March 23, 1943. I. H. C. GREEN 2,314,618

METHOD OF KNITTING

Filed Dec. 17, 1941

FIG. 1.

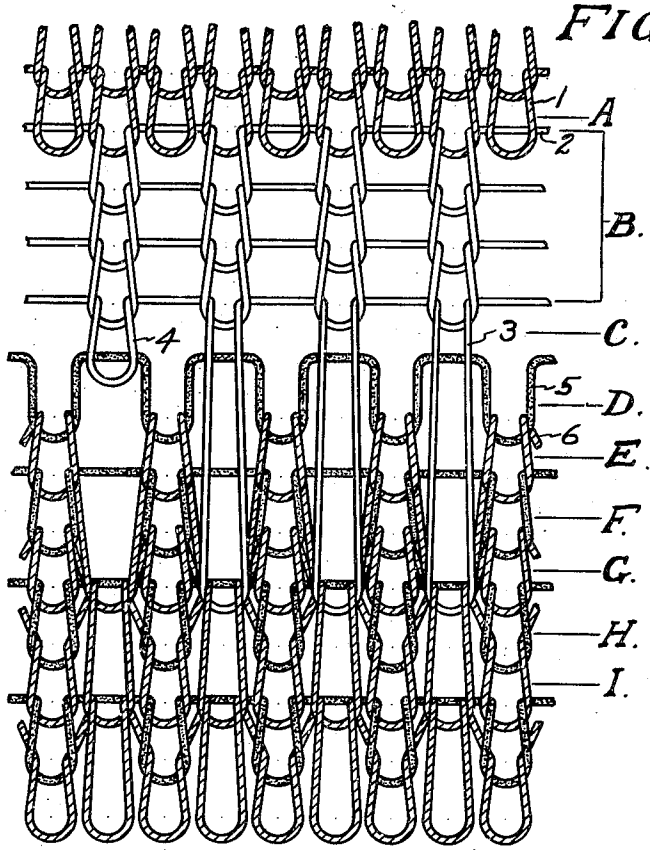


FIG. 2.

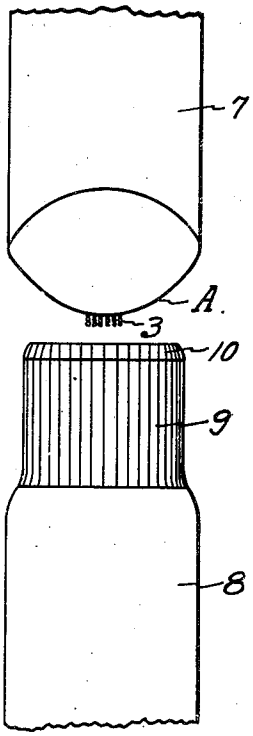
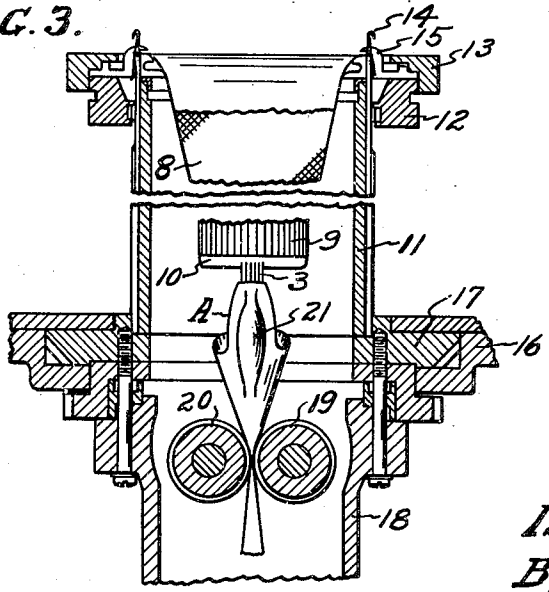


FIG. 3.



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METHOD OF KNITTING

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7 Claims. (Cl. 66—1)

This case has for its subject matter an invention in the method of knitting string work, for example, continuously knitting connected articles such as stockings. According to the invention the said connected articles, eventually to be broken apart, are held together by relatively few stitches rather than by stitches about the entire knitted article as has heretofore been the practice. According to previously known practice, string work has been made in many ways one of which involved connecting separate articles by knitting a so-called breaking thread later to be pulled apart and the ends of broken thread thereafter raveled out. This has been successfully done in many instances, but has certain disadvantages in that where breaking thread has been knitted around the entire article which, for purposes of illustration, will be assumed to be knitted hosiery such as is made on circular, independent needle knitting machines. These disadvantages include the difficulty of simultaneously breaking apart a gerat number of stitches which, although of weak yarn, are collectively quite strong and always present the possibility of breaking some portion of the knitted article itself thereby leading to the production of imperfect articles or seconds. It also takes considerable time to ravel out the broken ends of thread, especially where the thread is of similar characteristics, color, etc. as that of the body of the knitted article, and sometimes one may ravel part of the article itself without realizing it until irreparable damage has been done.

