United States Patent

Burleson et al.

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[54] HOSIERY-GIRDLE-TYPE PANTYHOSE

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[52] **U.S. Cl.** **66/177**, 66/176

[51] **Int. Cl.** **A41b 9/02**

[58] **Field of Search** ..... 66/171, 172 E, 175, 176, 178, 66/177

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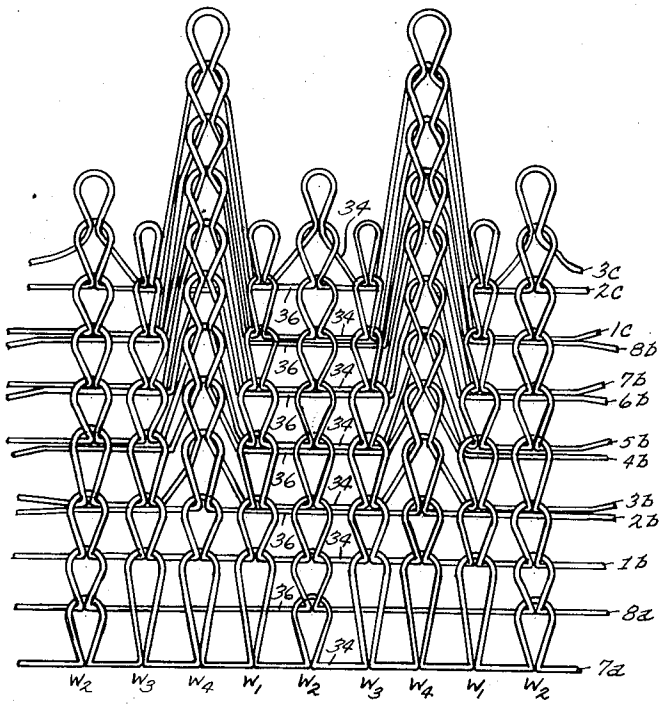
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[57] **ABSTRACT**

A hosiery-girdle-type pantyhose comprising two seamless hose sewn together wherein in place of a welt, there is a compressive, stretch fabric integrally knit with the hose to form a compressive girdle portion. The girdle portion of each hose has front and rear panels which are knit so as to provide more fabric in the rear panel than in the front panel with the front panel averaging less stitch loops per course than the rear panel for the same number of wales in the course. Fewer stitches per course in the front panel than the rear panel are provided by knitting stitch loops only in spaced-apart wales in the front panel for at least some of the courses and floating the yarn in these courses between the spaced-apart wales.

3 Claims, 5 Drawing Figures



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SHEET 1 OF 2

Fig. 1.

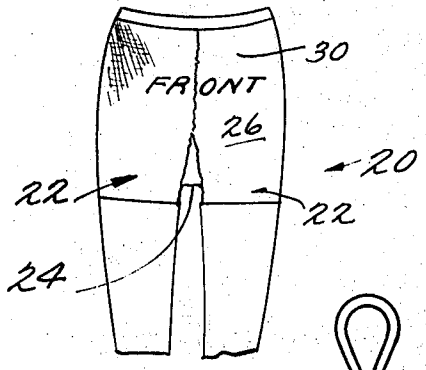
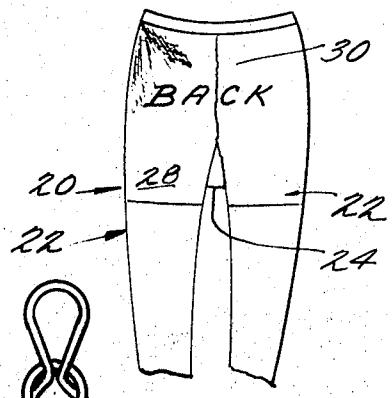


Fig. 2.



