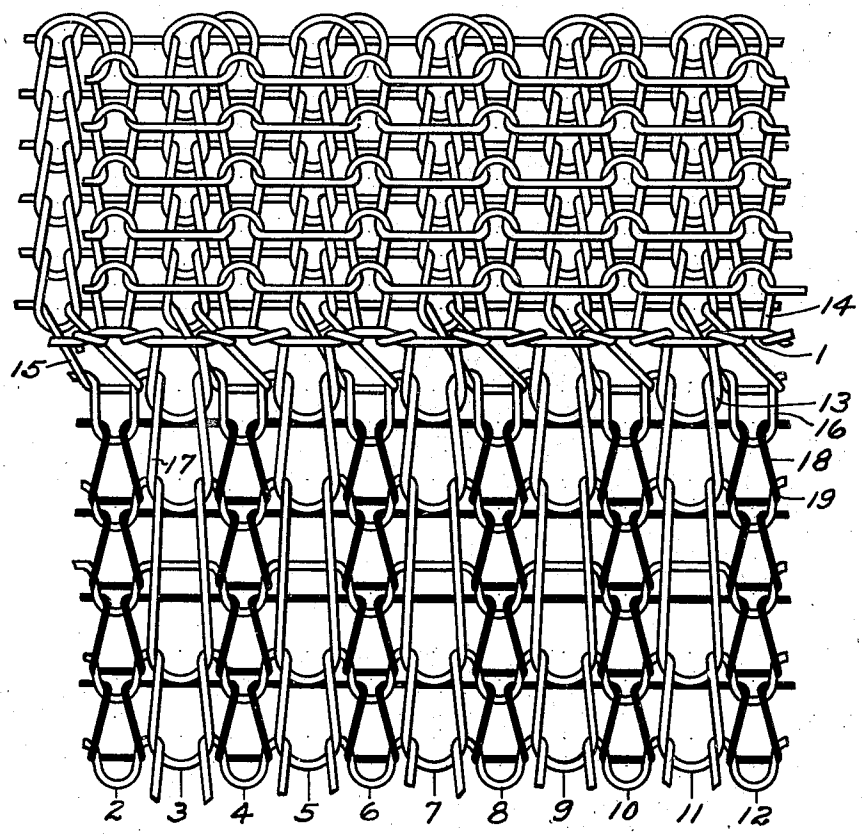
Jan. 25, 1944. E. ST. PIERRE ET AL 2,339,963

KNITTED FABRIC AND METHOD

Filed June 26, 1942 3 Sheets-Sheet 1

FIG. 1.



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KNITTED FABRIC AND METHOD

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FIG. 2.

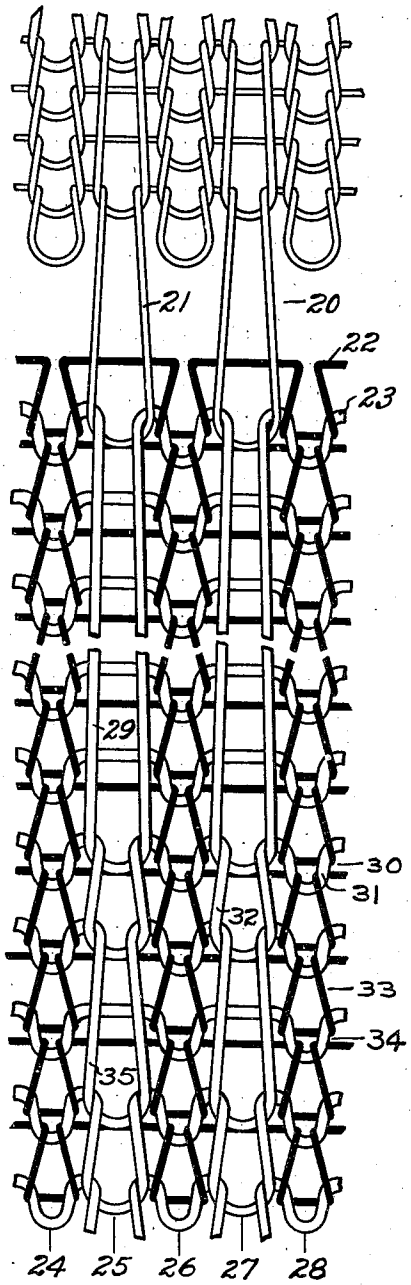


FIG. 3.

