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(54) **GARMENT FOR FOOT WITH TRIANGULAR ANKLE PANELS**

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A41B 11/00 (2006.01)
D04B 1/10 (2006.01)

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CPC ***D04B 1/26*** (2013.01); ***A41B 11/003*** (2013.01); ***D04B 1/108*** (2013.01)

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See application file for complete search history.

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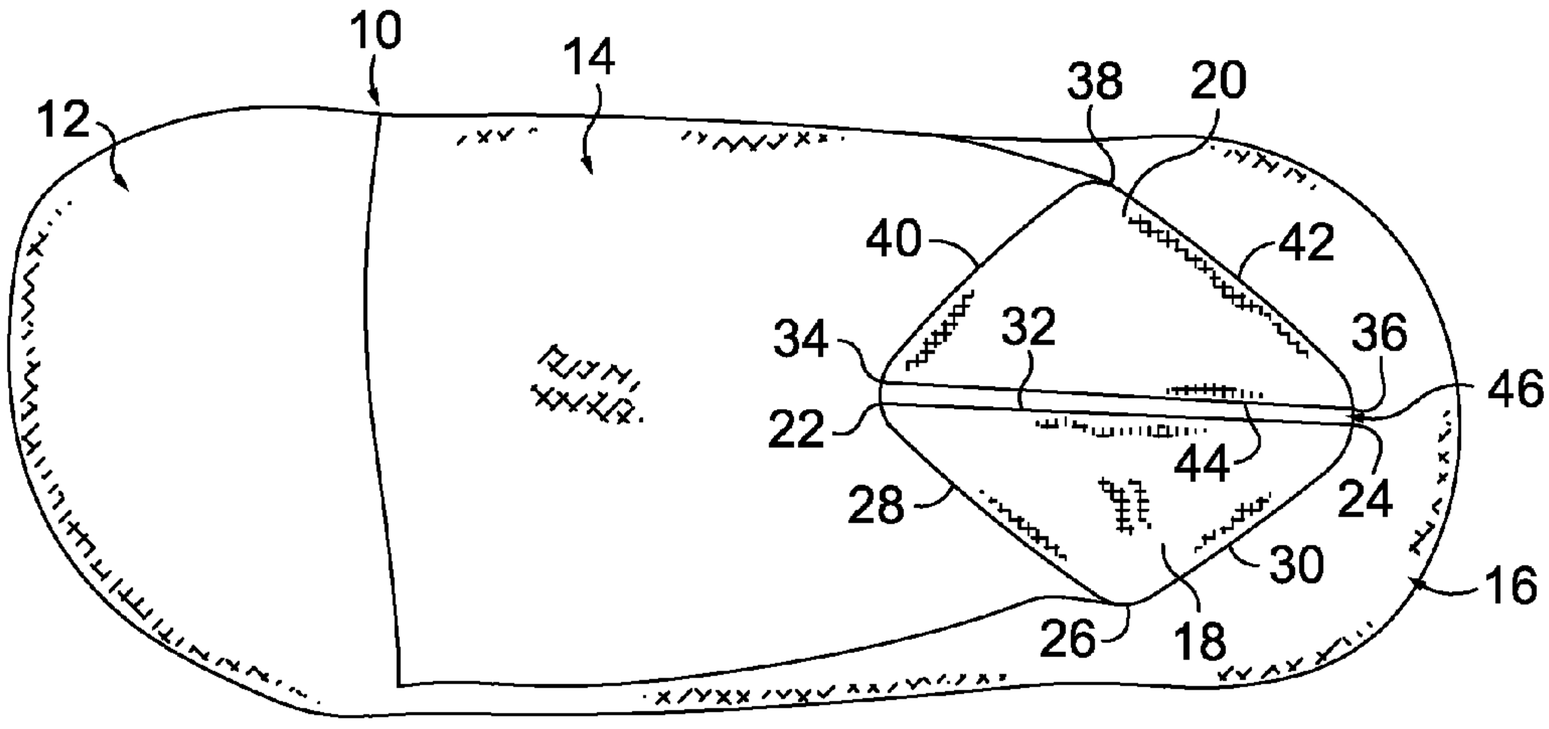
(57) **ABSTRACT**

A knit garment is provided to be worn on the foot that has a toe, foot, and heel area. The garment also has a medial triangular ankle panel and a lateral triangular ankle panel. The medial triangular ankle panel has a first medial vertex near the rear, top portion of the foot area, a second medial vertex near the top of the heel area, and a third medial vertex below and between the first and second medial vertices. The lateral triangular ankle panel has a first lateral vertex near the rear, top portion of the foot area, a second lateral vertex near the top of the heel area, and a third lateral vertex below and between the first and second lateral vertices. The sides of the medial and lateral triangular panels extending between the respective first and second medial and lateral vertices define an opening of the garment for a foot.

18 Claims, 4 Drawing Sheets



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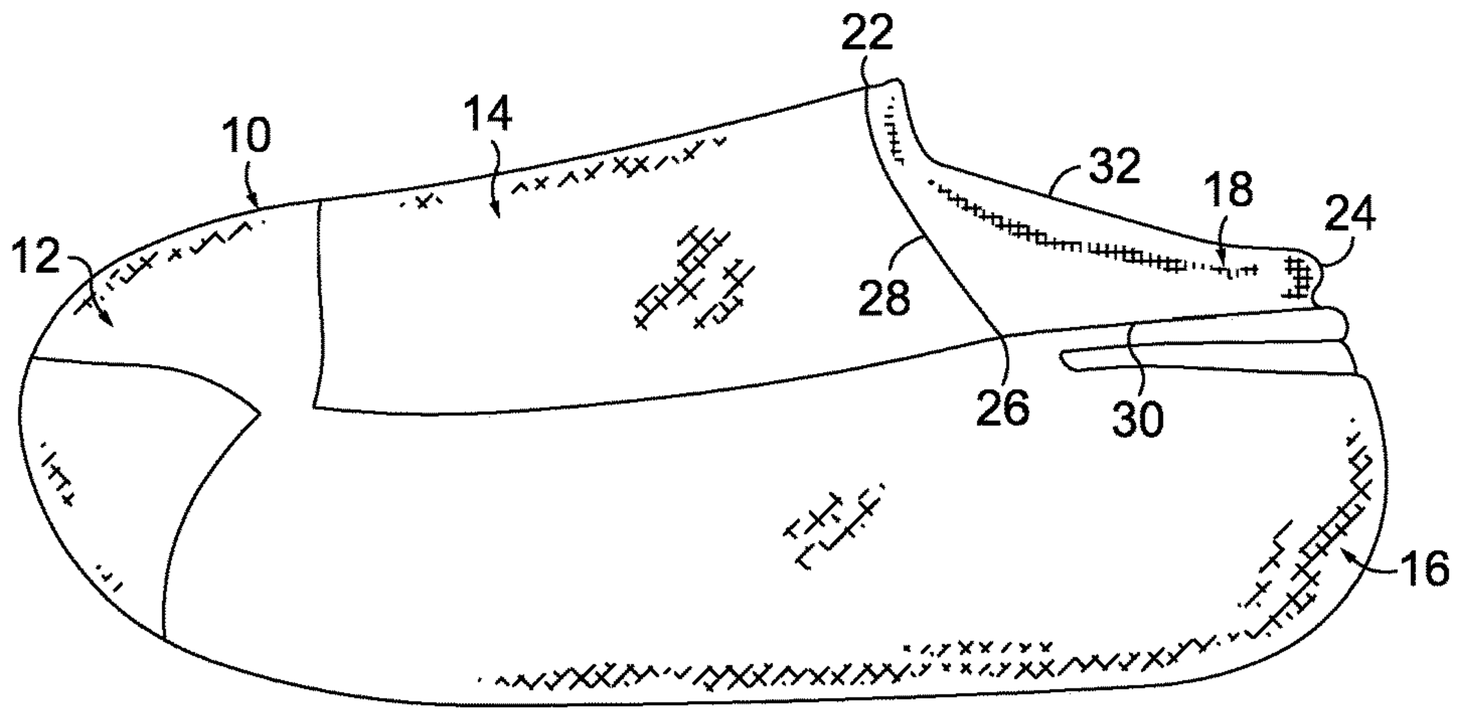