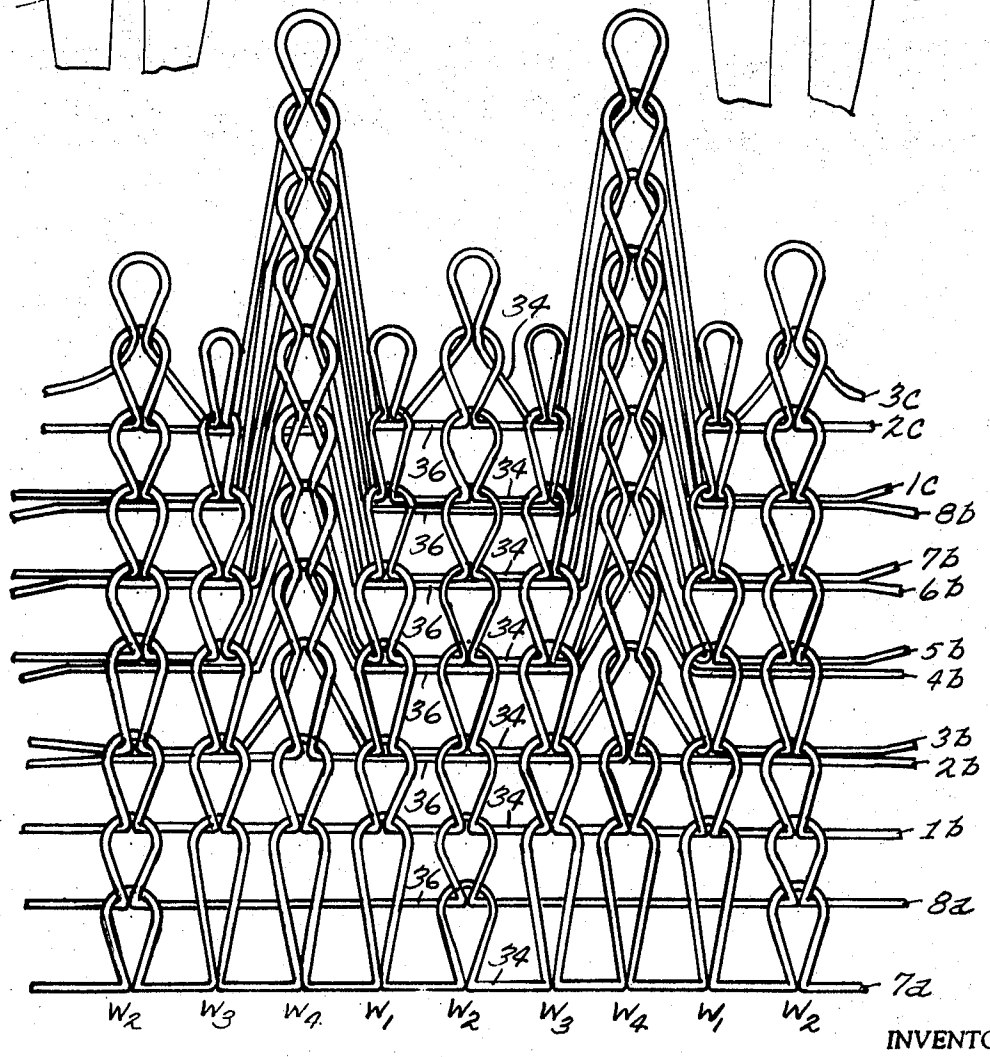


Fig. 3.

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Fig. 4.

