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WARP KNIT FABRIC AND METHOD

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2 Sheets-Sheet 1

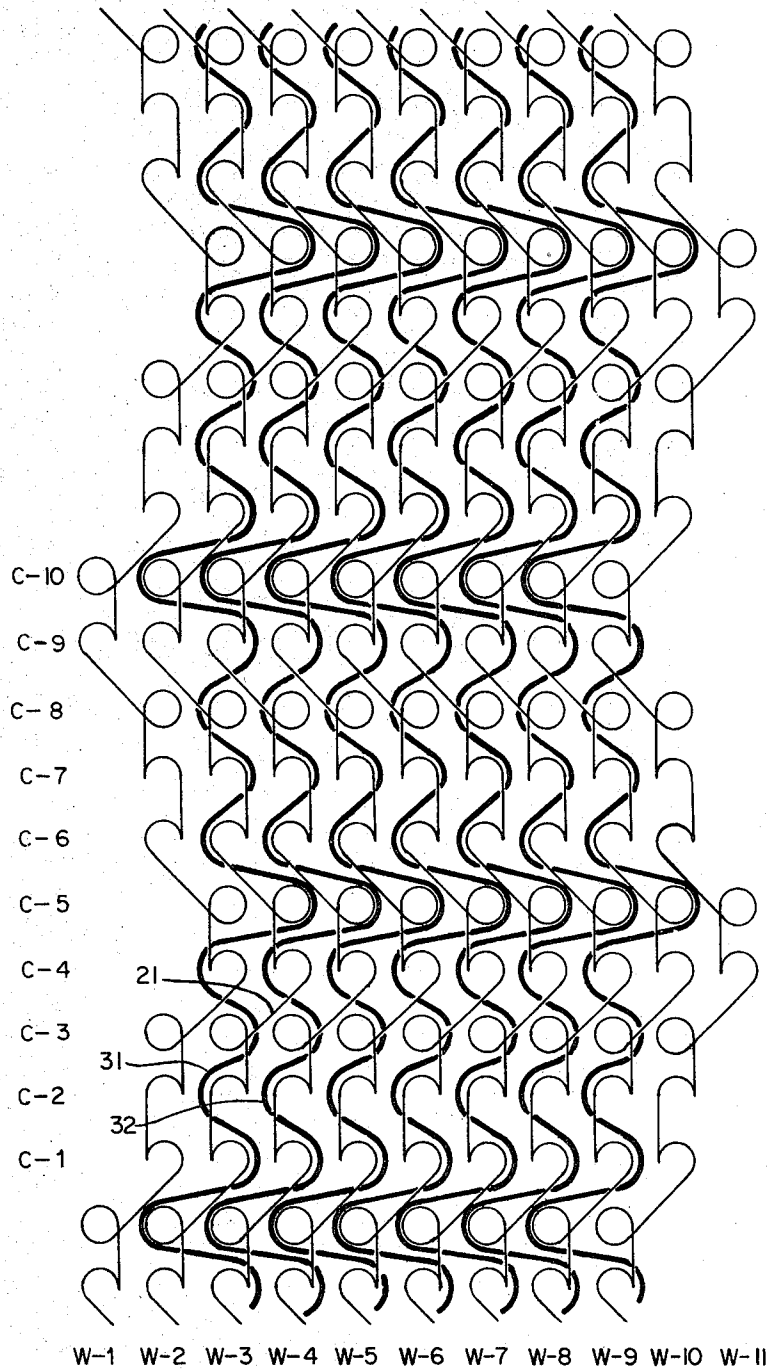


Fig. 1

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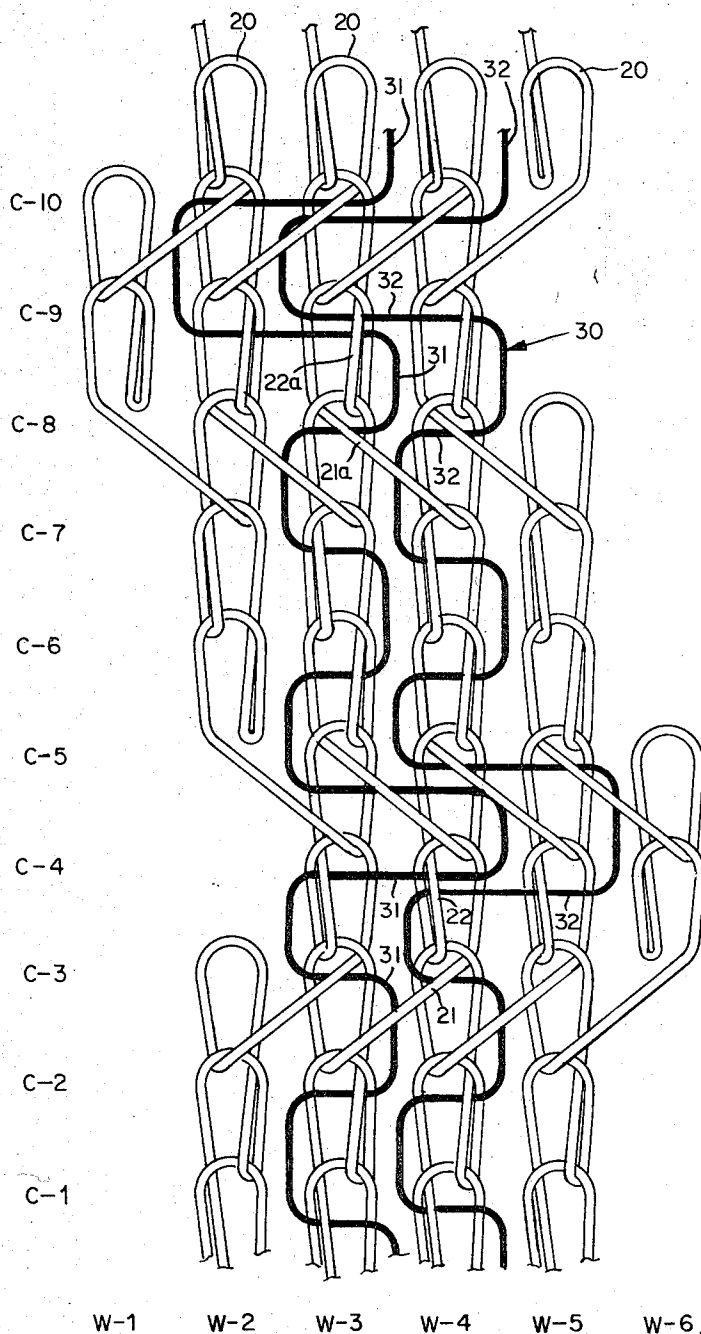


Fig. 2

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WARP KNIT FABRIC AND METHOD

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12 Claims

ABSTRACT OF THE DISCLOSURE

A warp knit fabric for ladies' figure control garments having a satin surface effect and a method of making same comprising interlacing elastic yarn so that at least two strands thereof pass under the outer legs of a non-elastic base yarn of two adjacent courses and repeating said interlacing steps after every three subsequent courses of the base yarn.

BRIEF SUMMARY OF THE INVENTION

Ladies' figure control garments require a fabric having many definite characteristics including durability, strength, elasticity and attractive appearance. In connection with the last named item, which is really the sine qua non in terms of marketability, is the matter of fabric "hand." This, of course, refers to the feel of the fabric face, which is the outside of the garment. The ideal is a satin-like hand which is pleasant to the touch and which permits free movement of the covering outer garment.

The prior art is replete with a variety of warp knit fabric constructions designed for a variety of purposes such as strength, elasticity, dimensional stability, etc. See for example U.S. Pats. 3,389,582; 2,199,449; 3,071,951; 3,183,685; 2,996,906; 2,356,819; 3,011,325; 2,263,787; and British Pat. 985,666. None of these patents, however, disclose a figure control fabric having a satin-like face of the type discussed, nor do they suggest how such an effect could be obtained.