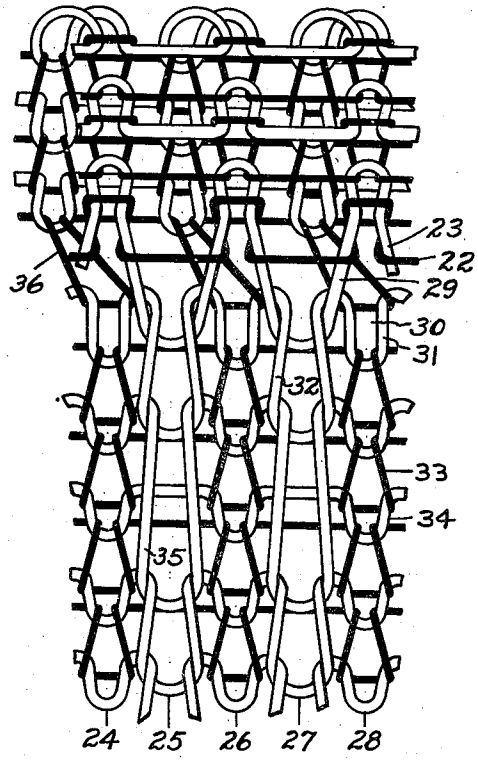
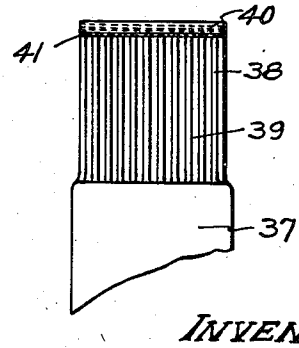


FIG. 4.



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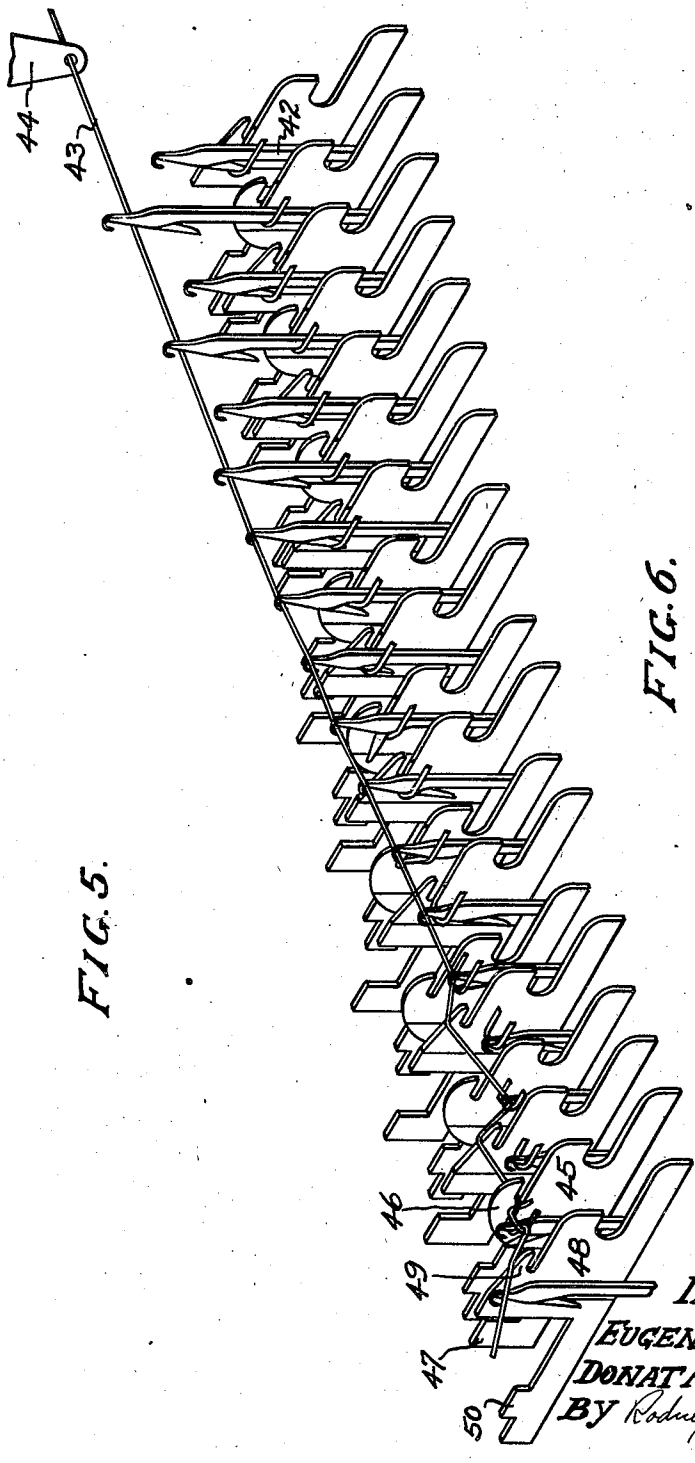


