 comprises a leg or body portion 2, a welt 3, an instep 4, a reinforced toe top 5, a reinforced foot sole 6, a reinforced heel pocket 7, and a high splice heel reinforce 8.

Extending longitudinally of the stocking, or walewise of the fabric, is formed a series of substantially parallel lines 9, and extending transversely of the stocking, or coursewise of the fabric, is formed a plurality of substantially parallel lines 10.

As shown in the drawing the lines 9 and 10 cross at substantially right angles to each other, thereby defining a plurality of substantially rectangular design blocks 11.

As shown in Fig. 2, the blocks 11 are formed of a plurality of regular stitches 12, that is, the stitches 12 are of regular uniform length and are formed in the regular manner on successive adjacently positioned needles of the knitting machine on which the fabric is being produced.

The longitudinal or walewise lines 9 and

the transverse or coursewise lines 10 are produced by forming relatively open spaces in the fabric, which, by contrasting with the regular stitches 12 of the blocks 11, define the outlines of the said blocks.

The open spaces constituting the transverse lines 10 are respectively produced by forming what is known in the art as a loose course, that is, a course of stitches 13 which are of greater length than the aforesaid regular stitches 12. These loose courses 13 are formed at predetermined intervals throughout the length of the fabric.

For example, I may produce six courses of regular stitches 12 and then a course of elongated stitches 13, then another series of six regular courses, then another loose course, and so on throughout the production of a strip of fabric.

The longitudinally extending or walewise open spaces constituting the lines 9 may be formed by either of two ways, that is, by what is known as "drop stitching" or by what is known as "needle out".

The first mentioned way of producing the walewise spaces, which constitute the lines 9, is used in the formation of the fabric such as that illustrated in Figs. 1 and 2.

In the production of the fabric shown in Figs. 1 and 2, a stitch is formed on each and every one of the regularly or uniformly spaced needles 14 of the machine, which are operating during the knitting of the fabric. A desired number of courses of regular stitches, such as the stitches 12, are formed in the regular manner, then a loose course, such as the stitches 13, is formed.

At such time as a loose course is about to be formed, the stitch is dropped from each of a predetermined number of the needles which have been knitting, for example, every seventh needle indicated at 14^a may be designated to drop its stitch.

The needles which have been designated as those from which the stitches are to be dropped have their beards or latches closed at such time as the remaining needles are receiving or having a thread π sunk round their shanks below the beards or latches for the formation of the next course of stitches, so that when the needles are operated to cast their stitches over their hooks in the usual manner the said designated needles 14^a, having no thread within their hooks, cast or drop

the stitches held on their respective shanks.

The preclosing of the beards or latches of the needles 14^a may be effected by means of points 15 which are secured in a carrier 15^a and brought to bear upon the needles as indicated in Fig. 2, the points 15 following down with the needles to the press off point in the machine, after which they are returned to an inoperative position where they remain while the needles are forming regular courses.

As soon as a needle drops a stitch a runner will develop and progress upwardly through the previously formed courses of stitches, the stitches in these previous courses which were formed on the needles which have dropped their stitches become unlooped from the corresponding stitches of the next previously formed course, and so on up through the fabric, these unlooped stitches becoming straight floats such as indicated at 16 in Fig. 2.

A runner will not progress beyond a loose course, therefore, I prefer to drop the stitches at the time a loose course is about to be formed. The ensuing runner will then progress upwardly through the previously formed courses of regular stitches until the next previously formed loose course has been reached, thereby forming the open spaces which constitute the walewise lines 9.

As shown in Fig. 1, the block defining lines do not extend through the welt portion 3 of the stocking 1, this is accomplished by forming the first loose course 13^a at a predetermined point below the extreme top edge of the stocking, or in other words at or adjacent to the lower extremity of the welt.

As a precautionary measure, to insure against the drop stitching running into the welt beyond the loose course 13^a from rough usage, any form of suitable lock stitch may be provided at this point, for example, a line of chain stitches 17 may be run transversely of the fabric, through the loose course 13^a.

