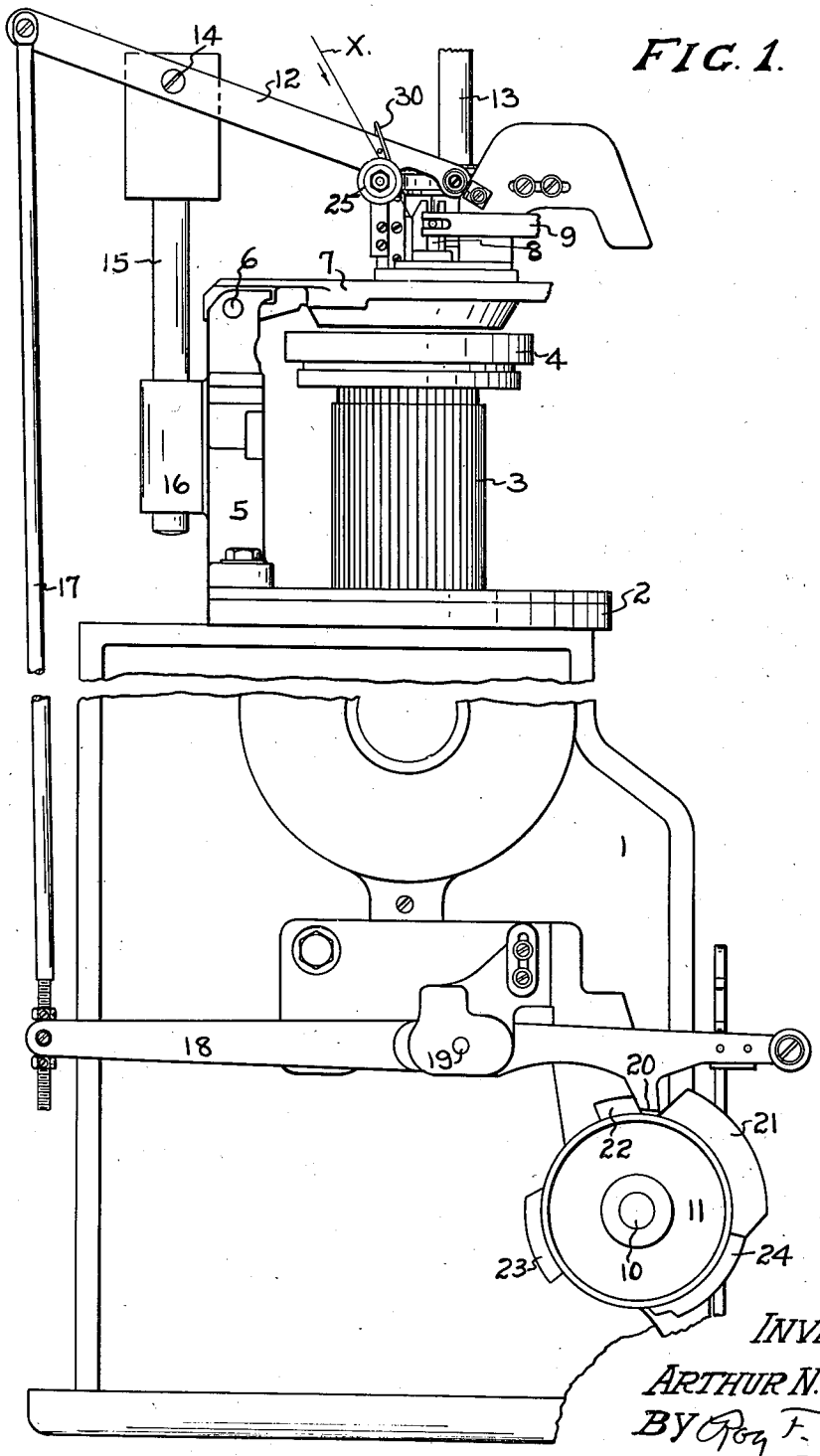
Nov. 25, 1941. A. N. CLOUTIER 2,264,069

STOCKING TOP AND METHOD OF KNITTING SAME

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FIG. 1.




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FIG. 2.