FIG. 1.

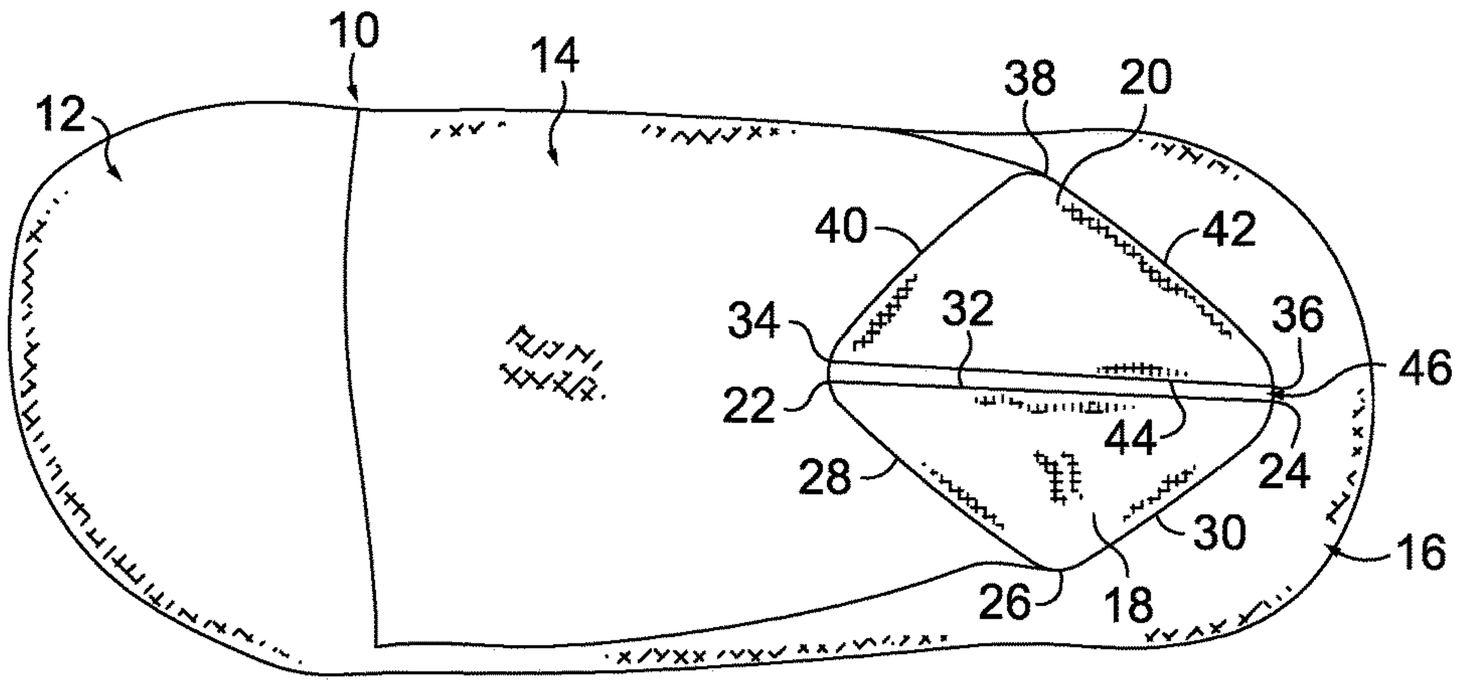

FIG. 2A.