FIG. 5.

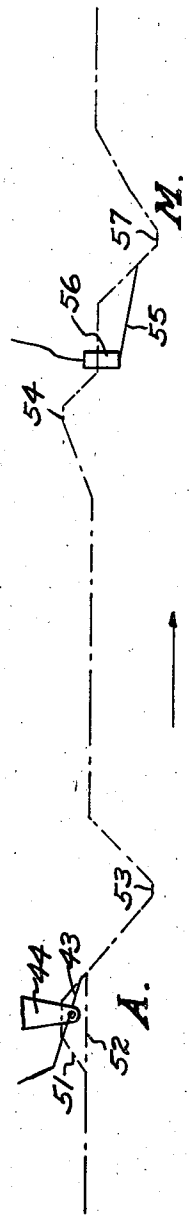


FIG. 6.

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UNITED STATES PATENT OFFICE

2,339,963

KNITTED FABRIC AND METHOD

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Application June 26, 1942, Serial No. 448,546

4 Claims. (Cl. 66—173)

This invention relates to a fabric and method of knitting, more especially a stocking top including a beginning edge and the following rib-like section of the top. In certain types of hosiery the ribbed appearance of the top and the general characteristics of elasticity which are associated with true rib fabric are obtained by a method of knitting which may be carried out on a single bank of needles thereby producing what is generally known as plain or weft knitted fabric. The rib-like appearance and the elasticity result from feeding two yarns separately, knitting one of the yarns at one feeding station and at each wale in the fabric, while the other yarn is knitted at another feeding station and in spaced wales only, preferably every other wale. The yarn knitted at spaced wales only may be of the same material and size as that knitted at all wales, but to obtain a more satisfactory ribbed effect, that yarn is preferably of smaller diameter.

One characteristic of plain knitted fabrics is that they tend to curl or roll outwardly or toward the face side. One of the objects of the present invention is to render that curling effect negligible and to make a substantial edge which will have at least as much elasticity as the continuing rib-like part of the stocking top. This edge will also be resistant against ravelling and serves very effectively to start the stocking top no matter whether knitted in string work or whether knitted by running on and dropping off as is sometimes practiced.

Just after the start of the edge, there is at least one course in which all needles take yarn; however, they may for two or more courses. Thereafter, alternate needles only take the yarn, intermediate needles being held down or otherwise prevented from engaging the yarn in their hooks. That continues until a satisfactory length of fabric is knitted for an outturned welt whereupon the inactive or intermediate needles are again brought into action and a course knitted which will contain stitches at each wale. Thereafter knitting continues in the remainder of the top as described above with respect to creating the ribbed appearance and knitting a top which will have satisfactory characteristics of stretch and elasticity.

By way of illustration there are two forms which the invention may take, one in which the so-called outturned welt is knitted at a single feed and the other in which that welt is knitted at two feeds and, of course, will contain two different yarns. There are certain advantages to either and both will be described in detail hereinafter. After the completion of the outturned welt, the fabric of accordion type which is knitted in continuance of that welt may be tucked over a number of courses at those wales which do not have stitches of both yarns. This matter of tucking is an alternative which may or may not be availed of.

Now referring to the figures of the drawings:

Fig. 1 shows a section of fabric in which the structure is shown to a greatly enlarged scale wherein one form of the invention appears.