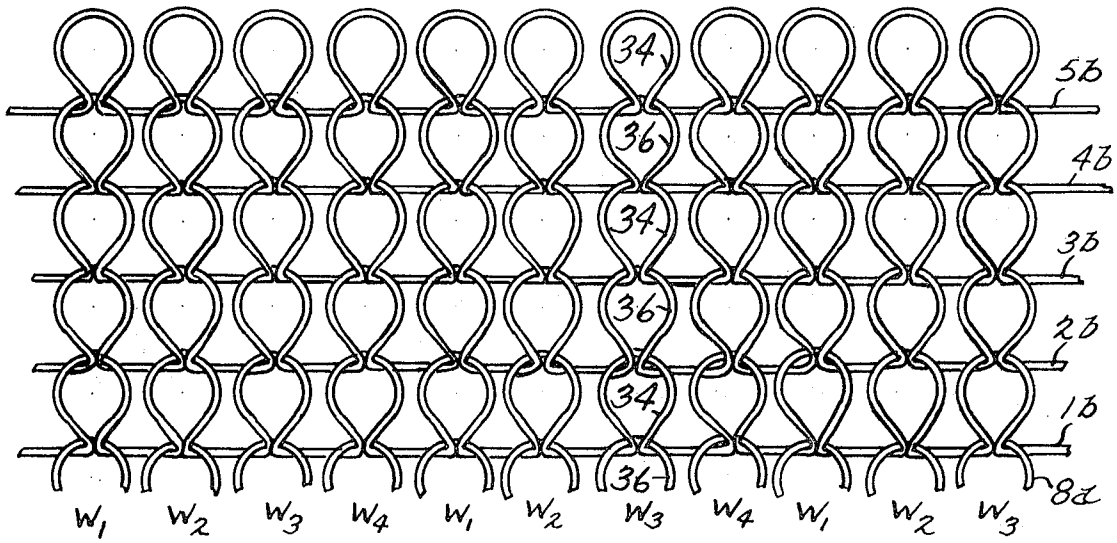
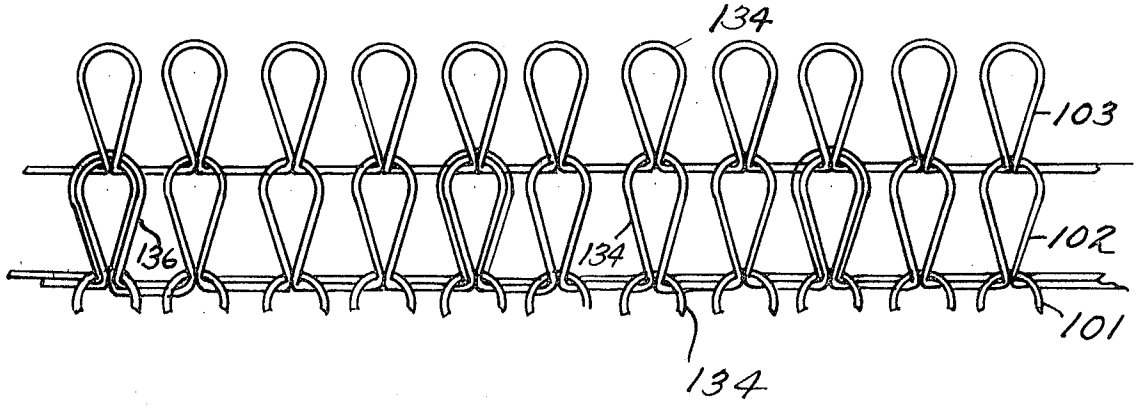


Fig. 5.



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HOSIERY-GIRDLE-TYPE PANTYHOSE

BRIEF DESCRIPTION OF THE INVENTION

This invention relates to pantyhose and, in particular, to hosiery-girdle-type pantyhose which provides more fabric or stretch in the backside panels of the girdle portion and the method of making such pantyhose.

With the advent of higher hemlines and miniskirts, the demand for pantyhose has increased because of the objections to the use of garters. This, in turn, has caused the need for a combination girdle- and hose-type pantyhose. The attempt to solve this problem by merely forming pantyhose from two seamless hose wherein the panty portion is simply made from ordinary stocking welts has not proved satisfactory.

It is, therefore, an object of the present invention to provide a hosiery-girdle-type pantyhose which consists of two seamless hose sewn together wherein in place of a welt there is a compressive, stretch fabric integrally knit with the hose.

It is a further object to form a hosiery-girdle-type pantyhose with front and rear panels that are knit in such a manner that the rear panels provide more fabric or stretch to conform to the buttocks of the wearer.

It is a further object of the invention to provide such a girdle-type pantyhose wherein the additional fabric in the rear panels of the girdle portion is provided through continuous knitting, without the need for cutting the hose and sewing in additional panels, so as to produce a pantyhose of the above character at reduced cost.

It is a further object of the present invention to provide pantyhose of the above character wherein the front panels have minimum vertical stretch and maximum horizontal stretch, while the rear panels are provided with more fabric for the same amount of yarn thereby giving more vertical stretch while not reducing the horizontal stretch very greatly.

A preferred form of the invention comprises two seamless hose wherein upper portions of the hose are formed from integrally knit compressive, stretch fabric rather than the usual hose welt. The compressive, stretch fabric portion of each hose is cut along a vertical line that extends down from the upper edge of the hose and separates front and rear panels of the hose. Pairs of hose are then joined directly together by sewn seams extending along the edges formed by the cuts in the upper regions of the girdle portion and indirectly together in the crotch region by a diamond-shaped crotch panel which is inserted between the edges.

