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- (72) Inventor; and
(71) Applicant : RAD, Fariba [US/US]; 1005 Terra Bella, Irvine, CA 92602 (US).
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(54) Title: FOOTLESS PANTYHOSE UNDERGARMENT WITH MODIFIED LEG BANDS

(57) Abstract: A footless pantyhose undergarment includes a panty portion and two leg portions. Each one of the leg portions terminates at a leg band. Each leg band has two layers, which together, create a first stretch factor. Each one of the leg portions has a second stretch factor which is approximately equal to the first stretch factor.

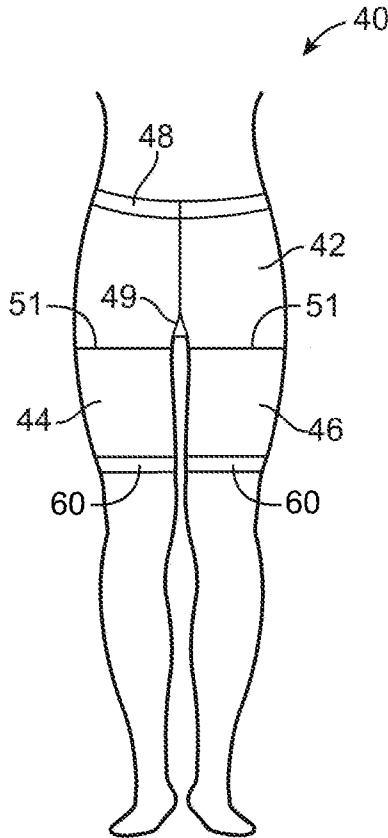


FIG. 1



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FOOTLESS PANTYHOSE UNDERGARMENT WITH MODIFIED LEG BANDS

PRIORITY

This application claims priority to U.S. Provisional Patent Application Ser. No. 61/204,748 titled "Footless Pantyhose Underwear with Elastic", which was filed Jan. 9, 2009, and U.S. Provisional Patent Application Ser. No. 61/209,852 titled "Non-control Shapewear", which was filed Mar. 11, 2009.

TECHNICAL FIELD

The present invention relates to a footless pantyhose undergarment, in particular to a leg band to be used with non-control or reinforced undergarments or shapewear made of pantyhose material.

BACKGROUND OF INVENTION

For years women have been using footless pantyhose undergarment or shapewear to sculpt their bodies and eliminate visible panty lines when wearing tight clothing such as pants or clothing with delicate fabrics such as silk. However, the leg bands of the footless pantyhose undergarment or shapewear usually cause different types of problems.

Footless pantyhose undergarments or shapewear are made of a panty portion integrally knitted to two leg portions each terminating at a leg band. Each portion of the footless pantyhose undergarment is knitted with a body yarn such as stretch nylon or textured nylon. A body yarn is the main yarn used to knit the pantyhose. A high denier elastic yarn, such as 80 or higher denier spandex, is coupled with the body yarn of the panty portion and may be to the body yarn of the leg portions to create reinforcement and place compressive force onto the body for the purpose of sculpting and/or smoothing.

The leg bands are typically made similar to the waistbands and have an elastic yarn with a high denier such as 150 denier spandex coupled to the body yarn during the knitting. The high denier spandex causes the waistband and the pantyhose to stay in place while the wearer moves.

However, the leg bands do not need such an excessive amount of elastic yarns. The conventional leg bands made with high elastic yarns such as 150 denier spandex, cause a lot of discomfort and may also cause blood circulation problems. Since the leg bands use a higher denier elastic yarn compared to the elastic yarn used in the leg portions and since the leg bands have two layers, they create a much higher compressive force than the leg portions and therefore, create indentation in the leg which is not desirable when worn with tight clothing. In addition, due to having two layers, the leg bands are usually thicker and create an uneven look compared to the leg portion.

Therefore, there is a need for leg bands that do not create excessive pressure and provide a smooth look on the legs which could be used for both control and non-control footless pantyhose undergarments. The non-control footless pantyhose undergarments can be used as a light undergarment without placing excessive pressure on the wearer's body.

