June 17, 1941. E. ST. PIERRE 2,246,079

METHOD OF KNITTING

Filed Nov. 28, 1938

FIG. 1.

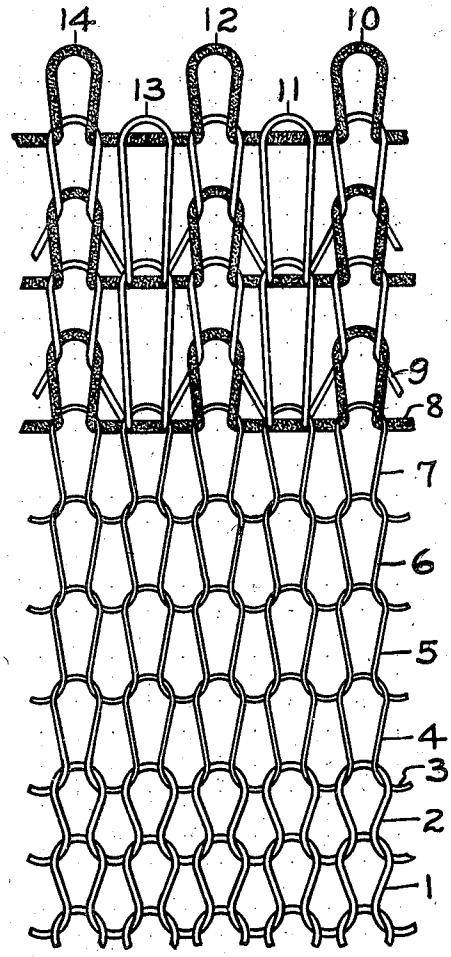
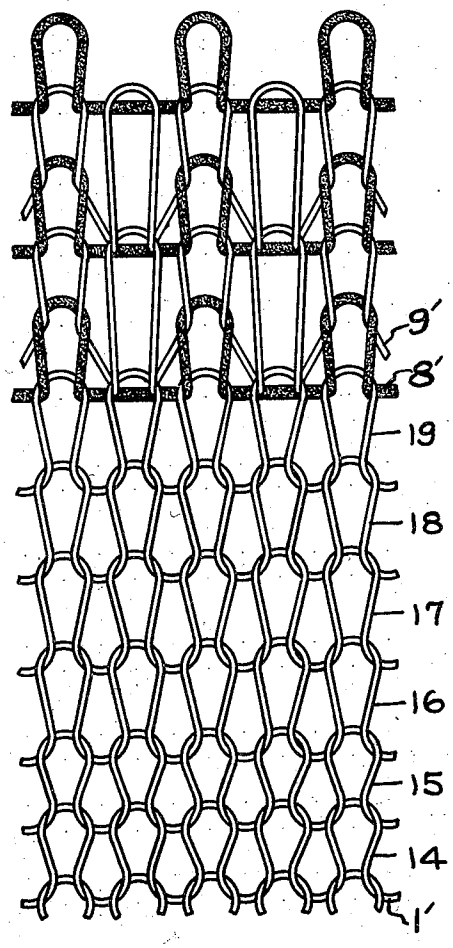



FIG. 2.




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## METHOD OF KNITTING

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4 Claims. (Cl. 66—172)

This case concerns knitting fabrics in string work and a new method or application of such work to fabrics in which an elastic yarn is incorporated.

In the figures of drawing:

Fig. 1 is a conventional view of a fabric greatly enlarged where one form of the invention is shown; and

Fig. 2 is a similar view but showing a slightly different form or modification of the invention.

In certain types of knitting such as in the knitting of hosiery, it has been found practicable to knit in what is generally termed string work. Instead of casting each completed article or section of fabric from the needles of the machine and starting anew on the next following article, it has been found advantageous to knit continuously, a section of fabric being knitted between consecutive articles which is later to be cut, broken or destroyed in some fashion so as to separate the individual, knitted articles after a series of them have been taken from the machine.

