

March 30, 1943.

E. ST. PIERRE ET AL

2,315,165

METHOD OF KNITTING

Filed Feb. 9, 1942

2 Sheets-Sheet 1

FIG. 1.

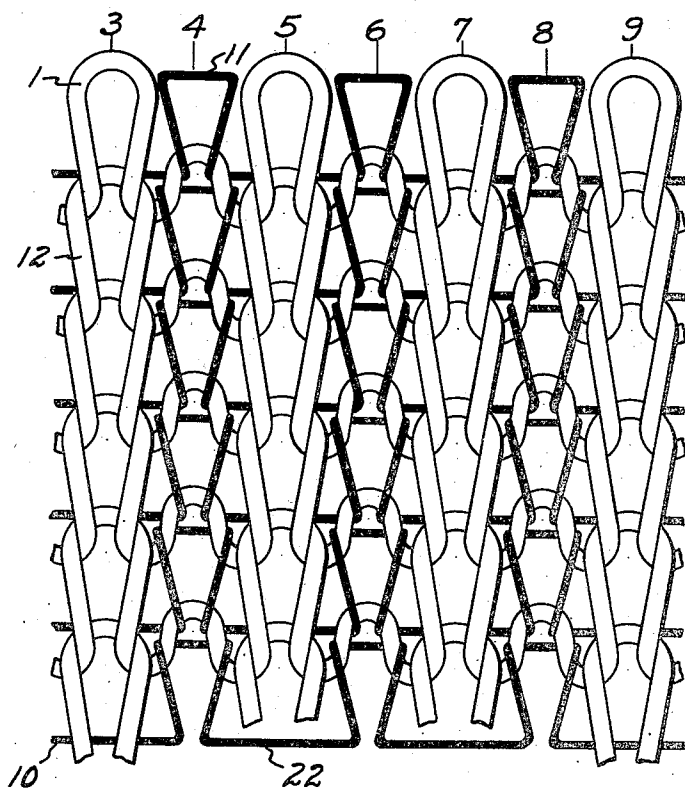


FIG. 2.

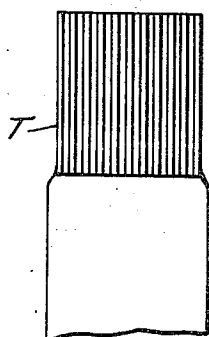


FIG. 3.

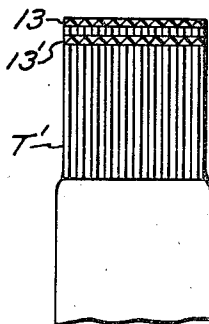
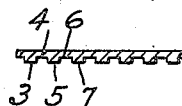


FIG. 4.



