

- [54] METHOD OF SEAMING PANTY HOSE
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- [58] Field of Search..... 2/224 R, 224 A, 227, 243, 2/239; 66/177, 176

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[57] ABSTRACT

A method of forming a combination panty hose garment from tubular blank members having leg and elongated upper portions terminating in an open end. The tubular blank members are placed together and aligned in side-by-side relationship and simultaneously slit and seamed from an aligned point in the upper edges to a predetermined point therefrom to provide a seam with predetermined length and free edges. A crotch piece is sewn by simultaneously slitting one of the tubular blank members from the predetermined point and seaming a first edge of the crotch piece to the one tubular blank member and by simultaneously slitting the other tubular blank member from the predetermined point and seaming a second edge of the crotch piece to the other tubular blank member and thereafter aligning the free edges and seaming them together from the crotch piece. The crotch piece may be diamond shaped.

- [56] **References Cited**
- UNITED STATES PATENTS
- 3,675,247 7/1972 Ferrell..... 2/224 R
- 2,697,925 12/1954 Goodman..... 2/224 R
- FOREIGN PATENTS OR APPLICATIONS
- 18,624 1893 Great Britain..... 66/177

3 Claims, 6 Drawing Figures

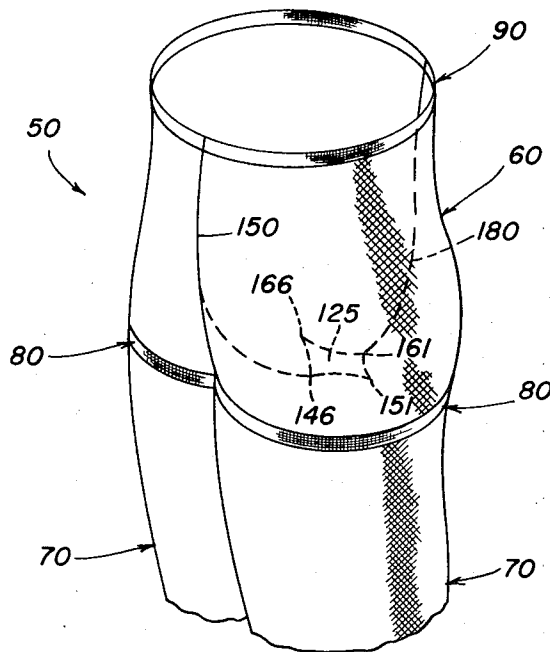


FIG. 1

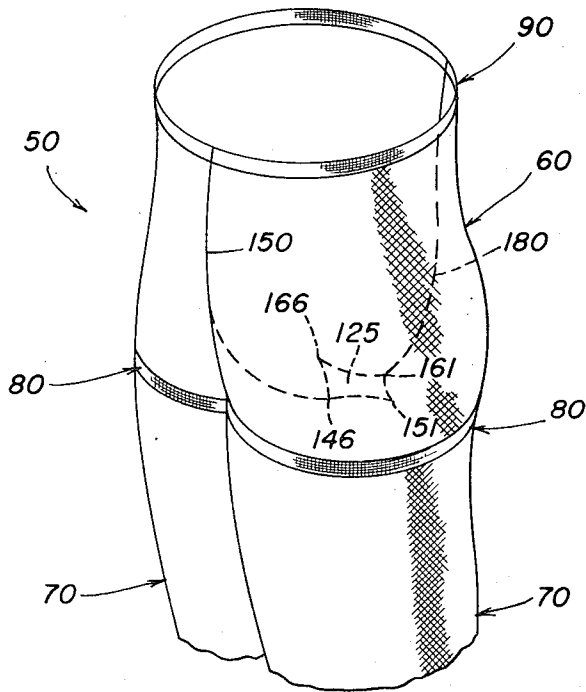


FIG. 2