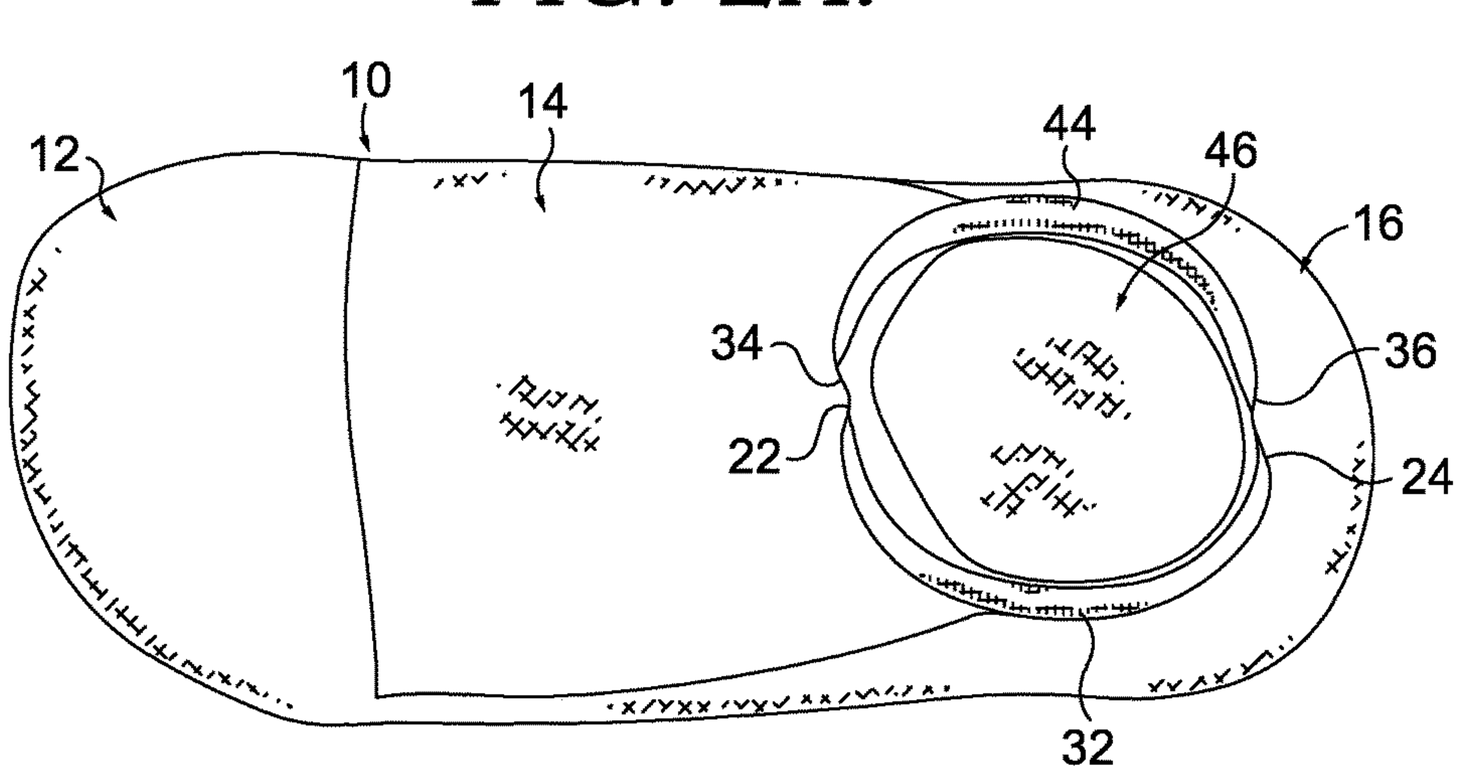

FIG. 2B.

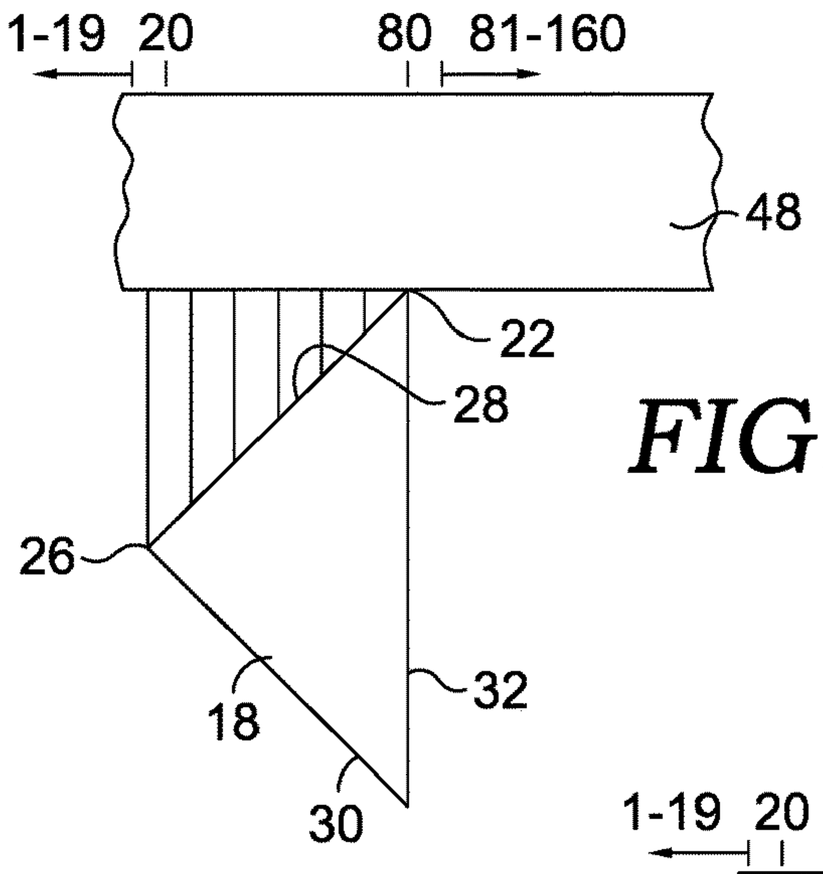

FIG. 3.

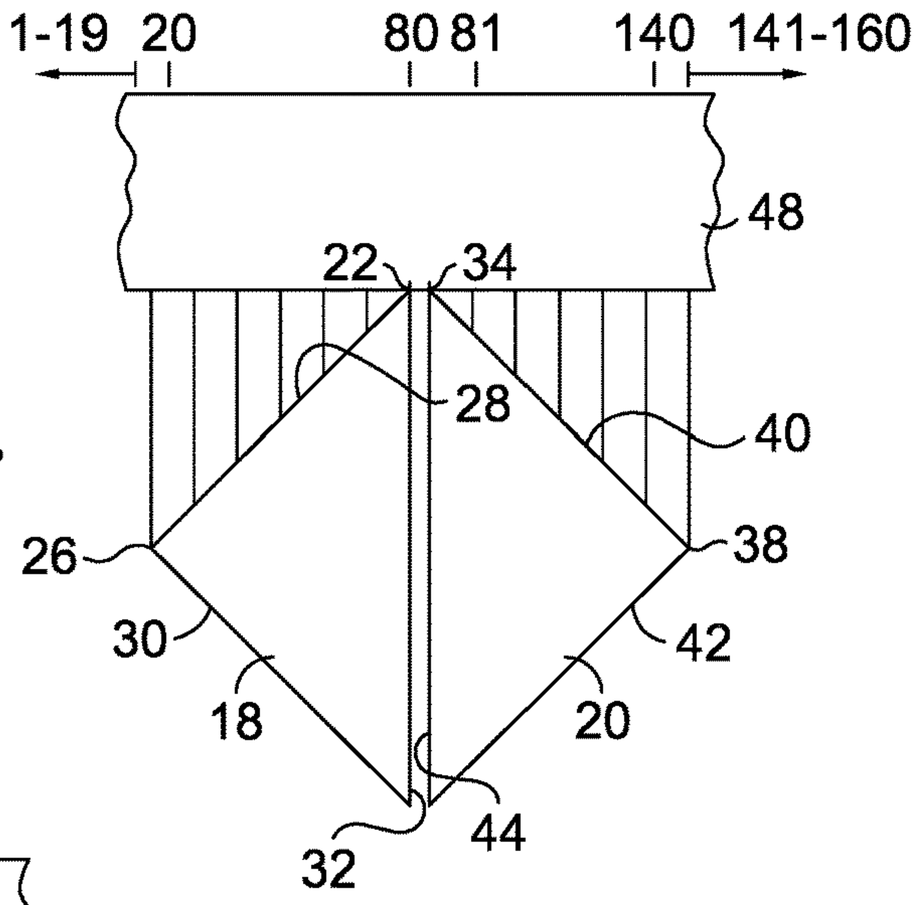

FIG. 4.