According to the invention herein described, a breaking thread is knitted and serves to connect the separate elements of string work, but it is knitted on a few needles only, preferably six needles in such a manner as to present a temporary connection. Obviously, it is easy to break away six stitches formed of relatively weak yarn and in so doing, it has developed that when knitting according to the system herein described, there will almost never be any loose, broken ends of the connecting thread left at the initial course of the next following article. When knitting hosiery in string work it is well known that the last part of one stocking knitted is the loopers rounds and that the first part of the next following stocking knitted will be the selvage. The six connecting stitches when broken, pull away from the selvage and hang from the end of the preceding article, that is, from the loopers rounds. That is most desirable since the loopers rounds must be later raveled out anyway and the only work the knitter has to do when disconnecting stockings is to pull them apart, and in very rare instances, draw out such broken ends as may cling to the selvage in the next stocking. In actual practice several consecutive stockings will be pulled apart without any loose ends at all being left in the selvage so that as a practical matter, it may be said that there will be nothing for the knitter to do in disconnecting the stockings except to pull them apart.

The knitting of string work has increased greatly with the advent of elastic top hosiery since it is not necessary to stop for transferring a true rib top, and with the knitting of wrap stripe goods, a method has sometimes been practiced where there has been no connecting element between stockings other than the wrap threads themselves. This is obviously a rather precarious way of doing the thing since the take-up naturally pulls with considerable force and a wrap thread or threads may easily be broken. With the system herein described the six stitches knitted from a relatively weak breaking thread serve to relieve strain on the wrap threads and do not involve more than a very slight amount of additional knitting time or consumption of material while removing all danger of breaking the wrap threads, winding them about take-up rollers, making it necessary to rethread the fabric into the take-up, or otherwise causing complications for the knitter and slowing down production. The invention will now be described in detail having reference to the figures of drawing in which:

Fig. 1 is a conventional illustration of a section of fabric knitted in accordance with the invention;

Fig. 2 is a conventional showing of two adjacent knitted articles after having been separated by breaking the connecting stitches.

Fig. 3 is a sectional view of parts of a circular, independent needle knitting machine wherein the invention is being practiced.

While slight variations may be practiced in the carrying out of the novel method of this case, it is herein described as applied to the knitting of hosiery of circular type, and in fact, it is immaterial as to whether that hosiery is of ankle length or longer, or whether it is for children's, men's or ladies' wear. The special control is normally applied to 12 needles having extra short butts, that producing six connecting stitches between adjacent articles, but it is to be understood that these particular figures are not absolute since in certain instances more or fewer specially controlled needles may be employed depending

upon the gage, diameter of the needle cylinder used and the material being handled.

The above number of needles and stitches, although merely illustrative of one specific embodiment, does represent substantially the number of stitches found most desirable for the breaking thread connection. It is the intent of the inventor to adhere fairly closely to that number of breaking thread stitches and hereinafter whenever a relatively few stitches is referred to, it is to be understood that applicant intends some number of stitches approximately six, but at any rate, a small percentage as compared to the total number of stitches possible. It is also a fact that these stitches are concentrated at one side of the knitted article rather than being independently located about the same.

In Fig. 1 the course A is the last course knitted from a yarn 1 which has been employed throughout the so-called loopers rounds. That concludes the production of one knitted stocking or article. At that time a yarn change is made to a yarn 2 which is of relatively light, weak and cheap material and is employed only for the breaking course and stitches. This yarn 2 will preferably be strong enough only reasonably to stand the knitting process and is fed for three courses, more or less, indicated at B. This breaking thread is fed to alternate needles only, and, for that purpose, jacks are employed to raise alternate needles for clearing latches and taking thread. At that time the front stitch cam is pulled out of action so that intermediate needles after dropping off stitches they knitted in course A, do not function actively until later.

The set-up of needles is such that there are the usual long and short butt groups at opposite sides of the machine, and in addition, one group of twelve extra short butt needles which are controlled upon the knitting of the fourth course C of the yarn 2. Of course, the intermediate needles are still inactive and this particular course C is drawn on all needles, but at that time, after feeding the complete course C, the yarn 2 is withdrawn and the front stitch cam moves to an intermediate position. This intermediate position is such that the cam will engage long butts and alternate short butts but not the extra short butts. The result is that all stitches drawn in course C are cast off with the exception of six stitches held by the alternate ones of the 12 needles above mentioned. In Fig. 1 three of these stitches are indicated by numeral 3 while the cast off stitches 4 would be left all about the remainder of the circumference of the knitted article. For example, if the machine had 220 needles, 110 needles would knit the said alternate wales from yarn 2 and six stitches such as the stitches 3 would be held on needles while the remaining ones of the 110 needles would cast off 104 of the loops 4.

At the start of the next stocking, an elastic yarn 5 is fed in course D and starts the selvage of an elastic stocking top. Of course, it is not necessary that the top of the next stocking or article be made from elastic, but that is merely taken here as one form of the invention which is being illustrated. The elastic yarn 5 will be cast off to be threaded through the initial loops of a course E knitted from an inelastic yarn 6, and, depending upon the type of top, this yarn 6 may be knitted at all wales or, as in this instance, will be knitted at intermediate and tucked at alternate wales, carrying through the same designation of wales adopted above. The held loops 3 will be retained on the alternate needles and will not be cast off until several accumulated loops of yarn 6 which are tucked are also cast off. In this instance a second course of elastic is knitted at F. After course G and during the next two courses, all needles are raised to clear their latches as other loops are knitted through each loop of this said course G.