This line of chain stitches may be produced by a sewing machine or any of the other machines adapted for this purpose and known to the art.

As shown in Fig. 1, neither the drop stitching nor the loose courses extend through the high splice heel reinforce 8 or the heel pocket 7.

Dropped stitches will not run down through the fabric, that is, after a stitch has been dropped and the needle picks up thread on the knitting of the next course and continues to knit thereafter the runner will not extend itself into the courses formed after the course in which the stitch has been dropped, the stitches interlocking in the manner indicated in Fig. 3, so, if the stitches are dropped at the course 13^b at the upper edge or beginning of the high splice heel 8, the runner forming the spaces constituting the lines 9^a and 9^b, for example, will not progress downwardly into the high splice heel 8.

The loose courses 13^c, intermediate the course 13^b and the course 13^d at the upper end of the toe-top 5, will terminate on each side of the stocking at the edges 8^a of the high splice heel 8 and the upper edges 6^a of the foot sole 6.

A stocking made in accordance with my invention may be formed on either a flat full fashioned knitting machine or on a circular seamless knitting machine.

In the drawings, I have shown the fabric as being knit on a flat machine in which the needles are carried by the usual straight bar (not shown). The stocking may be narrowed in the fashioning thereof by transferring a desired number of stitches along the selvage edges of the stocking blank from needle to needle in the usual manner.

The beard closing points 15 are carried by a bar 15^a mounted on the narrowing dip head of the machine, and adapted to be moved into an operative position at predetermined intervals when it is desired to drop the stitches to start the runners as above noted.

The stocking shown in Fig. 4 is made by the alternate way of producing the open spaces which constitute the longitudinal lines 9, that is, by the needle out process.

In producing the stocking 1^a shown in Figs. 4 and 5, needles are removed from the needle bar at predetermined intervals, for example, every seventh needle may be removed which will produce floats 16^a in a line extending walewise of the fabric.

Due to the fact that there is no needle, at the place where a float occurs, around which the thread would ordinarily be sunk by the sinkers of the machine, the floats 16^a of the "needle out" fabric are shorter than the floats 16 of the drop stitch fabric shown in Figs. 1 and 2, consequently the open spaces constituting the lines or stripes 9^a of the fabric shown in Figs. 4 and 5 are narrower than the corresponding lines or stripes 9 of the fabric shown in Figs. 1 and 2.

As shown in Figs. 4 and 5, the lines or stripes 9^a extend through the welt 3^a and the heel tabs 7^b which form the heel pocket 7^a.

The stockings shown in Figs. 1 and 4 may have what is known in the art as a "French foot" or what is known as an "English foot".

In the formation of the "French foot" the welt, leg and heel tabs of the stocking are formed on one machine (the legger), after which the partial blank is transferred to another machine (the footer) whereon the instep, toe top, and foot sole are knit. The edges of the flat blank thus produced are then joined together by sewing or looping to complete the stocking.

In the formation of the "English foot" the welt, leg, heel tabs, and instep are formed on one machine, then the partial blank is placed on a topping bar, the last formed course of the instep which is that immediately adjacent the

toe top of the stocking is placed on the topping bar and the inside edge of each of the respective heel tabs is placed on the topping on either side of the instep. The blank is then transferred to the needles of a knitting machine, from the topping bar. The instep stitches are placed below the knocking over bits and the heel tab stitches placed above the said knocking over bits, thus the needles having the heel tabs thereon will receive thread and knit successive courses of stitches which form the foot sole halves. When the desired number of foot sole courses have been knitted the instep stitches are raised above the knocking over bits and the needles carrying these instep stitches then receive thread to form successive courses which unite with the subsequently formed courses of the foot sole to form the toe top of the stocking.

The flat bank is then removed from the machine, the selvage edges of the instep and the adjacent inner selvage edges of the foot sole halves are joined together to form the foot. The outer edges of the flat blank are then joined together to complete the stocking.

