May 26, 1959 E. P. BELLMAN 2,887,860

HOSIERY WITH RUN RESISTING AREAS

Filed April 28, 1958

Fig. 1

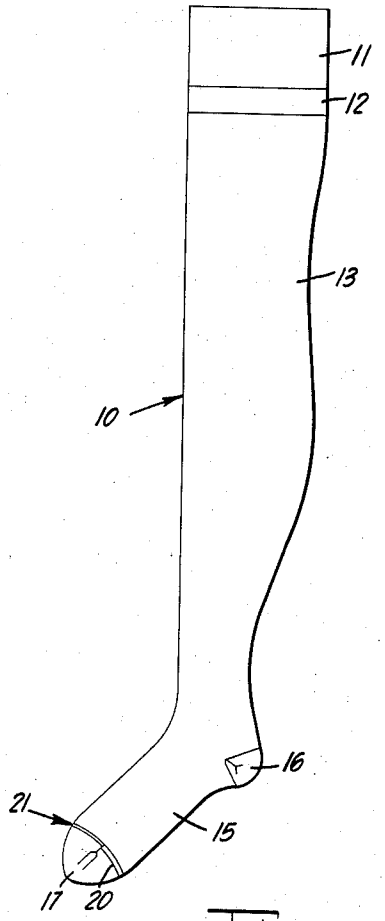


Fig. 3

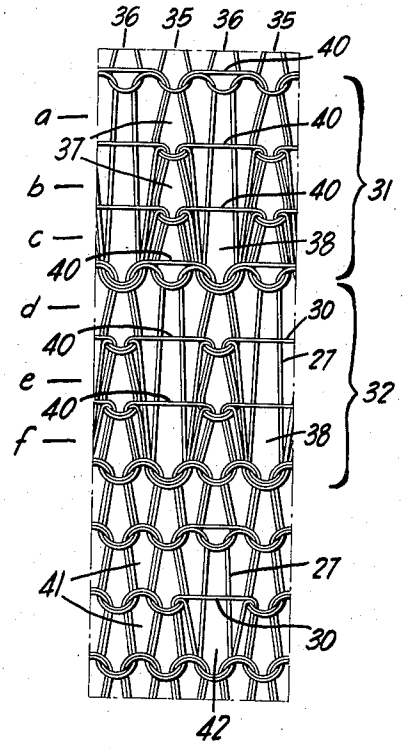
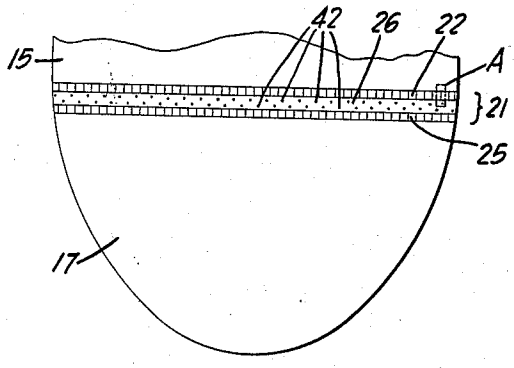


Fig. 2



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United States Patent Office 2,887,860 Patented May 26, 1959

2,887,860

HOSIERY WITH RUN RESISTING AREAS

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Application April 28, 1958, Serial No. 731,497

6 Claims. (Cl. 66—172)

The instant invention relates to hosiery and particularly to circular knit sheer women's hosiery and to improvements therein with respect to the ability of such hosiery to resist runs, originating in the toe portion of the stocking, from extending into the leg.

In the production of circular knit hosiery, conventionally referred to as "seamless hosiery" knitting proceeds by circular or round and round operation of the machine from the upper or welt portion until the heel area is reached at which time approximately one-half of the needles are taken out of operation, knitting then proceeding on the remaining needles with conventional widening and narrowing operations, to form a heel pocket. Following the formation of the heel pocket circular knitting on all the needles is again resumed until the toe area is reached. At that point knitting is again suspended on approximately one-half of the needles the remaining needles knitting in a reciprocatory manner with narrowing and widening to produce the toe pocket. The tube thus formed is closed at the lower end by looping together the free edges of the fabric adjacent the toe. Ordinarily the construction is such that the seam formed by the looping operation extends across the underside of the foot. It will be appreciated that, as a result of this method of knitting, wales of the fabric extend continuously of the front of the stocking through the leg portion, the upper part of the foot, around the toe and to the seam.

