

July 30, 1940.

L. H. MENDELSON ET AL

2,209,633

NONRUN FABRIC

Filed Sept. 26, 1939

2 Sheets-Sheet 1

Fig. 1

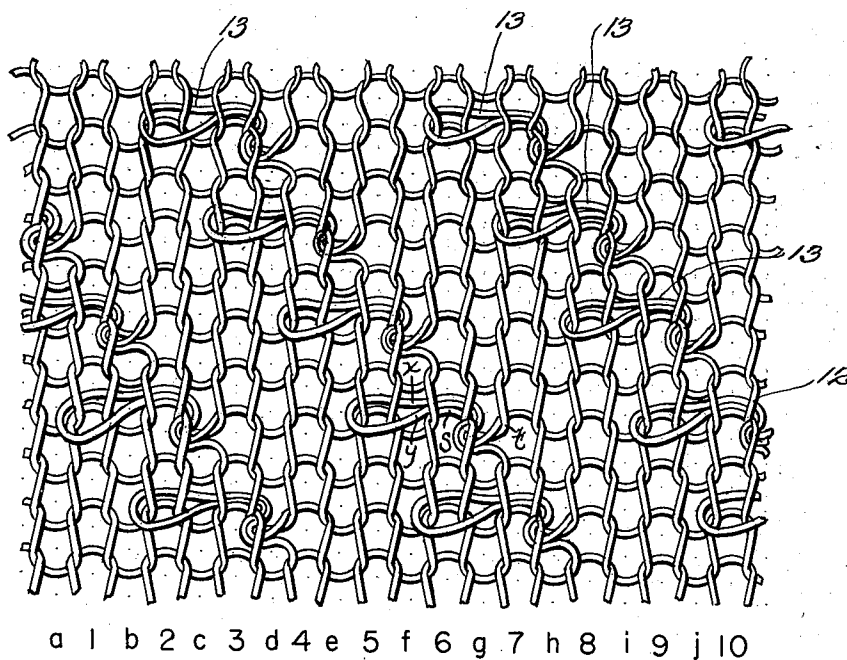
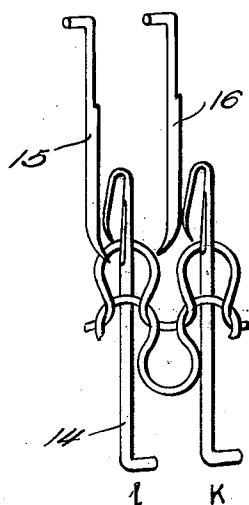