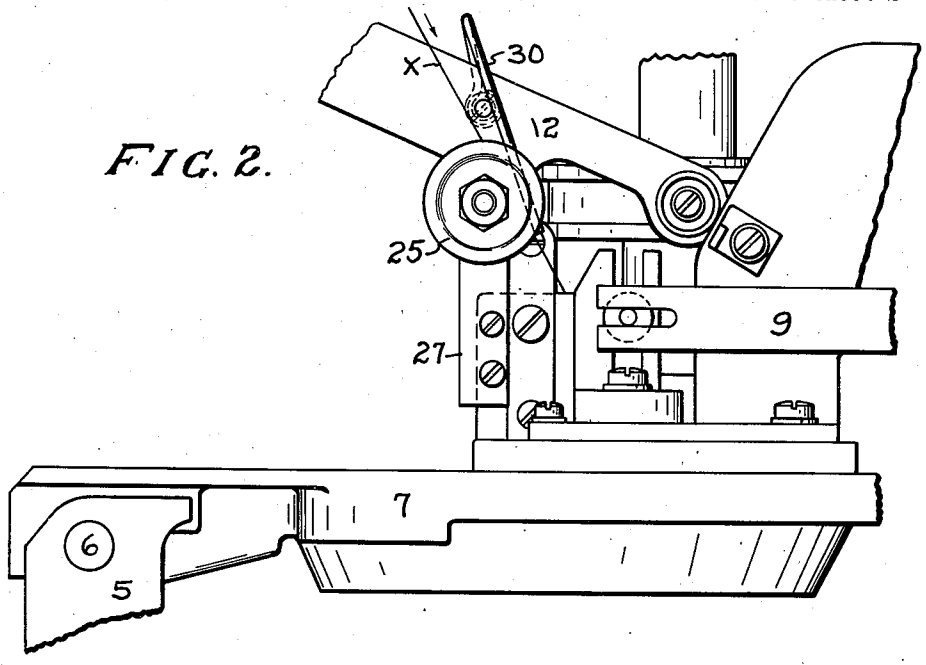



FIG. 3.

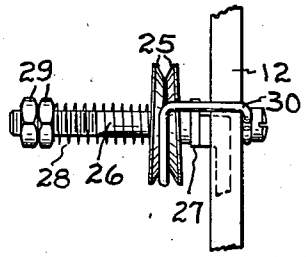



FIG. 4.

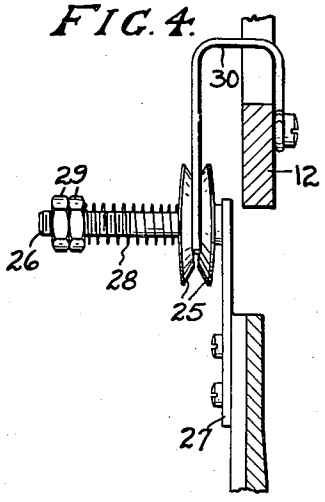
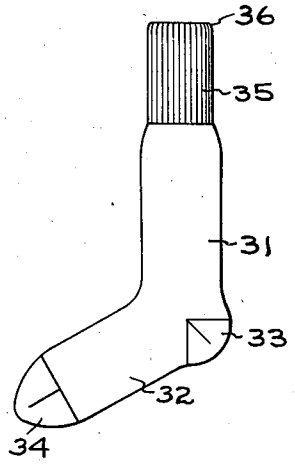



FIG. 5.




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# UNITED STATES PATENT OFFICE

2,264,069

## STOCKING TOP AND METHOD OF KNITTING SAME

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Application January 16, 1939, Serial No. 251,140

2 Claims. (Cl. 66—172)

This case concerns a mechanism and method employed in the elimination of curling or rolling in hosiery tops containing elastic, also the product produced.

In the figures of drawings:

Fig. 1 is an elevation showing one side of a knitting machine and the necessary parts involved in the practice of the invention;

Fig. 2 is a detail at the top of said machine showing the elastic yarn tensioning means and control therefor;

Figs. 3 and 4 are detailed views of this tension and control showing the same as seen from different viewpoints; and

Fig. 5 is a conventional illustration of a half hose in which the elastic top has been constructed in accordance with the invention herein described.

It has been common practice for some time now to knit hosiery such as half hose, anklets, children's hosiery and other types of such goods with an elastic yarn or yarns inserted in the top, this mainly for the purpose of knitting on a single machine a stocking which will be self-supporting and in which the top knitted of plain material will simulate rib knitted goods. Some of these so-called elastic tops have been turned over and sewed at the beginning edge while others are of single ply constructed throughout and are knitted with a selvage which is itself either wholly or partially knitted with the elastic yarn. One characteristic of such single ply tops is that the beginning edge has a tendency to roll or curl outwardly, this curled edge being evident even after the article has been boarded or otherwise treated.

