July 27, 1943. S. R. SHELMIRE 2,325,078

KNIT FABRIC

Filed Jan. 9, 1941 2 Sheets-Sheet 1

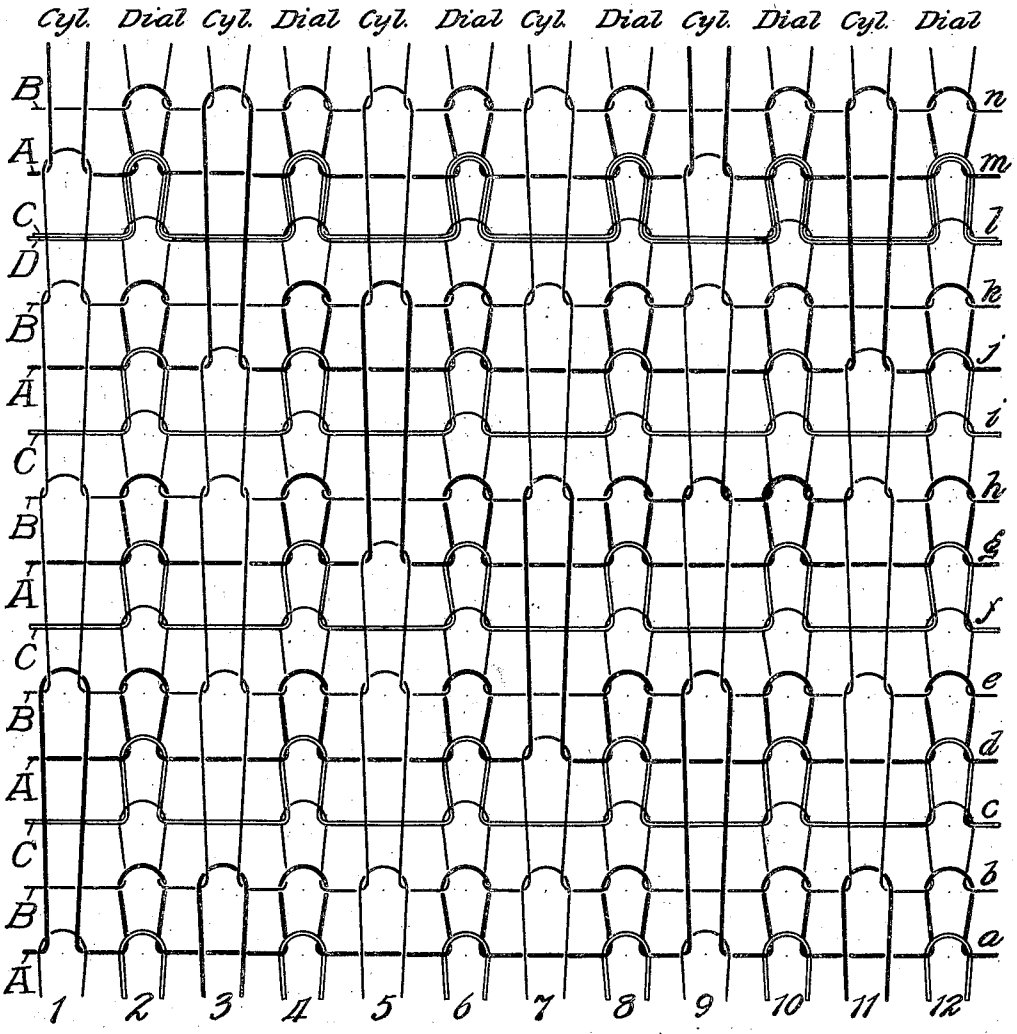


Fig. 1.