Fig. 2

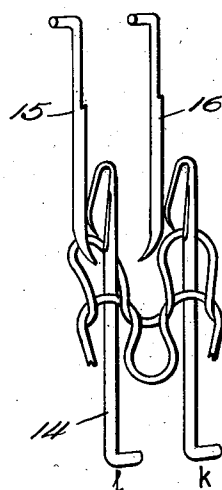


Fig. 3

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2 Sheets-Sheet 2

Fig. 4

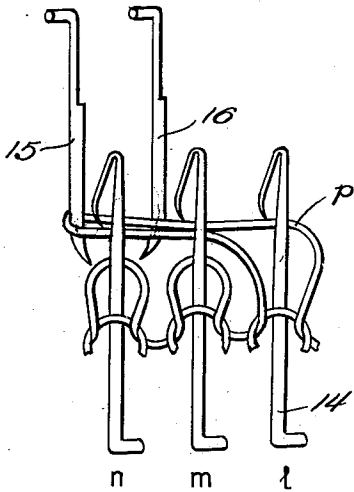


Fig. 5

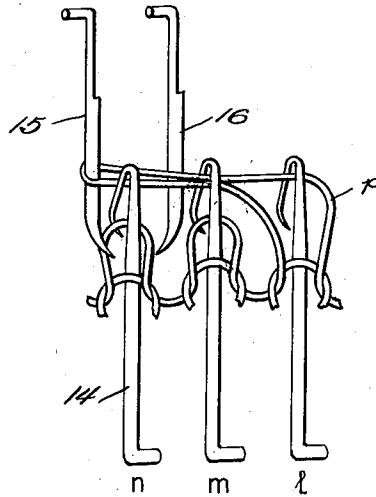


Fig. 6

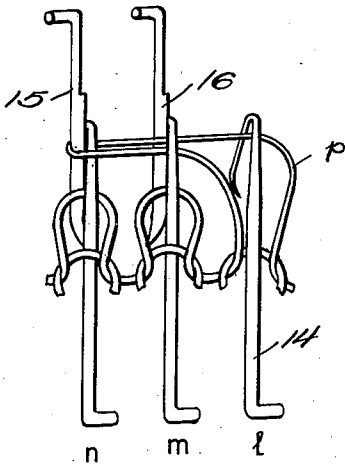
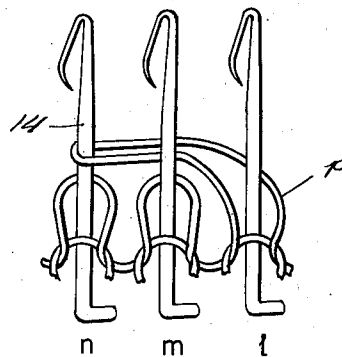


Fig. 7



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UNITED STATES PATENT OFFICE

2,209,633

NONRUN FABRIC

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Application September 26, 1939, Serial No. 296,692

14 Claims. (Cl. 66—198)

Our invention relates to a novel nonrun fabric and method of making the same and it is an object of the same to provide a fabric of this sort which shall be particularly smooth and incapable of irritating the skin of the user. It has been proposed to knit a nonrun fabric with spread stitches having long twisted loops but the twisting of the loops gives rise to a lumpy structure in the finished fabric and this has been found objectionable by users, particularly when such fabric is used in fine hosiery.

Another object is to provide a fabric that does not have long floats on a face thereof, as in some previously proposed fabrics of nonrun or run-resistant character.

Referring to the drawings, which are made a part of this application and in which similar reference characters indicate similar parts:

Fig. 1 is a view showing the face of a fabric knitted in accordance with our invention, and

Figs. 2 to 7 show various positions assumed by the parts of the machine and by the loops made thereon in forming the fabric of our invention.

In the drawings, reference character 12 indicates stitches of plain knitted fabric, commonly known as Jersey fabric, and 13 indicates spread stitches which are each formed in one wale and spread across an adjacent wale and about a stitch of the second wale from that one in which they are originally drawn. It will be observed that each of these spread stitches is shown as extending to the left of the wale in which it originates, but it is obviously within the scope of our invention to spread some or all of them to the right instead of to the left. Preferably the spread stitches are arranged in staggered relation so that in any part of the fabric only a small number of regular stitches will occur in a wale between spread stitches and so that a course or two of Jersey stitches will intervene between courses in which long loops are drawn and spread laterally of the fabric, but we do not limit ourselves to any particular pattern or arrangement of spread stitches. It will be seen that the elongated loop of a spread stitch crosses at least one similar wale in addition to the sinker wale that is formed in part by a portion of one of the legs of this elongated loop. Thus in Fig. 1 the spread stitch 13 which is drawn in needle wale 10 has an elongated needle loop that extends across sinker wales *j* and *i*, the crown of the loop encircling a stitch of needle wale 8. The course in which this stitch is formed is followed by a course of plain or Jersey stitches and the next course has an elongated loop in needle wale 9, which is spread

across sinker wales *i* and *h*, and of course also across needle wale 8, the crown of this loop encircling a stitch in needle wale 7, and so on with the other spread stitches.

The method of knitting our improved fabric is illustrated in Figs. 2 to 7 and this method may be carried out on an ordinary flat knitting machine equipped with lace points for acting in conjunction with the series of fixed needles.

In a machine of the type indicated there is a row of fixed bearded needles 14 and lace points of two varieties are arranged in fixed relation to coact with the individual needles, the spacing of the points being the same as that of the needles 14. The one set of points consists of points 15 of ordinary type or of any type adapted to remove loops from needles and to replace them on the same or other needles of the series. Interspersed between the points 15 in any desired relation there are points 16 differing from the points 15 in that their tapering end portions are directed away from their needles instead of toward them so that the points 15 cannot remove loops from the needles. The machine is of course equipped with the ordinary sinkers and other devices cooperating with the needles in knitting, and with means for operating the lace points, in addition to which it embodies means for giving special movements to certain of the parts, as outlined below.

Figs. 2 and 3, so far as the point 15 is concerned, illustrate merely the conventional operation of removing a loop from a needle, Fig. 2 showing a point 15 as about to enter a loop and Fig. 3 showing the loop as being on the point and removed from the shank of the needle. In these figures the point 16 has made exactly the same movements as the point 15 but owing to the different shape of its end it has not taken the loop off the right hand needle in Fig. 3.