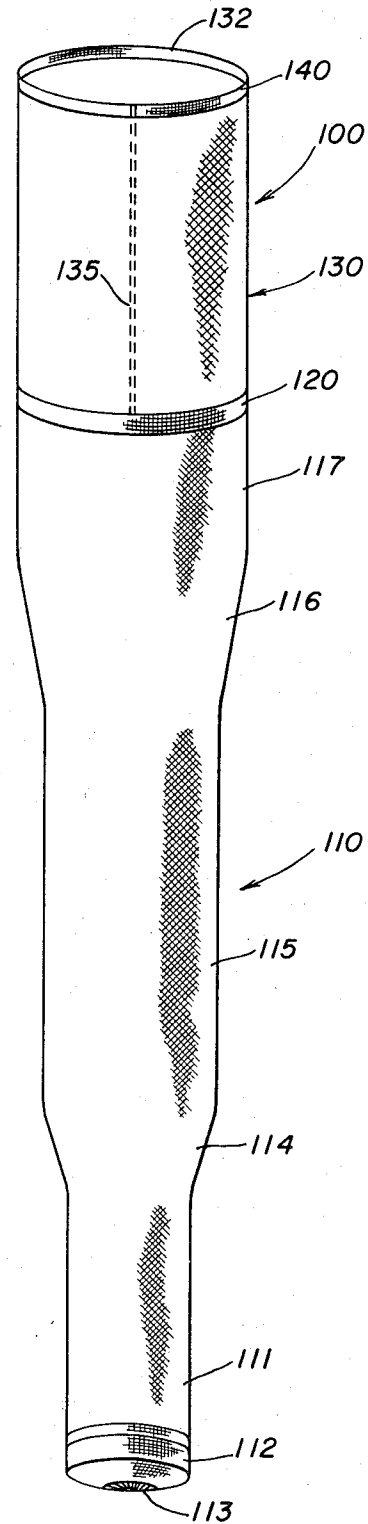


FIG. 3

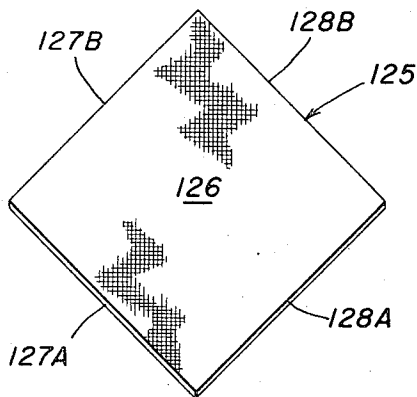


FIG. 6

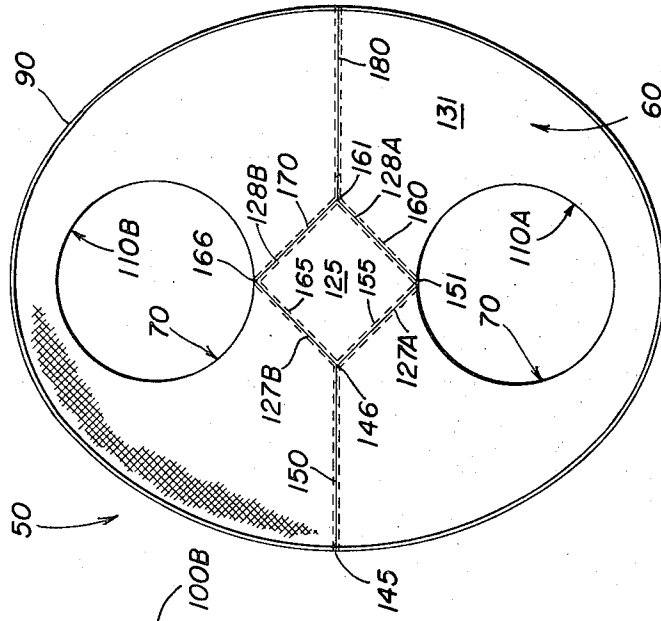


FIG. 5

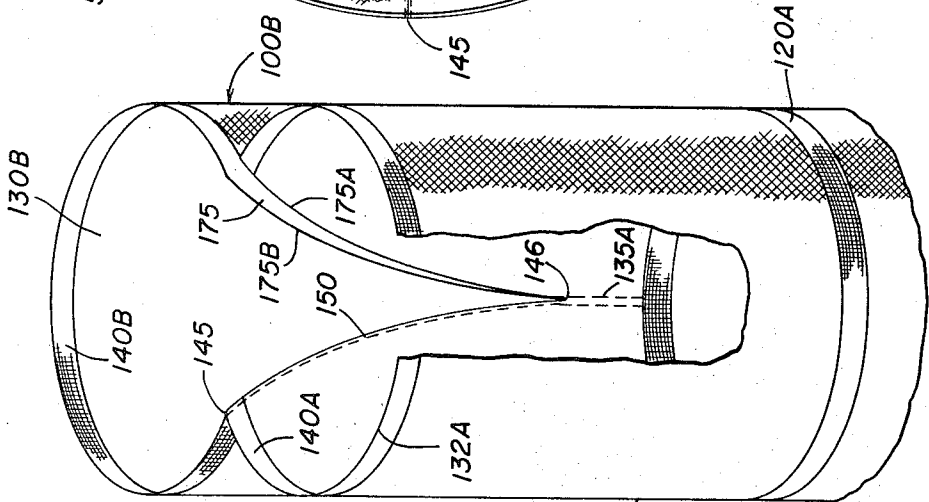
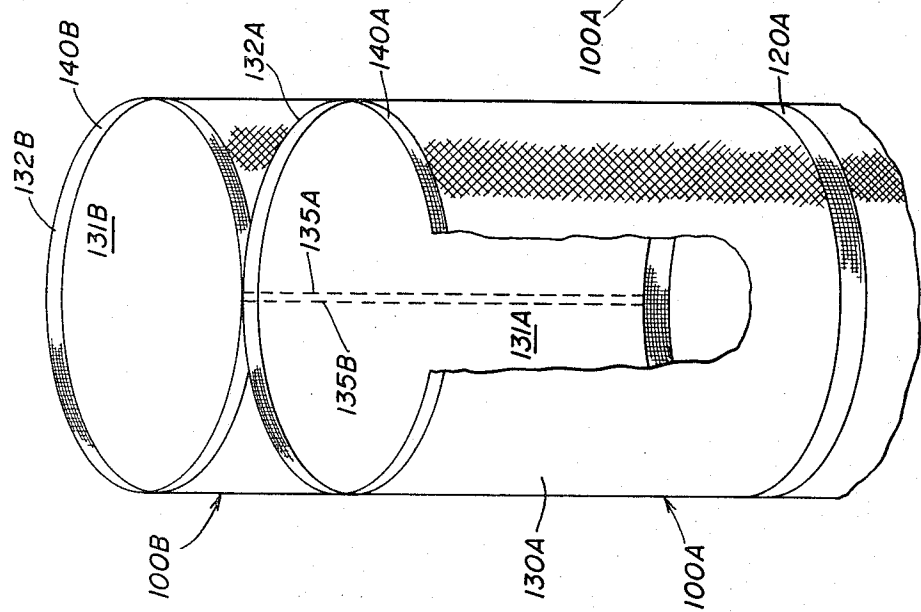


FIG. 4



METHOD OF SEAMING PANTY HOSE

This invention relates to ladies' knitted garments, and, more particularly, to a panty-hose garment in which a pair of knitted stockings are combined with a crotch piece to produce the panty-hose.

A general object of this invention is to provide a method of fabricating a panty-hose garment having a crotch piece therein by joining a pair of seamless knitted stocking blank members on a sewing machine with a minimum of handling of the stocking material.

