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Fregeolle

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[54] **SEAMLESS GARMENT WITH PARTIAL AND FULL COURSE FASHIONING AND METHOD**

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[52] **U.S. Cl.** **66/177**

[51] **Int. Cl.** **A41b 9/06**

[58] **Field of Search** 66/175, 176, 177, 172

[56] **References Cited**

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2,511,720	6/1950	Lacks	66/177
2,962,884	12/1960	Garrow et al.	66/177
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1,807,974	7/1970	Germany	66/177

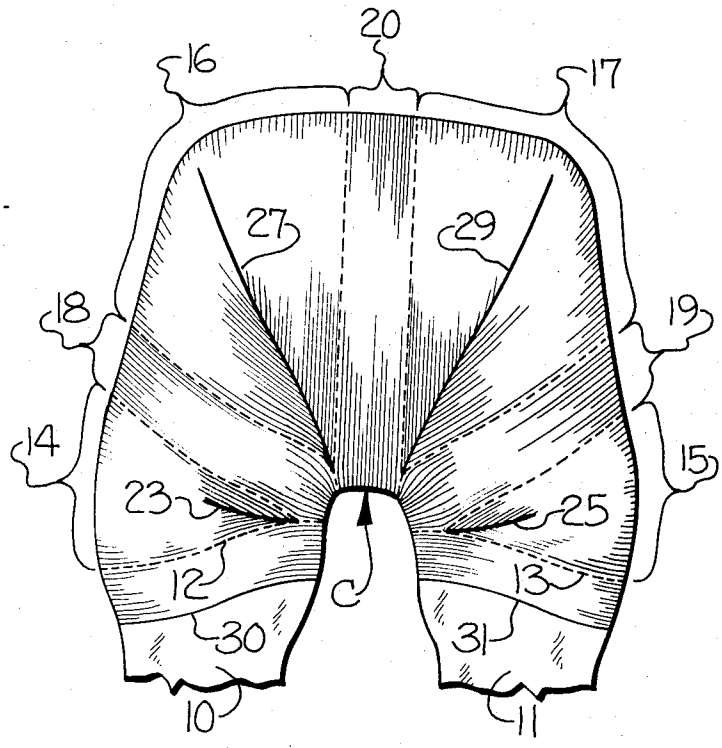
Primary Examiner—Ronald Feldbaum

Attorney, Agent, or Firm—Parrott, Bell, Seltzer, Park & Gibson

[57] **ABSTRACT**

This seamless garment includes a panty portion formed of fashioned gussets of partial courses and groups of complete courses positioned between the fashioned gussets, and fashioned leg extensions which are joined to a pair of legs integrally knit with the panty portion and depending therefrom. The positioning of the fashioned gussets and complete courses may be varied to change the length and width of the panty portion and to thus shape and fashion the body of the garment, as desired.

