Oct. 3, 1933. H. B. SNADER 1,929,006

HOSIERY WITH ELASTIC STRAIN ABSORBER

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Fig. 1.

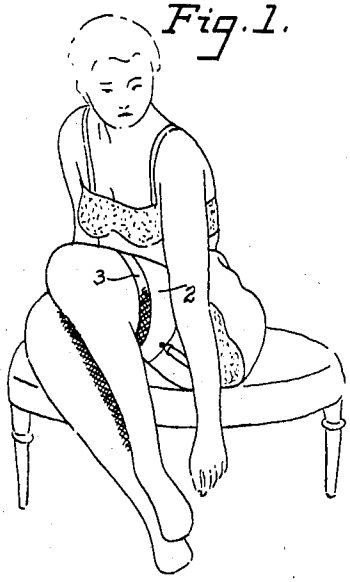


Fig. 2.

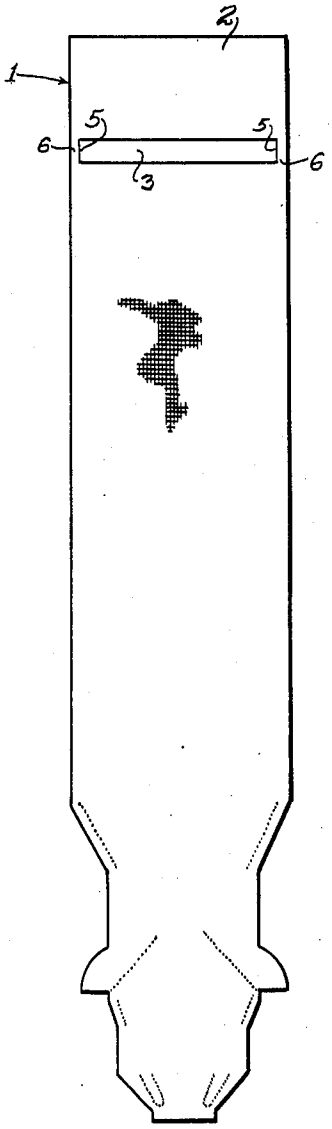
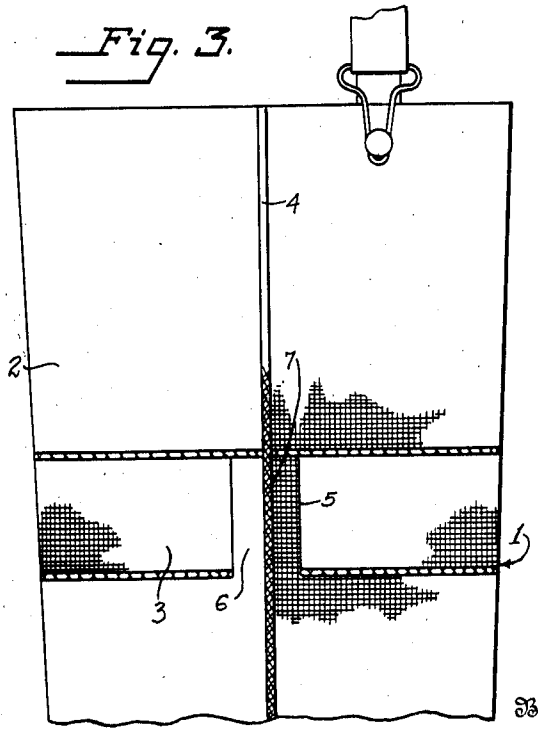


Fig. 3.



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Fig. 4.