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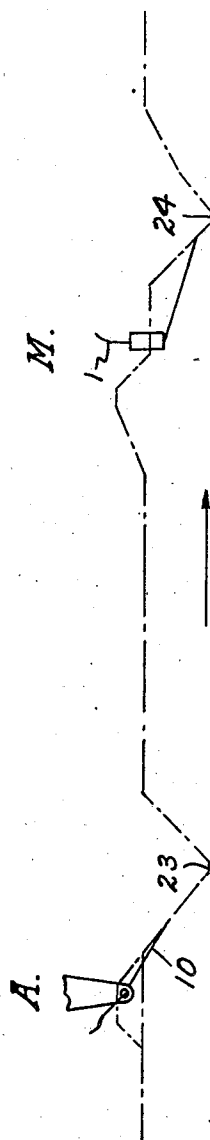
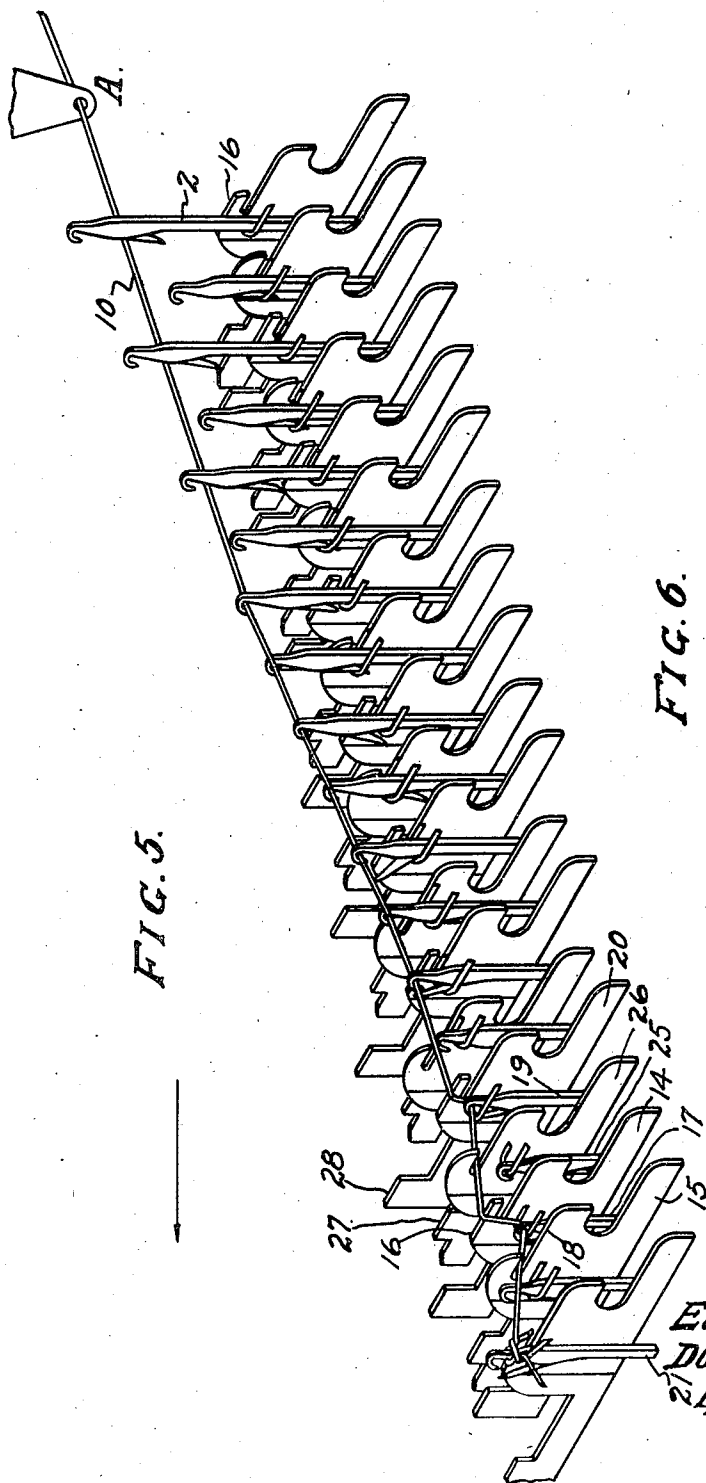
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METHOD OF KNITTING

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,315,165

METHOD OF KNITTING

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Application February 9, 1942, Serial No. 430,042

11 Claims. (Cl. 66—41)

The invention disclosed herein relates to a knitted fabric and method of knitting and more particularly to the knitting of hosiery tops with one set of needles, such as cylinder needles, and in such a manner as to provide a rib appearance.

In the drawings:

Fig. 1 is a view of a few wales and courses;

Fig. 2 is a fragmentary view illustrating the appearance of the stocking top, the upper portion of which is knitted in the manner shown in Fig. 1;

Fig. 3 is a view similar to Fig. 2 but showing tuck stitches in the selvage courses;

Fig. 4 is a diagrammatic sectional view taken through the top portion of the fabric as in Fig. 2 graphically to illustrate the ribbed appearance;

Fig. 5 is a perspective view showing needles and sinkers in their cycle of operations, the knitting being in the direction of the arrow; and

Fig. 6 is a diagrammatic development showing the knitting wave of the needles in the main and auxiliary feeding stations, the knitting being in the direction of the arrow.