When employing the "drop stitch" method of producing the walewise defining lines, I prefer to use the French foot, and when I employ the "needle out" process I prefer to use the English foot, for reasons of facilitating the manufacture of the stockings under the different methods of producing the walewise lines, the "French foot" being more adaptable to the drop stitch method, whereas the "English foot" is more adaptable to the "needle out" method.

From the above description, it will be obvious that I produce a plurality of solid blocks each composed of a plurality of courses of regular, uniformly dimensioned stitches, and tie these blocks together by substantially straight floats, the floats of the coursewise defining lines being formed by the thread constituting the sides of the loops in the loose course stitches 13, while the floats of the walewise defining lines are formed by the threads which would normally constitute the stitches of spaced wales of the fabric.

I claim:

1. A knitted fabric comprising a plurality of blocks defined by a plurality of relatively spaced lines extending coursewise of the fabric and a plurality of relatively spaced lines extending walewise of the fabric, each block comprising a plurality of courses of stitches of uniform dimensions, each of said defining lines comprising a relatively open space extending between adjacent blocks, and a plurality of substantially straight threads extending across the said open spaces and connected at their opposite ends to the said adjacent blocks.

2. A knitted fabric comprising a plurality of blocks defined by a plurality of relatively spaced lines extending coursewise of the fab-

ric and a plurality of relatively spaced lines extending walewise of the fabric, each block comprising a plurality of courses of stitches of uniform dimensions, each of said defining lines comprising a relatively open space extending between adjacent blocks, each of said coursewise defining lines comprising a course of elongated stitches, and each of said walewise defining lines comprising a plurality of substantially straight floating threads extending across the said open space between the edges of adjacent blocks.

3. A knitted fabric comprising a plurality of blocks defined by a plurality of relatively spaced lines extending coursewise of the fabric and a plurality of relatively spaced lines extending walewise of the fabric, each block comprising a plurality of courses of stitches of uniform dimensions, each of said defining lines comprising a relatively open space extending between adjacent blocks, each of said coursewise defining lines comprising a course of elongated stitches, each of said walewise defining lines comprising a plurality of substantially straight floating threads extending across the said open space between the edges of adjacent blocks, and connected at their opposite ends to corresponding courses of the said adjacent blocks.

4. A knitted fabric comprising a plurality of blocks defined by a plurality of relatively spaced lines extending coursewise of the fabric and a plurality of relatively spaced lines extending walewise of the fabric, each block comprising a plurality of courses of stitches of uniform dimensions, each of said defining lines comprising a relatively open space extending between adjacent blocks, each of said coursewise defining lines comprising a course of elongated stitches, each of said walewise defining lines comprising a plurality of substantially straight floating threads extending across the said open space between the edges of adjacent blocks, and connected at their opposite ends to corresponding courses of the said adjacent blocks, the said floats of each of said walewise lines being composed of the threads of an unlooped series of stitches which normally constitute the wale superseded by said walewise open space.

5. A knitted fabric comprising a plurality of blocks defined by a plurality of relatively spaced lines extending coursewise of the fabric and a plurality of relatively spaced lines extending walewise of the fabric, each block comprising a plurality of courses of stitches of uniform dimensions, each coursewise defining line being composed of a course of elongated stitches, and each walewise defining line being composed of floats created by eliminating the stitches of successive courses in a line extending walewise of the fabric which normally would constitute a wale in the fabric.

6. A stocking, comprising a leg portion, welt, an instep, a toe top, a foot sole, a heel

pocket and a high splice heel reinforced area, of which at least a portion of the leg is composed of a fabric formed by a plurality of blocks defined by a plurality of lines extending walewise of the fabric and a plurality of lines extending coursewise of the fabric, each block comprising a plurality of courses of stitches of uniform dimensions, each of said coursewise defining lines being composed of a course of relatively longer stitches than those of the said blocks, and each of said walewise defining lines being composed of floats created by eliminating the stitches of successive courses in a line extending walewise of the fabric which would normally constitute a wale in the fabric.

