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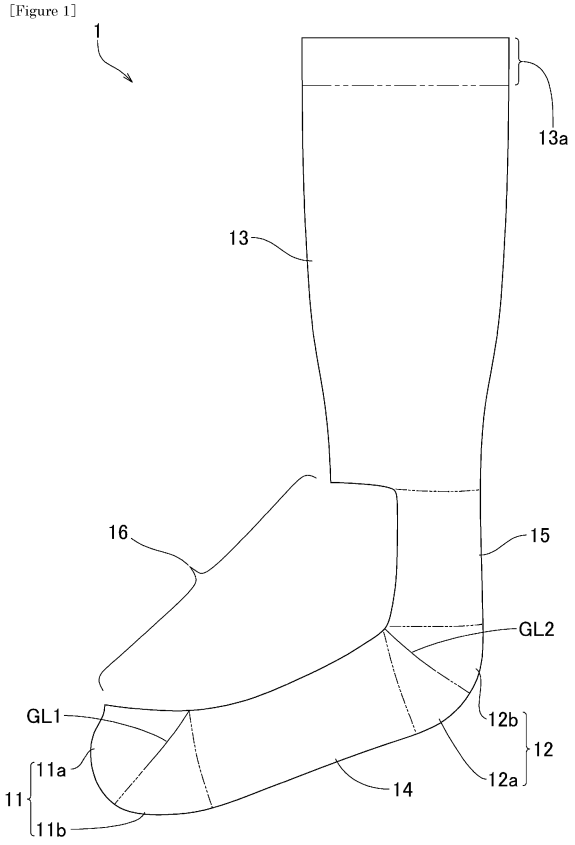
(54) **SOCK**

(57) A sock that is less likely to slip off and provide an excellent wearing feeling while ensuring a state of the sock being hard to see. This sock provides a foot connecting portion 14 between a toe portion 11 and a heel portion 12. The sock also provides an ankle connecting portion 15 between the heel portion 12 and a body portion 13. The foot connecting portion 14 and the ankle connecting portion 15 that sandwich the heel portion 12 are knitted as non-cylindrical knitted fabrics having predetermined knitting widths, respectively, to form an opening 16 surrounded by the toe portion 11, the foot connecting portion 14, the heel portion 12, the ankle connecting portion 15, and the body portion 13 to open an area from the ankle to the instep in a worn state. This prevents an instep portion of the sock from protruding from a shoe and becoming visible.

[Figure 1]



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Description

Technical Field

[0001] The present invention relates to a sock to be worn on a foot.

Background Art

[0002] Hosiery such as socks and pantyhose generally cover the surface of feet and legs in a worn state. In wearing socks and then wearing shoes having large instep openings that allow the insteps to be visible, the socks can be seen from the openings. This may sometimes impair the aesthetic appearance based on the design of the shoes.

[0003] To address such a situation of wearing the shoes having the large instep openings, socks shaped such that the worn state of the socks is hard to see from the outside even in the case of wearing the socks and then wearing the shoes, have been often used recently.

[0004] For example, the use of socks such as so-called foot covers, which are made invisible from the outside even in wearing shoes such as pumps having large instep openings by knitting a sock having a size of not reaching an ankle and providing a larger opening for a foot insertion on the instep side, is growing.

[0005] An example of such a conventional sock having a larger opening on the instep side is disclosed in JP 2003-342803 A.

[0006] Additionally, for a sock having a body portion that reaches a lower leg of a leg, such a sock has been proposed that can obscure the existence of a portion below an ankle of the sock from the outside when shoes such as pumps that make insteps visible in the case of a pants style by cutting off a portion corresponding to an instep of the sock to provide an opening. An example of such a conventional sock is disclosed in JP 3112115 U.

Citation List

Patent Literature

[0007]

Patent Literature 1: JP 2003-342803 A
Patent Literature 2: JP 3112115 U

Summary of Invention

Technical Problem

[0008] As shown in the above respective Patent Literatures, the conventional sock has a large opening in an instep portion of the sock, so that even if a shoe having a large opening in its instep is worn, the sock would be hard to see from the opening of the shoe, preventing the aesthetic impression based on the design of the shoe from being impaired.