13 Claims, 5 Drawing Figures



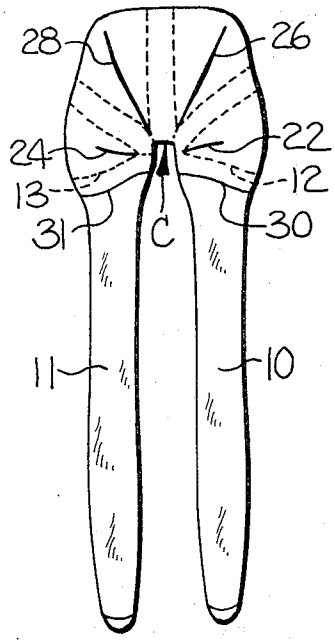


Fig-1

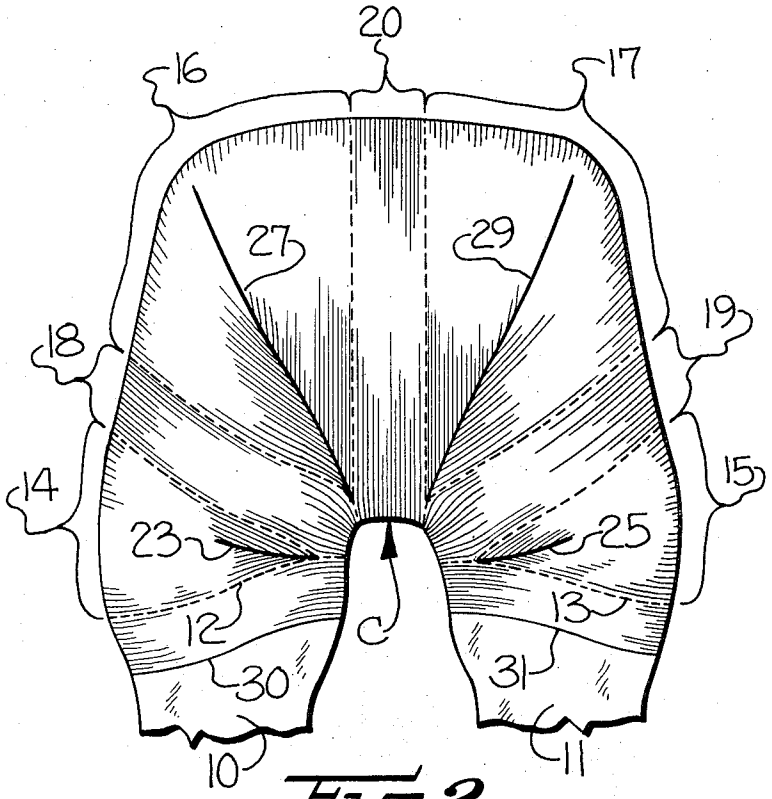


Fig-2

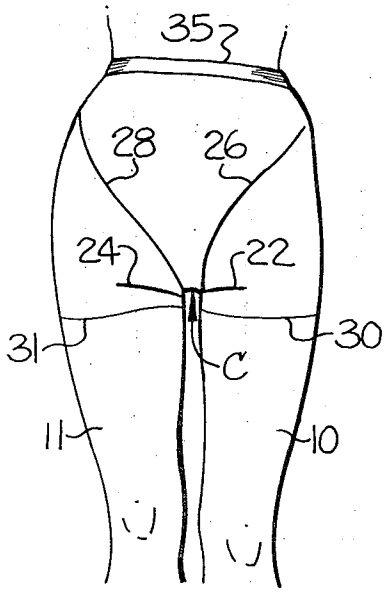


Fig-3

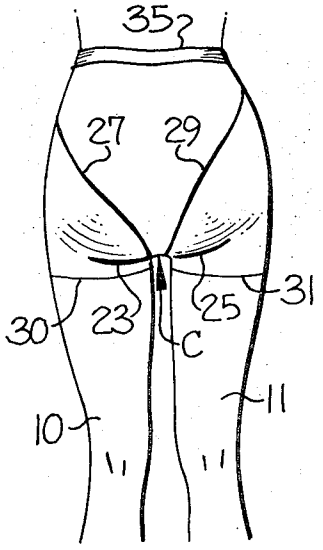


Fig-4

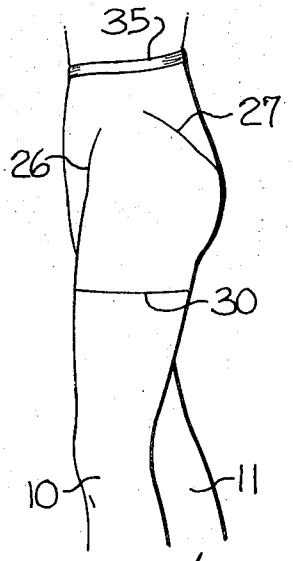


Fig-5

SEAMLESS GARMENT WITH PARTIAL AND FULL COURSE FASHIONING AND METHOD

This invention relates generally to seamless knit, two-legged lower body garments, such as panties, panty girdles, bathing suit trunks, tights, leotards, panty hose and the like and to the method of making the same. More particularly, the present invention relates to such garments which are provided with body shaping gussets or pockets which are spaced apart by groups of complete courses.