Fig. 2 is a conventional showing of fabric knitted in accordance with the second form of the invention, that is, wherein two separate yarns are employed both in the outturned welt and in the continuing portion of mock ribbed fabric;

Fig. 3 is a view similar to Fig. 1 but showing fabric in accordance with the scheme employed in Fig. 2;

Fig. 4 is a conventional illustration of a stocking top in which the invention has been applied;

Fig. 5 is an isometric view showing needles and sinkers and a yarn being fed and engaged by those needles and sinkers as it would be at the so-called auxiliary feed; and

Fig. 6 is a diagrammatic view showing the pathway of needle hooks as they move by the auxiliary and the main yarn feeding points.

Now referring to Fig. 1, the first course knitted actually is taken by every other needle for purposes of starting off. That course is drawn from yarn 1 and is the course of yarn to which the numeral 1 is actually applied. It is taken by needles knitting in the wales 2, 4, 6, 8, 10 and 12. On the next revolution of the machine all needles knit and in drawing the yarn and casting off the first course just described, that course of yarn, when cleared of the needles, merely serve as a selvage course and straightens out very much as illustrated in this figure. The intermediate wales are numbered 3, 5, 7, 9 and 11.

The loops 13 knitted in the intermediate wales are to be held in the hooks of needles until the requisite length of the outturned welt has been completed. The alternate loops such as the loops 14 really constitute the first loops in the outturned welt through which the series of loops knitted in alternate wales starts. After the first course in which the loops 14 are knitted on alternate needles, a series of courses are knitted, the number of such courses shown in Fig. 1 being ten. Of course, any satisfactory number of courses may be knitted to form an outturned welt depending upon the length of outturned welt which it is desired to have at the edge of the fabric.

After the tenth course, another course is knitted with the loops 15 and this is what may be called the terminal course of the outturned welt after which a course 16 is made knitting on all the needles. This course 16 has loops in alternate wales which are drawn through the loops 15 and loops 17 in the intermediate wales 3, 5, 7, 9 and 11, which are drawn through the held loops 13. This course 16 is knitted at the

so-called main feed at which all needles knit, if desired and at that particular point the second feed is rendered active whereupon a course 18 is knitted from the auxiliary yarn 19. That auxiliary yarn knits at alternate wales only and preferably is a yarn smaller in diameter than the yarn 1. The knitting from that point on is carried out as described in Patent No. 2,315,166. Of course, variations may be made in the knitting of the continuing rib-like fabric and such will still be within the scope of the invention as originally conceived.

Referring to Figs. 2 and 3 the second form of the invention is shown where the outturned welt is produced by knitting at both feeds. The invention, as before stated, may be practiced in machines set up to knit string work or to run on and off. In Fig. 2 a series of courses terminating in the course 20 are the connecting courses between two independent stockings or articles. This course is a typical pull course and has the long loops 21 some of which are later cut so that the course may be pulled out when it is desired to separate the stockings. One feature incidental to the knitting of pull courses connecting stockings having outturned welts as herein described is that the pull course is withdrawn very easily and also leaves a clean edge.

At the start of this two feed outturned welt both feeds are in action and the yarn 22 which is fed at the auxiliary feed and which is similar to yarn 19, Fig. 1, knits on alternate needles at that auxiliary feed. The yarn 23, similar to yarn 1 of the first form of the invention, knits at the so-called main feeding station, and, on the first round of knitting, that yarn 23 is taken in the hooks of all needles and is drawn by them. Alternate wales are herein numbered 24, 26 and 28 while intermediate wales are numbered 25 and 27. The loops 29 drawn by needles knitting in intermediate wales 25 and 27 are held in the hooks of those needles throughout that interval in which the complete outturned welt is formed, these loops 29 are shown in this conventional view very much elongated since the welt which is doubled over as shown in Fig. 3, is here shown flattened out so that the initial courses in which the yarns 22 and 23 are first incorporated can only be shown at the top of the figure as the said loops 29 are greatly distorted for that purpose.

In the wales 24, 26 and 28 (alternate wales) knitting continues at both the main and auxiliary feeding stations, each of the yarns fed at those respective stations being drawn into knitted stitches at those wales only, not knitting in intermediate wales 25 and 27.