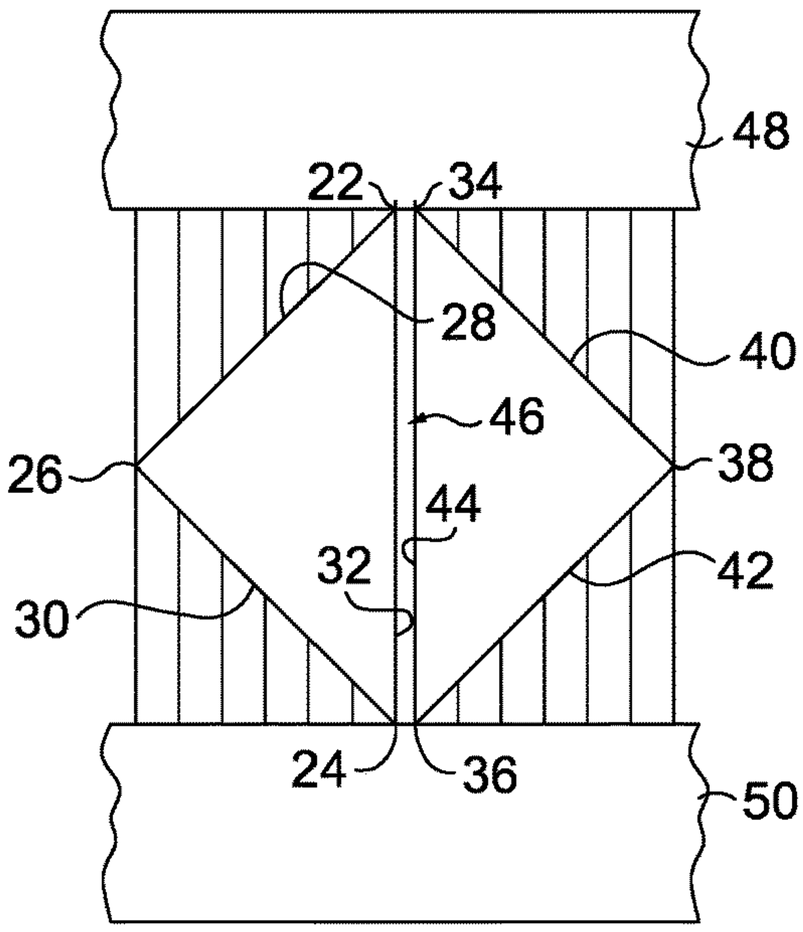

FIG. 5.

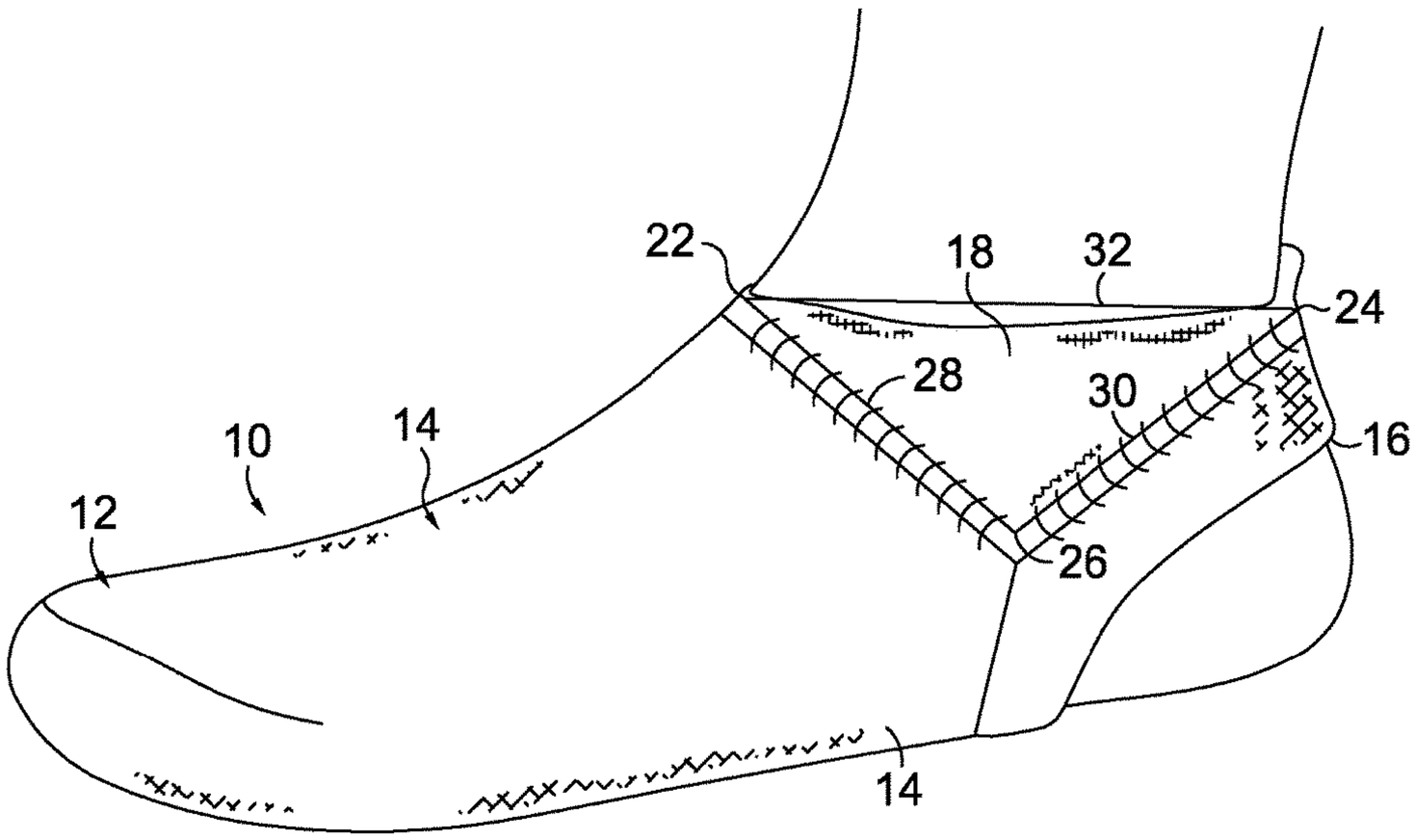

FIG. 6.