Various types of fashioned seamless lower body garments have been formed on circular knitting machines by knitting complete courses to form a first leg portion, then knitting a plurality of fashioned gussets of partial courses to form a fashioned panty portion, and again knitting complete courses to form the other leg. This general type of garment is illustrated in the Garrou et al. U.S. Pat. No. 2,962,884. The Garrou et al. U.S. Pat. No. 3,109,300 discloses a seamless knit garment which has increased length in the body portion by virtue of the fact that the fashioned gussets of the body portion are joined together along what may be characterized as Y-type gore lines. The Garrou et al. U.S. Pat. No. 3,109,301 discloses a seamless knit garment having increased width in the body portion because complete courses are formed in the central portion of the panty portion and space the legs further apart. While these prior patents disclose garments suitable for fitting wearers of different sizes, it is necessary to knit a different type of garment to fit wearers of each size.

With the foregoing in mind, it is an object of the present invention to provide a seamless garment with partial and full course fashioning wherein groups of complete courses are formed between fashioned body shaping gussets or pockets formed of partial courses to provide both increased length and increased width in the body portion so that one type of garment will fit a wide variety of wearers of different sizes.

It is a further object of the present invention to provide a method of knitting a seamless garment with partial and full course fashioning which may be carried out on a circular knitting machine.

In accordance with the present invention, the seamless knit lower body garment includes a fashioned panty portion having a pair of legs integrally knit therewith. The panty portion includes a fashioned leg extension or pocket at each side of the panty portion which extends upwardly from each of the legs and is formed of partial courses. Fashioned front and rear body gussets or pockets are provided at opposite sides of the panty portion and are formed of partial courses. First and second groups of complete courses are formed at opposite sides of the panty portion and join the respective fashioned leg extensions to the front and rear fashioned body gussets. A third group of complete courses is positioned in the center of the panty portion and joins the front and rear gussets at opposite sides of the panty portion. All three groups of complete courses are joined in the lower center crotch area of the panty portion to provide added fabric in this area. The fashioned gussets provide added fabric in the corresponding areas of the panty portion while the third group of complete courses adds width and the first and second groups of complete courses add length in the panty portion.

Other objects and advantages of the invention will appear as the description proceeds, when taken in connection with the accompanying drawings, in which

FIG. 1 is a front elevation of a panty hose type of seamless lower body garment blank knit in accordance with the present invention with the lower toe portions being closed, and illustrating the arrangement of fashioned gussets and complete circular courses in the body portion;

FIG. 2 is an enlarged rear elevational view of the upper portion of the garment blank shown in FIG. 1;

FIG. 3 is a front view of the upper portion of the garment and illustrating the same as it appears when worn;

FIG. 4 is a view similar to FIG. 3 but illustrating the rear portion of the garment; and

FIG. 5 is a view similar to FIGS. 3 and 4 but illustrating one side of the garment.

The garment blank illustrated in FIG. 1 is knit in a suitable shape for forming a panty hose type garment and includes a pair of seamless tubular legs **10, 11,** which are formed of successive complete courses. The courses of the legs extend substantially horizontally or transversely of the legs **10, 11.** The shade lines in the drawings indicate the direction in which the courses extend in various portions of the garment. As illustrated in FIG. 2, the upper ends of the legs **10, 11** terminate along the respective dash-dot lines **12, 13** and the inner portions of the legs **10, 11** are spaced apart by a crotch area, broadly indicated at C.

The panty portion of the garment includes fashioned leg extensions, gussets or pockets **14, 15** (FIG. 2) extending upwardly from the respective legs **10, 11** and being formed of fashioned partial courses. Fashioned front and rear body gussets or pockets **16** and **17** are provided at each side of the panty portion and are formed of fashioned partial courses, in a manner to be presently described.

