Dec. 31, 1935. R. BEUTER ET AL 2,026,339

KNITTED FABRIC

Filed April 9, 1935

Fig. 1.

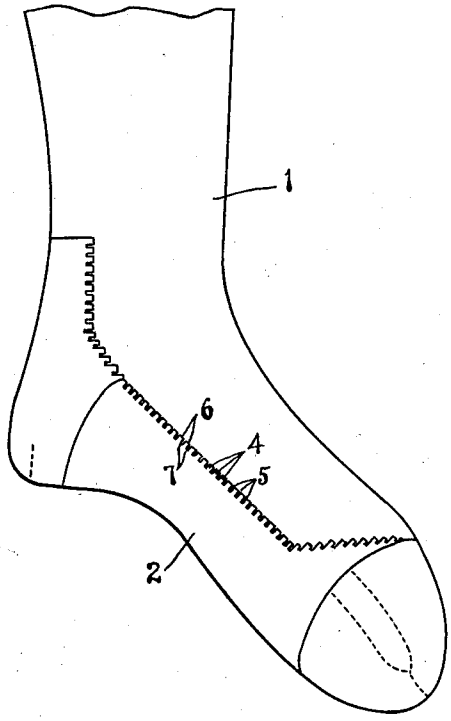
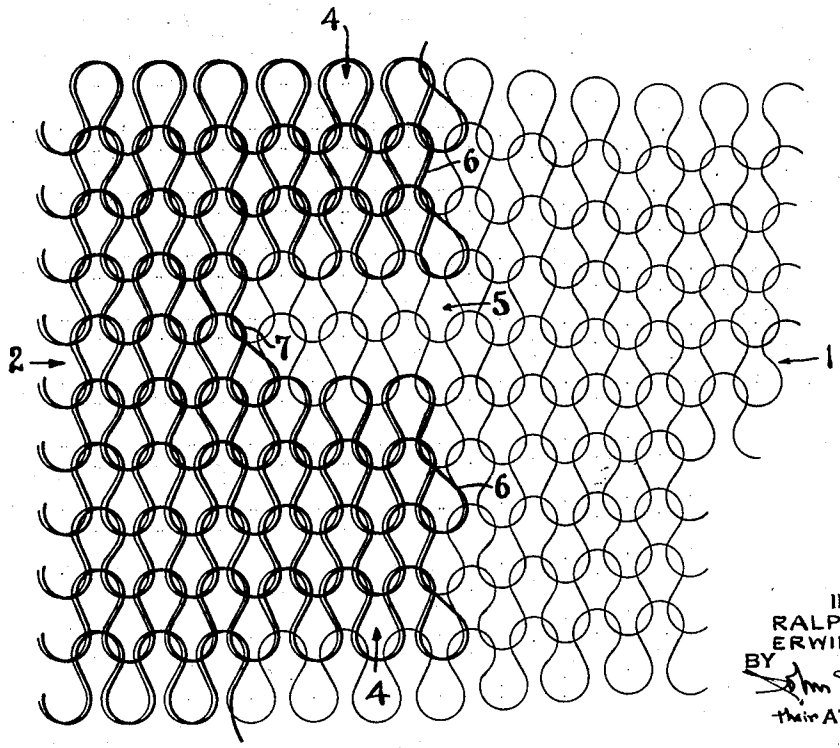


Fig. 2



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Patented Dec. 31, 1935 2,026,339

UNITED STATES PATENT OFFICE

2,026,339

KNITTED FABRIC

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Application April 9, 1935, Serial No. 15,368

4 Claims. (Cl. 66—182)

In the knitting of full fashioned hosiery fabric it is customary to employ either a single yarn throughout or, in any event, a single yarn throughout each course from edge to edge of the fabric and to reenforce or splice the single yarn fabric in the heel, sole and toe portions by incorporating therein additional yarn or yarns of the same or different kinds.