As indicated, this invention has for its primary objective the production of a warp-knit ladies' figure control fabric which has a satin-like face or surface of the character described.

This invention, accordingly, involves the production of a novel fabric and also the use of a new knitting technique, the details of which will be fully disclosed hereinafter.

DESCRIPTION OF THE DRAWINGS

FIG. 1 of the drawings is a lapping diagram for the yarns used in forming the fabric of this invention.

FIG. 2 is a drawing of the fabric of this invention looking at the surface of the fabric.

DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE INVENTION

The fabric of this invention is produced on a warp knitting machine. For purposes of this description, reference is to a Raschel Warp Knitting machine of any well-known type, such as that sold by the Mayer Company.

In forming the fabric of the invention, only two yarn guide bars of the machine are employed. In this embodiment, the front yarn guide bar carries the non-elastic yarn 20 utilized to form the base net or "ground" of the fabric. This yarn may be nylon of a comparatively fine denier, such as 40-50 denier.

The back guide bar carries the elastic yarn 30, which is preferably spandex. The latter may be 140-280 denier.

As shown in the drawings, the nylon 20 is formed into knitted stitches, whereas the spandex 30 is only laid in the fabric. The numbers C1-C10 are the left margin of the drawing figures indicate courses, while the figures along the bottom of the drawings prefixed by W indicate wales.

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As can be observed, the stitch pattern repeats every ten courses.

In the present invention, a novel knitting technique is used, characterized by the following lapping sequence of the guide bars which are, of course, controlled by the pattern chain.

TABLE A

Front bar (nylon):	Back bar (spandex)
1-2	1-1
2-1	2-2
1-2	1-1
0-1	2-2
1-0	0-0
2-1	2-2
1-2	1-1
2-1	2-2
3-2	1-1
2-3	3-3

The same effect can be obtained using the same back bar pattern as above but modifying the direction of the lapping movement about the needles during laps 1, 2, 3, 6, 7, 8 of the front bar as follows:

TABLE B

Front bar (nylon):	Back bar (spandex)
2-1	1-1
1-2	2-2
2-1	1-1
0-1	2-2
1-0	0-0
1-2	2-2
2-1	1-1
1-2	2-2
3-2	1-1
2-3	3-3

The fabric produced according to the method of Table A is shown in the drawings, and particularly in FIG. 2, which shows one repeat of the fabric between courses C-1 and C-10 and W-1 to W-6. The satin-like effect is produced by the specific manner in which the spandex 30 has been laid in the fabric during knitting of the yarn 20. That is, it will be observed that each of the non-elastic yarn legs 21 extending between courses C-3 and C-4 pass over two spandex yarns 31, 32 as clearly shown in FIG. 2. It should be remembered that FIG. 2 illustrates only a fragmentary portion of the fabric and if that the entire fabric were shown, the other transversely extending non-elastic yarn segments, which extend between courses C-3 and C-4 would also be underlaid by spandex thread such as 31 and 32 which underlie the particular yarn segment 21, which is shown extending between wales W-3 and W-4.

It will be understood that the passage of the spandex yarns under the transversely extending non-elastic yarn, such as the threads 31 and 32 passing under the leg 21, shown in FIG. 2, tends to raise the leg 21 from the matrix of the fabric, while at the same time imposing oppositely directed stretch upon each such leg 21.

Similarly, the yarn leg 22, shown in FIG. 2, which forms the next adjacent loop in wale W-4 at course C-4 is underlaid by yarns 31 and 32. The latter have the same effect on leg 22 as upon legs 21, i.e. legs 22 are raised and stretched. It will be noted that the spandex yarns 31 and 32 pass laterally in one direction under the legs 21 and thence pass laterally in the opposite direction to go under legs 22.