SUMMARY OF INVENTION

The present invention provides a footless pantyhose undergarment having a panty portion and two leg portions. Each leg portion terminates at a leg band. Each leg band has two layers and together they create a first stretch factor. Each leg portion has a second stretch factor. The first and second stretch factors are approximately equal.

The present invention reduces the compressive force placed on the body by the leg bands of the conventional footless pantyhose. In addition, the present invention substantially reduces the indentation created by the conventional leg bands on the legs of the wearers.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a non-control footless pantyhose undergarment with the leg band of the present invention.

FIG. 2 illustrates an enlarged view of the leg band of Figure 1.

FIG. 3 illustrates a reinforced footless pantyhose undergarment with the leg band of the present invention.

FIG 4 is a representation of different embodiments of this invention showing different possibilities for the placement of their waistband and leg bands.

DETAILED DESCRIPTION OF THE INVENTION

Referring to Figure 1, there is shown a footless pantyhose undergarment or shapewear 40 of this invention. The panty portion 42 is seamlessly connected to the leg portions 44 and 46 along the line 51. The panty portion 42 end at a waistband 48 and each leg portion 44 and 46 ends at one of the leg bands 60. The waistband 48 can be an elastic band, knitted-in welt, or can be made by any other knitting process which can create a terminating edge. A crotch section 49 can be made as a separate piece from a cotton yarn or with a cotton lining to eliminate the need for wearing a panty. However, the crotch portion may or may not be included.

It should be noted that, unlike fashion hosiery, the footless pantyhose undergarment or shapewear discussed in this specification is strictly used as an undergarment and is not visible to the public. Furthermore, in this specification, “shapewear”, “footless pantyhose undergarment”, “footless pantyhose”, “pantyhose undergarment”, or “undergarment” have all been used interchangeably.

Referring to Figure 2, there is shown an enlarged view of the knitted-in leg band 60 partially lifted to expose the inside or the bottom layer 62. The knitted-in leg band 60 is a two-ply band made of a continuous segment which has been folded along the edge 64 and attached to each other along the line 66. The body yarn used in the leg band 60 is nylon with a denier of about 60 or less to create thin leg bands. However, it should be noted that any body yarn with any denier suitable for footless pantyhose or shapewear can also be used.

Contrary to the conventional practice of using high denier elastic yarns, such as 120 denier or higher spandex, the leg bands 60 of this invention are made of elastic yarns with a denier of about 60 or less to create a small amount of compressive force to reduce the indentation created by the leg bands on the wearer's legs and provide a comfortable feel for extended wear. Since the leg bands 60 have a low denier body yarn and lower denier elastic compared to conventional leg bands, they provide a thinner and softer feel which is a very desirable feature for many women. For the purpose of clarity in this specification the leg bands 60 with the elastic yarn of about 60 or less denier are called "comfort leg band 60."

However, some women prefer a bit more snug fit, but still soft and comfortable feel. For a more snug fit, the leg band 60 can have elastic yarns with a denier of 60 - 80, which is still substantially less than the typical denier of 120 or higher, and therefore it can still provide a comfortable feel without the excess pressure. The snug fit of the leg bands 60 is much less tight compared to conventional leg bands. Therefore, the combination of the low denier body yarn with the snug fit provides a good grip with a comfortable feel. For the purpose of clarity in this specification the leg bands 60 with the elastic yarn of about 60 to 80 denier are called "grip and comfort leg band 60."

It should be noted that the following alternative embodiments equally apply to the comfort leg band 60 and the grip and comfort leg band 60.

The outside or the top layer 68 and the inside or the bottom layer 62 can have a common elastic yarn or each can have an elastic yarn with a different denier. Alternatively, only either the top layer 68 or bottom layer 62 can have an elastic yarn. In another embodiment, the elastic yarn of the top layer 68 can have a denier greater than the denier of the elastic yarn in the bottom layer 62.