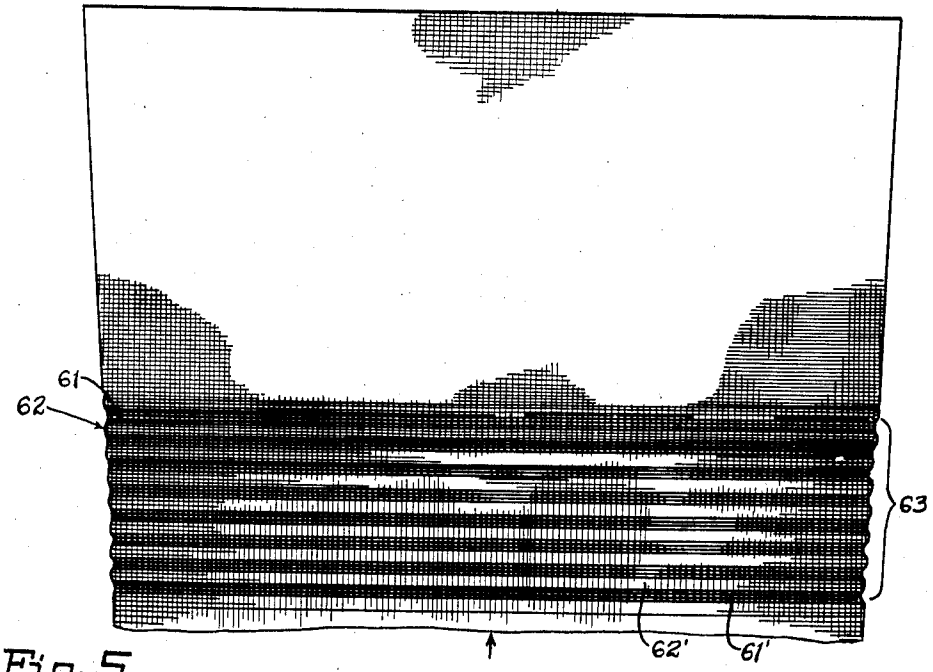
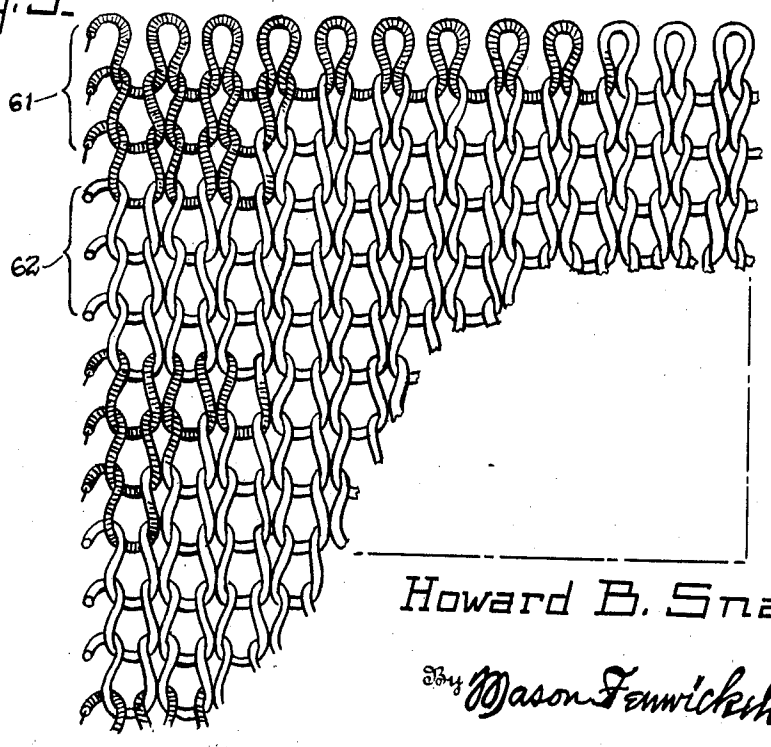


Fig. 5.



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UNITED STATES PATENT OFFICE

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HOSIERY WITH ELASTIC STRAIN ABSORBER

Howard B. Snader, Reading, Pa., assignor to Vanity Fair Silk Mills, Reading, Pa., a corporation of Pennsylvania

Application July 10, 1933. Serial No. 679,805

2 Claims. (Cl. 66—172)

This invention relates to hosiery and has the same general object as that expressed in my pending application, Serial No. 666,585, of which the present application is a continuation-in-part, namely, the provision in knit hosiery of a circumferential zone of greater elasticity than the basic fabric designed to function as a strain absorber to prevent garter runners and to give lengthwise stretch of the stocking at the knee when the knee is bent.

