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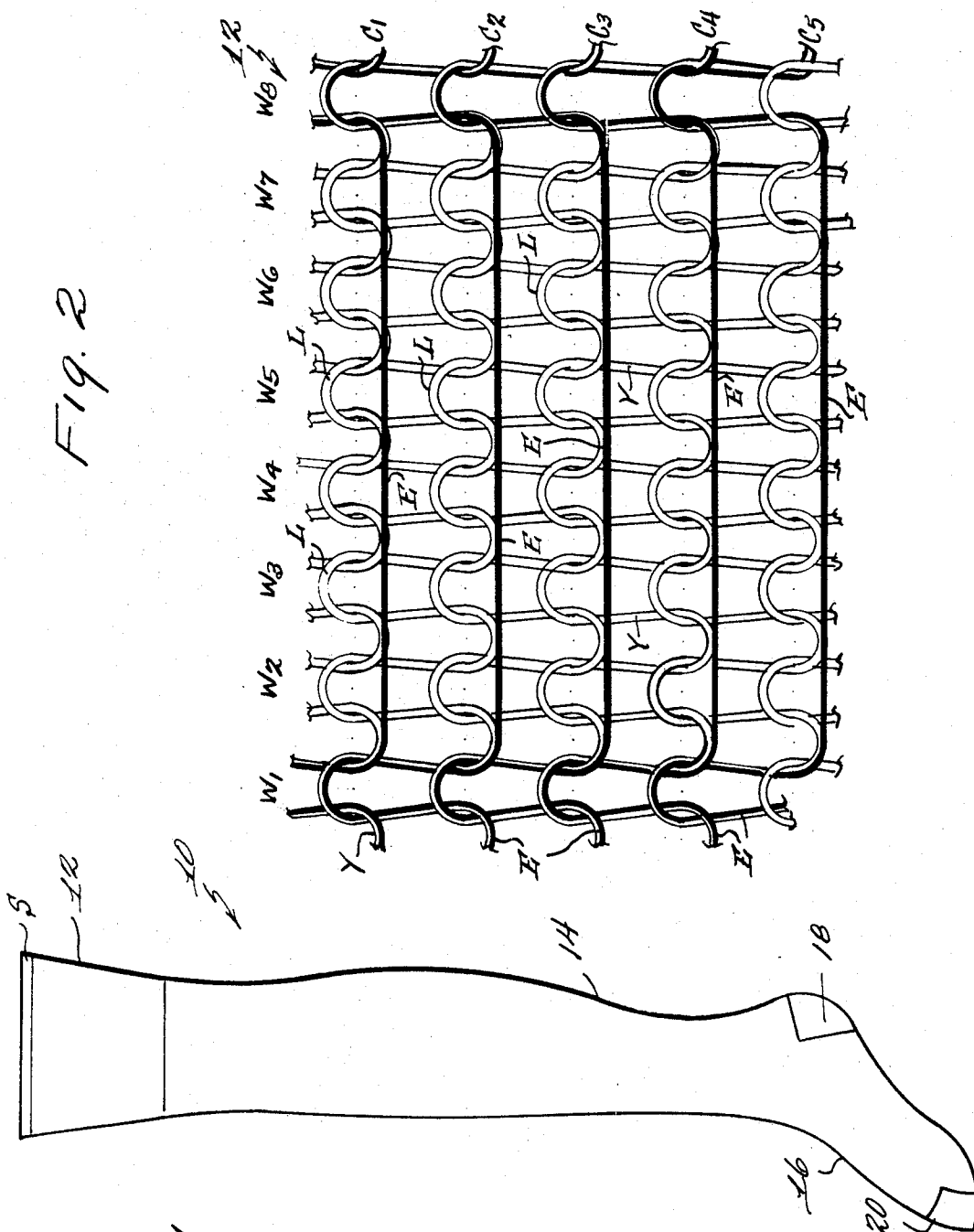
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STAY-UP STOCKING