Alternatively, either the top layer 68 or both the top layer 68 and the bottom layer 62 of the folded segment are knitted with the same stitch pattern, same body yarn, and same elastic yarn as the ones in the leg portion 65. In other words, the same stitch pattern and yarns of the leg portion continue into the knitted in leg band to create a uniform look between the top layer 68 and the leg portion 65. However, if one desires, the stitch pattern and the body yarn can be modified to create a different look or opacity on the leg band.

To create a more comfortable leg band, each one of the elastic yarns used in the top layer 68 and the bottom layer 62 should have a denier equal or less than the denier of the elastic yarn used in the leg portion 65.

In the leg band 60 of Figure 2, both the top and the bottom layers 68 and 62 have a common body yarn such as 40 denier nylon. Alternatively, the top layer 68 and the bottom layer 62 can have different body yarns. In either case of the common body yarn or different body yarns, to create a thin leg band, each body yarn should have a denier in the range of about 60 or less. However, any body yarn with any denier suitable for footless pantyhose undergarment can also be used.

It is desirable to have a leg band 60 with a stretch factor similar to the stretch factor of the leg portions 65 to substantially reduce the indentations caused by the leg bands. Since the leg bands 60 have two layers, the stretch factor of each leg band is the combination of the stretch factors of the two layers. Therefore, the top and bottom layers together create a stretch factor for the leg band.

In order to create an approximately equal stretch factor between the stretch factor of the single layer leg 65 and the stretch factors of the two-ply leg band 60, the sum of the deniers of the elastic yarn of the top layer 68 and the elastic yarn of the bottom layer 62 should be substantially equal or less than the denier of the elastic yarn used in the leg portion 65. For example, if the elastic yarn of the leg portion 65 has a denier of 40, the top layer 68 can have an elastic yarn with a denier of 30 and the bottom layer 62 can have an elastic yarn with a denier of 10. Alternatively the top layer 68 can have an elastic yarn with a denier of 40 and the bottom layer 62 can be knitted without an elastic yarn.

It should be noted that in this specification, an elastic yarn with a denier 0 is defined as a yarn without elastic.

It is also desirable to create a leg band 60 with the same thickness as the thickness of the leg portion 65 to create an even look between the leg portions 65 and the leg bands 60. Since the leg bands 60 have two layers, the thickness of each leg band 60 is the combination of thickness of the top layer 68 and the bottom layer 62.

Therefore, in order to create an approximately equal thickness between the leg bands 60 and the leg portions 65, the sum of the deniers of the body yarn of the top layer 68 and the body yarn of the bottom layer 62 should be substantially equal or less than the denier of the body yarn used in the leg portions 65. For example, if the body yarn of the leg portion 65 has a denier of 40, the top layer 68 can have a body yarn with a denier of 30 and the bottom layer 62 can have a body yarn with a denier of 10 or alternatively each one of the top layer 68 and the bottom layer 62 can have a body yarn with a denier of 20.

It should also be noted that the leg band 60 can be made of different stitch patterns. For example the leg band can be a knitted-in welt or it can be made with any other stitch pattern such as jersey. Furthermore, the leg band 60 can be used to terminate any footless pantyhose leg regardless of the denier of the yarns used in the leg portion. In other words, the leg band 60 can be used with reinforced, non-control, sheer, or thick footless pantyhose leg.

Referring back to Figure 1, the footless pantyhose undergarment or shapewear 40 is non-control. Any body yarn with any denier suitable for footless pantyhose undergarment or shapewear can be used for the undergarment 40. However for a thinner undergarment, the body yarn should have a denier of 60 or less, e.g., a 6.0 or 6.6 nylon with a denier of 60 or less. Thinner footless pantyhose are desirable because they allow the body to breath and move easier.

