ALL NEEDLES PULLED DOWN BY STITCH CAM TO NORMAL STITCH POSITION

ALL NEEDLES ARE RAISED TO CLEAR LEVEL

ALL NEEDLES PULLED DOWN TO LOW STITCH POSITION

ALL NEEDLES ARE LOWERED TO WELT LEVEL BY LOWERING SWITCH CAM

ALTERNATE NEEDLES RAISED TO CLEAR LEVEL TO BE IN POSITION TO TAKE LYCRA YARN AT POSITION #1

ALTERNATE NEEDLES TAKE BODY YARN

LYCRA YARN

FIG. 1

FIG. 2

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ABSTRACT OF THE DISCLOSURE

An open sheer knit fabric having a body yarn in all courses, an auxiliary yarn in alternate courses which is knit in alternate loops and floated across adjacent loops, with the knit loops of auxiliary yarn in successive auxiliary courses being staggered. The auxiliary yarn is a relatively heavy denier non-stretch yarn to add strength and wear qualities to a spandex yarn to give the fabric a compressive quality. The method of knitting the fabric includes feeding a body yarn to all needles and the auxiliary yarn to raised alternate needles at one feed station, forming the stitches, and feeding a second body yarn to all needles to form the courses without auxiliary yarn.

BACKGROUND OF THE INVENTION

This invention relates to sheer knit fabrics and to a method for knitting them.

Stocking fabrics incorporating high denier yarns have not been readily saleable due to the weight and coarseness of the fabric, even though they have a much greater wear life than stockings knit wholly of fine denier yarns. The same is true of support stockings. Support stockings have been used for some time, and their value has been recognized. Nevertheless, sale of support stockings has been retarded because of the bulkiness of plain knit fabric with compressive yarns added. The compressive yarn is usually a wrapped elastic filament which adds considerable bulk.

A number of manufacturers have been making a relatively sheer support stocking by using a stitch pattern disclosed in United States Patent No. 3,250,092, York et al., issued May 16, 1966. This stitch produces a plain fabric of somewhat open network, with a compressive yarn knit on alternate needles and changed on alternate courses. Nevertheless, the pattern is not as open as could be desired to produce a very sheer stocking.

SUMMARY OF THE INVENTION

The object of the present invention is to provide a stitch pattern incorporating a heavy, or a compressive, yarn which is very open and produces an extremely sheer fabric.

Another object is the provision of a fabric of this nature which will have body yarn in all courses and a heavy, or compressive auxiliary yarn in some courses.

A further object of the invention is to provide such a fabric wherein stitches of uniform length are used in similar courses throughout.

Still another object is to provide a novel method by which the improved fabric can be machine knit.

Other objects of the invention will become apparent from the following description of practical embodiments thereof, when taken in conjunction with the drawings which accompany, and form part of, this specification.

BRIEF DESCRIPTION OF THE DRAWING

FIGURE 1 is a diagrammatic view illustrating the method of knitting the improved fabric on a knitting machine; and

FIGURE 2 is a greatly enlarged view of a section of fabric, illustrating the stitch pattern.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The fabric of the present invention can be knit on a conventional two needle knitting machine. Different yarns, or different yarn combinations, are fed at the two feed positions. The fabric is knit using conventional yarn tensions.

Referring first to FIGURE 1, a knitting cylinder is illustrated schematically at 1, the cylinder rotating in the direction of the arrow 2 to bring the needles sequentially to the several knitting positions, or stations, following a counterclockwise path.

When the needles arrive at the first station, indicated at 3, all needles take body yarn and alternate needles take a coarse denier, or a compressive auxiliary yarn. The body yarn used is a pirm yarn, such as from ten to twenty-five denier monofilament. The compressive yarn can be a wrapped, high-stretch yarn, such as a spandex yarn, and is a multifilament yarn of from forty to seventy denier. The high denier yarn may be a multifilament nylon.

After taking yarn, the needles move to the second position, shown at 4, where they are drawn down by the machine stitch cam to a normal stitch position to form loops of conventional length, and to cast off previously formed loops. As the cylinder rotates from position 4 to position 5, the needles are raised to cause the newly-formed loops to open and clear the needle latches and to be in position to take body yarn. Position 5 is the second yarn feeding station, and all needles take body yarn. After receiving body yarn, all needles are pulled down to a low stitch position as the cylinder rotates to station 6. This causes the needle latches to close over the newly taken yarn and loops of body yarn and auxiliary yarn taken into the needles at station 3 are cast off. The needles are then raised to a level to clear the hooks by causing the loops to open the latches and slip down over the latches onto the needle shanks. This occurs as the needles reach station 7. As the needle cylinder continues to rotate, it comes to station 8 where the lowered switch cam draws all needles down to welt level. This is to position all needles at a level where the auxiliary yarn can pass over alternate ones to produce floats, as will be described. The needle hooks are high enough, however, to take body yarn when they arrive at the first feed station 3. As the needles reach station 9, alternate ones are raised to clear level to be in a position to take auxiliary yarn at station 3. The needles in raised position at this point are the needles which occupied the lower position on the previous rotation of the cylinder. In other words, alternate needles take auxiliary yarn at station 3, and the needles taking the auxiliary yarn alternate in successive courses. The cylinder then rotates to station 3, and begins a new revolution.