Such splicing gives added weight, strength and durability to the portions mentioned but practically eliminates the elasticity normal to the single yarn fabric, which elasticity is, of course, retained in the unspliced portions. The single yarn of the unspliced portion is, in effect, anchored rigidly at the inner edge of the splicing and since it cannot move, as in the rest of the fabric, it is subjected to excessive stains which frequently cause it to rupture.

This is particularly likely to happen when a stocking is pulled on or off, which is often done carelessly and roughly. Heavy strains are imposed upon the fabric in a direction longitudinal with the foot. The spliced sole and heel resist these strains without stretching, whereas the instep and upper foot portions made of single yarn stretch considerably except where the yarn enters the splice where it cannot stretch. The fabric is badly distorted in consequence and the greatest strain is placed upon the fabric where it is least able to sustain it.

This undesirable condition is acccentuated by the practice of terminating the splicing at its inner edge in a substantially smooth line, either straight or curved. Such a terminal line offers the greatest resistance to stretching and, consequently, the most rigid anchorage to the single yarn courses where they emerge from the splice and concentrates the strain within an extremely narrow area.

Strains at right angles to the edge of the splicing are absorbed to some degree by the ability of the loops of the single yarn portion to expand horizontally but strains paralleling the edge of the splice or somewhat diagonally thereto, which are the strains produced in pulling the stocking on and off and which, as already stated, are likely to be extremely severe, cannot be so absorbed because they occur in a direction substantially parallel to the direction of the loops.

The object of this invention is to substantially eliminate the danger of rupture of the sheer body yarn at the inner edge of the splice through a new construction at this point which provides much greater elasticity, distributes the strain over a much greater area and introduces a considerable amount of flexibility into the inelastic edge of the splice itself, permitting it to move or swing in the direction from which a strain progresses.

The fabric may be produced and the method performed upon a standard flat knitting machine without alteration of or addition to its parts and by a simple alteration in its mode of operation.

While the invention is particularly useful in conection with sheer silk hosiery it will be understood that it is not limited thereto but may be included in any fabric where the conditions which it is designed to remedy are encountered. However, since it is particularly valuable in relation to sheer silk hosiery the accompanying drawing and the following description will be limited thereto.

In the drawing:

Fig. 1 is a diagrammatic illustration of the stocking of this invention having a modified structure at the junction between the heel and sole splicing and the body fabric; and

Fig. 2 is an enlarged fragment of the fabric of Fig. 1 illustrating diagrammatically the loop arrangement adjacent the junction of the splice and the body fabric.

The usual construction of a full fashioned stocking consists of the body fabric, assumed to be made of a single yarn in the usual manner, reenforced or spliced in the heel, sole and toe. The heel and sole splicing terminate at the inner edge in a substantially smooth line.

The contrast in weight of compactness between the body portion and the spliced portions depends, of course, upon the weight of the yarns employed. Practically all present day full fashioned hosiery is extremely sheer and correspondingly fragile, whereas the reenforced portions, particularly the sole, are extremely heavy and often include cotton or other very durable yarns which, while greatly increasing the strength and wearing qualities of those portions, substantially eliminate all elasticity. Since the body portion of the fabric is much lighter and much more elastic it will stretch in any direction from which a strain is applied, with the result that the rigidly anchored extremely fine yarn forming the body portion receives the full effect of the strain along the line where it enters the splice.

This difficulty has been overcome by this invention in the manner illustrated in Fig. 1. The inner edge of the splice, particularly of the heel and sole, instead of terminating in a substantially smooth line, is carried further into the fabric in some courses than in others to form a series

of small inwardly projecting rectangular tongues 4 separated by courses 5 of unreenforced fabric. Each tongue 4 may, for example, be four wales in width and each intervening portion 5 of unspliced fabric may be two courses in width, although these proportions may, of course, be varied as desired.

In this way a serrated construction is produced at the inner edge of the splice, the serrations being joined together by unreenforced fabric of the same weight as that of the body portion.