The panty portion 42 and the leg portions 44 and 46 have a common body yarn of about 40 denier nylon. As a result, the panty extends into the legs with the same thickness without any transition line to create a unity between the panty and the legs. Alternatively, the panty portion 42 can have a body yarn with a higher denier than the body yarn of the legs 44 and 46 to create opacity. In either case of the common body yarn or different body yarns, each body yarn preferably should have a denier in the range of about 60 or less. Alternatively, the panty portion 42 and the leg portions 44 and 46 can be made to be all sheer or all opaque and can be knitted with any stitch pattern.

To create a clinging effect in the non-control footless pantyhose undergarment 40, elastic yarns with a denier of about 60 or less have been coupled with the body yarns of the panty portion 42 and leg portions 44 and 46. The clinging effect is a desirable feature because it causes the undergarment to stay in place during the body movement. However, the amount of elastic in the yarns with a denier of about 60 or less is sufficiently low to create a relatively small amount of compressive force against the body of the wearer. In other words, the panty portion 42 and the leg portions 44 and 46 are non-control.

It should be noted that in this specification, the non-control embodiments have elastic yarns with a denier that is below the typical range used for control top or support pantyhose. Therefore, in this specification “non-control”, “without reinforcement” “without support”, shall all mean a type of pantyhose/footless pantyhose knitted with elastic yarns having a denier of about 60 or less.

The panty portion 42 and the leg portions 44 and 46 have a common elastic yarn of about 40 denier spandex to create a uniform thin undergarment. The elastic yarn used for the panty portion 42 and the leg portions 44 and 46 can be the same or the panty portion 42 can have an elastic yarn with a different denier than the elastic yarn used for the leg portions 44 and 46. However in both cases of the common elastic yarn or different elastic yarns, each elastic yarn should have a denier of about 60 or less.

The elastic yarn is coupled with the body yarns of the panty and the legs at every other course. However, the elastic yarn can be coupled with the body yarn in any manner other than every other course. Furthermore, the elastic yarn used in different embodiments of this invention can be a covered elastic yarn or a bare elastic yarn.

Depending on the design of the undergarment 40, there might be a need to use multiple types of elastic yarns with different deniers in each one of the panty portion, the leg portions, or in both the panty and the leg portions. In which case, the elastic yarn with the highest denier should have a denier of about 60 or less.

It is well known in the industry that the best and preferred way to create control top pantyhose is to increase the denier of the elastic yarns. However, in some occasions, one might try to use a low denier elastic yarn and use high tension during stitching to create reinforced pantyhose.

It should be noted that in all the non-control embodiments of this invention, to keep the footless pantyhose as non-control, a tension of about 3 grams or less has been used.

The knitted-in waistband 48 has a high denier elastic yarn coupled with a body yarn during the knitting. The body yarn is a yarn such as 40 denier nylon and the elastic is a yarn such as 120 denier spandex. The high denier spandex causes the waistband and the pantyhose to stay in place while the wearer moves. If one desires, the knitted-in waistband can be replaced with an elastic band.

The footless non-control pantyhose undergarment 40 with comfort leg band 60 has the following yarn combinations: the panty portion, the leg portions, and each layer of the leg bands each has an elastic yarn with a denier in the range of about 60 or less. Within the range of 60 or less, it is possible to have the elastic yarn of the panty to be higher than the elastic yarn in the legs.

To provide approximately equal stretch factor between the leg band 60 and the leg portion 44 and 46, in the above embodiment, the sum of the deniers of the elastic yarns in the top and bottom layers of the leg bands 60 should be substantially equal or less than the denier of the elastic in the leg portions 44 and 46. In the same manner, to create an approximately equal thickness between the leg bands 60 and the leg portions 74 and 76, the sum of the denier of the body yarns in the top and bottom layers of the leg bands 60 should be substantially equal or less than the denier of the body yarn in the leg portions 74 and 76.

It should further be noted that the elastic yarn used in all the embodiments of this invention is spandex. However any other type of elastic yarns can also be used.

In all the embodiments of this invention, 7 denier yarns can be used with microscopic knitting process to create a finer sheer effect.