It is an important object of the present invention to provide a method of forming a combination garment from a pair of tubular blank members each having leg and elongated upper portions terminating in an open end, comprising placing two uncut blank members against each other in side-by-side relation at least in the upper portions and aligning one point of the edges of each upper portion, simultaneously slitting and seaming the two blank members from the aligned point in the edges of the upper portions to a predetermined point therefrom to form a seam of predetermined length and free edges of the blank members, simultaneously slitting one of the tubular blank members from the predetermined point and seaming a first edge of a crotch piece to the one tubular blank member for a distance equal to half the longitudinal extent of the first edge to form a seam of half the length of the first edge and a free edge of the tubular blank member and seaming the free edge to the other half of the first edge to form a seam between the one tubular blank member and the first edge of the crotch piece, simultaneously slitting the other tubular blank member from the predetermined point and seaming a second edge of the crotch piece to the other tubular blank member for a distance equal to half the longitudinal extent of the second edge to form a seam of half the length of the second edge and a free edge of the other tubular blank member and seaming the free edge to the other half of the second edge to form a seam between the other tubular blank member and the second edge of the crotch piece, and aligning the free edges of the blank members and seaming the free edges of the blank members to form a seam from the crotch piece to the open end of the upper portions of the tubular members.

Another object of the present invention is to provide a method of the type set forth in which a diamond-shaped crotch piece having four edges is provided, the method including simultaneously slitting one of the tubular blank members from the predetermined point and seaming the first edge of the diamond-shaped crotch piece to the one tubular blank member to form a seam along the first edge of the crotch piece and a free edge of the one tubular blank member and seaming the second edge of the crotch piece to the free edge of the one tubular blank member to form a seam between the first and second edges of the crotch piece and the one tubular blank member, simultaneously slitting the other tubular blank member from the predetermined point and seaming the third edge of the diamond-shaped crotch piece to the other tubular blank member to form a seam along the third edge of the crotch piece and a free edge of the other tubular blank member and seaming the fourth edge of the crotch piece to the free edge of the other tubular blank member to form a seam between the third and fourth edges of the crotch piece and the other tubular blank mem-

ber, and aligning the free edges of the blank members and seaming the free edges of the blank members to form a seam from the crotch piece to the open end of the upper portions of the tubular members.

The invention both as to its organization and method of operation together with further objects and advantages thereof will best be understood with reference to the specification together with the accompanying drawings, in which:

FIG. 1 is a front perspective view of a preferred embodiment of the panty-hose garment made in accordance with the present invention;

FIG. 2 is a front elevation view of a stocking for use in forming the panty-hose garment of FIG. 1 in accordance with the method of the present invention;

FIG. 3 is a top plan view of a crotch piece for use with the method of the present invention;

FIG. 4 is an enlarged fragmentary perspective view of a pair of stockings as shown in FIG. 2 aligned side-by-side with the seaming guides in juxtaposition;

FIG. 5 is a view similar to FIG. 4 and illustrating a pair of stockings after they have been seamed and slit along a portion of the seaming guides; and

FIG. 6 is an enlarged top plan view of the panty-hose garment of FIG. 1.

Referring to the drawings, and particularly to FIG. 1 thereof, there is illustrated a panty-hose garment, generally designated by the numeral 50, made according to the present invention, which panty-hose includes a panty section 60 that extends substantially from the crotch area to the waist of the associated wearer. The garment 50 further includes a pair of seamless hose portions, generally designated by the number 70, integrally knit with the panty section 60 thereby to provide a combination garment of seamless construction. Disposed between the hose portions 70 and the panty section 60 is a ranguard band 80 to be described more fully hereinafter. The upper end of the panty section 60 is open and is provided with a waistband 90 around the periphery thereof.

The method of making the garment 50 of the type illustrated in FIG. 1 will best be understood by reference to FIGS. 2 through 6 of the drawings. There is illustrated in FIG. 2 an elongated and generally tubular knit stocking blank member, generally designated by the numeral 100, and including a leg-and-foot portion, generally designated by the numeral 110, a ranguard portion 120, a crotch portion 125, a panty portion 130 and a waistband portion 140. The leg-and-foot portion 110 comprises a plurality of integrally knit portions of different longitudinal and circumferential dimensions. For example, each leg-and-foot portion 110 of the tubular stocking blank member 100 may be knit so that it includes a selvedge portion 112 at the lower end thereof followed by a foot portion 111 of relatively small diameter, a leg portion 115 of intermediate diameter and a thigh portion 117 of relatively large diameter. Interposed between the foot portion 111 and the leg portion 115 is a tapered portion 114 and disposed between the leg portion 115 and the thigh portion 117 is a tapered portion 116. The lower end of the stocking 100 is seamed closed, but it will be understood that the lower end may also be knit closed.

