Dec. 27, 1938. R. H. LAWSON ET AL 2,141,440

KNITTED FABRIC AND METHOD OF MAKING THE SAME

Filed June 18, 1936 2 Sheets-Sheet 1

FIG. 1.

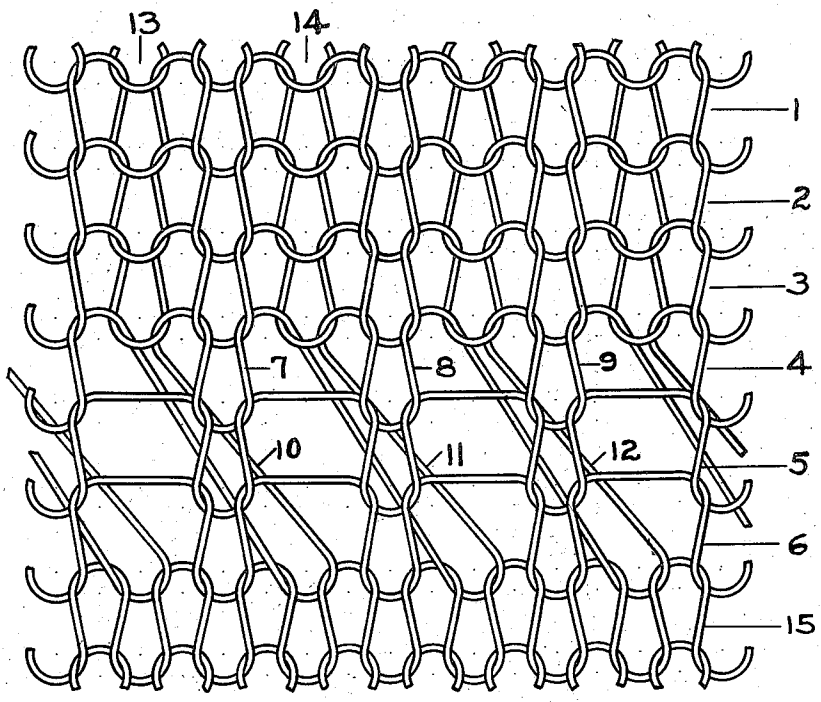
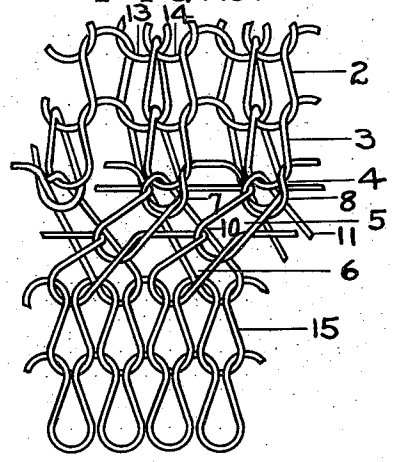


FIG. 2.



INVENTORS:
ROBERT H. LAWSON,
ARTHUR N. CLOUTIER.
BY Roy F. Lovell,
ATT'Y.

Dec. 27, 1938. R. H. LAWSON ET AL 2,141,440

KNITTED FABRIC AND METHOD OF MAKING THE SAME

Filed June 18, 1936 2 Sheets-Sheet 2

FIG. 3.