According to the present invention hosiery tops are knitted in which this beginning edge will be substantially free from curl or roll and yet retain all its elasticity, a characteristic very desirable but not evident when the edge of the stocking has been turned over and sewed. For the first few courses the elastic is to be inserted under a considerably greater tension than throughout the remainder of the elastic top. As heretofore knitted without variation in tension from the initial course to the end of the top, the first course or two of the elastic tend to loosen up, or at least, are not so tight as the remaining courses. Obviously this has enhanced the tendency to curl. Furthermore, if the elastic has been knitted into stitches or if it has been handled in such a way that after the initial edge has been started, greater tension has been imposed by knitting or in any other way, the edge itself will display a marked tendency to roll outwardly due to the excessive looseness of the elastic material. When considerable extra tension is imposed upon the elastic yarn which goes into the selvage, and preferably for as many as two to four courses, thereafter, the initial edge will be drawn in slightly as illustrated in Fig. 5, and in contrast to an outward roll or curl, will be maintained quite flat and of more pleasing appearance than tops which have displayed the marked tendency to curl outwardly. Furthermore, when on the leg of the wearer, this top will not roll but will be maintained flat to the very edge.

Referring to the figures, parts of a more or less conventional hosiery machine are illustrated in Fig. 1 including a frame 1, base 2, cylinder 3, sinker head 4, latch ring post 5 to which is hinged at 6 a carrier and latch ring 7. This carrier ring also has attached thereto, generally designated by numeral 8, an elastic yarn feeding mechanism controlled by lever 9 and other mechanism not necessarily shown in this case. A main cam shaft 10 carries a pattern drum 11 having thereon cams more fully to be described in a later paragraph.

In this particular embodiment of the invention, the control of the means for imposing the requisite tension on the elastic yarn is derived from a lever 12 which functions with other mechanism to raise and lower a wrap yarn feeding means, very little of which is illustrated in this case but which is rotatable on a spindle 13. This wrapping means is fully described in United States Patent #1,702,608. This spindle 13 is raised and lowered at certain times during the knitting of an article of hosiery and in stocking tops wherein a wrap pattern is imposed upon the fabric throughout the knitted elastic top, this wrapping means will be maintained elevated until the selvage and initial courses are completed, in most instances said wrap means drops to position about four courses after the start of knitting the elastic top, this being as many courses as has been found practically desirable for imposing the additional tension above mentioned. The lever 12 is pivoted at 14 at the upper end of a post 15 held within a bracket 16 projecting from the post 5. The outer end of this lever 12 connects by means of a link 17 to the outer end of a second lever 18 pivoted at 19 at the side of the frame of the machine. This lever 19 has a toe portion 20 which bears upon certain cams 21, 22, 23 and 24 on the drum 11.

Now referring to Figs. 2, 3 and 4, the elastic yarn $x$ is threaded through between a pair of

tensioning discs 25 which are adjustably attached on the spindle 26 projecting outwardly from a bracket 27 which extends up from the carrier ring 7 or other parts attached thereto. These different discs may be made to exert more or less tension upon the elastic in accordance with the adjustment of a spring 28 which is maintained in any adjusted position by the nuts 29. The lever 12 has an angularly bent wire 30 attached in such a position that the end of that wire, when the lever is in lowermost position, will strike between the discs and will separate them to such an extent that they exert no tensioning effect upon the elastic yarn. When in a raised position, this wire will be withdrawn from between the discs and they will tension the elastic yarn according to the degree of tension exerted by the spring 28.

In actual operation a cam 21 will lift the toe 20 of the lever 18 until the wrap spindle and all mechanism carried thereon is raised a considerable distance above the upper ends of the knitting instrumentalities. At this time, the wire 30 will be withdrawn from between the discs and they will be free to exert the full amount of tension on the yarn $x$. While the toe 20 is on the last part of this cam 21, the selvage or initial edge of a new stocking is started. At that time the discs exert the required amount of tension on the elastic yarn and it is inserted within the beginning edge or selvage and for the next few courses under that tension which is an appreciable amount greater than the tension on the yarn after these few courses have been completed. Just after the first few courses have been finished the wrap means will be dropped to active or wrapping position. That is the position illustrated in Fig. 1, and at that time, the wire 30 will separate the discs so that the elastic yarn will then be knitted under a minimum of tension; at least there will be no tension due to the discs 25. Of course the elastic yarn is actually knitted under tension at this time due to the action of the knitting instrumentalities drawing from the cone or other supply, and over the necessary points of friction as the yarn is drawn from the supply to the knitting point. At the completion of the elastic top, the toe 20 is raised on a cam 22 just as the elastic yarn is withdrawn. The raising of the elastic yarn feeding means at this time makes it necessary to lift the wrap mechanism slightly to avoid interference. Wrapping may again take place throughout the leg of the stocking or at other desired points. There will be no elastic yarn feeding after the top is knitted so that it is immaterial whether the discs 25 exert a tension or whether they do not. Other cams 23 and 24 function in the knitting of the heel and the toe, respectively, but such function is not intimately connected with the knitting of the elastic top and is merely mentioned by way of completeness at this time. The first part of cam 21 is employed at the knitting of the loopers rounds and no elastic is fed then.