Inventor
STANLEY R. SHELMIRE
by his attorneys
Howson and Howson

July 27, 1943. S. R. SHELMIRE 2,325,078

KNIT FABRIC

Filed Jan. 9, 1941 2 Sheets-Sheet 2

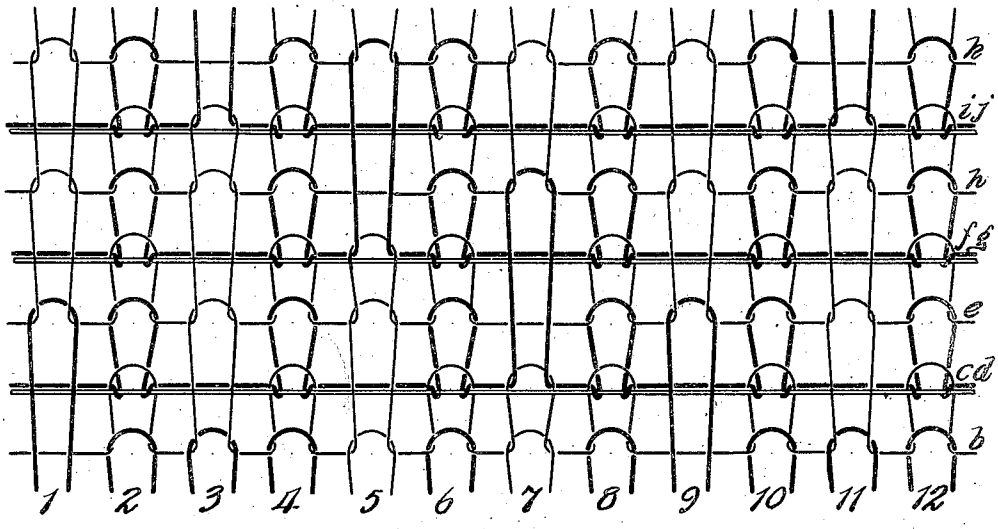


Fig. 2.

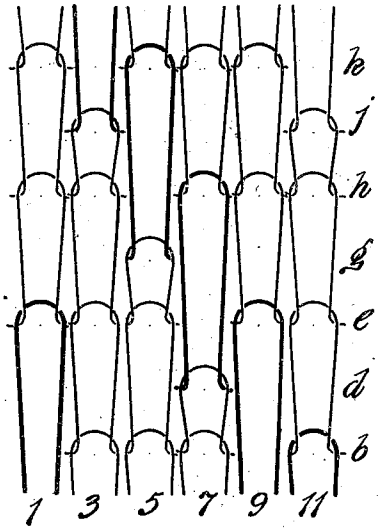


Fig. 3.

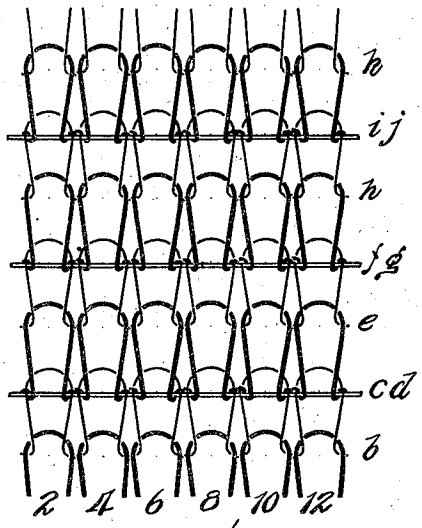


Fig. 4.

Inventor
STANLEY R. SHELMIRE
by his attorneys
Howson and Howson

Patented July 27, 1943 2,325,078

UNITED STATES PATENT OFFICE

2,325,078

KNIT FABRIC

Stanley R. Shelmire, Laconia, N. H., assignor to Scott & Williams, Incorporated, Laconia, N. H., a corporation of Massachusetts

Application January 9, 1941, Serial No. 373,818

10 Claims. (Cl. 66—200)

This invention relates to rib knit fabric and more particularly to rib knit fabric having an elastic thread incorporated therein during the knitting of the fabric and it is an object of this invention to provide an improved fabric of the type described knit of a plurality of contrasting yarns in such manner as to provide pattern effects on the face thereof and having an elastic thread incorporated therein during the knitting of the fabric in such manner as to be substantially buried in the fabric and to provide a fabric having a two-way stretch. It is also an object of this invention to provide a rib knit fabric having two-way stretch in which the elastic thread is engaged only with loops forming the back wales of the fabric.

In the drawings—

Figure 1 is a diagrammatic view looking at the face of a fragment of fabric in accordance with this invention the loops of the various yarns and threads being shown enlarged and separated so as to show the relations thereof, the loops of the elastic thread being shown as if knit without tension;

Figure 2 is a view similar to Figure 1 of a portion of the fabric of Figure 1 with the elastic thread shown straightened out in the position it tends to assume when contracted;

Figure 3 is diagrammatic view showing the relation when the fabric is contracted of the loops forming the face wales of the fabric; and

Figure 4 is a view similar to Fig. 3 showing the loops forming the back wales of the fabric.

