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TWO-WAY STRETCH STRAIN ABSORBING BAND WITH ALIGNED RELAXED MESHES

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Fig. 1.

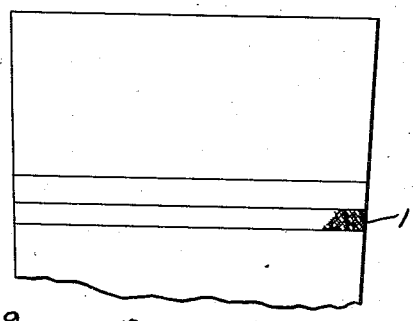
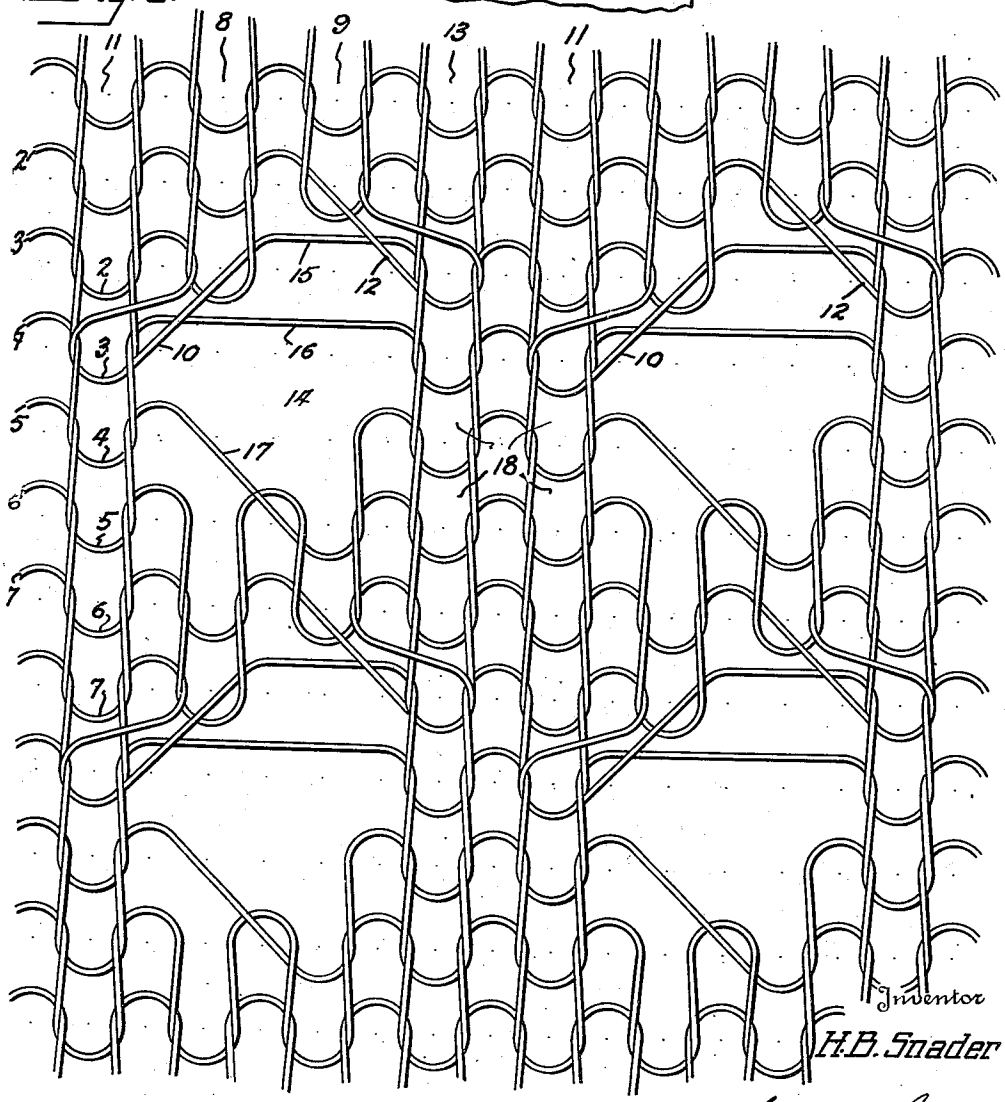


Fig. 2.