Filed March 30, 1965

2 Sheets-Sheet 1



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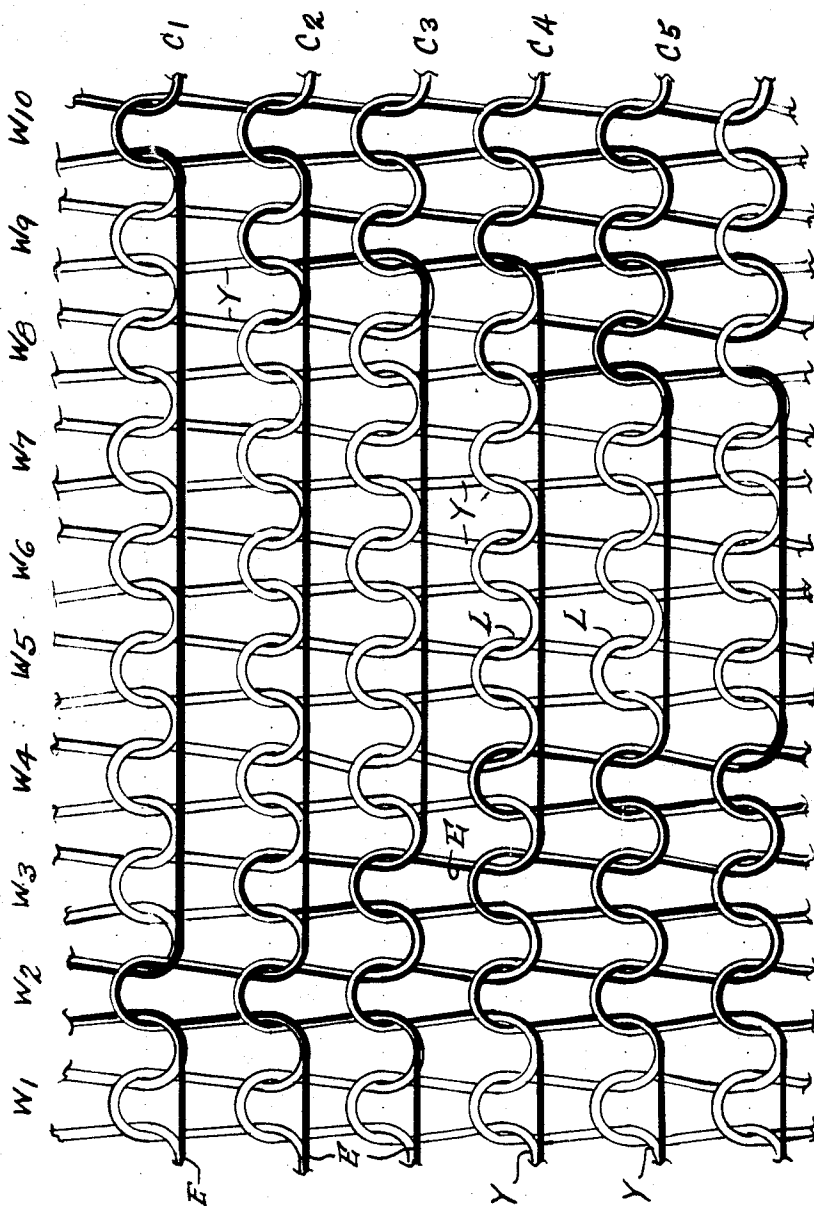


Fig. 3

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STAY-UP STOCKING

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ABSTRACT OF THE DISCLOSURE

A stay-up stocking having a welt knitted from an inelastic body yarn to form the base fabric of the same, the welt further incorporating an elastomeric yarn having a frictional surface, the elastomeric yarn being knitted and floated into the welt in a controlled manner so that the welt when relaxed is of gradually tapering shape toward the leg by the progressively increasing horizontal constriction from course to course toward the leg. The tapered construction of the welt resulting from the controlled knitting and floating of the elastomeric yarn produces a welt having a uniform or equal compressive force against all areas of contact with the wearer's leg.

The present invention relates generally to a stay-up stocking and, more particularly, to the welt of a stay-up stocking which applies compressive forces as well as frictional forces to the leg of the wearer to support the stocking.

Throughout the specification the word "stocking" will be used and is intended to cover various lengths of hose or hosiery, such as the stockings known as anklets, over-the-knee hosiery, half hose or the like. Primarily, the stocking of the present invention is of the over-the-knee type commonly referred to as ladies' hosiery.