Referring to Figs. 1, 5 and 6, a cotton or other yarn 1 is knitted at the main feeding station M on all of the needles 2 resulting in wales 3, 4, 5, 6, 7, 8, 9, etc. Whereas the alternate wales 3, 5, 7, 9, etc., are solely knitted at the main feeding station M, the intermediate wales 4, 6, 8, etc., are alternately knitted at the main feeding station M and the auxiliary feeding station A. The knitting of the intermediate wales at the auxiliary feeding station A as effected by the needles drawing the auxiliary yarn 10, such as rayon, over sinkers as illustrated in Fig. 5 of the drawings. Thus at the intermediate wales 4, 6, 8, etc., there are alternating loops of the main yarn 1 and the auxiliary or accordion yarn 10, the latter being fine or smaller as compared with the former. In other words, at the said intermediate wales 4, 6, 8, etc., loops of the main yarn 1, which may be of cotton, are drawn through accordion loops of the yarn 10, which may be of rayon, and likewise the accordion loops are drawn through the main or cotton loops or stitches.

The accordion loops 11 are shorter or smaller than the main yarn loops 12 knitted in the alternate wales 3, 5, 7, 9, etc. The relatively shorter accordion loops are important in that they accentuate the rib appearance of the fabric. The alternate wales 3, 5, 7, 9, etc., stand out prominently on the face of the fabric as diagrammatically illustrated at 3, 5, 7, etc., Fig. 4, whereas the accordion or intermediate wales 4, 6, 8, etc., are more or less buried or hidden at

4, 6, etc., as illustrated in Fig. 4. The rib appearance is further accentuated by imposing greater tension upon the accordion yarn 10 at the auxiliary feeding station A than upon the main yarn 1 at the main feeding station M.

The rib appearance of the tops T and T' is further illustrated in Figs. 2 and 3. In the latter figure, selvage tuck courses, such as a four-course tuck, are illustrated at 13 and a second four-course tuck is illustrated at 13'. The tuck courses 13 and 13' strengthen the selvage without impairing its elasticity.

Referring more particularly to Fig. 5, the accordion yarn 10 is shown passing through an eyelet at the auxiliary feeding station A being drawn by alternate needles A to knit in the direction of the arrow, Fig. 5. The needles shown are the conventional latch needles although other needles may be employed. The needles 2 act in conjunction with the alternating groups of sinkers 14 and 15. The sinkers 14 have flat topped nibs 16 over which the yarn is drawn by the alternate needles as illustrated by one of the said alternate needles 2 specially designated 17.

The needle 17 is shown at approximately the lowest stitch drawing point and at that point of depression is positioned about $\frac{1}{2}$ of an inch below the normal yarn drawing edge 18 of adjacent sinkers. The $\frac{1}{2}$ of an inch is measured from the throat of the needle hook in the bight thereof to the mentioned edge of the sinker.

As hereinbefore stated the main yarn 1 is drawn at the main feeding station M, over the yarn drawing edges 18 of all of the sinkers and the said yarn is drawn to a depth of about $\frac{1}{8}$ of an inch, measured in the manner hereinbefore described in connection with the drawing of the accordion yarn over the sinkers at the auxiliary feeding station A. Partly as a consequence of the shorter stitch drawing of the auxiliary or accordion yarn, the loops 11 are shorter than the loops 12. Another contributing factor to the relative shortness is the extra tension imposed upon the accordion yarn 10 as well as the fine count of the accordion yarn as compared with the yarn 1.

Noting particularly the needle 17, Fig. 5, said needle is at or approximately at its extreme stitch drawing position and when in that position is drawing accordion yarn 10 over the normal yarn drawing edge 18 of the sinker immediately in advance of the said needle and at the same time is drawing the said accordion yarn over the flat topped sinker nib 16 of the sinker next following (in the cycle) the sinker first mentioned. Al-

though the accordion yarn is drawn over the elevated sinker nib of the said next following sinker, Fig. 5, the accordion loop or stitch is relatively short or small. There are several reasons contributing to the short or tight accordion stitches 11. First, the alternate needle 19, following the needle 17 is, as shown in Fig. 5, drawing the accordion yarn over the nib of the next following sinker 20 as a consequence of which there is a pull or drag upon that portion of the accordion yarn 10 leading from the needle 19 to the needle 17 as a consequence of which there is a pulling back or robbing by needle 19 of the accordion yarn as it is being completely drawn by the needle 17. Second, there is some robbing by the needle 17 of the stitch loop already formed by the alternate needle 21 in advance of the needle 17 this further tending to shorten or tighten the ultimate stitch formed.