A fabric in accordance with this invention comprises a plurality of yarns, preferably of contrasting colors, which are knit upon a multi-feed machine having suitable patterning mechanism. The fabric shown in the drawings for the purpose of illustrating the invention was knit upon a multi-feed circular rib knitting machine having yarns or threads fed at three feeding points; contrasting non-elastic yarns being fed at two of the feeding points and an elastic thread fed at the third feeding point. The elastic thread may be any of the usual threads of rubber, either covered or of bare rubber, but preferably is of bare rubber fed under the desired tension.

The elastic thread may be fed alone at the third feeding point but, preferably, a non-elastic yarn is also fed to the needles with the elastic yarn.

In the fabric illustrated the non-elastic yarn A fed at a feeding point, for convenience designated the first feeding point, is fed to all the dial or rib needles and to selected cylinder needles, all the needles which take yarn at this feeding point being operated to cast off the loops previously drawn while the needles (non-selected cylinder needles) which did not take yarn at this feeding point retain the loops previously drawn. At the next, or second, feeding point, the non-elastic yarn B fed at this point is also taken by all of the dial needles and by such cylinder needles as did not take the yarn A at the first feeding point. As at the first feeding point, the needles taking yarn at the second feeding point cast off the loops previously drawn while the needles not taking yarn at the second feeding point (the cylinder needles which took yarn A at the first feeding point) retain the loops previously drawn. At the next or third feeding point the elastic thread C or an elastic thread C and its accompanying non-elastic yarn D are fed to all of the dial needles only, the cylinder needles not being operated to take yarn at this feed. The dial needles are operated at this, the third, feed to cast off the loops previously drawn while the cylinder needles, being inactive at this feed, retain the loops previously drawn. Selection of the cylinder needles to take the yarn A is, preferably, made just in advance of the first feeding point and may be by a cross-over cam system acting upon cylinder needles having sliding butts as in the Shelmire Patent No. 2,240,421, issued April 29, 1941, or the selection may be made by jacquard or other known suitable selecting means.

Fabric knit in the manner described comprises courses of loops of the yarns taken at each feed and knit by the dial needles thus having three such courses for each revolution of the needle cylinder with the loops thereof drawn to the inner face of the fabric, and loops which form substantially a single course knit on the cylinder needles for each revolution. The loops of the course knit on the cylinder needles are drawn to the outer face of the fabric and are knit of the two non-elastic yarns fed at the first and second feeding points. A loop is knit on each cylinder needle in each course but whether it is yarn A taken at the first feed or yarn B taken at the second feed is, of course, dependent upon the selection of the cylinder needles made for that revolution of the needle cylinder.

In Figure 1 which shows diagrammatically in extended condition the loops of a fragment of a fabric in accordance with this invention and knit on a rib knitting machine having alternate dial and cylinder needles there are shown wales 1 to 12 of courses *a* to *n*, wales 1, 3, 5, 7 etc., being knit by the cylinder needles and wales 2, 4, 6, 8, etc., by the dial needles. The courses

a, *d*, *g*, *j*, etc., are knit of the yarn A fed at the first knitting point; courses *b*, *e*, *h*, etc., of the yarn B fed at the second knitting point; and courses *c*, *f*, *i*, *l*, etc., of the elastic thread C alone or the elastic thread C and an inelastic yarn D fed at the third feeding point as shown in course *l*. The yarns and elastic thread are knit in rotation on the dial needles, each yarn or thread thus appearing in every third course in the wales knit by these needles. The cylinder needles taking yarns A and B selectively do not knit each yarn on every needle thus the yarn A in course *a* is taken only by the cylinder needles knitting wales 1 and 9 while the yarn B is taken by the cylinder needles knitting wales 3, 5, 7 and 11. The loops formed by the cylinder needles vary in length, that is, they extend past different numbers of courses formed on the dial needles, thus, in wale 9, where the cylinder needle drew a loop of yarn B where the previous loop was of the same yarn, as in course *h*, the loops extend for three courses knit on the dial needles as courses *i*, *j*, and *k* and where the change is made from the yarn B, fed at the second feeding point to the yarn A, fed at the first feeding point, as in course *m*, with the needle selection made just in advance of the first feeding point, the loop of the yarn B extends for only two courses of dial loops, as courses *k* and *l* of wale 9. Where the change is from the yarn A, to the yarn B, as made in course *e* of wale 9 then the loop of yarn A extends for four courses of the dial loops, as courses *b*, *c*, *d* and *e*, since the cylinder needle knitting wale 9 does not take the yarn B until the next revolution.