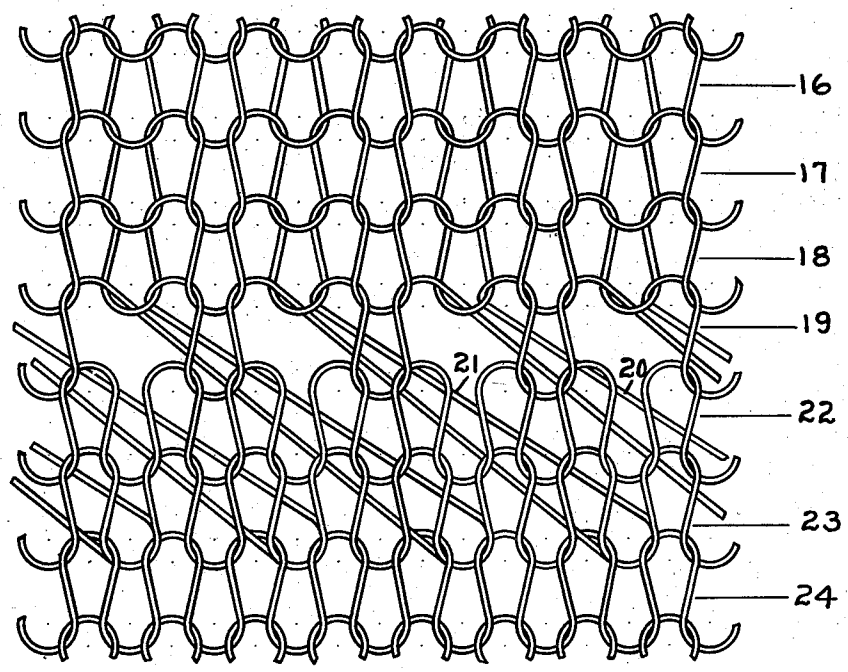
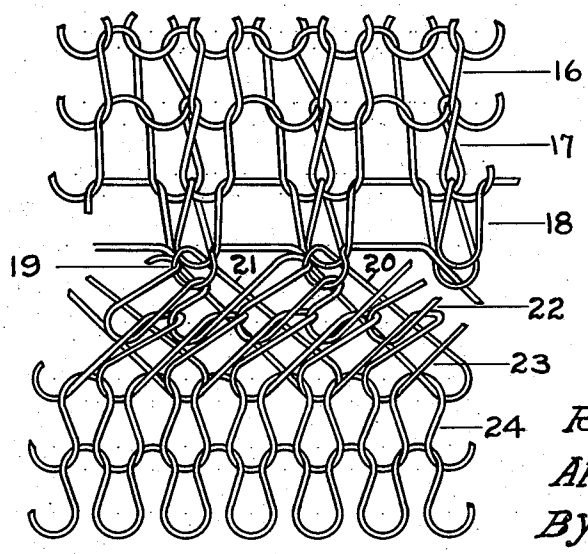


FIG. 4.



INVENTORS:
ROBERT H. LAWSON,
ARTHUR N. CLOUTIER,
BY Roy F. Lovell,
ATT'Y.

Patented Dec. 27, 1938 2,141,440

UNITED STATES PATENT OFFICE

2,141,440

KNITTED FABRIC AND METHOD OF MAKING THE SAME

Robert H. Lawson, Pawtucket, and Arthur N. Cloutier, Lonsdale, R. I., assignors to Hemphill Company, Central Falls, R. I., a corporation of Massachusetts

Application June 18, 1936, Serial No. 85,944

12 Claims. (Cl. 66—199)

This invention concerns a knitted fabric, more specifically, a novel construction at the transfer from rib fabric to plain fabric. The transfer from rib to plain fabric and vice versa has been effected in various ways, but it is an object of this case to set forth a form of transfer which will be strong, pleasing in appearance and which may be knitted on a dial and cylinder knitting machine without resorting to special transferring instrumentalities such as have been employed previously. It is a further object of the invention to knit a fabric having the same number of wales in the rib part as it has in the continuing plain part and to transfer the loops of discontinued rib wales to plain wales which are to be knitted in continuation of the rib wales which have been dropped.

In the drawings:

Fig. 1 shows a section of fabric in a conventional illustration, comprising a section of rib fabric, plain fabric and the transfer between the two;

Fig. 2 shows this same fabric about as it would appear after it had been removed from the machine;

Fig. 3 shows a section of fabric, conventionally illustrated, wherein the transfer is effected by a greater shogging movement than in the form shown in Fig. 1; and

Fig. 4 is a view of the fabric illustrated in Fig. 3 about as it would actually appear when magnified to a considerable extent.