The greater tension imposed upon the accordion yarn 10 as compared to the tension imposed upon the main yarn assists in casting off the stitch as a needle moves from the position of the needle 19 to the position of the needle 17, Fig. 5. Furthermore the greater the tension upon the accordion yarn 10, and consequently the tighter the accordion stitch, the more prominent is the rib appearance; in other words, the alternate wales 3, 5, 7, 9, etc., appear more prominently on the outer face of the fabric.

The foregoing description is illustrative of the invention which is not limited to precise details of construction and methods illustrated and described, e. g., the sinkers 14 and 15 may be transposed so that the sinker 14 instead of the sinker 15 would be in advance of the needle 17.

Whereas the selvage or finished edge is not shown in Fig. 1, any accepted form of selvage may be employed, Fig. 3, for example, diagrammatically illustrating a tuck selvage. The selvage for the stocking top T of Fig. 2 may be effected in any well-known manner, e. g., causing every other needle to engage the main yarn 1 during the first round of knitting and every needle to engage the main yarn 1 during a second round of knitting. In place of the selvage the edge may be turned over and sewed if desired.

Accordion fabric as previously known was unsatisfactory by reason of the former tightness or tautness of the float portions 22 of the accordion yarn. In the fabric specifically illustrated in Fig. 1 and knitted as disclosed in Fig. 5, the accordion yarn 10 is knitted only at the accordion feed A and when all the needles knit at the main feeding station M, the accordion yarn floats in back of the alternate wales 3, 5, 7, 9, etc. Whereas the method of knitting accordion yarn is broadly old, the tightness or tautness of the floats such as at 22 is avoided by the method illustrated in Fig. 5, as hereinbefore described. The robbing and consequent shortening of the accordion loops at the wales when they reach the position of the needle 21, Fig. 5, provides excess accordion yarn that has no other place to go than in the float portions 22 back of the intermediate wales 3, 5, 7, 9, etc. Furthermore, the drawing of the accordion yarn over the sinker nibs as illustrated by the sinker 20, Fig. 5, draws out more of the accordion yarn than would otherwise be the case and this extra length of accordion yarn must also place itself in the float portions 22. As a combined result of the mentioned robbing and action of the sinker nibs, the tautness of loops 22 heretofore present in accordion fabric is eliminated as a consequence of which the fabric, such as the stocking top T

has the requisite stretch thus permitting the stocking readily to be drawn over the foot of the wearer. Furthermore, the relatively tight accordion stitches in the intermediate wales 4, 6, 8, etc., in combination with the relative looseness of the float portions 22, increases the elasticity of the stocking tops.

A stocking top knitted in accordance with the method illustrated in Fig. 5 of the drawings and as hereinbefore described, provides an outside appearance not distinguishable from a stocking top knitted on a rib machine having two sets of needles, commonly referred to as ribbers.

As shown in Fig. 6 the extreme stitch drawing portion 23 of the knitting wave at the auxiliary feeding station A is positioned slightly above the corresponding portion 24 of the knitting wave at the main knitting station M. This contributes to the drawing of the tighter accordion stitch, the difference in height of the portions 23 and 24 being about $\frac{1}{2}$ of an inch as hereinbefore indicated. Furthermore, as shown in Fig. 6, the stitch drawing portions 23 and 24 do not come to a point but are somewhat flat. This permits two or more needles, 17 and 25 of Fig. 5, to be of substantially the same level. If the stitch drawing portions such as 23 came to a point, the needle 25 would be above the point indicated in Fig. 5 as a consequence of which the yarn 10 might be pushed above the nib of the following sinker 26.

The needles and sinkers may be selectively controlled in any desired manner, the jacks preferably being positioned under the alternate needles which engage and knit the accordion yarn. The sinkers are provided with butts, the alternate sinkers 14 having short butts 27 and the intermediate sinkers 15 having long butts 28. As shown in Fig. 5, the alternate sinkers 14 having short butts are positioned farther forward than are the intermediate sinkers 15, this being accomplished by causing all the sinkers to be advanced and then withdrawing the long butt intermediate sinkers. This selection control may be effected in any desired manner as for example in the patent to Ellis #697,078, April 8, 1902, or in the application of Oscar Fregeolle, Serial #342,323, filed June 25, 1940.