Referring to Figure 3, there is shown a footless reinforced pantyhose undergarment 70 with leg band 60 of Figure 2 to provide a softer and a more comfortable feel. The panty portion 72 is seamlessly knitted to the two leg portions 74 and 76 along the line 71. The panty portion 72 ends at a waistband 78 and the leg portions 74 and 76 end at leg bands 60. The waistband 78 can be an elastic band, knitted-in welt, or can be made with any knitting process which can create a terminating edge.

The panty portion 72 and the leg portions 74 and 76 have a common body yarn of about 40 denier nylon. As a result, the panty extends into the legs with the same thickness without any transition line to create a unity between the panty and the legs. Alternatively,

the panty portion 72 can have a body yarn with a higher denier than the body yarn of the legs 74 and 76 to create opaque panty and sheer legs. In either case of the common body yarn or different body yarns, the body yarns preferably should have a denier in the range of about 80 or less. However, it should be noted that any body yarn with any denier suitable for a shapewear can also be used. For a thinner undergarment, the body yarn should have a denier of 60 or less. Alternatively, the panty and the legs can be made to be all sheer or all opaque and can be knitted with any type of stitch pattern.

The panty 72 has an 80 denier spandex and the legs 74 and 76 have a 40 denier spandex. The elastic yarn used for the panty portion 72 and the leg portions 74 and 76 can be the same or different. In the case of common elastic yarn, the elastic yarn should have a denier in the range of about 60 to about 150. Using a common elastic yarn in both the panty portion and the leg portions creates reinforced panty and reinforced legs. However, to keep the legs non-control, the legs can be made an elastic yarn with a denier of about 60 or less.

The waistband 78 is a knitted-in welt made of a high denier elastic yarn such as 120 or higher denier spandex coupled with a body yarn such as nylon during the knitting process. The high denier spandex causes the waistband and the pantyhose to stay in place while the wearer moves. If one desires, the knitted-in waistband can be replaced with an elastic band. A crotch 79 may or may not be included.

The footless reinforced pantyhose undergarment 70 can be combined with the comfort leg band 60 to provide a more comfortable feel for women who prefer a lighter clinging effect on the leg band.

The footless reinforced pantyhose 70 with reinforced panty portion, non-control leg portions, and comfort leg band 60 have the following yarn combinations: the panty portion has an elastic yarn with a denier of about 60 to about 150, the leg portions have an elastic yarn with a denier of about 60 or less, and each layer of the leg band has a

denier in the range of 60 or less.

The footless reinforced pantyhose 70 with reinforced panty portion, reinforced leg portions, and comfort leg band 60 have the following yarn combinations: the panty portion has an elastic yarn with a denier of about 60 to about 150, the leg portions 74 and 76 have an elastic yarn with a denier of about 60 to about 150, and each layer of the leg band has a denier in the range of about 60 or less.

To provide an approximately equal stretch factor between the leg band 60 and the leg portion 74 and 76, in the above two embodiments, the sum of the deniers of the elastic yarn in the top and bottom layers of the leg bands 60 should be substantially equal or less than the denier of the elastic in the leg portions 74 and 76. In the same manner, to create an approximately equal thickness between the leg bands 60 and the leg portions 74 and 76, the sum of the denier of the body yarns in the top and bottom layers of the leg bands 60 should be substantially equal or less than the denier of the body yarn in the leg portions 74 and 76.

The footless reinforced pantyhose undergarment 70 can also be combined with the grip and comfort leg band 60 to provide a snug fit with comfort for women who prefer a bit tighter grip on the leg bands.

The footless reinforced pantyhose 70 with reinforced panty portion, reinforced leg portions, and grip and comfort leg band 60 have the following yarn combinations: the panty portion has an elastic yarn with a denier of about 60 to 150, the leg portions have an elastic yarn with a denier of about 60 to 150, and each layer of the leg band has a denier in the range of about 60 to about 80.

