

March 7, 1939.

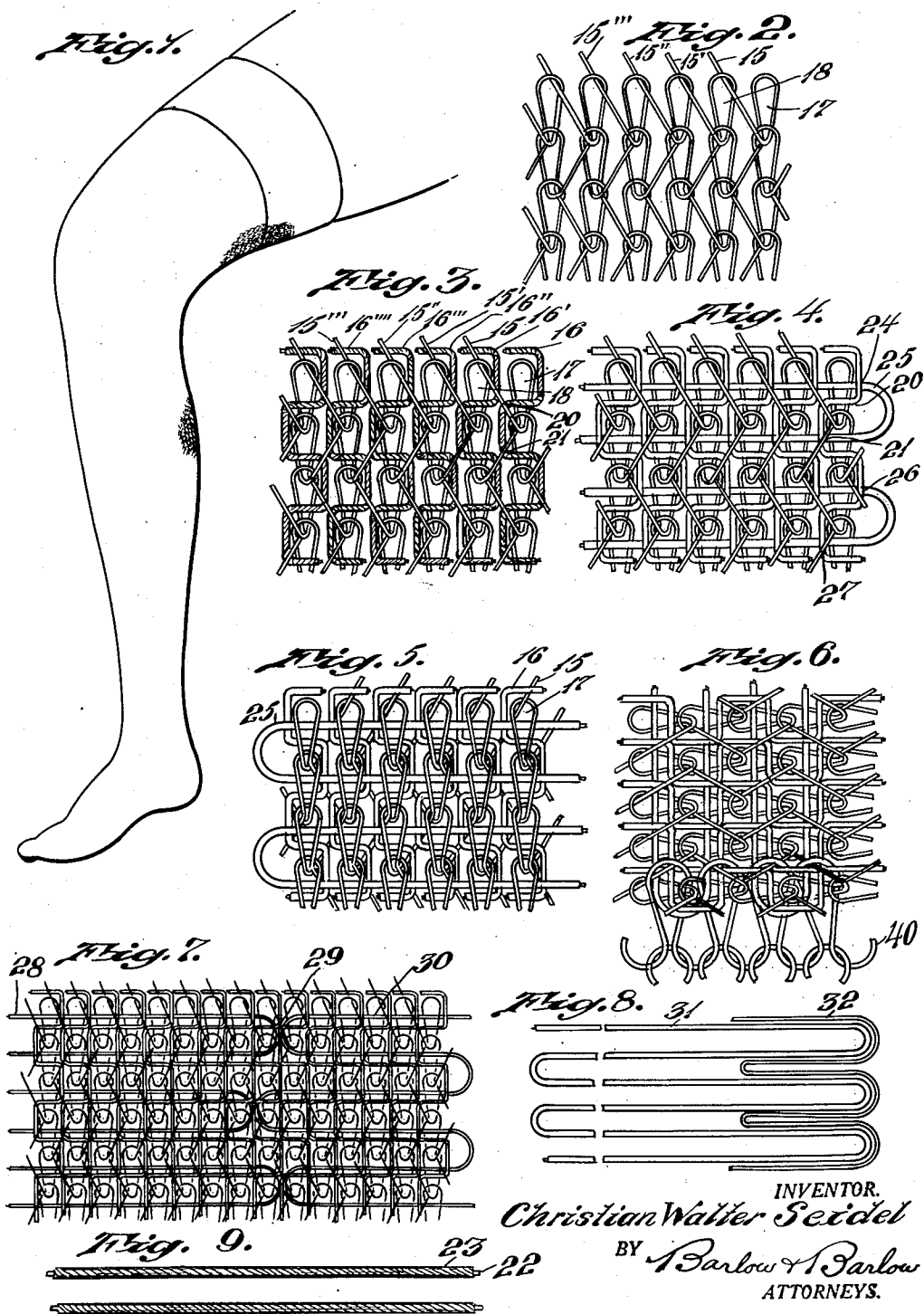
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2,150,133

ELASTIC WELT FOR STOCKINGS

Filed May 21, 1938

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Fig. 10.