In ordinary fabric it is customary to make the loops of the spliced portions somewhat longer than those of the unspliced body to provide space for the reenforcing yarns. This is ordinarily done by rocking the needle bar further back during the forming of the loops of the spliced portion of each course than during the formation of the remaining loops of the course, the transition between these two different loop lengths beginning a loop or two on one side and ending a loop or two on the other side of the inner margin of the splice. The mechanism for thus altering the loop length during the formation of a course is well known and does not require description.

If this customary practice were followed in this invention, the transition between long and short loops would, obviously, occur at a varying distance from the edge of the fabric, depending upon whether or not the course being formed were one involving a tongue 4, that is to say, in the courses in which a tongue 4 is found the transition between long and short loops will occur at the extremity 6 of the tongue, whereas in the intervening courses 5 the transition would occur at the point 7. While a very small amount of additional elasticity might be thus provided by the single weight fabric between each tongue 4 the structure would still be undesirably rigid because the loops of these intervening portions 4 would be small, i. e. of the same size as those of the body portion in general and the strain upon the single thread fabric where it enters the splice would not be appreciably decreased or more widely distributed.

In this invention the loops of which the portions 5 of the single yarn fabric between the tongue 4 are formed are of the same length as those of the same wales of the reenforced tongues 4. That is to say, they are long as compared with the loops of the body portion 1 in general. The transition from these long loops to the short loops of the body portion occurs, in the single yarn portions 5, in the same wales as it occurs in the reenforced tongues 4, that is to say, along the general line formed by the extremities of tongues 4. Therefore, between adjacent tongues 4 is a small section 5 of single yarn fabric composed of long loops. This construction is clearly shown in Fig. 2.

Each of these sections 5 is even more elastic and flexible than the sheer body portion 1 because the loops are longer and the yarn of which they are composed is able to slip upon itself more readily. As a result inherently inelastic tongues 4 which are connected by this elastic fabric derive a considerable flexibility since they are able to swing up or down, as the case may be.

The sheer body fabric of small loops is therefore connected to the spliced portions by a structure which is elastic or flexible throughout. Any strains upon those courses which enter tongues 4 will be eased by the flexing of the tongues and transmitted in part to adjacent elastic portions 5 and thence to other tongues 4. Similarly, any strains imposed upon the courses which include elastic portion 5 will be transmitted in part to adjacent tongues 4, intermediate portions 5, and so on. Thus the strain upon each wale or course instead of being largely concentrated at a single point on the margin of the rigid splice is distributed throughout an elastic area of several courses and several wales before it is finally absorbed in the rigid main portion 2 of the splice.

The distribution of strain substantially eliminates the danger of rupture adjacent the margin of the splice and incidentally improves the fit of the stocking by eliminating the abrupt transition from elastic sheer fabric to the inelastic splice, and providing an area able to adjust itself to the varying strains and conditions of service.

What we claim is:

1. A knitted fabric having an unreenforced area and a reenforced area the loops of which are longer than the loops of the unreenforced area lying beyond it and which terminates adjacent said unreenforced area in spaced tongues connected by unreenforced fabric composed of loops of the same length as those of the corresponding wales of adjacent tongues.

2. A knitted stocking blank having an unreenforced area and a reenforced high heel and sole composed of loops which are longer than the loops of the unreenforced area lying beyond them, the inner edges of said heel and sole reenforcement being provided with spaced tongues connected by unreenforced fabric composed of loops of the same length as those of the corresponding wales of adjacent tongues.

3. A knitted stocking blank having an unreenforced area and a reenforced high heel composed of loops which are longer than the loops of the unreenforced area lying beyond it, the inner edges of said heel reenforcement being provided with spaced tongues connected by unreenforced fabric composed of loops of the same length as those of the corresponding wales of adjacent tongues.

4. A knitted stocking blank having an unreenforced area and a reenforced sole composed of loops which are longer than the loops of the unreenforced area lying beyond it, the inner edges of said sole reenforcement being provided with spaced tongues connected by unreenforced fabric composed of loops of the same length as those of the corresponding wales of adjacent tongues.

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