It has long been desired to knit sections of rib fabric and to transfer to plain fabric having the same number of wales, on knitting machines such as are commonly employed for knitting hosiery. This has been accomplished by the use of special instrumentalities in some instances, and with some degree of success, but there have never been any machines put into practical use wherein rib fabric could be knitted as in the rib top of a stocking and on dial and cylinder needles of conventional construction such as the usual latch needles and also, wherein knitting could be continued on the cylinder needles after transferring the rib stitches from dial needles to cylinder needles which were previously inactive. Machines of this type must necessarily have twice as many cylinder needles as they have rib needles. The transfer herein shown is effected by special manipulation of the needles and needle carriers themselves and it is not necessary to employ special instruments such as transfer points or the like for picking off the rib stitches and placing them upon the cylinder needles.

The fabric according to this invention will be knitted as conventional rib fabric on an equal number of dial and cylinder needles to form a stocking top or welt and when such welt has been knitted for the required extent, dial needles will cease to knit and will next be affected by transfer cams so-called, which will cause them to spread their loops for being taken on cylinder needles prior to the knitting of the plain portion of the fabric.

It is preferable to knit a few courses on cylinder needles alone prior to making the transfer. After the last course of rib work we knit two courses, preferably on all cylinder needles, but at least on those cylinder needles which knitted in conjunction with the dial needles throughout the rib portion, that is, on every other cylinder needle. After these courses have been knitted, either the dial or the cylinder will be shogged throughout a little more than the space of one or two dial needles and a cylinder needle will be brought up to take the loop from that dial needle. Each of the dial needles will be formed with a sort of shoulder so that the loop held thereon will be extended and will be maintained in an open position above that place in which the cylinder needle is to be projected up for taking the same. It has been found that satisfactory results are to be obtained by this shogging movement of one needle although slightly better results will be obtained by shogging two needles since the loop will be opened a little more so that the accuracy within which the operation must be performed does not have to be quite so great as with the single dial needle movement.

After the loop has been penetrated by one of those cylinder needles which has previously been out of action, or which has just been brought up to knit the fill-in courses, the dial needles will be withdrawn. This movement leaves all of the cylinder needles provided with loops for the start of knitting in plain work or in the leg of the stocking. From this point the dial will be out of operation and the knitting will be very similar to that in the usual hosiery machine wherein cylinder needles only are provided and wherein these must have a rib top transferred to them prior to starting the stocking. Tension will be applied throughout the knitting of the rib top, and if necessary, may be applied throughout the knitting of the plain portions, however, there must be a difference of tension for the knitting of these connected parts of the fabric.

Now referring to Figs. 1 and 2 one form of the invention will be described wherein courses 1, 2

and 3 have been knitted in a rib top or welt, being knitted as one and one rib according to the usual practice. Course 4 is the last course knitted on both the rib and cylinder needles and it is the rib loops of this course which are to be transferred to cylinder needles for knitting the remainder of the article as plain work. Since according to our practice, each rib loop is to be extended over a cylinder wale and transferred to a cylinder needle which was in alignment with the rib needle adjacent that from which the loop is to be transferred, it will be desirable to knit a course or two such as courses 5 and 6 on those alternate cylinder needles which knitted in conjunction with the dial needles during rib work. The knitting of these courses will allow loops 7, 8, 9, etc., to be robbed so that the loops 10, 11 and 12 which are in the meantime held on the dial needle may be elongated. Of course, these loops can not be elongated as much as shown in Fig. 1 but it is to be understood that the figure is a conventional showing only and distortions of the fabric can not be shown therein although they are illustrated in Fig. 2.

