Oct. 16, 1934. N. LEVIN 1,976,885

KNITTED FABRIC AND METHOD OF MAKING SAME

Filed Aug. 1, 1931

Fig. 1.

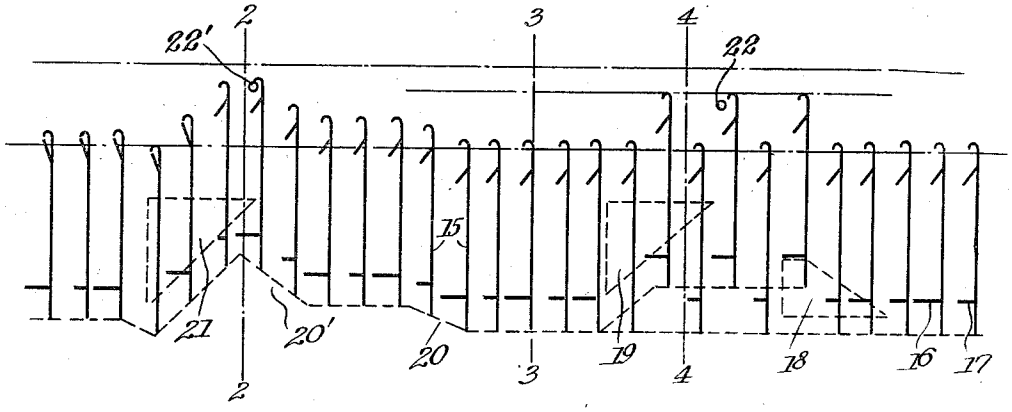


Fig. 2.

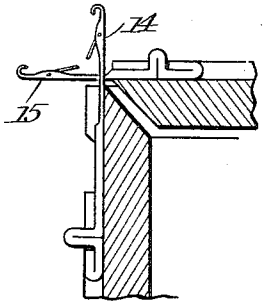


Fig. 3.

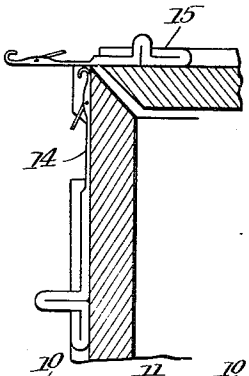
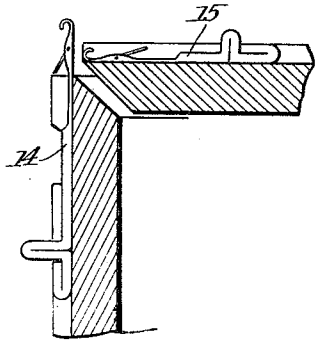


Fig. 4.



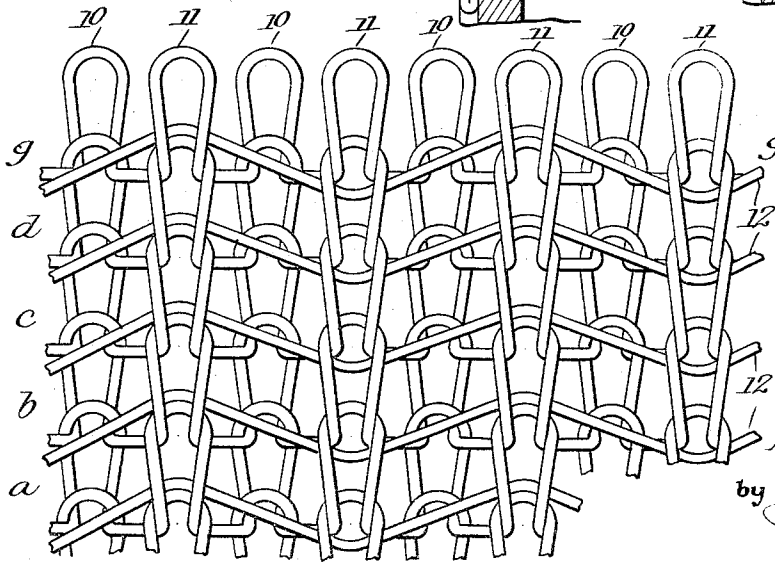


Fig. 5.

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KNITTED FABRIC AND METHOD OF MAKING SAME

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Application August 1, 1931, Serial No. 554,569

5 Claims. (Cl. 66—190)

My invention relates to a ribbed fabric and method of making the same and it is an object of the same to provide a ribbed fabric with inlaid yarns serving to thicken the fabric and to limit its elasticity in the direction of the width of the fabric. In various situations the lateral elasticity of ribbed fabric is considered objectionable, particularly in the making of certain types of outer garments which become baggy at the knees and elbows. According to my invention the lateral elasticity may be eliminated to a large extent by the use of inlaid yarns of material which will stretch but little, if at all.

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

Fig. 1 is a diagrammatic view illustrating the action of the cylinder or machine needles of a rib knitting machine in making my improved fabric,

Fig. 2, a section of a ribber illustrating the position of needles at line 2—2 in Fig. 1,

Fig. 3, a similar view with reference to line 3—3, of Fig. 1,

Fg. 4, a similar view with reference to line 4—4 of Fig. 1, and

Fig. 5, a conventionalized view of the fabric on an enlarged scale.