To provide approximately equal stretch factor between the leg band 60 and the leg portion 74 and 76, in the above embodiment, the sum of the deniers of the elastic yarns in the top and bottom layers of the leg bands 60 should be substantially equal or less than the denier of the elastic in the leg portions 74 and 76. In the same manner, to create an

approximately equal thickness between the leg bands 60 and the leg portions 74 and 76, the sum of the denier of the body yarns in the top and bottom layers of the leg bands 60 should be substantially equal or less than the denier of the body yarn in the leg portions 74 and 76.

Referring to Figure 4, due to the changes in fashion, the waistline of clothes move up and down. In any of the above embodiments 40 and 70, the panty portions 42 and 72 (shown by 112 in Figure 9) can be designed to have the waistband 48 and 78 (shown by 118 in Figure 9) end somewhere between the lines 100 and 102. Line 100 is located above the waistline and line 102 is located below the waistline. In the same manner, the leg bands 60 (shown by 120 in Figure 8) can be designed to terminate anywhere from above the knee shown by line 104 to anywhere below the knee shown by line 106.

It should be noted that numerous changes in details of construction, combination, and arrangement of elements may be resorted to without departing from the true spirit and scope of the invention as hereinafter claimed.

1. CLAIMS

A footless pantyhose undergarment comprising:

a panty portion;

two leg portions connected to the panty portion;

two leg bands;

each leg portion terminating at one of the two leg bands;

each leg band having a first layer and a second layer;

the first and second layers together having a first stretch factor; and

each leg portion having a second stretch factor, wherein the first stretch factor is approximately equal to the second stretch factor.

2. The footless pantyhose undergarment of claim 1, wherein the panty portion terminates at a waistband.
3. The footless pantyhose undergarment of claim 1, wherein the first layer comprises a first elastic yarn with a first denier, the second layer comprises a second elastic yarn with a second denier, and each leg portion comprises a third elastic yarn with a third denier.
4. The footless pantyhose undergarment of claim 3, wherein the sum of the first denier and the second denier is substantially equal or less than the third denier.
5. The footless pantyhose undergarment of claim 4, wherein each one of the first and second denier is about 80 or less.
6. The footless pantyhose undergarment of claim 4, wherein the third denier is above 60.
7. The footless pantyhose undergarment of claim 4, wherein the third denier is about 60 or less.
8. The footless pantyhose of claim 1, wherein the panty portion is reinforced.

9. The footless pantyhose of claim 8, wherein the panty portion comprises a fourth elastic yarn with a denier of above 60.
10. The footless pantyhose of claim 1, wherein the panty portion is non-control.
11. The footless pantyhose of claim 10, wherein the panty portion comprises a fourth elastic yarn with a denier of about 60 or less.
12. The footless pantyhose undergarment of claim 1, wherein the first layer of each leg band comprises a first elastic yarn with a first denier, the second layer comprises a body yarn with no elastic, and each leg portion comprises a second elastic yarn with a second denier.
13. The footless pantyhose undergarment of claim 12, wherein the first denier is substantially equal or less than the second denier.
14. The footless pantyhose undergarment of claim 13, wherein the first denier is about 80 or less.
15. The footless pantyhose undergarment of claim 13, wherein the second denier is above 60.
16. The footless pantyhose undergarment of claim 13, wherein the second denier is about 60 or less.
17. The footless pantyhose of claim 12, wherein the panty portion is reinforced.
18. The footless pantyhose of claim 17, wherein the panty portion comprises a third elastic yarn with a denier of above 60.
19. The footless pantyhose of claim 12, wherein the panty portion is non-control.

20. The footless pantyhose of claim 19, wherein the panty portion comprises a third elastic yarn with a denier of about 60 or less.

21. The footless pantyhose undergarment of claim 1, wherein the first layer comprises a first body yarn with a fourth denier, the second layer comprises a second body yarn with a fifth denier, and each leg portion comprises a third body yarn with a sixth denier, wherein each one of the fourth, fifth, and sixth deniers is about 60 or less.

