

March 3, 1942.

R. C. WILLIAMS

2,275,276

STITCH CONTROL MEANS FOR SEAMLESS HOSIERY KNITTING MACHINES

Filed April 15, 1941

FIG. 1

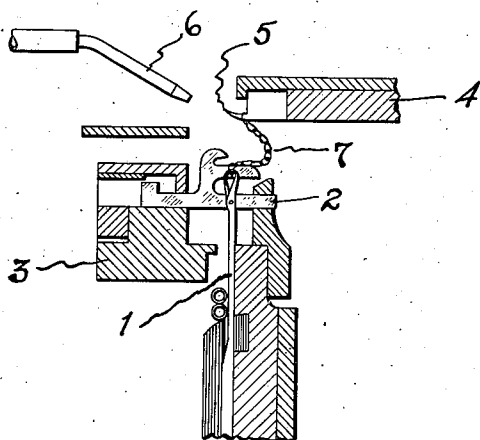
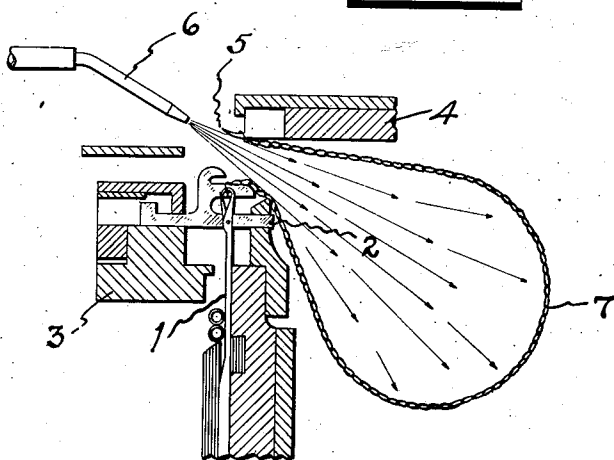


FIG. 2



RUFUS CLARK WILLIAMS

INVENTOR.

BY

Darby & Darby
ATTORNEYS

UNITED STATES PATENT OFFICE

2,275,276

STITCH CONTROL MEANS FOR SEAMLESS
HOSIERY KNITTING MACHINESRufus Clark Williams, Harriman, Tenn., assignor
to Harriman Hosiery Mills, Harriman, Tenn.,
a corporation of Tennessee

Application April 15, 1941, Serial No. 388,613

17 Claims. (Cl. 66—41)

The present invention relates to a stitch control means for seamless hosiery knitted on a circular knitting machine, and more particularly to a novel means for controlling the formation of the stitches made from the yarn used on such machines by the use of air under pressure.

In describing my invention, the stitch control means employed will be particularly referred to in connection with its use on a circular knitting machine of the type known as the Scott & Williams automatic top machine and which is adapted to produce ladies' seamless hosiery with an inturned welt portion. However, it will be obvious from the description of the invention that it may be also used in connection with other types of circular knitting machines.

As is well known, in the operation of the Scott & Williams automatic top circular knitting machine, in making the welt portion of the stocking, the machine starts or makes up on every other needle, four courses of fabric, and then transfer jacks are operated to take this fabric off the needles and hold it while said needles continue to knit the remainder of the welt fabric. When the welt fabric has been completely knitted the needles are then operated so as to remove the stitches from the transfer jacks and then to knit a seam or welt which produces the double top or welt portion of the stocking.

When ordinary yarn is employed in producing the welt fabric on such automatic top machine, said fabric will possess the required elasticity needed in the welt portion of the stocking. However, when Nylon yarn is used in knitting, it is difficult to produce a welt fabric which has sufficient elasticity or stretch. In order to provide the required elasticity when Nylon yarn is used it has been found necessary to loosen the stitches formed by the needles, and when the stitches are thus loosened and the knitting of the welt fabric proceeds, said fabric has the tendency to bunch or wad up into a ball-like condition and the stocking when completed has unsightly distorted stitches at the welt portion thereof which cannot be straightened out or changed by any known practical method and therefore the stocking has an objectionable appearance which detracts from its saleability.

It is one of the objects of the present invention to overcome this difficulty of having Nylon yarn knitted welt fabric bunch or wad up during the knitting thereof by providing means to cause said fabric as it is being knitted to be held by air pressure under tension and in an expanded or extended condition.

A further object of the invention is to provide means on a circular knitting machine which is adapted to supply air under pressure directly above the needles and at the stitching point of the machine, so as to produce a tension on the fabric being formed by the needles, and so said needles will operate to knit even and smooth stitches in forming the fabric.