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TWO-WAY STRETCH STRAIN ABSORBING BAND WITH ALIGNED RELAXED MESHES

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11 Claims. (Cl. 66—172)

This invention relates to hosiery of that type having an integrally knit two-way stretch band incorporating fine gauge covered rubber elastic yarn, above the knee, the longitudinal stretch component of which makes the band a strain absorber to relieve the knee portion of the stocking from bursting stresses resulting from the bulge of the knee when the leg is flexed.

A band, such as described, to be of effective service as a strain absorber must comprise quite a number of courses and is subject to an inherent tendency to curl, that is, to shape itself into a channel, this being due to the fact that fine gauge rubber yarn cannot be knit without its becoming tensioned, and as the knitting is released from the needles, the rubber yarn contracts, thereby drawing the fabric of the band together, producing the curling.

This concave or dished appearance of the strain absorbing band is a detriment to the sales appeal of the stocking, to obviate which, several remedial expedients have been proposed. One of these is to break the width continuity of the elastic fabric into a plurality of very narrow bands of the fine gauge covered rubber elastic yarn, alternating with narrow bands of the basic inelastic yarn of the stocking. Another is to cross the band with a widthwise series of stiffening ribs.

The present invention has for its object the provision of means to prevent objectionable curling of the strain absorbing band, not by breaking it down into a plurality of separated narrow bands, not by providing transverse stiffening ribs, but by the employment of a pattern of knitting which provides sufficient fullness distributed through the band, to allow for the full contraction of the elastic yarn without its drawing the elastic band together.

Another object of the invention is to divide the strain absorbing band into alternate groups of courses of fine gauge covered elastic rubber loops, and groups of courses of inelastic groups, the fabric of the band being knit so as to provide circumferential series of meshes in which the elastic yarn appears in the form of loose drop stitches, the locking means for which are formed by loops transferred to the right and to the left, respectively, in the silk yarn and the meshes being closed by a loose loop or bar of the elastic yarn resulting from one of the drop stitches. The transferred lock stitches are inelastic, and therefore, do not draw the fabric together, while the closing loop although elastic, is adequately loose and full, being the result of a drop stitch, to permit full contraction of the elastic without drawing the fabric.

A further object of the invention is to arrange the meshes in longitudinal alignment, thereby providing continuous wales between the meshes which act as paths of force transmission for the longitudinal stresses which the strain absorbing band is called upon to absorb, these wales being strengthened by the doubling of loops resulting from their acquisition of the loops transferred in the formation of the meshes, and the increased resistance to stretch which would normally attend the strengthening of the wales, being nullified by interspersing the wales with relaxed nuclei of elasticity in the form of clusters of loops of fine gauge covered rubber elastic yarn in a state of complete relaxation or repose resulting from the fact that they are derived from the contiguous drop stitches in the coursewise adjacent meshes on both sides of the row of continuous wales.

Other objects of the invention will appear as the following description of a preferred and practical embodiment of the invention proceeds.

In the drawing which accompanies and forms a part of the following specification:

Figure 1 is a view in elevation, of the upper part of the stocking showing a strain absorbing band incorporating the features of the present invention, and

Figure 2 is a diagrammatic layout of the knitting pattern.