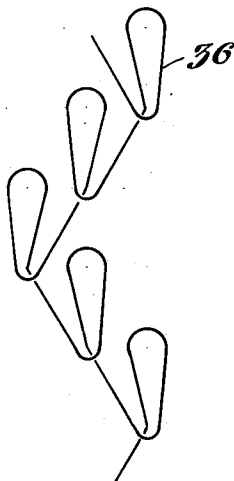


Fig. 11.

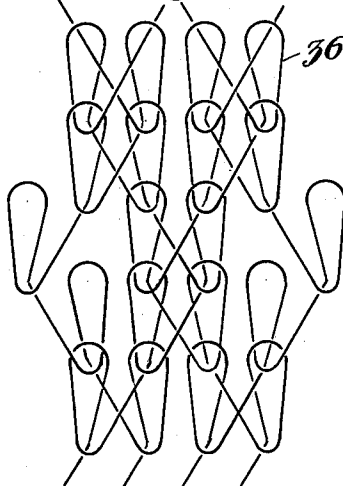
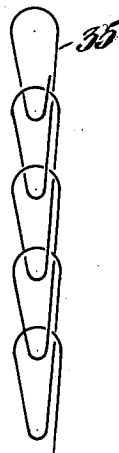
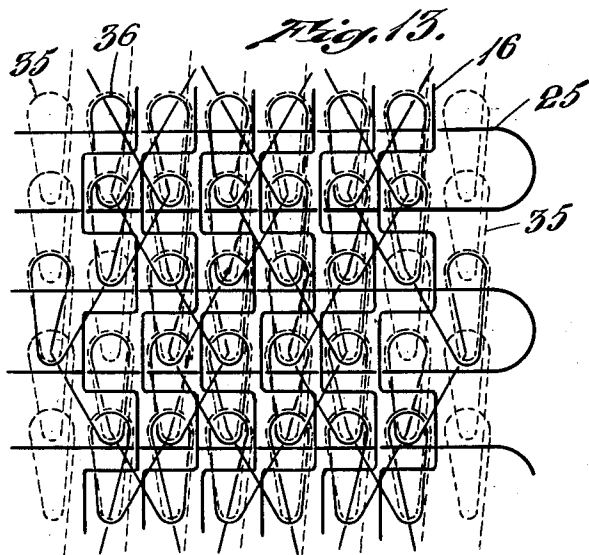


Fig. 12.



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ELASTIC WELT FOR STOCKINGS

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3 Claims. (Cl. 66—172)

This invention relates to a stocking, and more particularly to the welt at the upper end thereof; and has for one of its objects the provision of a welt which will stretch both longitudinally and circularly of the stocking, and will also keep the stocking tight and smooth along the leg.

Another object of the invention is to provide a welt of a light weight through which a garter or hose supporter will exert its pull, the welt being of such a construction and character that it will absorb strains instead of transmitting such strains to the leg portion of the stocking, and thus will assist in preventing runs in the stocking.

Another object of the invention is to provide a fabric welt having elastic yarns which are so bound that should the elastic yarns be severed or punctured they will not slide through the fabric but will be bound on either side of the rupture so that the structure in the fabric will remain substantially intact except at the localized point of severing.

Another object of the invention is the utilization of a fabric structure which will permit light weight yarns to be used that a welt comparable to the sheer stockings formed of silk or the like may be had and yet one which is sufficiently strong to resist tearing by pull of a garter.

Another object of the invention is to provide elastic yarns extending longitudinally of the stocking as well as circularly so as to assist in returning from any distortion to normal position by reason of a longitudinal pull on the stocking.

Another object of the invention is to provide a welt containing elastic yarns in which no runs will occur in the welt itself by reason of the fabric structure.

Another object of the invention is to provide a welt in which no special construction of topping edge need be provided for the reception of the knitting needles for knitting a stocking thereto.