After knitting course 6 the dial or the cylinder, preferably the dial, will be shogged or moved with respect to the other element until the needle which knitted wale 13 for example, will overlie the cylinder needle which has previously been inactive, but which was directly beneath the adjacent dial needle in wale 14. This is what we term a single dial needle movement. Of course, the dial needle will be moved ahead of the cylinder needle just enough so that the cylinder needle can pass up by the dial needle to remove the loops 10, 11 and 12, as the case may be, which will be extended laterally. Each loop will be held on a shoulder or abutment on the dial needle and its position will be determined quite accurately so that the cylinder needle may project up through it without failure. If desired the last course of rib fabric may be knitted loosely to assist in the transfer. After this cylinder needle has penetrated the dial loop the dial needle will be retracted and will leave its loop on the cylinder needle. From this point all cylinder needles have loops thereon and will knit plain work having therein as many wales as there were in the rib work. Course 15 is the first plain course knitted after the transfer.

In actual practice the fabric will not maintain any such theoretical form as that shown in Fig. 1 but will become distorted to look very much like what has been shown in Fig. 2. The rib part of wale 13 will tend to align with the plain part of wale 14 since the loops 10 etc., are shorter and tighter than the overlying plain loops in courses 4, 5 and 6 and will cause those plain loops to be inclined in the opposite direction from the inclination of the transferred loops 10, 11 and 12. The loops 7, 8 and 9 will be drawn back and will almost disappear as such in the fabric. This results in the elongation of loops 10, 11 and 12 to greatly facilitate the transfer. Corresponding loops and courses have been identified by similar numerals in Fig. 2 to those used in Fig. 1.

Now referring to Figs. 3 and 4 we will describe a modification of the invention. The cylinder or the dial of the machine must be shogged throughout a distance of a little more than two dial needles to effect this transfer and the fabric produced will be slightly more distorted than that of Figs. 1 and 2. This distortion is not particularly objectionable in the finished product but does render the transfer more certain and easier of accomplishment. The fill-in courses have been knitted by use of all cylinder needles and thus a transfer section is produced which is not so open in appearance and which should appear stronger than that of the first form.

In Fig. 3 courses 16, 17 and 18 will be the last courses knitted in the rib top. Course 19 is also knitted on the dial needles in conjunction with alternate cylinder needles but the dial loops 20, 21, etc., are retained on the dial needles while courses 22 and 23 known as the fill-in courses are knitted on all cylinder needles; it will be necessary to bring up the previously inactive cylinder needles prior to knitting these courses. Just as in the form of the invention shown in Fig. 1, these courses 5 and 6 and 22 and 23 will actually comprise one-half a course more than shown since the cams controlling the knitting function must be moved in on short butts and will first take effect on long butts. Thus the fill-in courses will actually comprise one and one-half, two and one-half courses, or perhaps a greater number, depending upon the particular gauge of fabric being knitted and as well upon other practical considerations.

With either form of the invention the fill-in courses may be knitted on alternate cylinder needles such as knitted in conjunction with the dial needles or upon all cylinder needles. After the fill-in courses have been completed, the dial or the cylinder, preferably the dial, will be shogged or angularly moved until the dial loops are stretched over the space in which cylinder needles may rise through them whereupon dial needles will be retracted leaving the loops on those cylinder needles which have been inactive during knitting of the rib top. In this form of the invention, Fig. 3, these elongated dial loops will be taken by cylinder needles which were substantially beneath dial needles removed by a space of two dial needles from the needle on which the loop was originally drawn.

Courses 24, etc., will then be knitted in the ring top or the leg of the stocking in the usual way. The appearance of the fabric after being dropped from the machine is shown in Fig. 4 wherein the elongation of loops 20 and 21 is shown more nearly to scale and wherein the courses 22 and 23 are shown covering these transferred loops and closing the space except for slight openings in courses 17 and 18. The outward appearance of the fabric transferred in this way does not vary greatly from the ordinary direct transfer commonly employed.

The fabric has been described with respect to two forms of the same and corresponding methods of producing them, but it is to be expected that slight variations may be resorted to by those skilled in the art without departing from the scope of the invention which is not to be limited except by the appended claims.