A first group of complete courses **18** is provided at one side of the panty portion and joins the first leg extension **14** to the first front and rear body gussets **16.** A second group of complete courses **19** is provided at the opposite side of the panty portion and joins the second leg extension **15** to the second front and rear body gussets **17.** A third group of complete courses **20** is provided in the center of the panty portion and joins the front and rear gussets **16, 17** at opposite sides of the pantry portion. As illustrated in FIG. 2, the lower portions of each of the groups of complete courses **18, 19** and **20** extend through the crotch area C and are directly connected to each other, and to the inner portions of the last full courses of the legs **10, 11.**

The particular fashioning of the body portion of the garment will be presently described in connection with the description of the method of knitting the garment. As best shown in FIG. 2, the first leg extension **14** comprises a gusset or pocket formed of a pair of body shaping panels which are knit with fashioned narrowed and widened partial courses with the endmost stitch loops of the partial courses being joined along respective front and rear suture or gore lines **22, 23.** The other leg extension **15** also comprises a gusset or pocket formed of fashioned panels of narrowed and widened partial courses with the endmost stitch loops being joined along respective front and rear suture or gore lines **24, 25.**

The fashioned front and rear body gusset **16** is formed of body shaping panels of narrowed and widened partial courses with the endmost stitch loops being joined along respective front and rear suture or gore lines **26, 27.** The other fashioned front and rear body gusset **17** is knit of body shaping panels of narrowed and widened partial courses with the endmost stitch loops being joined together along respective front and rear suture or gore lines **28, 29.** However, it is to be understood that the fashioned leg extensions **14, 15** and/or the fashioned front and rear body gussets **16, 17** may be formed of single body shaping panels formed of widened or narrowed partial courses so that the corresponding suture or gore lines are formed adjacent to the corrresponding groups of complete courses **18, 19** or **20.**

The panty portion of the garment is preferably knit of a heavier denier yarn than the leg portion, as indicated by lines **30, 31.** The upper end of the panty portion of the garment is provided with an elastic waistband, indicated at **35** in FIGS. **3–5,** is attached to the upper edge of the panty portion and provides a waist opening. The panty hose garment is preferably formed of some type of stretchable yarn so that it may be easily drawn on the body of the wearer, as illustrated in FIGS. **3–5.** When the panty hose is worn, as indicated in FIGS. **3–5,** the fashioned leg extensions or pockets provide added fabric in the upper thigh area while the fashioned front and rear body gussets or pockets provide added fabric in the hip areas, and the complete courses between the fashioned pockets provide added length and width in the panty portion, as well as added fabric in the crotch area C.

When the panty hose is worn, the front gore lines **26, 28** and rear gore lines **27, 29** define respective front and rear panels which may be knit of a heavy elastic yarn to provide control panels. Also, the entire panty portion, or selected areas, may be knit of a heavy elastic yarn to provide body control and support in the panty portion. The heavy elastic yarn may be inlaid or otherwise incorporated in selected areas of the panty portion and/or legs to provide support. The legs and panty portion, and/or selected areas thereof, may be knit with any desired type of plain or patterned stitch to provide open mesh or other patterns.

METHOD OF KNITTING

The knitting of the panty hose type garment illustrated in the drawings will be described as it is carried out on a fine gauge knitting machine of the type normally used in knitting ladies' hosiery. This particular machine has a three and three-quarter inch needle cylinder with 400 needles in the cylinder. Knitting of the garment may begin at the lower end of either leg **10, 11** and will be described beginning at the lower end of the leg **10.** The leg **10** is knit with all 400 needles in active position and full circular courses are knit of 18 denier yarn having four filaments and which supplied as stretchable yarn by the yarn producer. Near the upper end of the leg **10,** a heavy denier yarn is introduced, along the line **30.** This heavier panty yarn is two plied ends of 18 denier four filament yarn of the same type as was used in knitting the finer denier leg, and 36 courses are formed of this heavier yarn, up to the dash-dot line **12.**

The machine then switches into reciprocatory knitting and **52** needles in the crotch area are raised to an inactive level to pass above the switch cams and remain in the inactive position while the needle cylinder reciprocates. The narrowing picks are activated and narrowed partial courses are knit with each swing of the needle cylinder. The single leading needle is raised to inactive level by the narrowing picks with each swing.