Generally this method has been practiced where no wrap striping or other work was being done which necessitated stopping between the knitted articles, stockings or the like, so that there will be sufficient moves in the machine to take care of changes at the end of one knitted article and at the beginning of the next. Furthermore, when a true rib top was to be transferred to knitting machine needles as in a hosiery machine, there was necessarily a stop for this operation so that string work could not be knitted, and it was with this type of machine in which a transferred top was first applied to the needles that most ornamentation such as wrap striping was done. When needle wrapping is practiced such as in the Banner wrap, illustrated in United States #1, 702,608, or others, at the end of each article as it is cast from the needles and the machine is stopped it is necessary to cut the group of ornamental or wrap threads and to tie them. As the next article is started, whether started by transferring a true rib top to the needles or by "running on", these ends of wrap yarns were applied to the needles by attaching a weight and dropping the same down through an opening in the binder plate. This means that considerable hand work is involved and time is consumed while the machine is stopped between knitting consecutive stockings.

In the knitting of a stocking top such as disclosed in St. Pierre Patent #2,131,720 wherein an elastic yarn is fed at a separate feed for simulating a rib appearance and for making the stocking self supporting, one move of the machine at the start throws into action an elastic yarn and a plain yarn which thereafter knit through the entire top or welt. It is not necessary to make any hand transfer at this point and since few moves of the machine are necessary, it is possible to knit string work by feeding an extremly light breaking thread to the needles for a few courses after knitting the loopers rounds in the preceding stocking and before these changes in the machine incidental to starting the selvage and following portion of this type of elastic garter top. In another form of the invention the same thread if employed in the knitting of the loopers rounds may be continued for these breaking or pull courses, but in that case as in the previous, a series of courses will be knitted preferably extremely loosely so that they may be withdrawn by cutting at both sides and pulling out one or more of the courses. In either instance the remaining fabric from this breaking or pull section will be unravelled leaving a clean selvage at the top of the next stocking.

Referring to Fig. 1, the courses 1 and 2 are the last knitted courses in the loopers rounds of the preceding stocking. Then the machine is changed so that the stitch cam will be moved downwardly, or other satisfactory changes made, so that much longer and looser stitches may be drawn. Also at the same time, a yarn change is effected so that a very light breaking thread 3 is thrown into operation for a few courses, herein indicated as four courses, 4, 5, 6 and 7. This section of breaking courses may be knitted with any desired or satisfactory number of courses, four being illustrated since that has been found to work very well. At the end of these breaking courses, another change is made wherein an elastic yarn 8 is drawn at an auxiliary feed such as illustrated in said St. Pierre patent, above mentioned, and at the main side, a so-called plain yarn 9. First the elastic yarn is taken at every other needle, that is, in wales 10, 12 and 14 and is actually drawn into a knitted loop at each of these wales. At the main side the plain yarn 9 is knitted by all needles, thus being knitted in the wales 10, 12 and 14 and also in the intervening wales 11 and 13. Obviously, the elastic stitches which were drawn at wales 10, 12 and 14 will be knitted off as plain yarn is drawn through them at that feed. This procedure is repeated at each subsequent course throughout the full extent of the elastic, simulated rib top.

After the entire top has been knitted the leg and foot including the heel and toe, etc., are knitted up to the loopers rounds whereupon the procedure as just described with respect to Fig. 1

is repeated. After a number of such connected articles have been knitted, one of the breaking sections between articles is pulled out thus disconnecting a whole string of said connected articles which are preferably stockings such as half hose, children's hosiery, anklets, and possibly ladies' knee or full length hosiery. Then the series of articles which has been taken from the machine will be disconnected by breaking apart each individual section and it is to be understood that this entire operation can be done without stopping the machine.

Very little force is required to break one of these sections since the yarn 3 is as weak as can be used without having the same too easily breakable when knitting. Each article which has been broken away will have the few remaining courses of this breaking thread unravelled leaving the yarn 8 threaded through the sinker loops of the first course of plain yarn 9. While in the illustration the yarn 8 is shown drawn into knitted loops on this first course, once released and the breaking courses removed, that yarn straightens out and merely serves at the selvage to prevent any possibility of ravelling. If by any chance the breaking thread should be too strong, or accidentally either the yarn 8 or 9 in one of the initial courses should be destroyed, it is merely necessary in this type of top to ravel out until the first unbroken course of elastic yarn is reached. That will present a fast edge so that in any form of the invention as described, there is no danger when separating the articles, of destroying the selvage or initial courses of the next article as has sometimes been done with knitting string work and separating the articles by methods practiced heretofore.