A further object of the invention is to provide means on a circular knitting machine of the automatic top type for directing a stream of air under pressure directly above the needles and at the point where the stitches are formed, and below the transfer jacks, and against the fabric which is being knitted, when said jacks are holding one end of the fabric of the welt.

A further object of the invention is to provide a new method of improving the knitted structure of seamless hosiery and so there will be provided in the fabric of said hosiery a more even stitch formation and a more uniform elasticity.

With these and other objects in view, the several features of the invention consist in the devices, combinations and arrangement of parts hereinafter described and claimed, which with the advantages to be obtained thereby will be readily understood by one skilled in the art, from the following description taken in connection with the accompanying drawing in which—

Figure 1 is a detail sectional view in side elevation of a portion of an automatic top circular knitting machine of ordinary description at the stitching point of the machine, only so much of the mechanism of the machine being shown as is believed to be necessary to illustrate the connection of the present invention therewith.

Figure 2 is a view similar to Figure 1 but showing the fabric produced by the knitting operation more fully completed and also indicating the air pressure used in accordance with my invention being applied to said fabric.

Referring more specifically to the drawing, one of the latch knitting needles of the knitting machine as it is located at the knitting station of the machine is indicated at 1. The needles of the machine, as is well understood, are mounted in a revolving needle cylinder of the usual type. The cooperating sinker for the needle 1 is shown at 2. The sinker dial in which the sinkers are slidably mounted is shown at 3, and the transfer jack is indicated at 4. The transfer jack 4 is shown, for convenience, at the position it would be located at the time the welt fabric 7 is about

to be taken from the hooks 5 on the jack by the needles and the seam knitted by the needle to form the double top or welt of the stocking.

Mounted above the stitching station of the machine, in any suitable manner, is a nozzle 6. The nozzle may be of any convenient construction so that it will be adapted to feed compressed air therethrough in a stream which will be directed just above the point where the stitches are formed by the knitting needles and below the position of the transfer jack 4.

In the operation of the knitting machine, and after the initial courses of the welt fabric 7 have been knitted by the knitting needles, the transfer jacks 4 are operated to take the fabric off the needles and to hold it as indicated in Figure 1. As the knitting of the fabric proceeds, the air coming from nozzle 6 is directed against said fabric and causes it to be expanded or forced outwardly into a position indicated in Figure 2, and said fabric is held under tension by the force of said air stream. This tension placed upon the fabric 7 by the air pressure coming from the nozzle 6 prevents said fabric from wadding or bunching up, and in addition tensions the yarn at the needles so that a more even and smooth stitch will be formed by said needles.

It will be seen that when Nylon yarn is used in the knitting of the welt fabric and loose stitches are made of said yarn, when my compressed air stitch control device is employed, the loose stitched fabric produced by the knitting needles will be held in an extended position until the fabric is completed and will not bunch up, and when the stocking is completed the welt fabric will possess a proper elasticity and will not have the objectionable, unsightly and distorted stitches therein.

In addition to the stitch formation of the fabric of the welt portion of the stocking being improved by reason of the application of the air under pressure thereto in accordance with my invention, the structure of the fabric of the leg portion proper of the stocking, after the welt has been completed, will also be improved because the air under pressure striking the stitches of the fabric as it is being knitted will produce sufficient tension on the yarn at the knitting point of the machine that the knitting needles will produce more even and smooth stitches. In this connection the air under pressure directed against the fabric will function similarly to the weights and rollers which are often used on circular knitting machines, such for instance in connection with ribber machines, for applying tension while the knitting progresses.

Having now described my invention, what I claim is:

1. In a circular knitting machine, means for directing air under pressure against the fabric produced by the knitting needles of said machine and as said fabric is being knitted, to hold the same in an extended position away from the needles and under a yielding tension.

2. In a circular knitting machine, a stitch control means comprising an air nozzle positioned adjacent the stitching point of the machine for directing a continuous stream of air against the fabric knitted by the knitting needles, to hold it under tension and away from the needles during the operation of said needles.

3. In a circular knitting machine having a revolving needle cylinder provided with knitting needles adapted to be operated at a stitching station to produce circular knit fabric, means posi-

tioned adjacent the stitching station to cause the stitches produced by the knitting needles to be held under tension by air pressure as the fabric is being knitted.