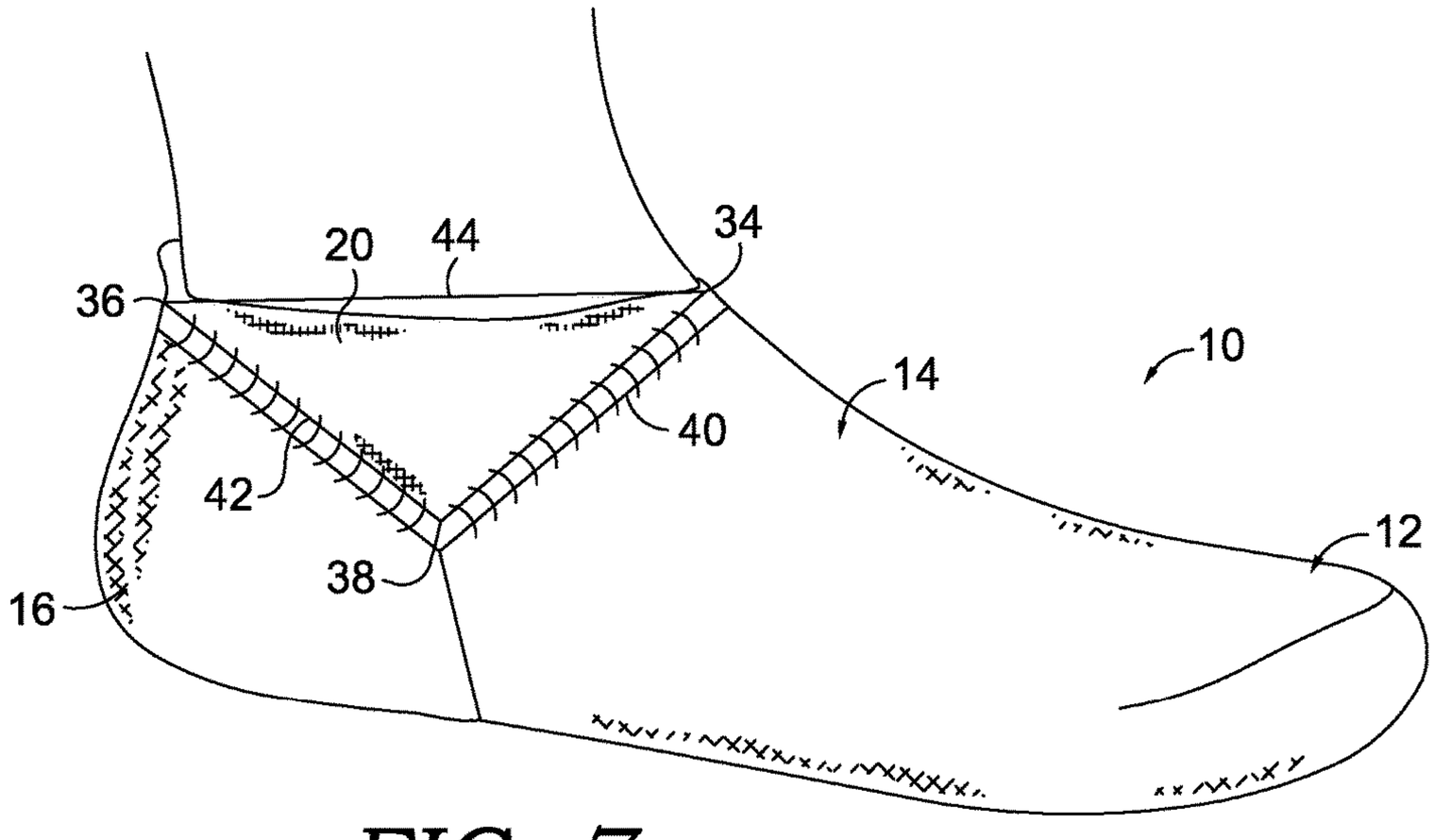

FIG. 7.

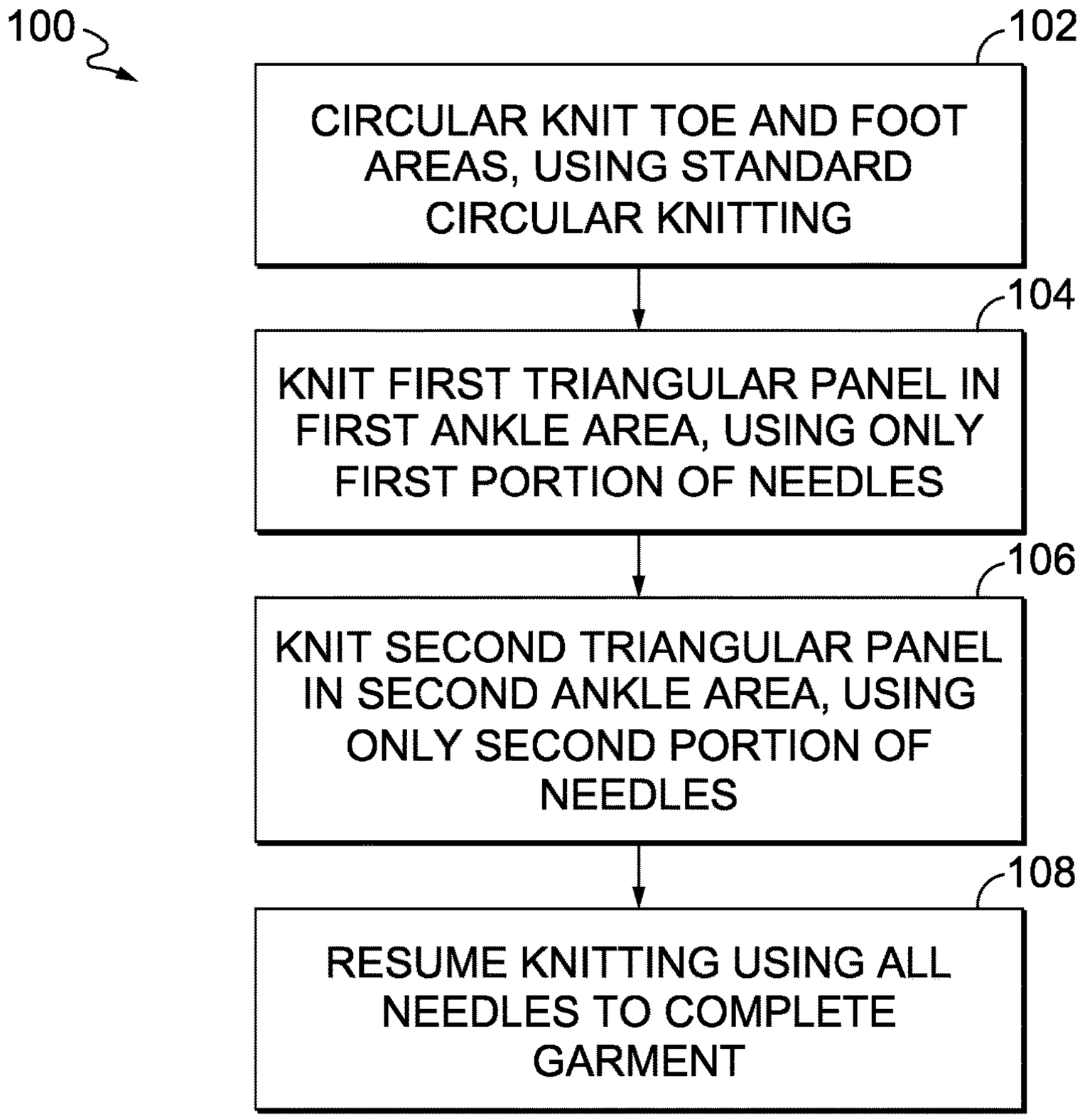
100
102
CIRCULAR KNIT TOE AND FOOT AREAS, USING STANDARD CIRCULAR KNITTING
104
KNIT FIRST TRIANGULAR PANEL IN FIRST ANKLE AREA, USING ONLY FIRST PORTION OF NEEDLES
106
KNIT SECOND TRIANGULAR PANEL IN SECOND ANKLE AREA, USING ONLY SECOND PORTION OF NEEDLES
108
RESUME KNITTING USING ALL NEEDLES TO COMPLETE GARMENT