Of course, as disclosed in said St. Pierre Patent #2,131,720, ornamental work such as true wrap patterns may be knitted in the top, such patterns being knitted at the main side of the machine and being unaffected by the presence or knitting of the elastic yarn 8. Any type of ornamentation may be knitted throughout the leg or foot of the stocking. Another point of advantage particularly worthy of mention is that it is neither necessary to stop for transferring a rib top to the needles nor is it necessary to stop the machine for cutting and tying up the wrap yarns. They may be fed continuously, being knitted in on certain needles in accordance with desired patterns throughout those areas desired. When not being knitted, they merely float down within the knitted stocking tube and need not be cut since no transfer is necessary. When the pull course or breaking courses are knitted these wrap yarns will be floated idly and even though a little more of the wrap yarn may be drawn than would otherwise be the case, the opposite is sometimes true since in cutting these wrap threads and in tying them, the machine operator frequently wastes considerable yarn and likewise, when the weight is hooked on and the yarns are dropped down through the binder plate, quite a bit of yarn is wasted so that it is probable that in most instances less wrap yarn will be required to feed continuously than would be the case in practicing the prior art. No stops of the machine are necessary and thus a great saving of time results with what may be truly termed, complete automatic operation.

Referring to Fig. 2 another form of the invention is illustrated wherein courses 14 and 15 are the last knitted courses in the loopers rounds of the previously knitted stocking. Courses 16, 17, 18 and 19 are pull courses and preferably are knitted from the same yarn 1' from which the loopers rounds were knitted. These pull courses are knitted from loops much longer and looser than usual so that they are easily distinguished and may be cut at one side so that a course or courses may be easily withdrawn. This practice is well known to those skilled in the art and the actual cutting at both sides and pulling of a course is not necessary to be illustrated or described in greater detail here. At the end of the pull courses, an elastic yarn 8' and a plain yarn 9' are thrown in and a selvage and continuing elastic garter top are knitted as described with respect to Fig. 1.

While it is preferable that these breaking and pull courses be knitted on every needle since it is not then essential to provide mechanism for dropping certain wales, such courses may be knitted on every other needle or on different combinations of needles. The pull courses may be knitted from a different yarn if desired, for instance, may be from a yarn of different color so as to be more easily distinguished for disconnecting the attached articles and for ravelling out after a course has been broken or pulled. The actual pull course or courses may take varying different forms all within the scope of the invention as originally conceived. The invention is defined in the appended claims.

I claim:

1. A method of knitting connected articles as in string work including the knitting of separating courses in continuation of the last knitted stitches of a preceding article, and in continuation of said separating courses, a second article having at the beginning edge thereof, a selvage including a course of non-elastic yarn and an elastic yarn passing through all sinker loops in said course, and in continuation, courses of non-elastic yarn with which, at spaced intervals, elastic yarn is incorporated in such a manner that upon raveling in the direction of knitting, any one of said courses with which the elastic is incorporated will present a selvage.

2. A method of knitting connected articles as in string work including the knitting of courses of a relatively weak breaking thread in continuation of the last knitted stitches of a preceding article, and in continuation of said breaking thread courses, a second article having at the beginning edge thereof, a selvage including a course of non-elastic yarn and an elastic yarn passing through all sinker loops in said course, and in continuation, courses of non-elastic yarn in which, at spaced intervals, elastic yarn is incorporated in such a manner that upon raveling in the direction of knitting, any one of said courses in which the elastic is incorporated will present a selvage.

3. A method of knitting connected articles as in string work including the knitting of pull courses in continuation of the last knitted stitches of a preceding article, and in continuation of said pull courses, a second article having at the beginning edge thereof, a selvage including a course of non-elastic yarn and an elastic yarn passing through all sinker loops in said course, and in continuation, courses of non-elastic yarn in which, at spaced intervals, elastic yarn is incorporated in such a manner that upon raveling in the direction of knitting, any one of said courses in which the elastic is incorporated will present a selvage.

4. A method of knitting connected articles as

in string work including the steps of knitting courses of relatively loose stitches from a yarn later to be destroyed, in continuation of the last knitted stitch of a preceding article, and then in continuation of said loosely knitted courses, knitting a second article having at the beginning edge thereof a course of non-elastic yarn stitches having elastic yarn incorporated therewith by knitting the same at alternate wales only, and thereafter, at spaced intervals, knitting similar courses of non-elastic and elastic yarns so that upon raveling in the direction of knitting, any one of said courses having an elastic yarn course incorporated in combination therewith will present a selvage.

EUGENE ST. PIERRE.