Such stockings, made conventionally from fine nylon yarns usually single filament yarns of 15 denier or less, are subject to snags or cuts which, due to the characteristics of nylon, quickly result in runs extending longitudinally of the hosiery. Heretofore it has been known to produce stockings having a certain run resistance through the provision of a pattern of tuck and plain stitches usually extending throughout the leg portion and often into the foot. It is well recognized however that such constructions, while quite effective in preventing running in the direction of knitting, namely downwardly of the stocking, have little or no effect on the prevention of runs in the opposite or upward direction. However, tests as well as common experience have demonstrated that runs in the leg in a large portion, if not a majority, of cases are originated by cuts, snags, or the wearing through of the fabric at or adjacent the toe.

With the above problems in view a principal object of the instant invention is the provision of a construction for circular knit sheer hosiery which includes an effective barrier to the passage of runs from the toe area of a stocking to the leg portion thereof.

Another object of the invention is the provision in a circularly knitted stocking of a section of fabric across the top of the foot adjacent the toe portion and between the ends of the seam which will resist the extension of a run originating in the toe or adjacent portions. In the preferred embodiment of the invention each course of this section includes a yarn in addition to the body yarn which at this location may be or may include a reinforcing yarn, the added or supplementary yarn and the body

yarn being knitted in a pattern of tuck and float and plain stitches substantially resistant to the extension of runs in a direction upwardly of the stocking.

A still further object of the invention is the provision of a run resistant area of the type referred to which will be unobjectionable from an appearance or comfort standpoint and will in fact impart a decorative effect to the stocking.

A still further object of the invention is the provision of a stocking with run resistant areas of the type referred to in which the added yarn is preferably of lighter weight than the body yarn, the area being so knit as to form narrow coursewise bands in which each wale includes at least one tuck stitch formed from a plurality of courses of one of said yarns with the other yarn floating therebehind and a plurality of courses of plain stitches formed of both yarns, the tuck stitches of each wale being opposite the plain stitches of adjacent wales.

A still further object of the invention is the provision of a run resistant section as defined by the foregoing objects in which the area between said bands is provided with a pattern of plain and tuck stitches in which the tuck stitches are relatively widely dispersed.

With the above and other objects in view, which will become apparent from the detailed description of the illustrative embodiment of the invention shown in the accompanying drawings, the invention resides in the novel elements, features of construction, and cooperation of parts as more particularly pointed out in the claims.

In the drawings:

Fig. 1 is a side elevational view of a stocking having a run resistant section formed in the foot portion thereof according to the instant invention;

Fig. 2 is an enlarged top plan view of the lower foot or toe portion of the stocking of Fig. 1; and

Fig. 3 is an enlarged view diagrammatically illustrating the loop formation of the fabric within the dot-and-dash outline A of Fig. 2 and as viewed from inside of the stocking.

Referring now to the drawings and more particularly Fig. 1 there is shown a stocking **10** knitted in tubular form on a circular knitting machine of conventional type having means therein to form tuck and other special stitches as for example the machine illustrated in Patent No. 1,969,853. Stocking **10** includes welt **11**, afterwelt **12**, leg or boot **13**, foot **15**, heel portion **16**, and toe portion **17**. Leg **13** and most of the foot **15** are commonly the sheerest portions of the stocking and are usually knitted of a single filament fine nylon yarn or the like of 15 denier or less while the welt **11**, afterwelt **12**, heel **16** and toe **17** are conventionally knitted of a single heavier yarn or of two yarns to reinforce such areas which are subject to the greatest wear or strain in use. Hereinafter when reference is made to a yarn without further definition it will be understood that this term is intended to include either a single yarn end or a plurality of individual yarn ends such as are conventionally employed in the portion of the stocking being described.

Stocking **10** is knitted in the conventional manner outlined previously, except for a run-resistant section later to be described, and as a result the stitch wales at the front half of the stocking extend continuously through the welt, leg and foot, top of the toe, and around the toe to a seam **20** formed by the conventional looping operation or other method of closure. Similarly the stitch wales corresponding to the rear half of the stocking extend continuously through the welt, leg, heel and foot to the seam **20**, the continuity of the wales between the lower foot and the lower toe being broken by the seam **20** which by its nature serves as a barrier to runs in either direction.