This narrowing operation continues until **36** needles have been raised to inactive level, along each of the front and rear gore lines **23, 24.** The reciprocating motion continues and the widening pick is moved to an active level so that two needles are lowered to active level and a single needle is raised by the narrowing picks so that the length of the widened partial courses increases by one needle with each swing of the needle cylinder. As the inactive needles are brought back into active position, the stitch loops which were held thereon are joined to the new stitch loops to form the gore lines **22** and **23** at the front and rear of the panty portion.

When the number of needles knitting thas increased in this widening operation until only 54 needles remain inactive, the machine again switches to rotary knitting and the inactive needles are switched to the lower active level and all needles knit to form the first group of full or complete courses **18.** The outer portion of the first full course of the group **18** is connected to the last widened partial course of the gusset **14** and the inner portion, in the crotch area, is connected to the corresponding portion of the last full course of the leg **10,** along the inner portion of the dash-dot line **12.** Ninety-two full courses are formed in the group **18.**

The machine then switches back to reciprocatory knitting and the stitch loops formed on the **52** needles forming the crotch area are raised to inactive level during the knitting of the first fashioned body gusset **16.** During the knitting of the first portion of the gusset **16,** the number of needles knitting is gradually reduced by activating the narrowing picks so that one needle is raised to inactive level with each swing of the needle cylinder, along the front and rear gore lines **26, 27.** This narrowing operation continues until 129 needles have been raised at the front and rear of the panty portion. The widening pick is then moved to an operative position and the second half of the fashioned body gusset is widened, one needle with each swing of the needle cylinder until only 54 needles remain active in the crotch area. During this widening operation, the needles brought back into active position form stitch loops through the stitch loops which were held on the needles raised during the narrowing operation and the gore or suture lines **26, 27** at the front and rear of the panty portion are formed.

Upon completion of the knitting of the fashioned gusset **16,** the machine again switches to rotary knitting and the inactive needles in the crotch area C are lowered to an active level and all needles knit the yarns to form the group of full courses **20.** Eighty full courses are knit in the group **20** with the lower portion of the first full course being joined to the lower portion of the last full course of the group **18,** in the crotch area C.

The machine again switches to reciprocatory knitting and the 52 needles which knit the crotch area are raised to inactive level and a narrowing operation takes place in the formation of the first portion of the second body gusset **17.** This narrowing operation continues raising the needles to the inactive position and

holding the endmost stitch loops thereon along the respective front and rear gore lines **28, 29** until 129 needles have been raised to inactive level at the front and rear of the panty portion. As reciprocation of the needle cylinder continues, the widening pick is brought into active position and the second or widened half of the body gusset **17** is knit to form the front and rear suture or gore lines **28, 29.**

Upon completion of the fashioned body gusset **17,** the inactive needles in the crotch area are lowered to active level and the machine switches to rotary knitting to form the group of complete courses **19** on all of the needles. This group of courses **19** includes 92 courses with the inner portion of the first full course being connected to the stitch loops at the lower portion of the last full course of the group **20** and in the crotch area C.