The compressive, stretch fabric of the hose is formed with front and rear panels that are knit so as to provide minimum vertical stretch and maximum horizontal stretch for the front panel while at the same time, the rear panel is knit so as to provide both a vertical and a horizontal stretch by reason of stitch construction wherein, on the average, there are a greater number of stitch loops in the rear panel than the front panel.

In the preferred form of the invention, the front panels of the hose are formed with alternative courses knit in regular jersey stitching while intermediate courses have stitch loops only in every fourth wale, the yarn being floated in the three wales intermediate every fourth wale. In the rear panels of the courses all or at least a greater number of the courses are knit with a regular jersey stitch without the yarn being floated for certain selected wales in the courses so as to form more fabric in the rear panels than the front panels for the same number of courses.

The girdle portions of the hose are preferably made on a conventional multi-feed circular knitting machine utilizing a first type of yarn for the alternative courses mentioned above and a second type of yarn for the intermediate courses. The first type of yarn can be any conventional stretch type yarn. Typically, suitable yarns which can be used for the first yarn comprise the synthetic linear thermoplastic polyamides and like polymers such as nylon with one such yarn being commercially identified as "Superloft." The second yarn is preferably an elastomeric yarn such as a non-foam elastomeric polyurethane yarn one such yarn being commercially identified as "Spandex" which is available from the Firestone Tire and Rubber Company. The elastomeric polyurethane yarns are preferably covered or wrapped with nylon or the like so that essentially uniform coloring is obtained after the dyeing of the fabric.

The above objects and advantages of the present invention will become better understood and further objects and advantages of the invention will become apparent from the following detailed description when taken in conjunction with the accompanying drawings in which:

FIG. 1 is a front view of the hosiery-girdle-type pantyhose of the present invention;

FIG. 2 is a rear view of the hosiery-girdle-type pantyhose of the present invention;

FIG. 3 is an enlarged fragmentary view of the front panel of the girdle portion of the hosiery-girdle-type pantyhose of the present invention illustrating a preferred knit for the front panels;

FIG. 4 is an enlarged fragmentary view of the back panel of the girdle portion of the hosiery-girdle-type pantyhose illustrating the preferred knit; and

FIG. 5 is a diagrammatic view of an alternative form of the knit which can be utilized in the present invention for the girdle portion of a girdle-type pantyhose.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the figures and, in particular, to FIGS. 1 and 2, a preferred form of the hosiery-girdle-type pantyhose of the present invention is shown which is generally designated by reference numeral **20**. The hosiery-girdle-type pantyhose comprises two seamless hose **22** and a diamond-shaped crotch panel **24**. The upper portions of each hose **22**, which form the compressive girdle portion **30** of the hosiery-girdle-type pantyhose, are made up of front and rear stretch fabric panels **26**, **28** that are integrally knit with the hose.

To form the girdle portion **30** of each pantyhose, the upper portions of a pair of hose are slit longitudinally from their upper edges along the inner junctures of the panels **26**, **28**. The two hose are then joined directly together along the edges formed by the slit except in the crotch area. In the crotch, the two hose are indirectly joined by the diamond-shaped crotch panel **24** with the edges formed by the slits in the hose being sewn to the crotch panel **24** rather than to the other seamless hose. The use of the crotch panel or insert **24** is desirable in that it relieves undue stresses in this particular area of the garment and adds to the comfort of the wearer.

In the preferred embodiments of the invention disclosed herein, it has been found desirable to fabricate the girdle portions of the hosiery-girdle-type pantyhose from a stretch nylon yarn, such as "Superloft" or some other suitable stretch synthetic yarn and an elastomeric polyurethane yarn, such as "Spandex," a yarn commercially available from Firestone Tire & Rubber Company or other suitable synthetic elastomer yarns. The elastomeric yarns are preferably covered with nylon fiber or the like. The preferred yarns are two-thirtieths denier "Superloft" nylon and 140 denier double covered "-Spandex." The small, diamond-shaped crotch panel is also preferably made from the same yarns as the rest of the girdle portion **30** on a seamless machine.

The front and rear panels **26**, **28** are knit in such a manner that the rear panels provide more fabric and vertical stretch than the front panels. This is accomplished by knitting the front panels and rear panels so that, for a given number of wales, more stitch loops per course are provided in the rear panels than in the front panels. The relative amount of fabric in the front and rear panels can be regulated by varying the ratio of the stitch loops per course per given number of wales of the rear panels to the front panels. Large ratios can be used when much greater amounts of fabric are required in the rear panels as compared to the front panels and small ratios can be used when it is desired to have the amount of fabric in the front and rear panels substantially equal. Thus, the relative

amount of fabric in the front and rear panels can be selected to meet the requirements of a particular size pantyhose.