Referring now in detail to the several figures, the strain absorbing band, which is designated by the reference character 1, occupies the position above the knee portion of the stocking and preferably at some little distance from the top edge of the stocking, and extends circumferentially thereabout. The strain absorbing band is integrally knit with respect to the adjacent portions of the stocking, both above and below, and in the present embodiment of the invention it is composed of a plurality of groups of alternating courses composed, respectively, of fine gauge covered rubber elastic yarn and the fine gauge basic yarn of the stocking. As shown, each group consists of two courses. In Figure 2 the courses 2 and 3 are the final courses of silk or other inelastic yarn in that portion of the stocking above the strain absorbing band. Then come the two courses 4 and 5, which are composed of fine gauge covered rubber yarn. These are followed by the courses 6 and 7 which are of inelastic

yarn, and this order is repeated throughout the strain absorbing zone.

It is to be understood from what has been said in the prefatory paragraphs of this specification that the fine gauge covered rubber yarn cannot be knit without its being tensioned. This is due to the fact that the fine gauge elastic yarn is so readily stretchable that in a full fashion machine the length of the elastic yarn laid in front of the needles is stretched by the action of the sinkers which push it between the needles. When the loops are shed by the needles they are free to contract towards a state of repose, and this draws in the fabric of the strain absorbing band, producing the objectionable phenomenon known as "curling."

The present invention seeks to distribute over the entire strain absorbing band a system of small areas of fullness which will permit the elastic yarn to relax down to a state of repose without distorting the adjacent fabric. These areas in the present invention take the form of meshes arranged in circumferential series in the several groups of courses and in rows walewise and the peculiar manner in which these meshes are formed creates th fullness which permits complete relaxation of th fabric without distortion, and therefore, without curling.

The principle which underlies the formation of these meshes is that of the drop stitch, certain stitches being dropped, releasing loops both of the elastic and inelastic yarn, and thereby creating the fullness which allows for the complete relaxation of the fabric.

Referring to Figure 2, it will be observed that the meshes are created by the obliteration of the adjacent walls 8 and 9 in the areas of said meshes, and that this obliteration is brought about by the dropping of a stitch in the last-knit course 5 of the elastic yarn in the group in the wale 8, and the dropping of the stitch in the first-knit course of elastic yarn 4, in the wale 9. Thus, the dropped stitches are staggered longitudinally in the two wales by the distance of one course. The runs created by the dropping of said stitches are stopped or locked by the transfer of a loop 10 in the last-knit course 3 of inelastic yarn in the preceding group of basic loops from the wale 8 leftward to the wale 11, and the transfer of a loop 12 in the next to last course 2 of inelastic yarn in the said preceding group from the wale 9, rightward to the wale 13. Thus, the locking loops are staggered longitudinally in the respective wales by the distance of one course, in longitudinal directions corresponding to the displacement of the drop stitches, making the runs created by the drop stitches equal in length.

It is, of course, understood that the dropping of a stitch causes the loop of said stitch to resolve itself into a straight bar having fullness acquired from the dissolution of the loop, and that all loops in the wale of the drop stitch up to the locking loop, whether elastic or inelastic, are likewise resolved into straight bars with consequent fullness. Thus in all the meshes, of which the mesh 14 is an example, we have the top of the mesh bounded by the oppositely transferred loops 10 and 12, which being inherently inelastic are in a state of relaxation and repose, these being tied together by the straight full bar 15 of inelastic yarn which bridges the wale 9. The sides of the mesh are bridged by the straight bar 16 of elastic yarn which possesses double fullness in view of the fact that it bridges both wales, and therefore, the sides of the mesh are in a complete state of relaxation. At its lower end the mesh is closed by the straight bar 17 of elastic yarn, and which is full in view of the fact that it bridges the wale 8.

Thus, the structure of the knitting which bounds the meshes is such as to permit the fabric between the meshes to freely contract down to a position of repose without distorting the fabric, and therefore, without producing curling.

It will be observed that the meshes are arranged in walewise rows with two continuous wales 11 and 13 therebetween, in which wales the groups of elastic and inelastic courses occur in alternation.

These continuous wales bear the brunt of the pull to which the strain absorbing band is subjected through flexions of the knee. It is therefore advantageous that the inelastic sections of these wales constituted by the loops of basis inelastic yarn be strengthened, and this reinforcement is accomplished through the transfer to the inelastic sections of these wales of the loops 10 and 12 which lock the meshes.