The machine again switches to reciprocatory knitting to knit the fashioned leg extension or gusset **15** and the 52 needles which knit the crotch area C are raised to an inactive level and the narrowing picks operate to raise one needle with each swing of the needle cylinder and these raised needles hold the stitch loops along the front and rear gore lines **24, 25.** This narrowing operation continues until **36** needles have been raised to inactive level, along each of the front and rear gore lines **24, 25.**

The widening pick is moved to an active level and the second half of the fashioned leg extension **15** is completed by a single needle widening operation with the added needles drawing stitch loops through the stitch loops held on the needles idled in the narrowed portion to form the front and rear gore lines **24, 25.** When widening has continued until only 54 needles remain inactive, the machine switches to rotary knitting and the raised inactive needles which knit the crotch are switched to a lower active level and full courses are knit, beginning along the dash-dot line **13** to begin the knitting of the second leg **11.** The inner portion of the first full course of the leg **11** is joined to the corresponding stitch loops of the inner portion of the last full course of the group **19** and in the crotch area C. At the line **31,** the heavy denier yarn is removed and the fine denier yarn is introduced to knit the leg portion **11.** Upon completion of the proper length of fabric to form the leg **11,** the panty hose blank is removed from the knitting machine.

The lower ends of the legs **10, 11** may be closed by any suitable means to form toe pockets in a lower ends of the legs of the panty hose. The upper closed end of the panty portion is slit, in a walewise direction from approximately one side to the other and the elastic waistband **35** is attached thereto, as by a sewing operation to complete the formation of the panty hose. If desired, the lower ends of the legs **10, 11** may be provided with "twisted toe closures" and the slit across the upper part of the body portion of the panty hose may be automatically formed on the knitting machine as the body portion is being knit so that the formation of the panty hose is completed by the knitting machine, except for the attachment of the elastic waistband **35.** Also, a waist opening with a selvaged edge may be automatically knit in the upper portion of the panty hose and an elastic waistband formed around the opening, in the manner described in my copending application Ser. No. 186,344, filed Oct. 4, 1971.

As best shown in FIG. **2,** the panty portion comprises the fashioned leg extensions **14, 15** at each side of the panty portion, fashioned front and rear body gussets **16, 17** at opposite sides of the panty portion, first and second groups of complete courses **18, 19** on opposite sides of the panty portion, and a third group of complete courses **20** in the center of the panty portion. The group of complete courses **20** in the center of the panty portion are no longer complete courses when the waist opening is formed and provide a central panel with the ends of the courses terminating at the waist opening in the front and rear of the panty portion. This group of center courses forming the central panel adds width to the panty portion while the groups of complete courses **18, 19** at opposite sides add length to the panty portion. The fashioned leg extensions **14, 15** provide additional fabric which is taken up by the buttocks, upper thighs and the crotch of the wearer. The fashioned front and rear body gussets **16, 17** also provide additional fabric which is taken up by the hips of the wearer. It will be noted that portions of the groups **18, 19,** and **20** of full courses each extend into and through the crotch area C and increase the amount of fabric in this area to provide comfort and fit for the wearer.

In the drawings and specification, there has been set forth a preferred embodiment of the invention, and although specific terms are employed, they are used in a generic and descriptive sense only and not for purposes of limitaton.

That which is claimed is:

1. A seamless knit blank for forming a lower body garment including a panty portion and a pair of legs integrally knit with said panty portion, each of said legs comprising successive circularly knit complete courses, said panty portion comprising a fashioned leg extension at each side of said panty portion and extending upwardly from each of said legs and being formed of reciprocatorily knit fashioned partial courses, fashioned front and rear body gussets at opposite sides of said panty portion and being formed of reciprocatorily knit fashioned partial courses, said front and rear body gussets including more than twice as many partial courses as the number of partial courses in said fashioned leg extensions, a first group of circularly knit complete courses on one side of said panty portion and joining one of said leg extensions to said front and rear body gussets at one side of said panty portion, a second group of complete circularly knit courses on the other side of said panty portion and joining the other of said leg extensions to said front and rear body gussets, said first and second groups of complete courses each including a greater number of full courses than the number of reciprocatorily knit fashioned partial courses in the adjacent fashioned leg extensions so that said fashioned leg extensions are spaced downwardly a substantial distance from said body gussets to provide additional fabric in the upper thigh areas of the garment blank, and a third group of complete circularly knit courses in the center of said panty portion and joining said front and rear gussets at opposite sides of said panty portion.