According to our invention a row or course of loops is formed on the needles and the transfer points are lowered into position to engage and close the beards of alternate needles as the needles are moved toward the points. Then both the needles and the points are lowered just far enough through the knockover bits (about one-half of the usual needle stroke) so that points 15 can remove the loops from the corresponding needles and the needles then rise with the points, the needles rising so far that the yarn loops are below their beards. Such loops as are now engaged by a point 15 and which also encircle a needle *l* (Fig. 4) are now stretched laterally a distance of two needle spaces as shown in

Fig. 4, so that the loop is stretched past the second needle to the left of needle *l* on which the loop was first formed and out of reach of the beard of needle *n*. Due to the presence and position of the point 16 both legs of the loop are held close to the shank of needle *m* and of course the leg at *p* is likewise held against the shank of needle *l*. The angle of the yarn (i. e., the legs of the elongated loop) between points 15 and 16 is very sharp so as to prevent the beard of needle *n* from catching any part of the loop. Now the needles are moved downward with relation to the lace points until they reach the position of Fig. 5. Here the legs of the elongated loop are inside the beard of needle *m* because of the action of point 16 and one leg is also inside the beard of needle *l*, but the extreme end of the loop is held away from the beard of needle *n* by the point 15.

The needles continue to move down between the knock-over bits until the tops of the needles are slightly below the tops of the knock-over bits. Now the needles make contact with the lace points and are then moved upward, so that a needle *n* will pass through the stretched loop on the lace point 15, the legs of the stretched loop being still inside of the beard of needle *m* as explained above and as shown in Fig. 6. Now the needles make contact with the lace points and are then moved upward so that a needle *n* will pass through the stretched loop on the lace point 15, the legs of the stretched loop being still inside the beard of needle *m*, as explained and as shown in Fig. 6.

The positions of the regular loops and of a stretched loop prior to the knitting of the next course are shown in Fig. 7. When the thread for the next course is now laid and the machine is operated to knit the stretched loop will be knitted into the fabric as shown in Fig. 1, the crown of the loop encircling a stitch in the second wale from the wale where the stretched loop was originally drawn and being interknitted with the stitches of the intermediate course, as shown for example at the stitch 13 in wales 6, *g*, 7, *h*, and 8, where the stitch was drawn in wale 8 and spread to encircle wale 6 (or a stitch in said wale). Due to the fact that both legs of the spread stitch are inside the beard with the newly laid yarn and are knitted off in the formation of the course formed by said yarn, the action of the knockover bits forces back portions of the legs of the spread loop which lie between needles *m* and *l* so as to create bights which are tied into the fabric in the manner shown in Fig. 1, i. e., parts of the legs *x* and *y* of the spread loop are tied into the fabric between a needle loop *s* and a sinker loop *t*, said legs both lying back of leg of the needle loop and in front of a leg of the sinker loop and being tied securely in place due to the fact that the parts of the loop are closely drawn and tied in tight by the coacting stitches.

It will be obvious to those skilled in the art that changes can be made in the product and process herein described and shown without departing from the spirit of our invention, and therefore we do not limit ourselves to what is so shown and described but only as required by the state of the prior art.

Having thus fully described our invention, what we claim is:

1. A method of knitting a nonrun fabric on a straight row of bearded needles comprising engaging a stitch of a course on a needle, stretching said stitch laterally across at least two other needles next to said first-named needle, placing

said stitch on the more remote of said needles while holding its legs inside the beard of the intermediate needle or needles, and then knitting another course on said needles.

2. A method of knitting a nonrun fabric on a straight row of fixed bearded needles comprising engaging a stitch on a needle and stretching it laterally across a plurality of other needles without removing it from the first-named needle, holding the crown of said stitch out of contact with an adjacent needle, placing the crown of said stitch on the needle adjacent thereto while holding intermediate portions of both legs of the stitch inside the beards of one or more intermediate needles, and knitting all parts of said stretched loop off in forming the next knitted course.

3. A method of knitting on a series of needles comprising engaging a lace point with one of the loops of a course, stretching said loop laterally across a plurality of other needles without removing the loop from its needle, holding the crown of the said loop away from an adjacent needle while forcing the intermediate parts of said loop close to the needle row, lowering the needles relatively to the loops of yarn, and placing the crown of said loop on said adjacent needle.