7. A stocking, comprising a leg portion, a welt, an instep, a toe top, a foot sole, a heel pocket and a high splice heel reinforced area, of which at least the leg and instep portions are composed of a fabric formed by a plurality of blocks defined by a plurality of lines extending walewise of the fabric and a plurality of lines extending coursewise of the fabric, each block comprising a plurality of courses of stitches of uniform dimensions, each of said coursewise defining lines being composed of a course of relatively longer stitches than those of the said blocks, each of said walewise defining lines being composed of floats created by eliminating the stitches of successive courses in a line extending walewise of the fabric which would normally constitute a wale in the fabric, and means for preventing said walewise lines from running into the welt portion of the stocking.

8. A stocking, comprising a leg portion, a welt, an instep, a toe top, a foot sole, a heel pocket and a high splice heel reinforced area, of which at least the leg and instep portions are composed of a fabric formed by a plurality of blocks defined by a plurality of lines extending walewise of the fabric and a plurality of lines extending coursewise of the fabric, each block comprising a plurality of courses of stitches of uniform dimensions, each of said coursewise defining lines being composed of a course of relatively longer stitches than those of the said blocks, each of said walewise defining lines being composed of floats created by eliminating the stitches of successive courses in a line extending walewise of the fabric which would normally constitute a wale in the fabric, means for preventing said walewise lines from running into the welt portion of the stocking, and means for preventing the said walewise lines from extending into the toe top of the stocking.

9. A stocking, comprising a leg portion, a welt, an instep, a toe top, a foot sole, a heel pocket and a high splice heel reinforced area, of which at least the leg and instep portions are composed of a fabric formed by a plurality of blocks defined by a plurality of lines

extending walewise of the fabric and a plurality of lines extending coursewise of the fabric, each block comprising a plurality of courses of stitches of uniform dimensions, each of said coursewise defining lines being composed of a course of relatively longer stitches than those of the said blocks, each of said walewise defining lines being composed of floats created by eliminating the stitches of successive courses in a line extending walewise of the fabric which would normally constitute a wale in the fabric, means for preventing said walewise lines from running into the welt portion of the stocking; and means for preventing the said walewise lines from extending into the toe top and heel reinforce portions of the stockings.

10. A process for knitting a fabric composed of blocks defined by a plurality of lines extending coursewise of the fabric and a plurality of lines extending walewise of the fabric, said process comprising the knitting of a plurality of courses of regular stitches of uniform predetermined dimensions, then knitting a course of stitches relatively longer than the said regular stitches, to form a coursewise defining line, repeating the alternate knitting of courses of regular and elongated stitches throughout the length of the fabric, and eliminating predetermined stitches of each course at spaced intervals across the fabric to form the said walewise defining lines.

11. A process for knitting a fabric composed of blocks defined by a plurality of lines extending coursewise of the fabric and a plurality of lines extending walewise of the fabric, said process comprising the knitting of a plurality of courses of regular stitches of uniform predetermined dimensions, then knitting a course of stitches relatively longer than the said regular stitches, to form a coursewise defining line, repeating the alternate knitting of courses of regular and elongated stitches throughout the length of the fabric, and dropping predetermined stitches at predetermined spaced intervals across the fabric at predetermined times during the knitting of said courses, whereby said dropped stitches will cause runners to extend from the course in which said stitches were dropped through the previously formed courses of stitches, thereby producing the said walewise defining lines.

12. A process for knitting a fabric composed of blocks defined by a plurality of lines extending coursewise of the fabric and a plurality of lines extending walewise of the fabric, said process comprising the knitting of a plurality of courses of regular stitches of uniform predetermined dimensions, then knitting a course of stitches relatively longer than the said regular stitches, to form a coursewise defining line, repeating the alternate knitting of courses of regular and elongated stitches throughout the length of the

5 fabric, dropping predetermined stitches at predetermined spaced intervals across the fabric at predetermined times during the knitting of said courses, whereby said dropped stitches will cause runners to extend from the course in which said stitches were dropped through the previously formed courses of stitches, thereby producing the said walewise defining lines, and introducing a chain of stitches coursewise of the fabric which inter- 10 lock with the stitches of one of said courses, to prevent said runners from extending beyond a predetermined point in said fabric.

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