A preferred knit for the front and rear panels of girdle-type pantyhose is shown in FIGS. **3** and **4** wherein the ratio of stitches per course per given number of wales of the rear panel to the front panel is eight to five.

As best shown diagrammatically in FIG. **3** (wherein the stitch loops in wales w_4 are shown elongated relative to the loops in wales w_1, w_2, w_3 for the purpose of two-dimensional illustration) the front panels **26** are formed with nylon yarn **34** in the alternate odd numbered courses **7***a*, **1***b*, **3***b*, **5***b*, **7***b*, **1***c*, **3***c* and elastomeric polyurethane yarn **36** in intermediate even numbered courses **8***a*, **2***b*, **4***b*, **6***b*, **8***b*, **2***c*. The courses with the nylon yarn **34** are formed with conventional jersey stitching in all of the wales (w_1 through w_4). However, the courses formed with the elastomeric polyurethane yarn **36** have stitch loops only in every fourth wale w_2 or w_4, depending on the course, with the yarn being floated across the intermediate wales whereby the intermediate even numbered courses in the front panels only have one fourth as many stitch loops as the alternate odd numbered courses in the front panels.

The knit of rear panels **28** is illustrated in FIG. **4**. As shown, both the odd numbered courses knit with nylon yarn **34** and the even numbered courses knit with elastomeric polyurethane yarn **36**, are formed with regular jersey stitching in all of the wales. Consequently, on the average, more fabric per course is formed in the rear panel than the front panel with the rear panel having eight stitch loops for every five stitch loops in the front panels. Thus, a girdle-type pantyhose of the present invention having 1,250 loops in 10 courses in the front panel would have 2,000 loops in the rear panel for the same number of courses or on a conventional circular knitting with two feed, there would be 1¼ courses per revolution in the front panel versus two courses per revolution in the rear panel.

With the above construction, in the front panels there is minimum vertical stretch and maximum horizontal stretch and compressive power due to the fewer number of vertical stitch loops which are replaced by floated horizontally extending portions of yarn. In the rear panels there is more fabric and more vertical stretch to accommodate the buttocks of the wearer.

From the above, it is obvious that more fabric can be formed in the front panels by floating the yarn for fewer wales in the intermediate courses or by forming some of the intermediate courses with a regular jersey stitch in all wales. Conversely, the amount of fabric in the rear panels can be reduced by floating yarn in some of the rear panel portions of the courses.

As can be seen in FIG. **3**, after the completion of a series of eight courses, the wales in which the stitch loops of elastomeric polyurethane yarn **36** are formed are stepped over to the wales midway between the wales in which the loops were knit for the previous knitting courses (from wales w_2 in series *a* to w_4 in series *b* and from wales w_4 in series *b* back to w_2 in series *c*). Due to the elasticity of the yarn and the greater number of stitch loops in wales w_2 and w_4 for successive series of courses, the fabric in the front panel becomes puckered when relaxed.

While the rear panel is shown (FIG. **4**) made up completely of regular jersey stitching for the purpose of illustrating the invention, a pucker pattern can also be formed in the rear panel. This, of course, will result in less fabric for the rear panel when compared to the embodiment illustrated in FIG. **4**. However, the formation of the rear panel in this manner can be desirable to improve the appearance of the pantyhose and to increase the compressive force of the stretch fabric in the rear panels.

In one preferred construction, the rear panel is formed with eight courses of jersey stitch with nylon yarn **34** in alternate courses and elastomeric polyurethane yarn **36** in intervening courses. After a series of eight courses, the next two courses are knit in the same manner as the courses in the front panel with the elastomeric polyurethane yarn **36** being floated a certain selected number of wales so as to form a pucker pattern in the rear panels. Of course, the number of wales the yarn is floated between stitch loops and the number of courses knit in this manner can be selected according to the requirements of the particular fabric. For example, instead of knitting only two courses in the same manner as the front panel, four, six, eight or more courses can be knit this way to obtain the desired effect.