Another object of the invention and which is peculiar to the present continuing application is to provide the strain absorbing zone in the form of a plurality of narrow bands of knit latex thread alternating with narrow bands of the knit basic fabric of the stocking, whereby certain advantages are obtained which will be disclosed as the following description of a preferred and practical embodiment of the invention proceeds.

In the drawings which accompany and form a part of the following specification, and throughout the several figures of which the same characters of reference have been employed to denote identical parts:

Figure 1 is a perspective view of a stocking embodying the features of the present invention, displayed on a form;

Figure 2 is a blank for a full fashioned stocking illustrating the invention;

Figure 3 is the upper portion of the leg of a completed stocking in which the invention is exemplified;

Figure 4 is a front view of the upper portion of the leg of a completed stocking showing a modified form of strain absorbing zone; and

Figure 5 is a view on a magnified scale illustrating an elemental manner in which the strain absorbing zone may be knit.

Referring now in detail to the several figures and first adverting to the group of Figures 1 to 3 which illustrate the improved stocking, the numeral 1 represents in general the flat blank for a full fashioned stocking which is knit from some usual basic fiber of comparatively slight elasticity such for example as rayon or silk. Just below the welt 2, a zone 3 is integrally knitted from a thread of superior elasticity such for example as covered latex rubber. In order to avoid bulkiness in the seam in the elastic zone when the edges of the blank are brought together as indicated at 4 in Figure 3, which would be occasioned by the incorporating of the rubber thread portion in the seam, it is preferred, although not necessarily mandatory for the purpose of the invention to terminate the integrally knit elastic portion at a distance from the lateral edges of the blank as indicated at 5 in Figure 2, leaving relatively narrow bands 6 of the integrally knit basic fabric adjacent the ends of the elastic zone and portions of which bands are incorporated in the seam as shown at 7 in Figure 3, so that the seam is homogeneous in all respects throughout its entire length.

The zone of knit covered latex rubber is extremely stretchable both circumferentially and longitudinally so that strains originating in the welt from the pull of the garter are absorbed by the elastic zone, and distributed laterally so that the fabric beneath the elastic zone is relieved from said strains and runners will not be incited.

Furthermore, the stretching of the front of the stocking when the knee is bent will be transmitted to the fabric of said elastic zone, relieving the basic fabric in the region of the knee from excessive strain and preventing runners from this cause.

The manufacture of a full fashioned stocking embodying the improvements of the present invention requires only slight modification in the structure of the ordinary knitting machine. A supply of covered latex thread must be provided at each knitting station with means for feeding it to the needles of the needle bar and for stopping the feed of elastic rubber at each end of the elastic zone. Moreover, the almost unlimited co-efficient of stretchability of the covered elastic thread presents peculiar problems in its adaptation to the knitting machine; it must be supplied at a uniform rate and uniform tension which requires that it be not unreeled from the spool by its own tension, but must be positively paid off.

Furthermore, the elastic nature of the covered rubber thread necessitates that greater knock-over be provided than in the case of the basic fabric so that the elastic thread may be drawn through the old loop, and the old loop thrown off to take its place in the fabric. This requires a quick adjustment of the motion of the needle bar at the moment of substituting the elastic rubber thread for the basic thread and when making the reverse substitution.

Referring now to Figures 10 and 11, a modified form of the stocking is shown in which instead of the strain absorbing zone being in the form of a single solid and relatively wide band of the knit rubber covered latex thread, it is formed as a plurality of quite narrow bands 61 of the knit latex thread alternating with narrow bands

62 of the base fabric of the stocking. The alternating bands of relatively elastic and relatively inelastic knitting are repeated a number of times until the desired width of the strain absorbing zone 63 is built up. This construction has the advantage of more widely distributing the stress circumferentially, than in the form of the invention shown in the first group of figures.