Another object of the invention is to provide an elastic fabric which although it is extendible in one direction will not cause at the time of such extension a contraction in the other direction and thus one in which the openings of the fabric will be enlarged in one direction when stretched in such direction and the openings will not be caused to close in the right angular direction, and thus the fabric may be easily topped upon knitting needles for the knitting of a stocking to the welt.

Another object of the invention is to provide a structure which may be made largely of non-elastic yarns with the utilization of elastic yarns in position where they may be minimized as to weight and yet exert a strong and considerable

contractive force and a structure in which the restriction of the rubber may be nicely controlled.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is a perspective view of a full length stocking with my welt at the top thereof;

Figs. 2, 3, 4, 5, 6 and 7 are diagrammatic views showing a section of the welt of the stocking on a large scale to illustrate the path of travel of the various yarns in the welt;

Fig. 8 is a diagrammatic view of the filling or welt threads alone of the structure of Fig. 7;

Fig. 9 is an elevation of two strands of yarn having a rubber core therein;

Fig. 10 is a diagrammatic view illustrating the path assumed by one of the yarns in a modified form of structure from that shown previously;

Fig. 11 shows the structure of a fabric having a plurality of yarns as shown in Fig. 10 joined in a fabric;

Fig. 12 is a diagrammatic view illustrating the formation of a different yarn stitch;

Fig. 13 is a diagrammatic view illustrating the composite structure of Figs. 11 and 12 with lay-in warps and lay-in filling threads also positioned in such fabric.

Full length stockings formed of silk or other material are usually provided with a so-called welt at their top formed either by doubling back a portion of the knit silk of the stocking on itself or by increasing the weight of the thread so as to provide a heavier welt at the top of the stocking to be engaged by the garters or other hose supporters to better resist the strains at this point. This weight increase requires considerable manipulation of the machine on which this thickened welt is provided or even a changing of the stocking from one machine to another, and the use of a comparatively large amount of material, which, if the stockings are formed of silk, is expensive. This portion of the stocking is not exposed to view and with my improved welt the double weight is unnecessary.

Further, when such a doubled or heavier silk welt is utilized, any strains which exist in the welt are transmitted to the leg portion of the stocking and runs which start in the welt are transmitted to the leg portion; and in order to overcome these difficulties, I have provided a welt having elastic yarns, such as rubber core yarns, which will provide a fabric to be extendible as I may desire. The fabric structure which I have

found most suitable for this welt is a warp knit structure preferably with lay-in warps and/or lay-in fillings. Some of the yarns may be rubber but just which ones may be rubber and which non-elastic yarns would depend upon varying desirabilities which are to be accomplished. The structure which I preferably choose is one which will not permit runs to occur even though there be a break in some of the yarns and yet one which will absorb strains applied longitudinally of the leg portion. By reason of the particular structure which I provide the fabric may be made thin and yet very strong so as not to break by poking the finger or the like into it, and further, I provide that should one of the yarns break no run will occur but rather the set of threads seems to be knotted in such a way that the effect of a knot being tied into or onto the severed end is effected; and the following is a more detailed description of the present embodiment of this invention, illustrating the preferred means by which these advantageous results may be accomplished:

The fabric which I provide and term a warp knitted fabric can perhaps best be visualized when stated that it is a fabric made upon such machines as a Kay loom, Raschel knitting machine, Jacquard Raschel knitting machine, Kitten Raschel knitting machine, Tricot knitting machine, or Tisch machine, in which machine there are a plurality of needles and a warp yarn for each needle, which is distinct from the circular or flat knitting machine such as are usual for the knitting of stockings in which all of the needles do not work at the same time and a yarn carrier guides the single yarn to the needles.

The fabric which I provide is formulated in the desired width which it is to have in the welt of the stocking in extended lengths and is then cut off in the length which is required for the encircling of the leg. Thus, the length of the material or the, warwise direction of the material extends circularly about the leg and the welt or filling threads when such occur will extend longitudinally or up and down the leg.