FIG. 8.

GARMENT FOR FOOT WITH TRIANGULAR ANKLE PANELS

TECHNICAL FIELD

The present disclosure relates to garments, such as socks or footies, designed to be worn on a foot. More particularly, the disclosure relates to a method of knitting such garments, and the garments themselves, that provide a better fit.

BACKGROUND

Various styles of socks are now available. Commercially manufactured socks are typically produced using circular knitting machines. These machines employ needles mounted on a cylinder, or sometimes a double cylinder. The cylinder spins and the needles interlock loops of yarn. In some aspects, the circular knitting process results in a circular tube that is open on both ends. Additionally, different sock styles are now available, such as a calf-length sock, a mid-calf sock, or a footie designed to terminate around the ankle of the wearer. In a typical footie-type sock, the open end (allowing entry of the wearer's foot) is typically a generally circular opening, produced by the circular knitting process, having a finished, welted cuff. This opening may result in a fit that could be improved. The sock described below is manufactured on circular knitting machines with a structure providing a better fit around the ankle area.

BRIEF SUMMARY

This Summary provides a high-level overview of the disclosure and introduces a selection of concepts that are further described in the Detailed Description below. This Summary is not intended to identify key features or essential features of the claimed subject matter, nor is it intended to be used as an aid in isolation to determine the scope of the claimed subject matter.

Aspects herein generally relate to a garment to be worn on the foot, such as a sock. The garment has a toe area, and a foot area having a top and a bottom, the foot area being contiguous with the toe area. The garment further has a heel area that is contiguous with at least a portion of the foot area. The garment has a medial triangular ankle panel and a lateral triangular ankle panel. The medial triangular ankle panel has a first medial vertex near the rear, top portion of the foot area, a second medial vertex near the top of the heel area, and a third medial vertex below the first and second medial vertices, generally midway between the first and second medial vertices. The lateral triangular ankle panel has a first lateral vertex near the rear, top portion of the foot area, a second lateral vertex near the top of the heel area, and a third lateral vertex below the first and second lateral vertices, generally midway between the first and second lateral vertices. The side of the medial triangular panel extends between the first and second medial vertices, and the side of the lateral triangular panel extends between the first and second lateral vertices, defining an opening of the garment for a foot. In some aspects, this opening is a non-circular opening, such as an oval.

In an additional aspect, a method of knitting a garment, using a circular knitting machine, to be worn on a foot, is provided. The method includes knitting a toe area and foot area using all of the needles on the circular knitting machine. The method further includes knitting a first triangular panel in a first ankle area, adjacent the foot area, using only a first portion of the needles on the circular knitting machine, while the remaining needles hold yarns from the last course of knitting the foot area. The method further includes knitting a second triangular panel in a second ankle area opposite from the first ankle area, using only a second portion of the needles on the circular knitting machine, while the remaining needles hold the yarn from the last course of knitting the first triangular panel. The method further includes resuming knitting of the garment using all of the needles of the circular knitting machine. The method could also be reversed, starting at a top of the sock, and knitting toward the toe (rather than starting the knitting with the toe).

In an additional aspect, a method of knitting a sock having a tubular structure with at least a closed toe end and an open end, using a circular knitting machine, is provided. The method includes knitting a first triangular panel at the open end, using only a first portion of the needles on the circular knitting machine, while the remaining needles hold yarns from the last course of knitting prior to knitting the first triangular panel. The method further includes knitting a second triangular panel at the open end, opposite from the first triangular panel, using only a second portion of the needles on the circular knitting machine, while the remaining needles hold the yarn from the last course of knitting the first triangular panel. In some aspects, the first and second triangular panels form a non-circular opening for the sock, such as an oval.

Additional objects, advantages, and novel features of the invention will be set forth in part in the description which follows, and in part will become apparent to those skilled in the art upon examination of the following, or may be learned by practice of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is described in detail below with reference to the attached drawing figures, which are incorporated herein by reference, wherein:

FIG. **1** is a side view of an exemplary left sock illustrating some aspects of the disclosure;

FIGS. **2**A-**2**B show a top view of the sock of FIG. **1**;

FIG. **3** is a diagrammatic representation of knitting a first triangular ankle panel;

FIG. **4** is a diagrammatic representation of knitting a second triangular ankle panel;

FIG. **5** is a diagrammatic representation of continued knitting after the first and second ankle panels;

FIG. **6** shows a portion of the garment, with overlaid lines showing the first triangular ankle panel;

FIG. **7** shows a portion of the garment, with overlaid lines showing the second triangular ankle panel; and

FIG. **8** is a diagram of an exemplary method of knitting a garment, according to aspects of this disclosure.

DETAILED DESCRIPTION

The subject matter of aspects of the present invention is described with specificity herein to meet statutory requirements. But the description itself is not intended to necessarily limit the scope of the claims. Rather, the claimed subject matter might be embodied or carried out in other ways to include different elements or combinations of elements similar to the ones described in this document, in conjunction with other present or future technologies.