Heretofore, many self-supporting hose have been made but certain difficulties have been encountered by the manufacturer during the making of the same and by the wearer in that the supporting portion of the stocking is too tight or too loose. The most common self-supporting hose presently available have incorporated in the top or welt of the same a covered elastic strand or thread which applied merely compressive forces for retaining the same in position on the leg of the wearer. Other more recently developed self-supporting hose which are now presently available incorporate in the welt not only the usual welt yarn for knitting the base fabric of the welt but also an elastic strand or yarn as well as a bare or uncoated strand or yarn having a surface which frictionally grips the leg of the wearer.

In all prior types of self-supporting hose where the welt was knitted in tubular form on the usual circular knitting machine, the shape of the resulting welt was substantially cylindrical. This type of welt had a disadvantage in that the welt had the same horizontal constrictive forces throughout its length. Since the welt is usually positioned on a portion of the leg which is tapered, the compressive and frictional forces of the same on the leg were unequal. Consequently, if the bottom portion of the welt had compressive forces capable of causing the welt to snugly fit the leg, the top portion of the welt had too great a compressive force and was uncomfortable. On the other hand, the welt was often knitted with the idea that the top portion of the same should be designed to have compressive forces which were comfortable on the leg and when this was done, the lower portion of the welt was too loose. In either situation a difficulty was encountered in the tendency of the welt to roll during the boarding operation of the stocking as well as during use of the finished product.

An important object of the present invention is to pro-

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vide a stay-up stocking or hose in which the welt or top of the stocking is knit in a tapered form as it approaches the leg portion of the stocking, the welt utilizing only a body yarn for knitting the base fabric of the welt and an elastomeric yarn incorporated into the knitting of the body yarn, the elastomeric yarn having a frictional surface thereon whereby the stocking is retained on the leg by uniform compressive forces as well as by a uniform frictional engagement of the material of the welt with the leg.

Another object of the present invention is to provide an improved stay-up welt for a stocking which will not have the tendency to roll either during the boarding operation or during use of the final product.

A still further object of the present invention is to provide an improved stay-up welt for a stocking in which the welt is tapered, the taper being provided by the laying in of an elastomeric yarn or strand in a particular and novel manner.

Still a further object of the present invention is to provide an improved tapered stay-up welt in which a strand of elastomeric and frictional material is incorporated, the stay-up welt being knit in such a manner that it can be knit on a conventional circular knitting machine, for example a 400 needle model KN Scott & Williams machine without substantial modification of the same.

A further object of the present invention is to provide a stay-up welt for a stocking which is pleasing in feel and attractive in appearance even though it incorporates a bare elastomeric yarn therein, the welt also being lightweight in construction and yet having the necessary strength for continued use.

These and other objects and advantages of the present invention will appear more fully in the following specification, claims, and in the attached drawings wherein:

FIGURE 1 is a side elevational view of a finished women's stocking incorporating the novel stay-up welt of the present invention;

FIGURE 2 is an enlarged fragmentary view of a portion of the stay-up welt of the present invention looking from the interior of the welt outwardly of the same; and

FIGURE 3 is an enlarged fragmentary view of a portion of a modified form of the stay-up welt of the present invention, the view also being taken from the interior of the welt.

Referring now to the drawings wherein like reference numerals or characters represent like or similar parts and in particular to FIGURE 1, the stocking of the present invention is generally indicated at 10 and includes a knitted welt 12 of the present invention, a knitted leg or body portion 14 having a foot portion 16 at its lower end, and the usual heel pocket 18 and toe pocket 20. The leg or body portion 14 of the stocking 10 may be knitted in any suitable manner. For example, it may be knitted so that the leg portion is in fact a compressive support stocking or it may be knitted as just a conventional leg portion of a stocking with or without design therein. It will be noted that in FIGURE 1 the welt 12 of the stocking is shown as having an exaggerated inwardly tapered configuration toward the leg portion 14. Of course, in the actual knitting of the welt of the stocking, the taper will not be as exaggerated as illustrated but will be of such a configuration as to resemble the average taper of the leg of a wearer.