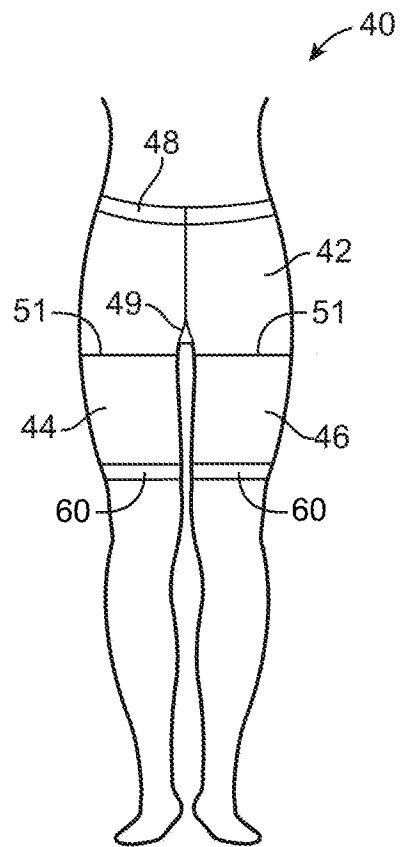


FIG. 1

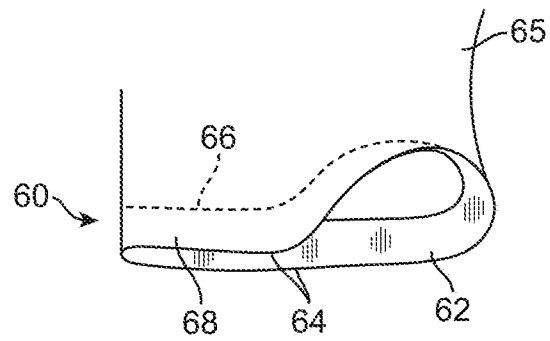


FIG. 2

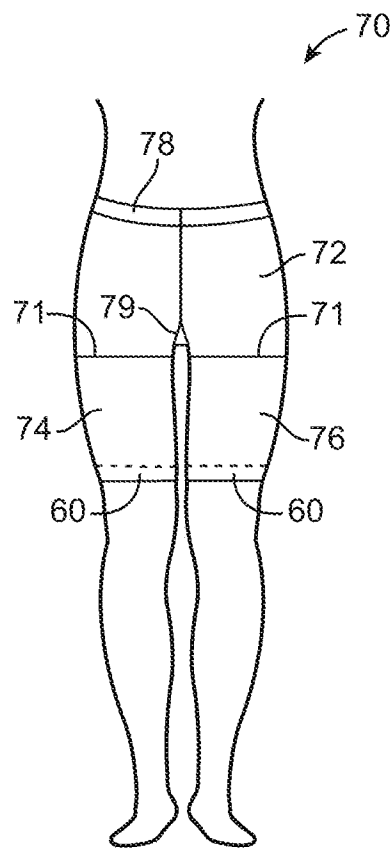


FIG. 3

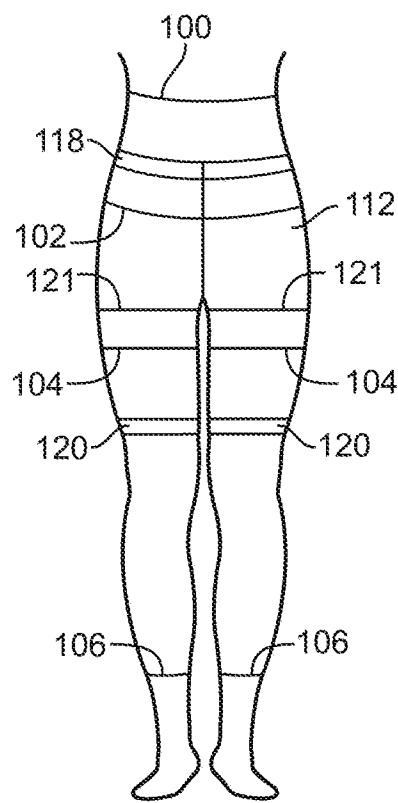


FIG. 4