4. A method of knitting a nonrun fabric on a row of bearded needles comprising engaging the loops of needles at spaced intervals in the row, stretching said loops laterally of the row across a plurality of needles while retaining the base portion of each of said loops on its own needle, and placing the top of the loop on the most remote of the needles over which it is stretched while holding the intermediate portions of said loop under the beards of one or more intermediate needles.

5. A method of knitting a nonrun fabric on a row of bearded needles comprising engaging the loops of needles at spaced intervals in the row, stretching each of said loops laterally of the row across a plurality of needles while retaining the base portion of each of said loops on its own needle, placing the top of each of said loops on the most remote of the needles across which it is stretched while holding the intermediate portions of said loops under the beards of one or more intermediate needles, knitting one or more plain courses, and in subsequent courses engaging and stretching loops of other needles of the series so that the resultant stretched stitches will occur in staggered relation to the completed fabric.

6. A nonrun fabric comprising spread stitches in staggered relation in said fabric, said stitches being each stretched so as to cross at least one adjacent needle wale at one face of the fabric and to encircle the next needle wale, the legs of each of the spread stitches being tied into a stitch across which they extend.

7. A nonrun knitted fabric comprising plain courses and interlocking courses, the interlocking courses having therein spread stitches each extending coursewise at one face of the fabric across at least one needle wale with the crown portion of said spread stitch encircling another needle wale, each spread stitch having its legs tied into a needle wale across which said spread stitch extends.

8. A nonrun knitted fabric comprising plain courses and interlocking courses, the interlocking courses having therein spread stitches each extending coursewise at one face of the fabric across at least one needle wale with the crown portion of said spread stitch encircling another

needle wale, the spread stitches being arranged in staggered relation in different courses, so as to form a fabric with only a small number of plain stitches walewise of the fabric between interlocking stitches, each of said spread stitches having an intermediate portion of its legs tied into a needle wale across which said spread stitch extends.

9. A method of knitting a nonrun fabric on a straight row of bearded needles comprising engaging a stitch of a course on a needle, stretching said stitch laterally across at least two other needles next to said first-named needle, placing said stitch on the more remote of said needles while holding its legs inside the beard of the intermediate needle or needles, and then knitting another course on said needles thereby tying the legs of the spread stitch into the needle wale next to the wale where said spread stitch was drawn.

10. A method of knitting a nonrun fabric on a straight row of fixed bearded needles comprising engaging a stitch on a needle and stretching it laterally across a plurality of other needles without removing it from the first-named needle, holding the crown of said stitch out of contact with an adjacent needle, placing the crown of said stitch on the needle adjacent thereto while holding intermediate portions of both legs of the stitch inside the beards of one or more intermediate needles, and knitting all parts of said stretched loop off in forming the next knitted course thereby tying the legs of said spread stitch into the fabric at an intermediate needle.

11. A method of knitting a nonrun fabric on a row of bearded needles comprising engaging the loops of needles at spaced intervals in the row, stretching each of said loops laterally of the row across a plurality of needles while retaining the base portion of each of said loops on its own needle, placing the top of each of said loops on the most remote of the needles across which it is stretched while holding the intermediate por-

tions of said loops under the beards of one or more intermediate needles, knitting one or more plain courses, and in subsequent courses engaging and stretching loops of other needles of the series so that the resultant stretched stitches will occur in staggered relation in the completed fabric, the legs of each stretched stitch, when knitted off, being tied into a wale across which said stitch was spread.

12. A nonrun knitted fabric comprising an area having a uniform number of wales throughout its length, spread stitches in staggered relation at intermediate points in certain of said wales in said area, said stitches being each stretched so as to cross at least one adjacent needle wale at one face only of the fabric and to encircle the next needle wale.

13. A nonrun knitted fabric comprising plain course and interlocking courses providing an area having wales extending through said area, the interlocking courses having therein spread stitches at an intermediate point in a wale, each spread stitch extending coursewise at one face only of the fabric across at least one needle wale and encircling another wale at its crown portion, the legs of each spread stitch being formed into bights tied into the fabric adjacent to the point of origin of said stitch.

14. A nonrun knitted fabric comprising plain courses and interlocking courses, having therein spread stitches at points intermediate between the ends of a wale, each spread stitch extending coursewise at one face only of the fabric across at least one needle wale and encircling another wale at its crown portion, the spread stitches being arranged in staggered relation in different courses so as to form a fabric with only a small number of plain stitches walewise of the fabric between interlocking stitches.

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