The spandex yarns 31, 32 pull the adjacent wales of non-elastic yarn 20 together so that the raised taut legs 21, 22 are brought into substantially contacting relationship when the fabric is in a relaxed state.

The same inter-relationship described above repeats after a selected number of courses, preferably after every

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three courses as shown in the drawings. Thus, the non-elastic legs of yarn extending between courses C-8 and C-9, such as the leg 21a are raised, stretched and compressed by the strands of spandex 31, 32 which pass underneath the legs 21a as best shown in FIG. 2. Similarly, in course C-9, the spandex 31, 32 pass under the non-elastic yarn segment 22a. In certain cases, the objects of this invention may be achieved using yarns all of one type for both the base and inlay, e.g. stretch yarns, or by using a non-elastic inlay, or combinations thereof.

The repetitive fabric construction described above has all of the strength and durability qualities needed for a figure control garment, and due to the recurring raised, stretched and compressed non-elastic surface yarn strands, such as 21, 22 and 21a, 22a, the fabric is rendered satiny to the touch. This smooth, silky hand is extremely desirable as mentioned.

In addition to the advantages of feel and appearance described above, the fabric of this invention is extremely easy to process. Moreover, in contrast to prior art techniques involving the knitting-in of elastic yarn, the present fabric will not roll or curl. The latter two problems are especially troublesome in garment formation, since it is highly desirable for this purpose that the fabric panels be flat.

Another practical advantage of the present invention is the saving of spandex by avoiding the looping into knitted stitches found in the prior art.

The object of the aforesaid loop stitch prior art construction was to lock the spandex into the fabric in order to prevent slippage of the same from the fabric net. In the present construction, the spandex is also locked in the fabric and slippage is avoided as desired, but without the necessity to use extra spandex in the periodic formation of knitted spandex stitches. Thus, in the present construction, the inlaid spandex is repetitively interlaced in at least three successive stitches of a single wale and then interlaced in two stitches of the adjacent wale. See, for example, the path followed by the spandex 31.

I claim the following as my invention:

1. A warp knit fabric comprising:

- (a) a plurality of courses including a base net formed by parallel wales of non-elastic yarns, adjacent pairs of said wales being inter-connected at selected courses by yarn segments extending transversely from the first wale of the pair to the second wale thereof, and
- (b) elastic yarns laid into said base net so that at least two such yarns pass laterally under a selected one of said transversely extending yarn segments; thence laterally in the opposite direction under one of the non-elastic yarn legs of an adjacent course of the said second wale; and so that one of the elastic yarns is then laid into successive stitches of said second wale and the other elastic yarn is laid into successive stitches of the first wale.

2. The invention of claim 1 wherein said elastic yarns pass respectively from said first and second wale in a lateral direction under one of the non-elastic yarn legs of an adjacent course of the said first wale and thence in the opposite direction under one of the transversely extending yarn segments of an adjacent course.

3. The invention of claim 1, wherein the elastic yarn is spandex.

4. The invention of claim 2, wherein the elastic yarn is spandex.

5. A warp knit fabric for use in ladies' figure control garments and the like including:

- (a) a base net of non-elastic yarn having a plurality of wales in a ten course repeat according to the following lapping pattern: 1-2, 2-1, 1-2, 0-1, 1-0, 2-1, 1-2, 2-1, 3-2, 2-3, including segments of non-elastic yarn extending from a first wale of a pair of wales to the second wale of the pair between courses three and four and courses eight and nine of said repeat, and

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- (b) elastic yarns laid into said base net according to the following lapping pattern: 1-1, 2-2, 1-1, 2-2, 0-0, 2-2, 1-1, 2-2, 1-1, 3-3, whereby at least two elastic yarns pass in one direction under said non-elastic yarn segments between courses two and three and seven and eight, and pass in the other direction under at least one leg of the non-elastic loops in said second wale at courses four and nine whereby the non-elastic yarns under which said elastic passes are raised and stretched to thereby impart a satin-like hand to the fabric.