We claim:

1. A stocking having a rib knitted top, a plain knitted leg having the same number of wales therein as the top, and a transfer portion between the top and leg consisting of a plurality of courses of plain fabric knitted in continuation of the plain wales of the top, and elongated loops of the last knitted rib course extending from a rib wale, behind a plain wale and into a plain wale knitted in continuation of another rib wale.

2. A knitted fabric having a portion thereof knitted in rib and a continuing portion knitted of plain work, the construction being such that plain wales of the rib portion continue uninter-

rupted as wales of the plain portion while the last drawn loops of rib wales are transferred behind said plain wales and continue throughout the plain portion as the intermediate wales therein.

3. A rib fabric having a portion knitted in rib, a continuing portion knitted in plain and a transfer section between the two including at least one course knitted in continuation of those plain wales which characterize the rib portion and wherein the last knitted rib loops are transferred behind these plain wales to be continued as intermediate plain wales throughout the plain portion of the fabric.

4. A knitted fabric having therein a portion knitted of plain work and a portion knitted in rib, the plain wales of the rib portion being continued as wales of the plain part and having discontinued rib wales of the rib part transferred behind and across said plain wales to start intermediate plain wales which will continue throughout the plain portion of the fabric.

5. In a knitted fabric having a portion thereof knitted as rib work, a continuing portion knitted as plain work and a section of fabric knitted between the rib and plain portions, said transfer portion consisting of a series of plain loops knitted in continuation of the plain wales of the fabric and extending uninterrupted down into a plain portion of the fabric and rib loops passing behind and across plain wales to continue as plain wales of the plain part of the fabric.

6. A knitted fabric having therein a rib knitted portion and a plain knitted portion, a transfer section between the two consisting of plain loops knitted between and connecting the plain wales of the rib portion to alternate plain wales of the plain portion so that they continue uninterrupted throughout the fabric, and loops of the rib wales extended behind and across two of these alternate plain wales and continuing down through the fabric as the intermediate plain wales throughout the plain portion thereof.

7. A stocking having a rib knitted top, a plain knitted leg having the same number of wales therein as the top, and a transfer section between the top and leg comprising a plurality of courses of fabric knitted in continuation of the plain wales of the rib top, and transferred loops of the rib wales in the top passing behind and across one plain wale and continuing down through the plain part of the stocking as a plain wale knitted in continuation of a rib wale, but not in continuation of the rib wale from which the loop was transferred.

8. A stocking having a rib knitted top, a plain knitted leg having the same number of wales therein as the top, and a transfer section between the top and leg comprising a plurality of fill-in courses knitted in continuation of the rib top and having as many plain loops in each course as there are plain and rib loops in the preceding courses, the loops transferred from rib wales, behind and across wales of said plain courses to other plain courses knitted in continuation of adjacent rib wales.

9. A stocking having a rib knitted top, a plain knitted leg having the same number of wales therein as the top, and a transfer section between the two comprising a plurality of courses of plain knitted loops and transferred loops extending from the rib wales in the rib top to plain wales in the plain portion of the fabric, said transferred loops passing behind a plurality of wales knitted in continuation of the plain wales of the plain wales of the rib top.

10. A method of transferring from rib fabric to plain fabric having the same number of wales, including the steps of knitting a plurality of courses of plain, fill-in fabric in continuation of the rib part and thereafter transferring the last drawn rib loops to wales knitted in continuation of discontinued rib wales but not to wales knitted in continuation of the same rib wale from which the loop is transferred.

11. A method as defined in claim 10 wherein said rib loops are transferred to a wale distant the space between adjacent rib wales from the wales in which they were knitted.

12. A method as defined in claim 10 wherein said rib loops are transferred to a wale distant the space between two rib wales from those wales in which they were originally knitted.

ROBERT H. LAWSON
ARTHUR N. CLOUTIER.