Various modifications may be resorted to within the scope of the appended claims.

We claim:

1. A method of knitting including feeding a yarn to all of the needles at one feeding station and feeding another and relatively fine yarn to alternate needles only at the other feeding station, and causing alternate needles to draw the second mentioned yarn over the nibs of sinkers.

2. A method of knitting including feeding a yarn to all of the needles at one feeding station and feeding another and relatively fine yarn to alternate needles only at the other feeding station, and causing alternate needles to draw the second mentioned yarn over the nibs of alternate sinkers, and imposing a greater tension upon the relatively fine yarn than on the first mentioned yarn.

3. A method of knitting including the feeding of one yarn to all the needles at one feeding station and a second yarn to alternate needles only at a second feeding station and causing each said alternate needle to draw stitches over the nib of one adjacent sinker and over the normal yarn drawing edge of the other adjacent sinker.

4. A method of knitting including the feeding of one yarn to all the needles at one feeding sta-

tion and a second yarn to alternate needles only at a second feeding station and causing each said alternate needle to draw stitches over the nib of the adjacent sinker following the needle and over the normal yarn drawing edge of the sinker ahead of said needle.

5. A method of knitting including the feeding of one yarn to all the needles at one feeding station and a second yarn to alternate needles only at a second feeding station and causing each said alternate needle to draw stitches over the nib of one adjacent sinker and over the normal yarn drawing edge of the other adjacent sinker and imposing a greater tension on that yarn drawn over sinker nibs.

6. A method of knitting including feeding one yarn to all the needles at one feeding station and feeding a second and relatively fine yarn to alternate needles only at another feeding station and causing every other sinker only to be so positioned that the yarn second mentioned shall be drawn over the nibs of said sinkers.

7. A method of knitting including feeding one yarn to all the needles at one feeding station and feeding a second and relatively fine yarn to alternate needles only at another feeding station and causing every other sinker only to be so positioned that the yarn second mentioned shall be drawn over the nibs of said sinkers and causing intermediate sinkers to be so positioned that the second mentioned yarn shall be drawn over the normal yarn drawing edges thereof.

8. A method of knitting a rib-like fabric by feeding a yarn to all the needles at one feeding station and feeding a second and relatively fine yarn to alternate needles at a second feeding station, and adjacent to said second mentioned feeding station causing alternate needles to draw the yarn second mentioned over the nibs of alternate sinkers only and knitting relatively tight stitches with the said alternate needles by causing each intermediate needle in the knit-

ting cycle to rob yarn from the needle immediately in advance thereof.

9. A method of knitting a rib-like fabric by feeding a yarn to all the needles at one feeding station and feeding a second and relatively fine yarn to alternate needles at a second feeding station, and adjacent to said second mentioned feeding station causing alternate needles to draw the yarn second mentioned over the nibs of alternate sinkers only and knitting relatively tight stitches with the said alternate needles and causing each said last mentioned needle in the knitting cycle to rob from the stitch drawn by the needle in advance thereof.

10. A method of knitting including the knitting of yarn by all the needles at one feeding station and knitting a second and relatively fine yarn with alternate needles only at a second feeding station and causing the said alternate needles at the second feeding station to draw their stitches approximately $\frac{1}{2}$ of an inch below the normal yarn drawing edge of adjacent sinkers and causing all the needles at the first mentioned feeding station to draw their stitches approximately $\frac{1}{8}$ of an inch below the normal yarn drawing edge of adjacent sinkers.

11. A method of knitting including the knitting of yarn by all the needles at one feeding station and knitting a second and relatively fine yarn with alternate needles only at a second feeding station and causing all needles as they pass the first mentioned feeding station to draw stitches by measuring yarn approximately $\frac{1}{8}$ of an inch below the normal yarn drawing edge of adjacent sinkers, and causing alternate needles at the second mentioned feeding station to draw stitches by measuring yarn to a depth of about one-half the distance the said needles measure yarn at the first mentioned feeding station.

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