The elastic thread C being under tension when knit tends to contract and straighten out when the loops are cast off the needle and, in doing so, contracts the fabric both laterally and longitudinally so that a fabric having a two-way stretch from its contracted condition is provided. In contracting, the wales knit on the cylinder needles are brought together so that the face of the fabric presents a design resulting solely from the selective knitting of the yarns A and B by the cylinder needles as shown in Figure 3.

The wales knit by the dial needles are also brought together by the contraction of the fabric but these wales fall in back of the cylinder needle wales and form the back or inner face of the fabric, as shown in Figure 4. The elastic thread tends to straighten out, as shown in Figures 2 and 4, and in so doing deforms the loops of the other yarns to some extent. The elastic yarn, however, is buried in the body of the fabric and concealed from view on both faces whether it is fed alone or with an inelastic yarn, as the yarn D. Where fed with an inelastic yarn the contraction of the elastic thread forms small projecting loops of the yarn D similar to pile loops, which aid in burying the elastic fabric.

While the fabric has been described as having been knit on a rib knitting machine having the pattern mechanism applied to the cylinder needles only, it is to be understood the fabric can be knit equally well upon a rib knitting machine having the pattern mechanism applied to the dial needles only. And it is also to be understood that where an elastic thread is specified in the claims such term comprises a non-elastic thread fed simultaneously with the elastic thread at the one feeding point as described in the foregoing specification as well as an elastic thread fed alone. It is also to be understood that while for the purpose of illustration the fabric shown and described has been such as would be knit upon a knitting machine having three feeds, the invention is not limited to such fabric but is applicable to fabrics having a greater number of feeds or a plurality of groups or cycles of three feeds such as have been described above.

What I claim is:

1. A knitted fabric comprising face and back wales, said face wales being formed of loops of a plurality of contrasting yarns, each of said yarns being knitted singly at certain of the wales, and said back wales being formed of loops of each of said contrasting yarns and courses of an elastic thread, said fabric having a plurality of courses of loops appearing in the back wales for each course of loops appearing in the face wales.

2. A knitted fabric comprising face and back wales, said face wales being formed of loops of a plurality of contrasting yarns with each of said yarns being knit singly and at selected wales only of each course, and said back wales being formed of loops of each of said contrasting yarns and courses of an elastic thread in rotation.

3. A knitted fabric comprising face and back wales, said face wales being formed of loops of a plurality of contrasting yarns with each of said yarns being knit singly and at selected wales only of each course and said yarns together occurring at each face wale of a course, and said back wales being formed of loops of each of said contrasting yarns and courses of an elastic thread in rotation.

4. A rib fabric comprising a plurality of non-elastic yarns and an elastic thread knitted in rotation, each of said non-elastic yarns being knitted singly in selected face wales and knitted singly in all the back wales and said elastic thread being knitted as a separate course of loops in the back wales only.

5. A rib fabric having one face formed of loops of courses of non-elastic yarns knitted singly, the loops of said non-elastic yarns being in selected arrangement on said face to form pattern effects, and the opposite face formed of loops of each of said courses of non-elastic yarns and spaced courses of loops of elastic thread.

6. A rib fabric having one face formed of courses of loops of non-elastic yarns knitted singly in selected arrangement to form pattern effects and the opposite face formed of courses of loops of each of said non-elastic yarns and spaced courses of loops of elastic thread.

7. A rib fabric having a face formed of courses of loops of non-elastic yarns knitted singly in selected arrangement to form pattern effects and a back formed of courses of loops of each of said non-elastic yarns and a course of loops of elastic thread in repeated succession, said elastic thread providing two-way stretch for the fabric.

8. A rib fabric having face wales formed of courses of loops of non-elastic contrasting yarns, said yarns being singly and selectively knit in said face wales to form pattern effects, and back wales formed of courses of loops of said contrasting yarns and a course of loops of elastic thread in rotation.

9. A rib fabric comprising a plurality of non-elastic yarns and an elastic thread knitted in rotation, each of said non-elastic yarns being selectively knitted singly in the face wales and knitted singly in all the back wales and said

elastic thread being knitted as a separate course of loops with loops at less than all the wales to give lateral elasticity.

10. A rib fabric comprising a plurality of non-elastic yarns and an elastic thread knitted in rotation, each of said non-elastic yarns being knitted singly with one of said non-elastic yarns appearing in a portion only of the face wales of a course and the other non-elastic yarn appearing in the remaining face wales of that course, both of said non-elastic yarns being knitted singly in all the back wales and said elastic thread being knitted as a separate course of loops in the back wales only.

STANLEY R. SHELMIRE.