At the upper end of the thigh portion 117 is knitted a relatively narrow annular ranguard portion 120 extending circumferentially around the periphery of the upper end of the thigh portion 117. Integral with the

runguard portion **120** and extending upwardly therefrom is the panty portion **130** which may be formed of a heavier yarn than the leg-and-foot portion **110** and has the crotch portion **125** sewn therein as hereinafter set forth. At the upper end of the panty portion **130** disposed around the periphery thereof and integral therewith is a narrow annular waistband portion **140** which may preferably be knitted of a highly elastic yarn such as Lycra Spandex. In addition, the waistband portion may include a double layer of fabric. The upper end of the waistband portion **140** terminates in an upper edge which is generally circular in outline and defines an open upper end **132** of the stocking **100**. Extending longitudinally downwardly from the upper end **132** of the stocking **100** substantially parallel to the longitudinal axis thereof to the rungward band **120** is a colored seaming marker **135** for a purpose to be described more fully hereinafter. Preferably, the seaming marker **135** is laid in the stocking **100** and is formed from a yard dyed with a water soluble dye which is of a color contrasting with the color of the panty portion **130** so as to be clearly visible. For example, when the stocking **100** is white the seaming marker **135** may be green.

The entire tubular stocking **100** is preferably knit of a thermoplastic stretch yarn to provide stretchability therefor. The term "stretch" is intended to include all types of mono-filament and multi-filament yarns capable of providing the desired stretch and shape characteristics for the finished garment. Preferably, the leg-and-foot portion **110** is knit of 20 denier S and Z yarn while the panty portion **130** is knit of 40 denier S and Z yarn, but it will be understood that different weight yarns may be used for either portion. Also, as indicated hereinafter, various sections of the tubular stocking **100** may be knit of different denier yarn of different stitch patterns. For example, the foot portion **111**, the leg portion **115** and the thigh portion **117** and the panty portion **130** may be knit of flat-knit, micromesh or non-run stitches. The rungward portion **120** may be formed of a runproof lockstitch pattern such as that disclosed in U. S. Pat. No. 3,430,463 granted to Nebel et al., whereby runs which might occur in the panty portion **130** will not be transmitted to the leg-and-foot portion **110** and vice versa.

There is also provided, as seen in FIG. 3, a crotch piece **125**, the crotch piece **125** being diamond shaped. Crotch piece **125** may be made out of the same material as hereinbefore set forth and has opposed surfaces **126** and peripheral side edges **127A** and **128A**, to be sewn into one of the stockings, **100A** as hereinafter explained, and peripheral side edges **127b** and **128B** to be sewn into a stocking **100B**, all as will be explained.

In fabricating the garment illustrated in FIG. 1, a pair of stockings **100** as illustrated in FIG. 2 is first knitted in standard fashion on a circular knitting machine. Referring to FIGS. 4 through 6 of the drawings, the stockings **100** in this pair of stockings have been respectively designated by the letters A and B, all of the reference numerals for each of these stockings being followed by the corresponding letter. In particular, the pair of stockings **100**, comprising stocking **100A** and stocking **100B**, are placed together as indicated in FIG. 4 with the upper ends **132A** and **132B** of the respective waistbands **140A** and **140B** being disposed adjacent to each other and with the respective seaming guides **135A** and **135B** being placed in juxtaposition and generally parallel to each other. As viewed in FIGS. 4 through 6 of the

drawings, the pair of stockings **100** have been shown disposed one in front of the other with the stocking **100A** being disposed in the foreground and the stocking **100B** disposed in the background. In FIG. 5, the seaming guide **135B** is not shown but is disposed immediately behind the guide **135A** in contact therewith. After the stockings **100A** and **100B** have been oriented and matched as indicated in FIG. 4, they are seamed along the seaming guides **135A** and **135B** beginning at the upper ends **132A** and **132B** of the stockings at point **145** and proceeding longitudinally downwardly therefrom as viewed in FIG. 5 to a point **146** a predetermined distance from the upper ends **132** of the stockings **100**, thereby producing a seam **150**. Simultaneously with this seaming operation, the stockings **100A** and **100B** are slit along the seam **150** from the upper ends **132** to the point **146**, thereby producing a slit opening **175** between the stockings **100A** and **100B** and also producing slit edges **175A** and **175B**, respectively, on the stockings **100A** and **100B** opposite the seam **150**.