In general, this disclosure relates to a garment having features that provide a fit better adapted to a wearer's body. More specifically, the disclosure, in some aspects, relates to a sock having an opening better adapted to fit around the leg,

or ankle area, of the wearer. Referring initially to FIG. **1**, a sock **10** is depicted that is made using a circular knitting machine. The sock **10** shown in FIGS. **1** and **2**A-**2**B is foot-agnostic, but could also be formed having features adapting the sock to be left, or right, foot specific. The sock **10** includes a closed toe area **12** contiguous with a foot area **14**. As further detailed below, the sock **10** is typically knitted on a circular knitting machine, starting with toe area **12**. The sock **10** could also be knitted starting at the other end of the sock **10**, such as in a heel area **16**. Heel area **16** is contiguous with a portion of the foot area **14** and is typically knit in a cup configuration in a form to fit a wearer's heel. A first triangular ankle panel **18** is knit, using methods detailed below, contiguous with an upper portion of the foot area **14** and heel area **16**. Similarly, with reference to FIG. **2**A, a second triangular ankle panel **20** is knit, using methods detailed below, contiguous with an upper portion of the foot area **14** and heel area **16**, opposite first triangular panel **18**. First triangular panel **18** may generally be seen to have three vertices. The first vertex **22** is near the top of the sock **10**, at the rear of foot area **14**. The second vertex **24** is near the top of the heel area **16**. The third vertex **26** is located below, and generally midway between, the first vertex **22** and the second vertex **24**. In some aspects, the side **28** extending between the first vertex **22** and the third vertex **26** extends as a boundary between the foot area **14** and the first triangular ankle panel **18**. The side **30** extending between the second vertex **24** and the third vertex **26** extends as a boundary between the heel area **16** and the first triangular ankle panel **18**. The top side **32** of first triangular ankle panel **18** extends between first vertex **22** and second vertex **24**. In some aspects, top side **32** is knit as a non-welted, finished edge.

With reference to FIG. **2**A, the second triangular ankle panel **20** may also generally be seen to have three vertices. The first vertex **34** is near the top of the sock **10**, at the rear of foot area **14**. The second vertex **36** is near the top of the heel area **16**. The third vertex **38** is located below, and generally midway between, the first vertex **34** and the second vertex **36**. In some aspects, the side **40** extending between the first vertex **34** and the third vertex **38** extends as a boundary between the foot area **14** and the second triangular ankle panel **20**. The side **42** extending between the second vertex **36** and the third vertex **38** extends as a boundary between the heel area **16** and the first triangular ankle panel **18**. The top side **44** of second triangular ankle panel **20** extends between first vertex **34** and second vertex **36**. In some aspects, top side **44** is knit as a non-welted, finished edge. The triangular ankle panels **18** and **20** may be knit with an elastic yarn, and the elastic yarn may be more elastic than the yarns used to knit the remainder of sock **10**. As best seen in FIGS. **6** and **7**, the top sides **32** and **44** may tend to roll to some degree, due to the tension of the elastic yarns forming first and second triangular ankle panels **18** and **20**, respectively. As best seen in FIG. **2**B, the top sides **32** and **44** form a foot opening **46**. FIG. **2**A shows foot opening **46** as a generally linear gap between top side **32** and top side **44**. In some aspects, if top side **32** and top side **44** are not held in an unrolled condition, the foot opening **46** expands (due to the configuration of first triangular ankle panel **18** and second triangular panel **20**, and the elasticity of the yarns of panels **18** and **20**) to form a non-circular foot opening **46**. In one exemplary aspect, the foot opening **46** is a generally oval shape as shown in FIG. **2**B.

With reference to FIGS. **3-5**, an exemplary aspect of knitting the first triangular panel **18** and the second triangular panel **20** is shown, somewhat schematically. The knitting of sock **10** typically starts with toe area **12** and moves to foot area **14**. The knitting could also start with the heel area, in some aspects. To simplify the description of knitting the first and second triangular panels **18** and **20**, with initial reference to FIG. **3**, a band **48** is shown, representing a portion of the knitting of foot area **14** immediately prior to knitting first triangular ankle panel **18**. Up to and including band **48**, standard circular knitting techniques are used to knit toe area **12** and foot area **14**, using all of the needles in the circular knitting machine. When the first triangular ankle panel **18** is to be knit, the circular knitting machine uses only a portion of the needles, while the remaining needles hold the yarns from the last course of standard circular knitting. In one exemplary aspect, on a circular knitting machine having one hundred sixty needles, first triangular ankle panel **18** is knit using only needles twenty through eighty in a reciprocating knitting motion between needles twenty through eighty. In this exemplary aspect, needle twenty corresponds to the location of third vertex **26**, and needle eighty corresponds to the location of first vertex **22**. The first knitting course between needles twenty and eighty thus forms side **28** of first triangular ankle panel **18**. Needles one through nineteen and needles eighty-one through one hundred sixty hold the yarns from the last standard circular knitting of foot area **14**, with the various numbered needles shown in FIG. **3**. It should be understood that other circular knitting machines, having a different number of needles could be used, with comparable needle ratios. The knitting process continues as the first triangular panel **18** is knit with reciprocating knitting between needles twenty and eighty, forming the top side **32** and the side **30**, as shown in FIG. **3**.

After the first triangular ankle panel **18** is knit, the second triangular ankle panel **20** is knit, as shown in FIG. **4**. To knit the second triangular ankle panel **20**, again only a portion of the needles on the circular knitting machine are used. Continuing with the exemplary aspect above, on a circular knitting machine with one hundred sixty needles, only needles eighty-one through one hundred forty are used to knit second triangular ankle panel **20**. The remaining needles hold the last course knit by the respective needles. The first course of knitting between needle eighty-one and one hundred forty form the side **40** between the first vertex **34** and the third vertex **38**. The reciprocating knitting between needles eighty-one and one hundred forty form the top side **44** and side **42**, as seen in FIG. **4**. Once the second triangular ankle panel **20** is knit, standard circular knitting techniques are used, with all of the needles on the circular knitting machine knitting, starting from the last courses of the first triangular ankle panel **18** and the second triangular ankle panel **20**, shown as a band **50** in FIG. **5**. In an exemplary aspect, this standard circular knitting forms the connection of the first triangular ankle panel **18** and the second triangular ankle panel **20** to the heel area **16**, along sides **30** and **42**, as seen in FIG. **5**. Note that in FIGS. **3-5**, the connections along sides **28**, **30**, **40**, and **42** are shown as long lines for the sake of clarity. In reality, these lines are just single stitches.