After a sufficient number of courses have been knitted to constitute a satisfactory length of outturned welt, all needles are brought into action again at the main feeding station. Course numbered 30 is knitted with the loops 31 being drawn through the last knitted loops of the auxiliary yarn 22 while the loops 32 are drawn through the held loops of stitches 29. This completes the outturned welt and thereafter courses 33, 34 and similar continuing courses are knitted as in the form of the invention shown in Fig. 1.

In both Figs. 1 and 2 the stitches 35 are really draw stitches held over four courses so that in reality the course 34 is a special course in that its yarn floats behind intermediate wales whereas in the following courses, the yarn 23 will be knitted continuously in these intermediate courses, but of course, at the main feeding station only. While that was not described with respect to Fig. 1, it is illustrated there and the same applies. These draw stitches may be continued for any desired distance throughout the top, or may be dispensed with if desired.

In Fig. 3 the fabric which has just been described by reference to Fig. 2 is shown more as it actually appears. The initial course drawn from the yarn 22 and knitted at the auxiliary side on alternate needles is merely interlocked with the first course which is drawn from yarn 23 at the main feeding station. The held loops 29 are still shown to a great deal larger scale than they really should be so that the initial course and also other details of the fabric may be more clearly seen. Then the continuing courses extend up at the face of the fabric and down within the interior of the knitted tube to the terminal course 36 which is drawn from the yarn 22 after which a course 30 is drawn by needles knitting in every wale, whereupon the loops 29, also those of the terminal course 36, are knitted off. Thereafter the rib-like fabric throughout the rest of the top is knitted in continuation of the outturned welt. Like numerals are employed throughout the Figs. 2 and 3. The pull course 20 has been withdrawn as the fabric appears in Fig. 3.

Now referring to Fig. 4 a stocking having a leg 37 has a top generally indicated by numeral 38 which has a rib-like section 39 and an outturned welt 40 at the edge. Of course, this outturned welt may be of the form shown in Fig. 1 or that shown in Fig. 3, or variations thereof falling within the scope of the present disclosure. A draw line 41 may be knitted as above described, or the top may be formed without these draw stitches if so desired.

In Fig. 5 several needles and sinkers have been shown at about the position of the auxiliary feeding point and stitch wave. These needles and sinkers in the typical circular type hosiery machine would travel about a circular path, but here they are shown as moving in a straight line merely for convenience of illustration. The needles 42 are of latch type and alternate needles are raised to take the so-called auxiliary yarn 43 which feeds through a yarn feeding finger 44. The intermediate needles are not raised to latch clearing position and their hooks are not at an elevation which would allow them to take the yarn 43.

The selection or division of needles is effected by any satisfactory means and a stitch cam of any convenient construction is to be employed for drawing needles downwardly to draw the stitches of this auxiliary yarn. Of course, the auxiliary yarn is fed throughout the rib-like part of the top and in the second form of the outturned welt which involves feeding of two yarns. In the outturned welt which is knitted from a single yarn or at a single feeding station such as at the main side of the machine, this auxiliary feeding station is not used. However, a description of the more complicated type will serve to teach the knitting of both.

There are preferably two types of sinkers employed, although it is to be understood that the invention may be practiced by different types of mechanism and that the preferred machine organization is being described here. The sinkers 45 are of conventional type and have the usual nibs 46. Those sinkers are also provided with long butts 47. Then a second type of sinker 48 has nibs 49 with inclined upper edges over which

the yarn 43 is preferably drawn. These sinkers 48 have short butts 50. At the stitch drawing wave and just prior to the stitch drawing point, all sinkers will be moved along in a position at which the fabric is held down by engagement thereof in sinker throats. The plain sinkers having butts 47 are moved outwardly by a sinker cam (not shown) and the yarn 43 is drawn over the inclined nibs 49, that is, over nibs of every other sinker. Just before and at the casting off point sinkers are pushed in so that the inclined edges of the nibs 49 are pressed inwardly extending the floats or that part of the yarn entering into courses drawn from the yarn 43 thereby imparting a greater possibility of extension in the fabric, all as described in Patent No. 2,315,166. The sinkers 45 serve to cast off the previously drawn stitches.

At the main side of the machine stitches are drawn by the usual stitch cams and sinkers are controlled in more or less the conventional fashion. Draw control is to be provided there if draw courses are desired. That may be accomplished by control of the front stitch cam or in any other one of the usual methods.