For example, should a strain originate at the point indicated by the arrow in Figure 10, due to sudden flexing of the knee, the lowermost elastic band 61' being relatively weak in resistance, will stretch a moment before the stretching can be communicated to the elastic band immediately above it. It is of course characteristic of knit fabric, as may be well appreciated by a glance at Fig. 11, that a vertical stretching of the loops draws the subjacent loops together sidewise, so that when the lowermost narrow band 61' is stretched in the manner stated, the loops which join it to the relatively inelastic band 62' will tend to pull together laterally, communicating stress to the loops of the inelastic band 62' over quite a wide range, and these loops in turn will communicate the stress to a wide area of the loops of the elastic band next above and so on throughout the width of the strain absorbing zone. Thus, not only will the shock of the strain begin immediately to be absorbed by a localized portion of the strain absorbing zone, but there will be a wider distribution of the stress by reason of the alternating arrangement of the relatively elastic and relatively inelastic bands.

Another advantage of the alternating band construction, is that better ventilation is secured through the interposition of the narrow bands of basic material, since the latter bands are lighter and more porous and more absorptive than the bands of relatively thicker covered rubber thread. It has been discovered that the wide band of elastic knitting as described in connection with Figures 1, 2 and 3 has a tendency to curl widthwise so that the stocking will not lie flat either in unworn condition or when on the leg. The breaking up of this elastic area into narrow bands alternating with the relatively inelastic material of the stocking counteracts this tendency to curling so that the stocking in the strain absorbing zone lies flat.

The elastic threads being in a comparative state of repose in the unworn stocking and being somewhat stretched by the contour of the leg, may have a garter effect in the case of a leg of stout proportions, and even where the stocking does not fit tight enough to permit the strain absorbing zone to function as a garter, nevertheless, the elastic clings to the leg with sufficient closeness to hold the upper portion of the stocking against angular displacement, so that the seam at the back of the stocking will always remain straight. In both those instances in which the strain absorbing zone acts as a garter and where it merely acts with sufficient grip to hold the seam in place, the formation of the strain absorbing zone in a plurality of narrow elastic bands alternating with relatively inelastic bands, produces a corrugated construction in which the ribs slightly interdigitate with the surface of the leg, contributing to the grip to such extent that the strain absorbing zone need not be circumferentially tensioned to any considerable extent in order to perform its function either as a hose support or merely to hold the seam in rectilinear position.

While I have in the above disclosure described what I believe to be preferred and practical improvements in knitting machines and in the knitted product for which the improvements are particularly designed, it is to be understood that the specific details of construction as shown and described are merely by way of example and not to be construed as limiting the scope of the invention as claimed.

What I claim is:

1. Stocking having a strain absorbing zone below the welt and above the knee, the adjacent portion of the welt and the adjacent portion of the leg of the stocking down to a point at least below the knee being knit from relatively inelastic yarn, said strain absorbing zone being integrally knit with the said adjacent portions and comprising a plurality of narrow bands constituted alternately by courses of covered elastic rubber thread and courses of relatively inelastic yarn, whereby the stress created by pressure of the knee when flexed, against the relatively inelastic fabric, is referred to the said strain absorbing zone without substantially stretching the fabric in the region contacted by the knee.

2. Stocking having a strain absorbing zone below the welt and above the knee, the adjacent portion of the welt and the adjacent portion of the leg of the stocking down to a point at least below the knee being knit from relatively inelastic yarn, said strain absorbing zone being integrally knit with the said adjacent portions and comprising a plurality of narrow bands constituted alternately by courses of covered elastic rubber thread of a gage approximating that of the relatively inelastic yarn, and courses of relatively inelastic yarn, whereby the stress created by pressure of the knee when flexed, against the relatively inelastic fabric, is referred to the said strain absorbing zone without substantially stretching the fabric in the region contacted by the knee.

HOWARD B. SNADER.