The elastic yarn is merely knitted through loops in intermediate wales of the course G as the elastic yarn course H is drawn, while in the alternate wales the accumulated stitches are cast off as, at the main feeding station, a course I is drawn on all needles from yarn 6. The knitting continues in any desired way, for example, in accordance with the method practiced in United States Patent #2,131,720. Now the two pieces of fabric will be held together by six, more or less, of the stitches 3 and the knitter after several stockings have accumulated in a container beneath the machine, may pull them apart breaking the stitches 3 which, as above explained, will draw out of the top section rather than having broken ends left there. Probably this is due to the fact that there are so few connecting stitches.

In Fig. 2 the foot of one knitted stocking is generally indicated at 7 and the last course in the loopers rounds A would have six of the elongated stitches 3 pulled away from the next knitted article which has a leg 8, top 9 with a tuck or other selvage area generally indicated by numeral 10. Of course, it is to be understood that it is not necessary that the selvage area be of a type in which several courses are tucked, the invention being as easily applicable to other types of tops whether of elastic or inelastic yarns, and whether or not the stitches 3 connect to the very first inelastic yarn course or to a course farther advanced due to the fact that there has been a tucking of loops in certain wales.

In Fig. 3 part of a typical hosiery knitter has been illustrated with cylinder 11 shown in section, sinker head 12 and sinker cam cap 13. The usual latch needles 14 cooperate in forming fabric with sinkers 15. The base 16 has rotatively contained therein a ring gear 17 attached to the cylinder and by means of which the cylinder is rotated and other parts beneath which is a fabric take-up the casing of which is generally indicated at 18. No particular details of this take-up are herein shown, but it is to be understood that a typical example of such take-up is shown in United States Patent #2,251,222.

This take-up has fabric engaging and drawing rollers 19 and 20 between which a stocking is shown if it is engaged and pulled from the upper part or knitting section of the machine. This stocking has a toe pocket 21 terminating in loopers rounds with the terminal course A connected by stitches 3 to the next following stocking which has a selvage section 10, top 9 and leg portion 8.

The invention, as before stated, is particularly useful when wrap threads are being fed and the interconnection between the stockings of the breaking thread loops 3 relieves any strain on the wrap threads such as has been found so troublesome if there are only a few wrap threads or if the wrap threads are relatively weak. This strength is gained without entailing complications such as have always been present when a full and complete breaking course has been used. The invention is defined in the appended claims.

I claim:

1. A method of knitting string work including the steps of knitting a breaking thread so as to

connect two independently knitted articles on a circular independent needle knitting machine and limiting the connecting stitches to a very small part only of the total number of breaking thread stitches knitted in a course.

2. A method of knitting string work in a circular independent needle knitting machine including the steps of knitting a breaking thread as a connecting element between adjacent ends of independently knitted articles and casting off by far the greater number of said breaking thread stitches in a course thereby limiting the connection to relatively few breaking thread stitches compared to the total number of stitches in a course.

3. A method of knitting string work in circular independent needle knitting machines including the steps of knitting a plurality of courses of a relatively weak breaking thread to connect adjacent ends of independently knitted articles and at the last of the said breaking thread courses, casting off all but a very few of said stitches knitted at that course so as to connect said article by a few only of the stitches in that course.

4. A method of knitting string work to connect hosiery knitted in a circular independent needle knitting machine including the steps of knitting loopers rounds at the end of one knitted stocking, knitting a plurality of courses of a relatively weak breaking thread on alternate needles only, then withdrawing said breaking thread from feeding position and casting off all but a relatively small number of the stitches knitted at one side of the stocking in the last breaking thread course and starting the knitting of a selvage for the next continuing stocking.

5. A method of knitting string work in a circular independent needle knitting machine including drawing of the fabric from the knitting instrumentalities by a take-up and connecting said fabric sections which are independently knitted by six stitches, at one side of the fabric.

6. A method of knitting string work in circular, independent needle knitting machines for continuously knitting hosiery and including the steps of knitting loopers rounds at the end of one knitted stocking, then knitting a breaking thread about the entire extent of the said stocking and casting off all the loops of that breaking thread thus knitted except a relatively few of said loops concentrated at one side only of the stocking, and thereafter starting the next stocking whereby the connection between the two stockings will be comprised of relatively few knitted stitches as compared to the total number of stitches possible in a course and will be concentrated at one side of the stocking only.

7. A method of knitting string work in circular, independent needle knitting machines which includes as one step in the process, the drawing of fabric from the knitting instrumentalities by a continuously acting take-up and knitting a connection between each of the several independently knitted articles which includes a very few stitches knitted from a breaking thread, said stitches being concentrated at one side of the knitted tube thereby allowing separation of the articles by pulling apart the said few stitches of breaking thread.

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