As it is well known the stocking described above may be of plain loop construction throughout or in order to

increase the resistance of the fabric to runs the leg and foot portions may be provided with a pattern of tuck stitches. However, as previously pointed out such tuck stitch patterns as conventionally employed provide little or no resistance to runs upwardly of the fabric.

In accordance with the instant invention a circularly knit stocking fabric with a boot or leg having a plain knit construction or incorporating a pattern of plain and tuck stitches, as desired, is provided with a section **21** (see Fig. 2) extending across the upper part of the foot adjacent the toe portion, the area terminating at the ends of the seam **20**. Section **21** comprises upper and lower narrow bands **22** and **25** respectively and an intermediate portion or area **26**. Preferably each course of section **21** is formed of a yarn in addition to yarn **27** conventionally employed in this portion of the stocking. The added or auxiliary yarn, indicated at **30** (Fig. 3), may be of the same denier as the yarn employed in the leg and foot portions but preferably is of lighter weight, say of 10 denier or less. Referring now particularly to Fig. 3 band **22** in its preferred embodiment comprises six courses including a group **31** of three courses *a*, *b* and *c* and a group **32** of three courses *d*, *e* and *f*. Group **31** is provided with wales **35** alternating with wales **36**, wales **35** being plain loops or stitches **37** knit of both the normal yarn **27** and the auxiliary yarn **30**. Wales **36** on the other hand comprise tucked loops or stitches **38** formed from one of the yarns, preferably the yarn **27** of each of courses *a*, *b* and *c*, the other yarn, preferably the auxiliary yarn **30** floating in front thereof as viewed in Fig. 3 or therebehind as viewed from the outside of the fabric and forming floats **40**. The tuck loops **38** thus extend for three courses and lie opposite the three courses of plain loops **37** in wales **35**. The second group **32**, comprising courses *d*, *e* and *f*, is of similar construction except that the plain loops **37** formed of both yarns are incorporated in wales **36** and the tuck loops **38** with one yarn of each course floated in front thereof are incorporated in wales **35**. It will be appreciated that the construction as illustrated in Fig. 3 and as described above extends for the entire width of the stocking between the ends of seam **20**. Band **25** not shown in detail is preferably of identical construction with band **22**.

The intermediate portion or area **26** lying between bands **22** and **25** and which preferably constitutes six or more courses is also provided with plain loops or stitches **41** and tuck loops or stitches **42**. However in this instance the tuck loops **42** extend over only two courses and are more widely dispersed than is the case with the tuck loops **38** in bands **22** and **25**. For example, the tuck loops **42** disposed in a coursewise row in this section of the fabric may be separated by three or more plain loops **41** and the coursewise rows may be separated by one or more courses of plain loops. Preferably the tuck loops **42** are formed of only one yarn, suitably yarn **27**, the other, suitably the auxiliary yarn **30**, being floated in front of the tuck loop, and the plain loops **41** are formed of both yarns similarly as in the case of the bands **22** and **25**.

The arrangement of the tuck loop wales in the bands **22** and **25** together with the float portions **40** of the auxiliary yarn cooperate to effectively resist the extension of runs, which originate in the toe or other portion of the stocking below the section **21**, into the foot and leg portions of the stocking. Thus while ordinary tuck stitches are not alone effective to prevent runs in a direction opposite to the direction of knitting the tuck stitches here described extending over a plurality of courses plus the floats of the second yarn have proven to provide an effective run barrier. At the same time due to the relative narrowness of the bands there is no undue constriction on the foot of the wearer of the stocking. The intermediate area **26** while contributing to the over-all effectiveness of the section **21** primarily serves to visually tie the bands **22** and **25** together to lend an attractive appearance to the section **21** as a whole.

While in the above description it is pointed out that the run resistant section is preferably located adjacent the toe of the stocking as it finds its primary function at such location it will be understood that it can be used in other parts of the stocking where it is desired to prevent the extension of runs upwardly of the stocking. Also it will be recognized that when in other locations than that shown the section may extend coursewise entirely around the stocking if desired. In its preferred location it combines with the seam **20** to completely encircle the toe, a primary source of runs, with a run-resistant barrier.