4. In a circular knitting machine provided with knitting needles adapted to be operated at a stitching point in the machine to produce circular knit fabric, means to hold the fabric produced by the knitting needles in an extended condition away from the needles by air pressure.

5. In a circular knitting machine provided with knitting needles adapted to be operated at a stitching point in the machine to produce circular knit fabric, means for directing a stream of air under pressure at said stitching point to control the formation of said stitches.

6. In a circular knitting machine provided with knitting needles adapted to be operated at a stitching point in the machine to produce circular knit hosiery and having mechanism for automatically knitting an intumed welt for said hosiery, means for directing a stream of air under pressure against the welt fabric as it is being knitted by the needles to hold said fabric in an expanded condition and until said welt fabric has been completely knitted.

7. In a circular knitting machine having knitting needles operated at a stitching point in the machine to produce circular knit hosiery and also having mechanism for automatically knitting an intumed welt for said hosiery, means for directing air under pressure against the welt fabric as it is knitted by the needles to hold it under a yielding tension and in an extended condition until the welt has been completely knitted.

8. In a circular knitting machine provided with knitting needles adapted to be operated at a stitching point in the machine to produce circular knit hosiery and having mechanism for automatically knitting an intumed welt portion for said hosiery, said mechanism including means for holding the fabric of said welt suspended until the entire welt has been knitted by the needles, and means for directing a stream of air under pressure against the welt fabric as it is held suspended to hold it under a tension and away from the knitting needles.

9. In a circular knitting machine for producing circular knit hosiery and which has mechanism for automatically knitting a double welt portion for said hosiery, means for causing the fabric of the welt as it is being knitted to be held under tension and in an extended condition with respect to the knitting mechanism of the machine by air pressure.

10. In a circular knitting machine provided with knitting needles adapted to be operated at a stitching point to produce circular knit fabric from Nylon yarn, means for directing air under pressure against the fabric knitted from the Nylon yarn by said needles to yieldingly hold said fabric under tension and in an extended condition away from the needles.

11. In a circular knitting machine provided with knitting needles adapted to be operated at a stitching point on the machine to produce circular knit hosiery from Nylon yarn, and having mechanism for automatically knitting an intumed welt portion for said hosiery of loose stitches, means for directing a stream of air under pressure against the fabric of the welt as it is being knitted to hold said fabric in an extended condition and to prevent it from bunching up due to its loosely knitted stitch structure.

12. In a circular knitting machine having knit-

ting needles adapted to knit circular knit hosiery from Nylon yarn, means associated with the knitting needles at the point where said needles form the stitches from the Nylon yarn to apply air under pressure to the fabric as it is being knitted to control the stitch formation thereof. 5

13. A method of controlling the formation of the stitches in a fabric produced by the needles of a circular knitting machine which consists of directing a stream of air under pressure against the fabric as it is being knitted to hold it under tension and in a suspended condition and away from the needles. 10

14. A method of controlling the formation of the stitches in a fabric produced from Nylon yarn by the needles of a circular knitting machine which consists of directing air pressure against the fabric as it is being formed and so that said fabric is held in an extended condition until the knitting is completed. 15

15. A method of controlling the formation of the stitches in a welt fabric produced from Nylon yarn by the needles of a circular automatic top machine which consists of directing air pressure against the welt fabric as it is being knitted and until said fabric is seamed or welted to the remainder of the stocking fabric. 20 25

16. A method of knitting a circular knit fabric on a circular knitting machine which consists of knitting said fabric at a stitching point in the 30

machine by the knitting needles and during the knitting operation directing a stream of air under pressure at said stitching point to hold the knitted fabric as it is knitted under a tension and extended away from the needles.

17. A method of knitting the welt fabric of a circular knit stocking on a circular automatic top knitting machine with Nylon yarn which consists of knitting the starting courses of said welt fabric by the operation of every other needle of the machine, then operating said needles and the transfer jacks of the machine to transfer said fabric from said needles to said transfer jacks, then holding said starting courses of the fabrics on said transfer jacks until the complete welt fabric has been knitted and during the knitting of said welt fabric applying a stream of air under pressure directly above the needles at the point where the stitches are formed and below the said transfer jacks and so that the knitted welt fabric will be forced outwardly and away from the needles and held in an extended inflated balloon-like condition, then upon the completion of the knitting of the welt fabric, operating the needles of the machine to transfer the stitches held by the transfer jacks onto said needles, and then knitting the said stitches taken from the transfer jacks to the stocking fabric to form an inturned welt top for the stocking.

RUFUS CLARK WILLIAMS.