In knitting on a circular knitting machine of the type heretofore mentioned, it is a common practice to lay in yarns during the course of knitting the welt and or leg portion and it is also a common practice on such knitting machines in knitting with elastomeric yarns, the elastomeric yarns being placed under tension during the knit-

ting process. Therefore, it is not believed necessary to go into any detail of the mechanical operation of the knitting machine for the knitting of stitch loops and incorporating elastomeric yarn into certain wales W of each of the courses C and floating the same over intermediate wales W while the elastic yarn is under the tension as these steps are known in the art. Further, it will be understood that stockings may be knitted either from the welt end of the same to the toe end or from the toe end to the welt end. The more generally accepted way of knitting a stocking is from the welt end toward the toe end with the toe pocket being the last thing incorporated in and closed on the stocking. In the hereinafter description of the present invention, the knitting of the welt will be described with respect to the more conventional method of knitting the stocking, i.e., from the welt end toward the toe end.

After the welt selvage has been knit in conventional manner and folded over, the knitting of the main portion of the welt 12 begins. The welt 12 is knit with a body yarn Y in FIGURE 2, the yarn being fed to all needles of the circular knitting machine to form a base fabric for the welt having stitch loops L forming the wales W, such as those indicated at W1 through W8 in FIGURE 2. The stitch loops L lie in the courses C, such as those indicated at C1 through C5 of FIGURE 2. The body yarn is substantially non-elastic and is preferably a synthetic self-crimping yarn, such as E. I. du Pont de Nemours & Co. nylon yarn under the name "Cantrece" or the like. However, other synthetic yarns or, for that matter, natural yarns may be used in the welt 12 so long as the yarn or strand may be considered substantially inelastic.

During the knitting of the base fabric with the body of the yarn, a bare or uncovered elastomeric yarn or strand E is incorporated into the courses in a known manner and knitted into the stitch loop L of certain of the wales W and floated over intermediate wales W. As shown in FIGURE 2, the uncovered elastic yarn E is preferably incorporated in every eighth wale as the stitch loop L is being formed. It is then floated over the six intermediate wales. The example illustrated in FIGURE 2 is a preferable example of knitting the welt with the incorporation of an elastomeric yarn E but it will be appreciated that other types of stitch panels may be used, such as the tuck stitch panel or the Jersey stitch panel.

The elastic yarn or strand E is also of the type having a surface which has good frictional characteristics when contacting the skin of a wearer of the stocking 10. It has been found that uncovered or bare spandex yarn, such as that of E. I. duPont de Nemours & Co. under the name of "Lycra" or the like could be used.

To obtain the novel tapered configuration of the welt 12 with the knitting arrangement disclosed in FIGURE 2, the tension on the elastomeric yarn E is varied from course C to course C by a progressively increasing amount as the courses C approach the leg portion 14 of the stocking 10. By increasing the tension under which the elastic yarn E is knitted into the stitch loops L and floated across the intermediate wales W, through the use of the usual tensioning devices for the circular knitting machine, the effective length of elastomeric yarn E in the courses C varies in a decreasing amount as the courses C approach the leg portion 14 of the stocking. By varying the tension on the elastomeric yarn E so that the tension increases for the courses C as they are made up in the direction of the leg portion 14 of the stocking 10, the welt W when completed and relaxed will have more horizontal constriction in those courses C adjacent the leg portion 14 than those courses C adjacent its upper selvage S. Since a major portion of the elastomeric yarn E is floated on the interior of the welt 12, it does not materially affect the exterior appearance of the welt W. Also, the arrangement of utilizing just two yarns, namely the body yarn Y and elastomeric yarn E, to make the stay-up welt 12 and by knitting the welt so that it has a tapered configuration, the welt does not have a tendency to roll at the top because

there is not as much constriction in the top courses of the welt as in the lower courses. This tendency to roll does not occur during the boarding operation or when the final product is used.

Referring now to FIGURE 3, there is disclosed a slightly different knitted construction for knitting the stay-up welt 12 in a tapered configuration toward the leg portion 14 of the stocking 10. In the arrangement shown in FIGURE 3, the body yarn Y may be the same type as that described above as may be the elastomeric yarn E. However, in this configuration there is a fundamental difference in the knitting in that the elastomeric yarn E is maintained under a constant tension throughout the knitting of all of the courses C.