Having thus described my invention in full detail it will be understood that these details need not be strictly adhered to and various changes and modifications may be made all falling within the scope of the invention hereinafter claimed.

I claim:

1. In a circularly knit stocking including a leg, foot and toe portions with the wales extending longitudinally thereof, a section resistant to runs in both directions of the wales including at least two yarns in each course and comprising a pair of closely spaced narrow bands of stitches in the toe portion, each wale of said bands including at least one tuck stitch extending over at least three courses and formed from one of said yarns of said courses with the other yarn thereof floating therebehind and at least three courses of plain stitches formed of both yarns, the tuck stitches in each wale lying opposite the plain stitches of adjacent wales.

2. In a circularly knit stocking including leg, foot and toe portions with the wales thereof extending longitudinally, a section resistant to runs in both directions of the wales including at least two yarns in each course and comprising spaced narrow bands of stitches forming borders of said section and defining an area therebetween, each wale of said bands including at least one tuck stitch extending over three courses and formed of one of said yarns of said three courses with the other yarn thereof floating therebehind and at least three courses of plain stitches formed of both yarns the tuck stitch of each wale lying opposite the plain stitches of adjacent wales, and relatively dispersed tuck stitches in the area between said bands.

3. In a circularly knit stocking including leg, foot and toe portions with the wales thereof extending longitudinally, a section resistant to runs in both directions of the wales including at least two yarns in each course and comprising spaced narrow bands of stitches forming borders of said section and defining an area therebetween, each wale of said bands including at least one tuck stitch extending over three courses and formed of one of said yarns of said three courses with the other yarn thereof floating therebehind and at least three courses of plain stitches formed of both yarns the tuck stitch of each wale lying opposite the plain stitches of adjacent wales, and relatively dispersed tuck stitches in the area between said bands, said last named tuck stitches extending over only two courses and formed of one of the yarns with the other yarn floating therebehind.

4. In a circularly knit stocking fabric including leg, foot and toe portions, a seam extending transversely of said fabric beneath the foot portion of the stocking, wales of said fabric extending from said seam around the toe, upper foot and into the leg portion, a section resistant to runs in a direction upwardly of the stocking fabric, said section extending transversely across the upper part of the foot portion between the ends of said seam and comprising at least one narrow band of stitches knit of two yarns, each wale of said band including at least one tuck stitch extending across a plurality of courses and formed of one of said yarns of said courses with the other yarn thereof floating therebehind and a plurality of courses of

plain stitches formed of both yarns, the tuck stitches in each wale lying opposite the plain stitches of adjacent wales.

5. In a circularly knit stocking fabric including leg, foot and toe portions, a seam extending transversely of the fabric beneath the foot portion of the stocking, the wales of said fabric extending continuously from said seam around the toe, upper foot portion and into the leg portion, a section resistant to runs in a direction upwardly of the stocking fabric and extending transversely across the upper portion of the foot between the ends of said seam, said section having two yarns in each course and comprising spaced narrow bands of stitches forming borders of said section and defining an area therebetween, each wale of said bands including at least one tuck stitch extending across at least three courses and formed from one of said yarns of said courses the other yarn thereof floating therebehind and at least three courses of plain stitches formed of both yarns, the tuck stitches in each wale lying opposite the plain stitches of adjacent wales, and a relatively dispersed pattern of tuck stitches in the area between said bands.

6. In a circularly knit stocking fabric including a leg, foot and toe portions primarily of single filament thickness, a seam extending transversely of said fabric beneath

the foot portion of the stocking, wales of said fabric extending continuously from said seam around the toe, upper foot and into the leg portion, a section resistant to runs in a direction upwardly of the stocking fabric and extending transversely across the upper portion of the foot between the ends of said seam, said section including two yarns in each course and comprising spaced narrow bands of stitches forming the longitudinal borders of said section and defining an area therebetween, each wale of said bands including at least one tuck stitch extending across three courses and formed from one of the yarns of said courses the other yarn thereof floating therebehind and at least three courses of plain stitches formed of both yarns, said tuck stitches in each wale lying opposite the plain stitches of adjacent wales, and a relatively dispersed pattern of tuck stitches in the area between said bands said last named tuck stitches extending across two courses and being formed of one of the yarns of said courses with the other yarn thereof floating therebehind.

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