Referring to Fig. 5, a half hose having a leg 31, foot 32, heel 33 and toe 34 has been conventionally shown in which an elastic top 35 has been knitted in accordance with the invention. The first courses of this top have been knitted with the elastic under a considerable amount of additional tension so that at 36 the edge is drawn inwardly slightly rather than flaring outwardly. As can be seen this appearance is much more desirable than an outward curl or roll, and furthermore, will not allow the top to roll down the leg as has been experienced when the opposite has been true. While we mentioned about four courses as being a desirable number of courses in which additional tension is to be imposed upon the elastic yarn, it is to be understood that that is not limited as for different materials, different diameters of elastic, etc., it may be necessary to have either fewer or more courses knitted in this fashion to obtain the most satisfactory results.

Obviously, the so-called plain yarn will be knitted throughout the top of the stocking and the elastic yarn is to be knitted, inlaid or otherwise incorporated in accordance with some one of the preferred forms or systems available. For example, the elastic yarn will be knitted in spaced wales and/or spaced or adjacent courses, or may be inlaid by feeding below the latch on spaced needles or in spaced or adjacent courses. Again, the elastic may be incorporated as in St. Pierre Patent #2,131,720. At the selvage the elastic is preferably taken by alternate needles, and, either in conjunction with another yarn or alone, will be cast off to form a non-ravel edge or selvage according to methods now being practiced.

In the particular mechanism shown the control for discs 25 has been derived from a movable element which controls the wrapping mechanism. Obviously, this control may be derived from any elements on the machine which function at the desired time. For example, movement may be derived from yarn feeding levers, from a binder and cutter mechanism, or may be from any other of the movable elements on the machine or may be separately derived from cams at the main cam shaft or from any other cam elements available. Probably different machines would naturally make it desirable to derive this motion from other elements than have been described in the case. Other tensioning means may be employed so long as they are capable of being opened up to allow the yarn to run free of tension and are so constructed as to impose the necessary tension at the right time. One example of another tension means which may be used is that of United States Patent #2,124,001.

As a modification, tension may be imposed upon the elastic yarn at the initial course or courses which tension may be varied, that is, may be decreased course by course to a point at which there will be no tension above that normally desired to be imparted to the elastic yarn throughout the major portion of the stocking top. To do this, it is essential to provide cam control, or other control, which will regulate the tension means in such a way as to impose a maximum of tension desired at the start for one course, for example, and thereafter to control the tension means so that tension is lessened at each subsequent course or courses. In certain instances this may result in slightly better control of the edge and in an article more perfect in appearance. The invention is defined in the following claims:

I claim:

1. A method of knitting an elastic, self-supporting stocking top including knitting a non-elastic yarn throughout a plurality of courses in the top and incorporating an elastic yarn at spaced wales only in at least some of said courses in which the said non-elastic yarn is knitted, imposing a tension on said elastic yarn so as to draw spaced wales in which it is incorporated to be held, together to simulate a rib appearance, and at the initial courses at the edge of

said top, incorporating the elastic under a substantially greater tension thereby to draw in the edge and render it resistant against curling or rolling.

2. An elastic stocking top having a non-elastic yarn knitted at all courses throughout the top and an elastic yarn incorporated in spaced wales at some at least of the courses in said top, the said elastic yarn being held at stitches in those wales wherein it is incorporated and being of a length such as to draw those wales together to contract the top and simulate a rib appearance, the elastic yarn being incorporated at the first few courses under sufficient tension such that at the edge of the top wales are drawn together more closely thereby drawing in the edge of the top to a diameter less than that of the courses following and rendering it resistant against curling or rolling.

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