In order to obtain the desired end results of providing more progressively horizontal constriction in the courses C as they approach the leg portion 14, the number of wales W over which the elastomeric yarn E is floated is progressively decreased from course to course as the courses are formed in a direction toward the leg portion 14 of the stocking 10.

By careful examination of FIGURE 3, it will be noted that course C₁ and course C₂ both have the elastomeric yarn E floated across seven intermediate wales W while knitted into every eighth wale. However, in course C₃ and course C₄ the elastomeric yarn E is floated across only five intermediate wales while it is knitted into the stitch loops L of four of the nine wales. This pattern of stitching the elastomeric yarn Y into the courses C is repeated until the welt is completed. Of course, it will be appreciated that the arrangement shown in FIGURE 4 is merely for the purpose of description as the pattern could be varied in many ways to obtain the same end result when utilizing a constant tension on the elastomeric yarn E.

The important feature in the modification shown in FIGURE 2 as well as that shown in FIGURE 3 is that the horizontal constriction of each of the courses is generally increased as the courses approach the leg portion 14 of the stocking 10. Thus, when the welt 12 is completed, there being more constriction in the courses adjacent the leg portion than those adjacent the selvage S of the welt, the welt will have a tapered configuration and will more smoothly conform to the shape of the leg of the wearer. In this respect the compressive forces of the welt may be maintained substantially uniform on the wearer of the stocking and they need not be excessive to hold the stocking up as the frictional surface of the elastomeric yarn fully engages the leg portion throughout the length of the welt to grip the same and assist those compressive forces.

It will now be seen that the stay-up welt of the present invention accomplishes the objects and advantages hereinbefore set forth. Also, it will be understood that various modifications may be made to the invention described herein without deviating from the scope and the intent of the same.

Therefore, the terminology used throughout the specification is for the purpose of disclosure only and not for limitation, the scope of the invention being defined in the claims.

What is claimed is:

1. In a stay-up welt for a stocking, the welt having a gradually inwardly tapered configuration in a direction toward the leg portion of the stocking, the improvement comprising: a plurality of courses of body yarn knit at every wale; and an elastomeric yarn knit under tension into the stitch loops of selected spaced wales of each of said courses and floated across a plurality of intermediate wales, said elastomeric yarn having a frictional surface, and said elastomeric yarn in said courses being arranged in a predetermined controlled manner to cause said courses to have progressively more horizontal constriction from course to course as the courses approach the leg portion of the stocking to define a gradual taper

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in said welt when relaxed, whereby the welt of the stocking applies uniform compressive force against all areas of contact with the wearer's leg.

2. The stay-up welt as claimed in claim 1 in which said body yarn is a self crimp synthetic yarn and in which said elastomeric yarn is uncovered spandex.

3. The stay-up welt as claimed in claim 1 in which said elastomeric yarn is floated across the same number of intermediate wales in each of said courses and in which said elastomeric yarn is knit under a selectively increased amount of tension in the plurality of courses as the courses approach the leg portion of the stocking.

4. The stay-up welt as claimed in claim 1 in which said elastomeric yarn is floated across a progressively decreasing number of intermediate wales in certain courses as the courses approach the leg portion of the stocking, the elastomeric yarn being knitted under constant tension in each of the courses.

5. The stay-up welt as claimed in claim 1 in which the courses have decreasing lengths of elastomeric yarn as the courses approach the leg portion of the stocking.

6. The stay-up welt as claimed in claim 5 in which the elastomeric yarn is floated across the same number of intermediate wales in each of said courses and in which said elastomeric yarn is knit under a selectively increased amount of tension in the plurality of courses as the courses approach the leg portion of the stocking.

7. The stay-up welt as claimed in claim 1 in which said courses have the same length of elastomeric yarn in the same and in which said elastomeric yarn is knitted

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into more wales in certain courses in the direction of the leg portion of the stocking.

8. The stay-up welt as claimed in claim 1 in which said elastomeric yarn is knitted under constant tension in each course.

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