By way of example, the girdle portion of the girdle-type pantyhose of the present invention, as illustrated in FIGS. **3** and **4**, is knit on a conventional multi-feed circular knitting machine. When using such a machine, two courses can be knit per revolution. The nylon yarn in both the front and rear panels is knit in every needle in a regular or jersey stitch. However, the elastomeric polyurethane yarn although knit in every needle in a regular jersey stitch in the rear panel, is laid in on three needles and knit every fourth needle in the front panel. After eight courses, the knitting machine is programmed so that the elastomeric polyurethane yarn is knit on the needles midway between the needles on which the yarn was previously being knit. By stepping over the alternate needles in every eighth course (from the needles knitting wales w_2 to the needles knitting wales w_4 and back) the desired pucker pattern illustrated in FIG. **3** is produced.

Turning now to FIG. **5**, which is a fragmentary illustration of a portion of the front or rear panel of girdle-type pantyhose, another embodiment of the invention is shown wherein nylon yarn **134** is present in all courses **101**, **102**, **103** etc., and knit on all the needles in a conventional jersey stitch. Elastomeric polyurethane yarn **136** is provided in alternating courses **102** and is knit on one needle and laid in on the next three needles. While maximum compressive force is obtained from the construction, such as illustrated in FIG. **5**, the construction lacks one advantage of the previous embodiment from a cost standpoint since the laying in of the elastomeric polyurethane yarn **136** in the rear panels reduces the available amount of fabric. As illustrated in FIG. **5**, the second embodiment has the elastomeric polyurethane yarn **136** knit in alternate courses with the yarn **136** being knit in wales w_4 and floated in wales w_1, w_2, w_3. It is to be understood that additional courses of nylon yarn **134** could be interposed between the courses including the elastomeric polyurethane yarn **136** and that the yarn **136** can be floated for a greater or lesser number of wales if desired or necessitated by the particular fabric being produced.

While the preferred form of the invention has been shown and described it is to be understood that all suitable modifications and equivalents may be resorted to which fall within the scope of the invention.

What is claimed is:

1. A component of a pantyhose garment having a girdle portion integrally knitted therein, said component comprising:

a lower stocking portion shaped to fit a leg of a wearer,

an upper elastic portion comprising essentially half of said girdle portion in a finished garment and including courses of an elastomeric yarn integrally knit therein,

said upper elastic portion comprising:

a front panel comprising adjacent sets of predetermined numbers of courses and also comprising approximately one half the circumference of said component and having alternate courses of yarn knitted in every wale with intervening courses of elastomeric yarn knitted at preselected wales which occur at regular intervals with said elastomeric yarn being floated over intervening wales between said preselected wales and wherein said preselected wales are staggered between said adjacent sets of courses; said preselected wales being of a number to result in a first average number of stitch loops in said intervening courses of elastomeric yarn, and

a back panel comprising the other half circumference of said component and having alternate courses of hose fabric knitted in every wale with intervening courses of elastomeric yarn knitted at preselected wales, which courses are continuations of the corresponding courses

in said front panel but wherein the number of said preselected wales for the back panel is higher than that for the front panel to result in a second average number of stitch loops in said intervening courses of elastomeric yarn,

said second number being substantially greater than said first number to provide more fabric for accommodating the buttocks of a wearer in said back panel.

2. A girdle-pantyhose garment formed from two components as in claim 1 and comprising:

a first one of said components providing a first front panel and a first back panel.

a second one of said components providing a second front panel and a second back panel,

said first front and back panels being cut apart and separated along at least a portion of the upper elastic portion of said first component,

said second front and back panels being cut apart and separated along at least a portion of the upper elastic portion of said second component,

said first and second front panels being joined together along at least part of said separated portions to form a complete front panel for said girdle portion of said pantyhose garment, and

said first and second back panels being joined together along at least part of said separated portions to form a complete back panel for said girdle portion of said pantyhose garment.

3. A component for a girdle-pantyhose garment as in claim 1 wherein:

said preselected wales comprise every fourth wale in the front panel with elastomeric yarn being floated over the intervening three wales therebetween,

said predetermined numbers of courses being eight whereby the preselected wales are shifted in position by two wales after every eighth course to result in a staggered configuration of knitted elastomeric yarn wales, and

said preselected wales in the back panel comprise every wale in the back panel to result in every wale of elastomeric yarn being knitted to thereby provide a maximum amount of stretch fabric in the back panel to accommodate the buttocks of a wearer.

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