Referring first to the fabric as a matter of convenience, Fig. 5 shows a ribbed fabric having a series of dial or frame needle wales 10 alternating in any desired ratio with cylinder or machine needle wales 11, the fabric there shown being the familiar one-and-one ribbed fabric. The yarns 12, 12 are laid into the fabric in a manner hereinafter described, so that each inlaid yarn lies alternately on one face of the fabric and then on the other i. e., they lie at one side of the dial or frame needle wales and at the other side of the cylinder or machine needle wales. In addition to this each inlaid yarn, referring now to the plain wales (those made by the machine or cylinder needles) lies back of a stitch in one course in one plain wale but back of a stitch in another course in the next plain wale. Taking, for example, the lowermost yarn marked 12 and beginning at the left of Fig. 5, this yarn lies in front of rib wale 10 then back of a stitch in course *b*, then in front of the next rib wale 10, then back of a stitch in course *a* at the next plain wale 11, after which it passes in front of the next rib wale 10 and back of a stitch in course *b* at the next plain wale 11 and so on.

For making this fabric I use preferably a dial and cylinder machine of known type having any kind of independent cylinder needles 14 and any kind of dial needles 15. The cams for operating the dial needles may be of conventional type and therefore are not illustrated. The cylinder needles are all alike except that alternate ones have long butts 16 while the others have short butts 17. The broken line at the bottom of Fig. 1 indicates the path of the foot ends of the cylinder needles. The cams for operating the cylinder needles include a thin cam 18 acting only on the long butts to elevate the long butt needles, a cam 19 acting to depress any needles that have been elevated, raising cams of suitable character for elevating all needles in the manner indicated at 20 and 20′ and a stitch cam at 21 for lowering all the needles.

In the operation of the device yarn feeds are provided adjacent the two lowering cams, the yarn feed 22 to the right in Fig. 1 supplying the inlaid yarn 12 whereas the yarn feed 22′ at the left supplies the regular knitting yarn. The long butt needles only are elevated to tuck level by cam 18 before passing the feed for the inlaid yarn. These needles therefore take the inlaid yarn without clearing their latches through the old loops and are then retracted by cam 19, after which they pass on to the elevating cam at 20 where they are partially elevated. At this point the dial needles have been advanced from the retracted or welt position of Fig. 4 to the position of Fig. 3, so that they hold down the inlaid yarn which has been taken by the long butt needles. The needles then move on to the knitting point, where the cylinder needles are advanced by the elevating cam at 20′ to the position illustrated in Fig. 2, the dial needles being also advanced at this time to the normal knitting position illustrated in said figure. Both sets of needles now take the ordinary knitting yarn or body yarn and knit ribbed fabric, thus producing the structure illustrated in Fig. 5.

It will be seen that at the right of Fig. 1 the dial needles which knit wales 10 are withdrawn when the yarn 12 (the yarn to be inlaid) is fed to the cylinder needles. Now if alternate cylinder needles (as here shown for illustration) are raised to tuck level these raised needles will take the yarn 12 as in the making of tuck fabric, since these raised needles are not moved far enough to clear their latches. But tuck stitches are not made for the reason that the intermediate (non-elevated) needles do not take the yarn 12. On the contrary, yarn 12 comes to lie back of the non-elevated needles, since the length of yarn 12 between two adjacent raised cylinder needles will

subtend a chord of an arc of the cylinder between said two needles, as at the second and fourth wales 11 from the left in Fig. 5. When the dial needles are advanced those dial needles adjacent to a long-butt cylinder needle will extend over the limb of a bight of yarn 12 which bight is held down by said long-butt needle and when this cylinder needle again takes yarn and knits the bight of inlaid yarn will lie behind the new stitch as shown in Fig. 5 at the first and third wales 11. As yarn 12 lies behind the short-butt needles it must lie at the opposite side of the fabric in wales 10 from the side where it lies in wales 11, regardless of whether the dial needles pass over it or not.

While I have shown the product as a one-and-one rib it will be obvious that other ratios can be used and the same applies to the alternate long butt and short butt needles in Fig. 1. Many other changes will be obvious to those skilled in the art all without departing from the spirit of my invention, and therefore I do not limit myself to what is shown in the drawing and described in the specification but only as set forth in the appended claims.

I claim:

1. A rib knitted fabric comprising plain wales and intercalated rib wales, with inlaid unknitted substantially taut yarns extending in front of successive rib wales and behind successive plain wales, the portions of inlaid yarns lying successively behind a stitch of one course in a plain wale, and behind a stitch of an adjacent course in an adjacent plain wale.

2. A rib knitted fabric comprising plain wales and rib wales, with substantially taut inlaid yarns lying at one side of wales of one set and at the opposite side of wales of the other set, the portions of yarn extending across a wale of one set lying successively first behind a stitch in one course of said set of wales and then behind a stitch in an adjacent course of said set of wales.

3. A rib knitted fabric comprising inlaid yarns lying behind the plain wales and in front of the rib wales, the inlaid yarns being substantially taut when the fabric is in unstretched condition, whereby loose loops do not appear on a face of the fabric.

4. A 1+1 rib knitted fabric comprising inlaid yarns lying on one face of the fabric at the rib wales and at the other face of the fabric at the plain wales, said inlaid yarns being substantially taut when the fabric is in unstretched condition, whereby loose loops do not appear on a face of the fabric.

5. A method of knitting ribbed fabric on a plural feed circular ribber, comprising knitting a body yarn at one feed on both sets of needles, feeding at another feed a tensioned non-knitted yarn to selected needles of one set which are raised to tuck level, retracting said selected needles, advancing needles of the other set to hold the non-knitted yarn down, and then again knitting the body yarn on both sets of needles, whereby the non-knitted tensioned yarn lies in front of the rib wales and lies successively back of one stitch in a plain wale but back of a stitch of another course in an adjacent plain wale.

NATHAN LEVIN.