After the seam **150** has been provided between point **145** on the upper ends **132** of the respective stockings **100A** and **100B** and the point **146**, the crotch piece **125** is prepared for seaming into the garment. The seam **150** is formed along the seaming guides **132** from the point **145** to the point **146**, the point **146** being intermediate from the ends of the seam guides **132**. The crotch piece **125** is aligned so that one corner thereof is in contact with the point **146** on the seaming guide **135A**. The side **127A** of the crotch piece **125** is aligned along the remaining portion of the seaming guide **135A** and the crotch piece **125** is slit-seamed along the edge **127A** from the point **146** along the seaming guide **135A** to a point **151** as shown in FIG. 6, thereby to provide a seam **155** extending from the point **146** to the point **151** on the leg **70A** of the stocking **100A**. The side **128A** of the crotch piece **125** is thereafter seamed to the free edge of the leg **70A** from the point **151** to the point **161** which is where the slit edges **175A** and **175B** terminate, as seen in FIG. 6. It should be remembered that as the seam **155** is formed between the point **146** and the point **151**, both points being on the seam guide **135A**, a free edge is created on the stocking **100A** equal in length to the length between the point **146** and the point **151**, that is, equal to the length of the side **127A**. This free end is sewn to the edge **128A** of the crotch piece **125** and forms the seam **160** between the edge **128A** and the crotch piece **125**. After the seams **155** and **160** have been formed, the crotch piece **125** has been sewn to the stocking **100A** and the side edges **127B** and **128B** are ready to be seamed.

After the side edges **127A** and **128A** of the crotch piece **125** have been seamed to the stocking **100A**, the seamstress returns to the point **146**. From the point of **146** the seamstress simultaneously slits and seams the stocking **100B** with the side edges **127B** of the crotch piece **125**, as hereinbefore explained with respect to the stocking **100A**. That is, the seamstress aligns the seam guide **135B** with the side edge **127B** and simultaneously slits and seams the stocking **100B** along the seaming guide **135B** and the side edge **127B** of the crotch piece **125** to form the seam **165** between the point **146** and the point **166** which is at the end of the seaming guide **135B**. During the formation of the seam **165**, there has been provided a free edge in the stocking **100B** which is thereafter aligned with the side edge

128B of the crotch piece 125 and seamed thereto to form the seam 170, the seam 170 extending between the point 166 and the point 161. After the seam 170 has been formed the crotch piece 125 is firmly sewn into the stockings 100A and 100B to form the crotch piece as seen in FIG. 1. The free edges 175A and 175B formed during the formation of the seam 150 are now seamed together from the point 161 to the upper ends 132A and 132B to form the seam 180, thereby completing the panty-hose garment 50. In practice, it is possible to form the seam 170 and the seam 180 in a continuous stitching operation by aligning the points 166 and 161 with the free edges 175A and 175B formed during the formation of the seam 150, thereby further to reduce the number of operations necessary to form the panty-hose garment 50 of the present invention.

While there has been described a construction of a panty-hose garment 50 using a crotch piece 125 that is diamond-shaped, it will be apparent that other shaped crotch pieces may be used with the process of present invention and not vary from the spirit thereof. For instance, an elliptical-shaped crotch piece may be used wherein the sides of the ellipse are seamed to the respective stockings by simultaneously slitting and seaming for half of each side of the ellipse and seaming for the other half. Similarly, other shapes may also be used such as an oval.