The transferred loops are staggered in the wales so that, considering both wales as constituting the path of stress transmission, there is a reinforcement in each inelastic course in said path.

Such thickening of the wales as would normally attend this doubling of loops would give a transverse rib effect to the fabric of the strain absorbing band, which is contrary to the purpose of invention. Therefore, the wales are broken between the courses having the doubled loops, by the cluster 18 of loops of elastic yarn, which are in fully relaxed condition, through fullness derived from the yarn of the coursewise adjacent drop stitches of the meshes on both sides.

The structure as described is such as to give the fabric in the strain absorbing zone the appearance of being composed of walewise rows of French knots, the fabric being without any stiffening bias in either direction, and entirely free from any tendency to curl.

While I have in the above description disclosed what I believe to be a preferred and practical embodiment of the invention, it will be understood to those skilled in the art that the principles of the invention may be exemplified in other patterns of knitting than those specifically described.

What I claim as my invention is:

1. In a knit stocking of the strain absorber type, a strain absorbing band integrally knit in the stocking above the knee, the fabric of said band including alternate groups of courses consisting respectively of a plurality of courses of fine gauge covered rubber yarn and a plurality of courses of fine gauge inelastic yarn, said fabric being formed with circumferential series of meshes, the meshes of successive courses being aligned in walewise rows with continuous wales between said rows, each mesh being formed by drop stitches in the courses of elastic yarn locked by loops in the wales of said drop stitches, in courses of the precedingly knit inelastic yarn, transferred to loops of inelastic yarn in said continuous wales, the inelastic loops of the continuous wales being strengthened by their doubling with the transferred loops from the meshes, and the elastic loops of said continuous wales having fullness derived from the coursewise adjacent drop stitches, said elastic loops constituting nuclei of elasticity, breaking the stiffness of the strengthened continuous wales.

2. In a knit stocking of the strain absorber

type, a strain absorbing band integrally knit in the stocking above the knee, the fabric of said stocking including alternate groups of courses consisting respectively of a plurality of courses of fine gauge covered rubber yarn and a plurality of courses of fine gauge inelastic yarn, said fabric being formed with circumferential series of meshes, the meshes of successive courses being aligned in walewise rows, with continuous wales between said rows, each mesh being formed by drop stitches in the courses of elastic yarn, locked by loops in the wales of said drop stitches in courses of the precedingly knit inelastic yarn, transferred to loops of inelastic yarn in said continuous wales, said mesh being closed by the interlooping of the last dropped stitch with the succeedingly knit course of inelastic yarn, the inelastic loops of said continuous wales being strengthened by their doubling with the transferred loops from the meshes and the elastic loops of said continuous wales having fullness derived from the coursewise adjacent drop stitches, said elastic loops constituting nuclei of elasticity, breaking the stiffness of the strengthened wales.

3. In a knit stocking of the strain absorber type, a strain absorbing band integrally knit in the stocking above the knee, the fabric of said band including alternate groups of courses consisting respectively of a plurality of courses of fine gauge covered rubber yarn, and a plurality of courses of fine gauge inelastic yarn, said fabric being formed with circumferential series of meshes, the meshes of successive courses being aligned in longitudinal rows with continuous wales between said rows, each mesh being formed by runs in adjacent wales emanating from staggered drop stitches starting respectively in the last and next to last knit courses in a group of elastic courses, said runs being locked by staggered stitches oppositely transferred from said adjacent wales respectively in the last and next to last knit inelastic courses in the precedingly knit inelastic group, said stitches being transferred to loops of inelastic yarn in said continuous wales whereby on the one hand, said meshes are bounded at one end by inherently relaxed transferred loops tied by a full bar of inelastic yarn bridged across one wale, closed at the opposite end by a full bar of elastic yarn bridging the other wale, and having an intermediate bar of elastic yarn of double fullness acquired from both wales, bridging its sides, and on the other hand, the inelastic loops of the continuous wales being strengthened by their doubling with the transferred loops from the meshes, and the inelastic loops of said continuous wales having fullness derived from the coursewise adjacent drop stitches on both sides of said continuous wales, said elastic loops constituting nuclei of elasticity breaking the stiffness of the strengthened wales.