2. A garment blank according to claim **1** wherein said front and rear body gussets each comprise groups of narrowed and widened partial courses with the endmost stitch loops being joined along front and rear gore lines.

3. A garment blank according to claim 1 wherein said fashioned leg extensions each comprise groups of narrowed and widened partial courses with the endmost stitch loops being joined along front and rear gore lines.

4. A seamless knit lower body garment including a panty portion, a pair of legs integrally knit with said panty portion, and a waist opening along the upper end of said panty portion, each of said legs comprising successive circularly knit complete courses, said panty portion comprising a fashioned leg extension at each side of said panty portion and extending upwardly from each of said legs and being formed of reciprocatorily knit fashioned partial courses, fashioned front and rear body gussets at opposite sides of said panty portion and being formed of reciprocatorily knit fashioned partial courses, said front and rear body gussets including more than twice as many partial courses as the number of partial courses in said fashioned leg extensions, first and second groups of circularly knit complete courses on opposite sides of said panty portion and joining said respective leg extensions to said respective front and rear body gussets at opposite sides of said panty portion, said first and second groups of circularly knit complete courses each including a greater number of full courses than the number of reciprocatorily knit fashioned partial courses in the adjacent fashioned leg extensions so that said fashioned leg extensions are spaced downwardly a substantial distance from said body gussets to provide additional fabric in the upper thigh areas of the garment, and a central panel of courses positioned between and joining said front and rear gussets at opposite sides of said panty portion, the ends of the courses of said central panel terminating at said waist opening in the front and rear of said panty portion.

5. A garment according to claim 4 including a crotch area in the panty portion and between said legs, and wherein the inner portions of said first and second groups of complete courses are joined to opposite sides of corresponding inner portions of the courses of said central panel.

6. A garment according to claim 5 comprising a panty hose with said legs being knit of fine denier yarn, and said panty portion being knit of heavy denier yarn.

7. A panty hose garment according to claim 6 including an elastic band attached to said waist opening along the upper end of said panty portion.

8. A panty hose garment according to claim 6 wherein said front and rear body gussets each comprise groups of narrowed and widened partial courses with the endmost stitch loops being joined along front and rear gore lines.

9. A panty hose garment according to claim 8 wherein said fashioned leg extensions each comprise groups of narrowed and widened partial courses with the endmost stitch loops being joined along front and rear gore lines.

10. A method of forming a seamless lower body garment including a panty portion and a pair of legs integrally knit with the panty portion, said method comprising the steps of circularly knitting successive complete courses to form the first leg, reciprocatorily knitting a certain number of fashioned partial courses to form a first leg extension, circularly knitting a greater number of complete courses than the number of partial courses in the first leg extension, reciprocatorily knitting more than twice as many fashioned partial courses as the number of partial courses in the first leg extension to form a first body gusset in one side of said panty portion, circularly knitting a group of complete courses, reciprocatorily knitting substantially the same number of fashioned partial courses as the number of partial courses in the first body gusset for form a second body gusset in the other side of said panty portion, circularly knitting a group of complete courses corresponding in number to the number of complete courses knit after the first leg extension, reciprocatorily knitting a group of fashioned partial courses corresponding in number to the number of partial courses knit in the first leg extension to form a second leg extension, circularly knitting successive complete courses to form the second leg, and slitting the upper end of the panty portion to form a waist opening in the garment.

11. A method according to claim 10 including the knitting of groups of narrowed and widened partial courses to form said first and second body gussets.

12. A method according to claim 11 including the knitting of groups of narrowed and widened partial courses to form said first and second leg extensions.

13. A method according to claim 12 wherein single needle narrowing and widening is employed in knitting said body gussets and said leg extensions.

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