When the fabrication of the panty hose 50 is thus complete, it will be noted that the leg-and-foot portions 110 of the stockings 100, respectively, form the hose portions 70 of the panty-hose 50; the ranguard portions 120A and 120B of the stockings 100A and 100B combine to define the ranguard band 80 of the panty-hose 50; the panty portions 130A and 130B of the stockings 100A and 100B combine with the crotch piece 125 to define the panty section 60 of the panty-hose 50; and the waistband portions 140A and 140B of the stockings 100A and 100B combine to define the waistband 90 of the panty-hose 50. As indicated above, this waistband 90 is formed of a highly elastic material to provide support for the panty-hose 50 on the torso of the associated wearer.

After the fabrication of the panty-hose 50 is completed, the panty-hose 50 are subjected to a soap scouring operation which removes the water-soluble dye in the seaming guides 135. Afterwards, the panty-hose 50 may be dyed to the desired color in the usual manner. It will be noted that, after dyeing, the panty-hose 50 is completed and is ready for wear. No boarding of the garment is necessary, but rather it is suitable for use with the hose portion 70 in their original tubular form as indicated in FIG. 2 of the drawing. Thus, the impairment of the stretch characteristics of the panty-hose 50 which is normally attendant upon the boarding process is avoided.

It is a significant feature of the present invention that the handling of the stockings 100 during the fabrication of the panty-hose garment 50 is reduced to a minimum. Thus, the pair of stockings 100A and 100B, once having been matched and oriented properly to align the seaming guides 135 thereof, are placed in a sewing machine and need be repositioned only once to complete fabrication of the panty-hose garment 50. More particularly, once inserted in the sewing machine, the stockings 100A and 100B are seamed and slit simultaneously, whereby the slitting operation does not have

to be performed separately before placing the stockings in the sewing machine.

Thus, it will be seen that there has been provided a method of making a panty-hose garment by knitting a pair of seamless stockings each comprising integrally knit leg-and-foot portions, ranguard portions, a panty portion and waistband portion and joining the pair of stockings with a crotch piece into a panty-hose garment in an economical, step saving machine operation. This operation comprises the steps of aligning the stockings and then seaming them along predetermined longitudinal elements thereof and simultaneously slitting them along the resultant seam, thereby producing slit edges on each of the stockings, and thereafter seaming a crotch piece to each stocking and finally seaming the slit edges to form an interrupted continuation of the first seam to complete the joining of the stockings to form the panty-hose garment.

While there has been described what is at present considered to be the preferred embodiment of the invention, it will be understood that various modifications may be made therein and it is thus intended to cover in the appended claims all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. The method of forming a combination garment from a pair of tubular blank members each having leg and elongated upper portions terminating in an open end, comprising placing two uncut blank members against each other in side-by-side relation at least in the upper portions and aligning one point of the edges of each upper portion, simultaneously slitting and seaming the two blank members from the aligned point in the edges of the upper portions to a predetermined point therefrom to form a seam of predetermined length and free edges of the blank members, providing a diamond-shaped crotch piece having four edges, simultaneously slitting one of the tubular blank members from the predetermined point and seaming the first edge of the diamond-shaped crotch piece to the one tubular blank member to form a seam along the first edge of the crotch piece and a free edge of the one tubular blank member and seaming the second edge of the crotch piece to the free edge of the one tubular blank member to form a seam between the first and second edges of the crotch piece and the one tubular blank member, simultaneously slitting the other tubular blank member from the predetermined point and seaming the third edge of the diamond-shaped crotch piece to the other tubular blank member to form a seam along the third edge of the crotch piece and a free edge of the other tubular blank member and seaming the fourth edge of the crotch piece to the free edge of the other tubular blank member to form a seam between the third and fourth edges of the crotch piece and the other tubular blank member, and aligning the free edges of the blank members and seaming the free edges of the blank members to form a seam from the crotch piece to the open end of the upper portions of the tubular members.

2. The method set forth in claim 1, wherein the seam formed between the free edge of the other tubular member and the fourth edge of the crotch piece and the seam formed between the free edges of the tubular blank member is a continuous seam.

3. The method set forth in claim 1, wherein each of the tubular blank members is provided with a seaming guide extending longitudinally of the blank member for a distance equal to at least the length of the first seam formed and the length of one side of the diamond-shaped crotch piece.

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