The front stitch cam is further controllable when knitting the outturned welt shown in Fig. 1 so that intermediate needles may be prevented from taking the yarn. When knitting the outturned welt at the main side only, thus from one yarn, the stitch length is so governed as to loosen the stitch enough to give the requisite stretch and elasticity.

In Fig. 6 the auxiliary feeding station is shown at A and there the feeding finger 44 is feeding yarn 43 to needles, hooks of which travel in a pathway generally indicated by numeral 51. Needles which do not take that yarn have their hooks moving at a lower level 52. All needles move down in a stitch wave to the lowest point 53 and then along a raise cam until they are all cleared just prior to reaching the main feeding station. Hooks reach the highest point 54 as needle butts rise above the front stitch cam at the main feed M and thereafter take a main yarn 55 feeding through a finger 56 whereupon all needles are controlled by the rear stitch cam to be drawn down to a lowermost stitch drawing level 57.

The outturned welts herein described have been applied to simulated rib tops of the accordion type, but it is to be understood that the said welts may be applied to other types of simulated rib work, and especially, to accordion types of rib work in which a variation as to wales and courses may be resorted to for producing other rib-like effects. The mechanism described is illustrative of one manner in which the invention may be carried out in a typical, circular hosiery frame. The invention is applicable to other fabric than hosiery, for example, body type fabrics, and may be practiced in other machines such as spring needle machines, flat or straight type machines employing independent or united needle constructions. The scope of the invention is not to be limited other than by the terms of the appended claims.

We claim:

1. A stocking top having in combination an outturned welt knitted from two yarns, one said yarn being of appreciably greater diameter than the other, said yarns being knitted alternately in successive courses throughout the outturned welt and, after an initial course in which there are stitches drawn at each wale, both said yarns being knitted at alternate wales only, and in continuation of said outturned welt, a continuing portion of fabric throughout the remainder of the top knitted from two yarns and of accordion type fabric with one yarn knitted at each wale in alternate courses and the second yarn knitted at alternate wales only in intermediate courses, the sinker loops of the smaller yarn being substantially looser than the sinker loops of the other yarn in both the out-turned welt portion and the continuing portion of the top whereby the relative weakness of the small yarn is compensated for when the fabric is stretched laterally.

2. A knitted stocking top having in combination an outturned welt at the beginning edge thereof and in continuation thereof simulated rib type plain knit fabric, the construction being such that the outturned welt is knitted from two independent yarns, one of appreciably greater size than the other, the said yarn of greater size being first knitted in all wales and thereafter in alternate wales only, the second yarn being knitted at alternate wales only throughout the said outturned welt, the continuing portion of simulated rib type fabric being knitted from the same two yarns as the outturned welt but having the yarn of greater diameter knitted at each wale while the smaller yarn is knitted at alternate wales only and floated over intermediate wales, the sinker loops of said smaller yarn being substantially looser throughout than the sinker loops of the yarn of greater diameter whereby the relative weakness of the smaller yarn is compensated for when the fabric is stretched laterally.

3. A method of knitting a stocking top including the steps of forming an outturned welt by first knitting one yarn at all wales in at least a single course, thereafter holding intermediate stitches of that course and continuing knitting throughout the outturned welt by drawing stitches in alternate wales only and by knitting alternate courses from the yarn above mentioned and intermediate courses from a second yarn smaller in diameter than the first, then continuing the top by knitting the two yarns above mentioned, the first mentioned yarn at all wales and the second mentioned yarn at intermediate wales only, the sinker loops of said smaller yarn being lengthened abnormally throughout the welt and top whereby the relative weakness of the smaller yarn is compensated for when the fabric is stretched laterally.

4. A method of knitting a stocking top including the steps of forming an outturned welt by knitting two separate yarns throughout the said welt, one yarn being greater in size than the other, and so knitting the yarn of greater size in at least one course at all wales, then holding intermediate stitches of that course and thereafter knitting every other course from a second yarn smaller in diameter than the first, and intervening courses from the first said yarn, but at alternate wales only, and thereafter continuing by knitting the yarn of greater size in alternate courses and at all wales and the smaller yarn at intermediate courses but at alternate wales only while floating over intermediate wales, the sinker loops of said smaller yarn being lengthened abnormally throughout the welt and top whereby the relative weakness of the smaller yarn is compensated for when the fabric is stretched laterally.

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