The stitch pattern formed by the above described knitting method is shown on a greatly enlarged scale in FIGURE 2 of the drawing. The body yarn 10 and auxiliary yarn 11 taken into the needles at station 3 is shown in courses 12 and 13, while the body yarn 14 taken at station 5 is shown in courses 15, 16 and 17. By taking auxiliary yarn on alternate raised needles, the auxiliary yarn is knit in wales 18, 19 and 20 of course 12, and floated over lowered needles in wales 21, 22, 23 and 24 in course 12. By reversing the needle positions at station 3 on the next revolution, the auxiliary yarn is knit in wales 21, 22, 23 and 24, and floated across wales 19 and 20 in course 13. Thus, the auxiliary yarn appears in alternate courses, being knit in alternate wales and floated across intervening wales, with the positions of the knit and
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float stitches being reversed in alternate auxiliary yarn courses. Body yarn is in all courses and all wales and knit in all wales of all courses.

Fabric knit in this manner is extremely open and sheer appearing, despite the presence of a course denier, or compressive, yarn. The stitches are of uniform length in similar courses and the fabric is uniform in weight and appearance throughout.

It will be obvious that yarns of different weights and in different combinations can be used to vary the fabric while maintaining the same stitch pattern. Some examples of tested yarn combinations are given in the following examples.

Example No. 1
At the main feed (station 3) one end of ten denier monofilament pirm nylon and one end of forty denier two filament spandex were used. On the auxiliary feed (station 5), one end of fifteen denier monofilament pirm nylon was fed. The resulting fabric was very sheer, and quite soft in the hand.

Example No. 2
On the main feed one end of ten denier Chadal nylon was used with one end of seventy denier, twenty filament Chadal Lyca. At the auxiliary feed one end of twenty denier Superloft was fed. This produced a fairly dense stocking with an extremely soft hand.

Example No. 3
One end of fifteen denier monofilament nylon together with one end of seventy denier, twenty filament Lyca was used on the main feed, and one end of twenty denier monofilament nylon was fed at the auxiliary feed. The resulting fabric was exceptionally pleasing, both as to sheerness of appearance and soft hand.

Example No. 4
This example differed from the others in substituting a relatively coarse auxiliary yarn for the compressive yarn used in the other examples. One end of fifteen denier monofilament nylon was used with one end of fifty denier monofilament nylon on the main feed. One end of twenty denier monofilament was used on the auxiliary feed. A very sheer appearing, long wearing stocking was produced. As in all other examples, the stocking had quite a soft hand.

As mentioned above, the yarn combinations given can be varied within reasonable limits. The important factors are the stitch pattern and the method by which it is formed.

While in the above practical embodiments of the invention have been disclosed, it will be understood that the particular examples given are merely by way of illustration and the invention may take other forms within the scope of the appended claims.

What is claimed is:
1. A sheer plain knit reinforced fabric comprising, a plurality of courses, with a body yarn of fine denier knit in all courses, and an auxiliary compressive yarn of heavier denier knit in alternate body yarn loops of alternate courses and floated across intervening body yarn loops in the same courses, with the fabric in the areas between the loops containing auxiliary yarn including large open loops formed wholly by fine denier yarn wherein the body yarn loops in which the auxiliary yarn is knit are alternated in alternate courses, and the large open loops are two wealwise adjacent loops, and the courses having the compressive yarn are of one stitch length and intervening courses are of a longer stitch length.
2. A sheer knit reinforced fabric as claimed in claim 1 wherein, the body yarn is nylon pirm yarn and the auxiliary yarn is a coarser nylon yarn than the body yarn.
3. A sheer knit reinforced yarn as claimed in claim 1 wherein, the body yarn is nylon pirm yarn and the auxiliary yarn is a stretch yarn having compressive strength.
4. A sheer knit reinforced fabric as claimed in claim 1 wherein the body yarn is a nylon pirm yarn and the auxiliary yarn is a spandex yarn.
5. A sheer knit reinforced fabric as claimed in claim 4 wherein, the nylon body yarn is from ten to twenty-five denier, and the spandex auxiliary yarn is from forty to seventy denier.
6. A sheer knit reinforced fabric as claimed in claim 4 wherein, the nylon body yarn in those courses including auxiliary yarn is one end of fifteen denier monofilament, the nylon body yarn in those courses not having auxiliary yarn is one end of twenty denier monofilament, and the auxiliary yarn is one end of seventy denier twenty filament spandex yarn.

References Cited

UNITED STATES PATENTS
3,413,824 12/1968 Kuney 66—170 XR
2,050,535 8/1936 Martel 66—182 XR
2,257,718 9/1941 Smith
2,503,444 4/1950 Lawson et al.
3,016,726 1/1962 Lawson 66—177
3,095,369 7/1963 Burleson et al.
3,131,556 5/1964 Nebel
3,292,392 12/1966 Squillario et al. 66—49 XR
3,338,071 8/1967 Pons et al. 66—182

FOREIGN PATENTS
423,052 2/1935 Great Britain

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U.S. Cl. X.R.

66—178, 182, 202