6. A method of knitting a fabric on a warp knitting machine comprising the steps of:

- (a) knitting a base net of adjacent pairs of parallel non-elastic yarn loop wales, including forming segments extending from the first wale of the pair to the second wale thereof at selected courses, and then forming successive stitches of said yarn respectively in said first and said second wales,
- (b) laying elastic yarn into said base net so that at least two of said elastic yarns pass under selected ones of said non-elastic segments which extend from said first to said second wale and thence passing said two elastic yarns under at least one leg of one of the said stitches of said second wale and thence laying said elastic yarns so that one of the elastic yarns is laid into successive stitches of said second wale and the other elastic yarn is laid into successive stitches of the first wale.

7. A method of knitting a fabric on a warp knitting machine according to claim 6, wherein the non-elastic yarn is knit according to the following lapping pattern: 1-2, 2-1, 1-2, 0-1, 1-0, 2-1, 1-2, 2-1, 3-2, 2-3, and wherein the spandex is laid into the fabric according to the following pattern: 1-1, 2-2, 1-1, 2-2, 0-0, 2-2, 1-1, 2-2, 1-1, and 3-3.

8. A method of knitting according to claim 6, wherein the non-elastic yarn is knit according to the following lapping pattern: 2-1, 1-2, 2-1, 0-1, 1-0, 1-2, 2-1, 1-2, 3-2, 2-3, and wherein the elastic yarn is laid into the fabric according to the following pattern: 1-1, 2-2, 1-1, 2-2, 0-0, 2-2, 1-1, 2-2, 1-1, and 3-3.

9. The invention of claim 5, wherein said elastic yarns each pass under two legs of non-elastic loops of adjacent wales in courses 4 and 9.

10. A method of knitting a fabric on a warp knitting machine comprising the steps of:

- (a) knitting a first yarn to form a base net of adjacent pairs of parallel yarn loop wales, including segments extending from the first wale of the pair to the second wale thereof at selected courses, and then forming at least a first and a second stitch loop of said yarn in said second wale, while,
- (b) laying a second yarn into said base net so that at least two of said second yarns pass under each of said base net yarn segments which extend from said first to said second wale and thence passing said second yarn under at least one leg of the said second stitch loops of said second wale.

11. A warp knit fabric comprising:

- (a) a base net of a first set of yarns having a plurality of wales in a ten course repeat according to the following lapping pattern: 1-2, 2-1, 1-2, 0-1, 1-0, 2-1, 1-2, 2-1, 3-2, 2-3, including segments of said yarn extending from a first wale of a pair of wales to the second wale of the pair between courses three and four and courses eight and nine of said repeat, and
- (b) a second set of yarns laid into said base net according to the following lapping pattern: 1-1, 2-2, 1-1, 2-2, 0-0, 2-2, 1-1, 2-2, 1-1, 3-3, whereby at least two yarns of said second set pass in one direction under said base net yarn segments between courses two and three and seven and eight, and pass in the other direction under at least one leg of the

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base net loops in said second wale at courses four and nine, whereby the base net yarns under which said second set of yarns pass are raised and stretched to thereby impart a satin-like hand to the fabric.

12. A warp knit fabric comprising:

- (a) a base net formed by a plurality of wales of non-elastic yarn, said wales being inter-connected at selected courses by transversely extending non-elastic yarn segments, 5
- (b) a plurality of elastic yarns laid into the base net, wherein selected ones thereof are laid in according to the following pattern: 10
- (i) in stitches of a first base net wale;
- (ii) thence laterally in a first direction in at least one stitch of a wale on one side of said first base net wale; 15
- (iii) thence laterally in a second direction in stitches of the first base net wale;
- (iv) thence laterally in said second direction in at least one stitch of a wale on the other side of said first base net wale, whereby said elastic 20

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yarn raises and stretches selected ones of the transversely extending yarn segments to impart a satin-like appearance and hand to the fabric.

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