In Fig. 2 I have shown a simple or basic formation of a warp knit fabric. In this simple form only warp threads 15, 15', 15'' and 15''' are shown and the guide bars of the machine are so shifted that one loop ties in with the next line of loops to the left, the guide bars shifting from left to right or back and forth one needle. This illustrates the basic formation of the warp knit loop stitch which is provided in a welt of the character herein specified, and while this simple form of stitch might be utilized alone for the welt by using rubber warp threads 15, 15', 15'', 15''', greater advantages may be had by other structures which are hereinafter illustrated.

In Fig. 3 I have illustrated in addition to the warp yarns 15, 15', 15'', etc., lay-in warp yarns 16, 16', 16'', 16''', 16'''' and so forth, which yarns instead of being looped and thus locked together are placed in a different guide bar in the machine and are disposed in a sinuous path back and forth across a line of locking loops, and as the yarns from one line of loops 17 are disposed to the next line of loops 18 the loop warp yarn 15 will bind in the lay-in warp yarn as at 20, 21, and where the fabric is so constructed I will make the lay-in warp yarns 16 of elastic yarn such as provided with a rubber core 22 and covering 23, see Fig. 9, while the loop warps which form the ground-work of the fabric will be non-elastic yarns. In this way a minimum amount of rubber is used and yet maximum contractive

force and extendibility is provided. Also, by this formation of structure although the maximum extendibility will be warp-wise or in the general direction of the sinuous path of the rubbers 16, there will also be permitted an extendibility and contraction of the fabric at right angles to this general warp-wise direction whereby a fabric formed in accordance with the showing in Fig. 3 may be utilized as a welt for a stocking.

In Fig. 4 I have shown the same structure of yarns as illustrated in Fig. 3, but have added to the structure of Fig. 3 a weft or filling yarn 25. This weft or filling yarn is laid-in always on the same side of the lay-in warp yarn 16 and is bound in by the ground loop warp yarns in the same manner that the lay-in warp yarn is bound in, namely, at such points of crossing as 20 and 21 and is also bound in additionally by the warp yarns 16 at such points as 26 and 27. In the structure shown in Fig. 4 the ground loop warps 15 will be non-elastic while the lay-in warps 16 will be elastic or rubber core yarn, as will also the filling or weft yarns 25 be elastic or rubber core yarns. By the structure shown in Fig. 4 I provide a much greater extendibility and contractibility weft-wise of the fabric than the structure shown in Fig. 3, as the rubber yarns 25 serve this purpose of contraction to draw the fabric closer together in this direction. Fig. 5 is the same structure as Fig. 4 looking at the opposite side of the fabric to better show the binding relationship of the ground warps with the lay-in warps and filling yarn.

In some cases instead of carrying the wefts 25 the entire distance across the fabric it may be desirable, as shown in Fig. 7, to stop the wefts 28 at a point 29 part way across the fabric and then returned, while other wefts 30 may be positioned from the opposite edge the remaining extent of the width of the fabric. In such an arrangement the wefts 28 would be rubber while the wefts 30 would be non-elastic material and would be positioned at the upper edge of the welt where the garter would be attached, it being unnecessary that there be a stretch at the location where the garter is attached. The arrangement may be such that the points of meeting of such yarns 28 and 30 as at 29 are staggered as clearly apparent from Fig. 7.

In other instances, as shown in Fig. 8, the filling yarns 31 may extend entirely across the fabric and the non-elastic filling yarns 32 may extend but part way across the fabric, as shown in this Fig. 8. The placing of the non-elastic filling yarns 32 in the relation shown in Fig. 8 will crowd the yarns into the fabric and limit the extendibility weft-wise by reason of the non-elastic yarns 32 so that there will be no such extendibility along this edge of the welt. It will be understood that a structure in which Fig. 8 will be incorporated will be, so far as the warp yarns are concerned, like Fig. 7.