FIG. **6** shows a portion of the sock **10**, showing the sides **28**, **30**, and **32** of the first triangular ankle panel **18** in solid, overlaid lines. In reality, lines representing sides **28**, **30**, and **32** are not as visible, but are shown here for clarity. As described above, the foot area **14** of sock **10** is knit with standard circular knitting techniques. First triangular ankle panel **18** is then knit as described above with respect to FIGS. **3** and **4**. The heel area **16** shown in FIG. **6** is knit after the second triangular ankle panel **20** is knit. As shown in FIG. **6**, the heel area **16** may be knit to form an open heel

area, in some aspects. FIG. **7** is similar to FIG. **6**, but shows second triangular ankle area **20** (and illustrates a closed heel area **16** aspect of the sock **10**). The sides **40**, **42**, and **44** are shown in solid, overlaid lines, but in reality the lines representing these sides are not as visible. As described above, the foot area **14** of sock **10** is knit with standard circular knitting techniques, followed by the first triangular ankle panel **18** (FIG. **6**) and then the second triangular ankle panel **20**. After the second triangular ankle panel **20** is knit, the heel area **16** is knit with standard circular knitting techniques.

An exemplary method **100** of knitting the sock **10** is shown in FIG. **8**. As shown at block **102**, the toe and foot areas of the sock are knit using standard circular knitting techniques, typically using all of the needles in the circular knitting machine. After the foot area is knit, a first triangular ankle panel (such as first triangular ankle panel **18**) is knit, as shown in FIG. **8** at block **104**. In knitting the first triangular panel, the method includes programming the circular knitting machine to use only a portion of the needles, while the remaining needles hold the yarns from the last course of standard circular knitting. After the first triangular ankle panel is knit, the method continues at block **106** in knitting a second triangular ankle panel (such as second triangular ankle panel **20**). In knitting the second triangular panel, the method includes programming the circular knitting machine to use only a portion of the needles, different from the needles used to knit the first triangular panel, while the remaining needles hold the yarns from the last course of knitting. Once the second triangular ankle panel is knit, standard circular knitting continues as shown at block **108**, with all of the needles on the circular knitting machine knitting to finish the garment. As mentioned above, the method could be essentially reversed in some aspects, starting at the top, or the heel area, and knitting to the toe area.

From the foregoing, it will be seen that this invention is one well adapted to attain all the ends and objects hereinabove set forth together with other advantages which are obvious and which are inherent to the structure.

It will be understood that certain features and sub-combinations are of utility and may be employed without reference to other features and sub-combinations. This is contemplated by and is within the scope of the claims.

Since many possible embodiments may be made of the invention without departing from the scope thereof, it is to be understood that all matter herein set forth or shown in the accompanying drawings is to be interpreted as illustrative and not in a limiting sense.

The invention claimed is:

1. A garment to be worn on a foot, comprising:

a toe area;

a foot area contiguous with the toe area, the foot area having a top and a bottom;

a heel area contiguous with at least a portion of the foot area, the heel area having a top and a bottom;

a medial triangular ankle panel having a first medial vertex near a rear portion of the top of the foot area, a second medial vertex near the top of the heel area, and a third medial vertex below the first medial vertex and the second medial vertex, generally midway between the first medial vertex and the second medial vertex; and

a lateral triangular ankle panel having a first lateral vertex near the rear portion of the top of the foot area, a second lateral vertex near the top of the heel area, and a third lateral vertex below the first lateral vertex and the second lateral vertex, generally midway between the first lateral vertex and the second lateral vertex,

wherein a side of the medial triangular ankle panel extending between the first medial vertex and the second medial vertex forms a free side of the medial triangular ankle panel, and a side of the lateral triangular ankle panel extending between the first lateral vertex and the second lateral vertex forms a free side of the lateral triangular ankle panel, such that the free sides of the medial triangular ankle panel and the lateral triangular ankle panel define an opening of the garment to be worn on the foot.

2. The garment of claim **1**, wherein the garment is a sock and the medial triangular ankle panel and the lateral triangular ankle panel are knitted with an elastic yarn.

3. The garment of claim **2**, wherein the elastic yarn is a spandex yarn.

4. The garment of claim **1**, wherein the opening defined by the side of the medial triangular ankle panel extending between the first medial vertex and the second medial vertex, and the side of the lateral triangular ankle panel extending between the first lateral vertex and the second lateral vertex, is a non-circular opening.

5. The garment of claim **4**, wherein the defined opening is an oval shape.

6. The garment of claim **5**, wherein the side of the medial triangular ankle panel extending between the first medial vertex and the second medial vertex, and the side of the lateral triangular ankle panel extending between the first lateral vertex and the second lateral vertex are non-welted.

7. A method of knitting a garment, using a circular knitting machine, to be worn on a foot, comprising:

knitting a toe area and a foot area using all of the needles on the circular knitting machine;

knitting a first triangular panel in a first ankle area, adjacent the foot area, using only a first portion of the needles on the circular knitting machine, while the remaining needles hold yarns from a last course of knitting the foot area;

knitting a second triangular panel in a second ankle area opposite from the first ankle area, using only a second portion of the needles on the circular knitting machine, while the remaining needles hold yarns from a last course of knitting the first triangular panel; and

resuming knitting of the garment using all of the needles of the circular knitting machine.

8. The method of claim **7**, wherein the first portion of the needles used to knit the first triangular panel is different from the second portion of the needles used to knit the second triangular panel.

9. The method of claim **8**, further comprising using an elastic yarn to knit the first triangular panel and the second triangular panel.

10. The method of claim **9**, wherein the first triangular panel has a free side adjacent to a free side of the second triangular panel, and wherein the free sides of the first triangular panel and the second triangular panel define an opening in the garment.

11. The method of claim **10**, wherein the defined opening is non-circular.

12. The method of claim **11**, further comprising knitting the free sides of the first triangular panel and the second triangular panel such that they are non-welted.

13. A method of knitting a sock having a tubular structure with at least a closed toe end and an open end, using a circular knitting machine, comprising:

knitting a first triangular panel at the open end, using only a first portion of the needles on the circular knitting machine, while the remaining needles hold yarns from a last course of knitting prior to knitting the first triangular panel; and

knitting a second triangular panel at the open end, opposite from the first triangular panel, using only a second portion of the needles on the circular knitting machine, while the remaining needles hold yarns from a last course of knitting the first triangular panel.

14. The method of claim **13**, wherein the first portion of the needles used to knit the first triangular panel is different from the second portion of the needles used to knit the second triangular panel.

15. The method of claim **14**, further comprising using an elastic yarn to knit the first triangular panel and the second triangular panel.

16. The method of claim **15**, wherein the first triangular panel has a free side adjacent to a free side of the second triangular panel, and wherein the free sides of the first triangular panel and the second triangular panel define the opening of the open end.

17. The method of claim **16**, wherein the defined opening is non-circular.

18. The method of claim **16**, further comprising knitting the free sides of the first triangular panel and the second triangular panel such that they are non-welted.

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