4. A stocking having a plain knit top section, said top section having consecutive courses of regular stitches of inelastic yarn, an immediately following group of courses having stitches transferred in opposite directions, and an immediately following series of courses having a plurality of spaced loops dropped to provide dropped stitches, said immediately following series of courses being knit of elastic yarn at least substantially throughout.

5. In a knit stocking of the strain absorber type, a strain absorbing band integrally knit in the stocking above the knee, the fabric of said band including alternate groups of courses consisting respectively of a plurality of courses of fine gauge covered rubber yarn and a plurality of courses of fine gauge inelastic yarn, said fabric being formed with circumferential series of meshes, each mesh being formed by drop stitches in the courses of elastic yarn locked by transferred loops in the corresponding wales, in courses of precedingly knit inelastic yarn, said mesh being closed by the interlooping of the last dropped stitch with the succeeding course of inelastic yarn.

6. Knit hosiery having a two-way elastic stretch band adjacent the top integrally knit from groups of courses of fine gauge elastic yarn alternating with groups of courses of fine gauge inelastic yarn, said band of such width as to have an inherent tendency to objectionable curling transversely of the band, the elastic fabric in said band being provided with groups of oppositely transferred loops and groups of drop stitches associated therewith, thereby resisting the tendency of the band to curl.

7. A knit fabric having a two-way elastic stretch band adjacent the top integrally knit from groups of courses of fine gauge elastic yarn alternating with groups of courses of fine gauge inelastic yarn, said band of such width as to have an inherent tendency to objectionable curling transversely of the band, the elastic fabric in said band provided with groups of oppositely transferred loops and groups of drop stitches associated therewith, thereby resisting the tendency of the band to curl.

8. A fabric having consecutive courses of regular stitches of inelastic yarn, an immediately following group of courses having stitches transferred in opposite directions, and an immediately following series of courses having a plurality of spaced loops dropped to provide dropped stitches, said immediately following series of courses being knit of elastic yarn at least substantially throughout.

9. A fabric having a strain absorbing band integrally knit therein, the fabric of said band including alternate groups of courses consisting respectively of a plurality of courses of fine gauge covered rubber yarn and a plurality of courses of fine gauge inelastic yarn, said fabric being formed with circumferential series of meshes, each mesh being formed by drop stitches in the courses of elastic yarn locked by transferred loops in the corresponding wales, in courses of precedingly knit inelastic yarn, said mesh being closed by the interlooping of the last dropped stitch with the succeeding course of inelastic yarn.

10. A knitted stocking having incorporated therein above the knee a strain absorbing band consisting of a plurality of groups of courses of elastic yarn alternating with a plurality of groups of courses, of inelastic yarn, each group of elastic yarn consisting of two courses, and each group of inelastic yarn consisting of two courses, the groups of courses of elastic yarn being provided with a plurality of circumferentially spaced series of groups of dropped loops defining dropped stitches and the groups of courses of inelastic yarn being provided with groups of loops transferred in opposite directions located at the terminus of each of said series of dropped stitches.

11. A knitted fabric incorporating a strain absorbing band consisting of a plurality of groups

of courses of elastic yarn alternating with a plurality of groups of courses of inelastic yarn, each group of elastic yarn consisting of two courses, and each group of inelastic yarn consisting of two courses, the groups of courses of elastic yarn being provided with a plurality of circumferentially spaced series of groups of dropped loops defining dropped stitches and the groups of courses of inelastic yarn being provided with groups of loops transferred in opposite directions located at the terminus of each of said series of dropped stitches.

HOWARD B. SNADER