The above described structures of fabrics are of a more simple form in order that the general arrangement of yarns may be more readily understood. In order, however, to more securely lock the yarns against shifting or raveling instead of shifting the guides from one row of loops or needles to the next adjacent row and then return, I will provide that the guides be shifted in two stages in the same direction and then returned in two stages in the opposite direction, as illustrated in Fig. 10, with also a reversal of direction of looping, and when a fabric is so formed with such a stitch, as shown in Fig. 11, a greater interlock-

ing and binding relation is provided, and should a yarn break, there is less likelihood of its contracting back through the fabric. Also, by the use of a still additional guide bar I form a stitch which will further lock by being in the same vertical line of loops, as illustrated in Fig. 12, and by utilizing a yarn with this stitch in the fabric along with the stitch of Fig. 11 and forming the fabric structure of Fig. 13, I provide a fabric which will be non-shifting and non-raveling even though severed at any part, the stitches 35 of Fig. 12 being shown in dotted lines in Fig. 13, while the stitches 36, as shown in Figs. 10 and 11 are utilized and interlocked therewith. I have also provided in this structure of Fig. 13 the lay-in warps 16 and the filling yarns 25 which by reason of the interlocking of the loops causes these yarns 16 and 25 to be additionally interlocked in their relationship in the fabric and prevents any shifting or any runs while forming a very strong fabric. The ground warp loops 35 and 36 or the loop yarns are of non-elastic material and therefore are not bulky. The elastic material of the lay-in warps 16 or the filling 25 are of a minimum amount and yet in directions so that the maximum extensibility and contractibility is had for the weight and thickness of the fabric provided.

By reason of the fabric constructed as above, pulling on the fabric warp-wise will not cause the fabric to get narrower weft-wise and all of the openings through the fabric will remain in their enlarged condition lengthwise without narrowing weft-wise so that the fabric may be easily topped upon knitting needles in any line of openings in the welt. I have illustrated the regular knit stitch as at 40 in Fig. 6 as formed onto the fabric of Figs. 4 and 5 illustrating one line of openings back of a lay-in warp through which the knitting needles may be projected for commencement of the knitting operation. It will be noted that the fabric of Fig. 6 is shown as turned through 90° with reference to the showing of this same fabric in Figs. 4 and 5. By reason of the formation such as above illustrated, no runs can occur in the welt nor will any strain applied to the welt as by a garter be transmitted to the regular knit portion of the stocking, but will rather be absorbed. A very thin welt may be provided and one much stronger than can be formed as a lace. The extensibility is permitted without weft-wise contraction, thus leaving topping openings in the regular formation of the fabric without special construction to provide the welt for knitting nee-

dles. Less rubber need be used and yet the position of the rubber is so that its maximum contractive and extendible qualities are utilized. The loop threads being preferably non-elastic may be very small or narrow and the bulk of the material kept at a minimum. No fraying will occur in cutting and any lengthwise tension will be absorbed while there will be enough circular extension so that the stocking will fit snugly to the leg without binding thereon.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. A stocking welt comprising a light weight relatively narrow strip of warp knit fabric through at least a portion of which the tension of a garter is intended to be applied, said fabric having generally parallel lay-in elastic warp yarns and generally parallel lay-in elastic weft yarn extending at generally right angles thereto, warpwise chains of yarn loops locking said lay-in warp and weft yarns by being looped about said lay-in yarns, said fabric being so constructed and arranged as to prevent shifting of the yarns from normal usage and a narrowing of the fabric in width by reason of a warpwise stretch thereof.

2. A stocking welt comprising a light weight relatively narrow strip of warp knit fabric through at least a portion of which the tension of a garter is intended to be applied, said fabric having bound thereinto a lay-in elastic weft yarn extending back and forth across the fabric at least a major portion of the width thereof and a lay-in non-elastic weft yarn extending back and forth in the fabric at most a minor portion of the width thereof to provide a section non-elastic weftwise.

3. A stocking welt comprising a light weight relatively narrow strip of warp knit fabric through at least a portion of which the tension of a garter is intended to be applied, said fabric having bound thereinto a lay-in elastic weft yarn extending back and forth across the fabric substantially the full width thereof and a lay-in non-elastic weft yarn extending back and forth in the fabric an extent lesser than the width thereof to provide a section non-elastic weftwise.

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