[0009] However, the conventional sock having the large opening on the instep side as shown in Patent Literature 1 cannot obtain a sufficient effect that an opening edge located below the ankle of the foot holds the sock so as not to slip off by its tightening force, due to that large opening. This causes a heel portion of the sock to be pulled toward a toe through a sole portion of the sock when a wearer walks, thus having a problem in that not only the sock slips off but also the sock comes off from the foot. Additionally, in this conventional sock having the large opening on the instep side, a frictional force between the sock and the shoe acts to keep the sock inside the shoe when the wearer takes off the shoe, thus having another problem in that the heel portion of the sock is likely to come off from the foot.

[0010] In addition to this, the conventional sock as shown in Patent literature 2 requires a step of cutting off fabric of an instep portion of the once knitted sock to form an opening, and processing an edge around the opening by overcast or the like, thus having a problem in that not only it takes time but also material for manufacturing the sock is partially wasted.

[0011] The present invention has been made to solve the above-mentioned problems, and it is an object of the present invention to provide a sock that can maintain a state in which the sock is less likely to slip off and provide an excellent wearing feeling while ensuring a state in which the sock is hard to see, as well as that can be manufactured without taking time by a circular knitting machine in the same manner as a general sock.

Solution to Problem

[0012] An aspect of the present invention provides a sock that is integrally knitted as a whole with a circular knitting machine and has at least a toe portion covering a toe of a foot, a heel portion covering a heel of the foot, and a body portion cylindrically surrounding a lower leg of a leg, the sock including: a non-cylindrical foot connecting portion that is knitted between the toe portion and the heel portion and integrally connects the toe portion and the heel portion; and a non-cylindrical ankle connecting portion that is knitted between the heel portion and the body portion and integrally connects the heel portion and the body portion, wherein the foot connecting portion is knitted between the toe portion and the heel portion as a knitted fabric having a predetermined knitting width located on a sole side in a worn state, the ankle connecting portion is knitted between the heel portion and the body portion as a knitted fabric having a predetermined knitting width located on a back side of an ankle in the worn state, and a predetermined opening surrounded by the toe portion, the foot connecting portion, the heel portion, the ankle connecting portion, and the body portion is formed as an arrangement that opens a predetermined area on a front side of the foot from the ankle to an instep in the worn state.

[0013] As described above, this sock provides the foot connecting portion between the toe portion and the heel portion that form the sock and the ankle connecting portion between the heel portion and the body portion that form the sock, wherein the foot connecting portion and the ankle connecting portion that sandwich the heel portion are knitted as the non-cylindrical knitted fabrics having the predetermined knitting widths, respectively, to form the opening on the instep side, and this opening is surrounded by the toe portion, the foot connecting portion, the heel portion, the ankle connecting portion, and the body portion to open the large area from the ankle to the instep in the worn state. This prevents an instep portion of the sock from protruding from the shoe and becoming visible from the outside, while positioning the body portion on the leg to suppress unnecessary movement of the sock to the toe side even if a force to slip off the sock to the toe side is applied, thus making it possible to maintain the worn state of the sock from the start of wearing as it is, without causing adverse effect such as a change in wearing feeling. Further, when the shoe is taken off, a holding force at the body portion of the sock being worn can sufficiently counter a force to slip off the sock, thus reliably preventing the heel portion of the sock from slipping or falling off with respect to the foot.

[0014] Additionally, in the case of pants style, for example, the body portion is hidden under the pants, and the ankle connecting portion is positioned behind the ankle to be inconspicuous when viewed from the front of the foot, so that even in a state where a shoe having a large instep opening is worn, the opening of the sock is sufficiently larger than the opening of the shoe, and the portions other than the ankle connecting portion and the body portion of the sock do not protrude out of the shoe, thus enabling the existence of the sock not to be easily recognized by another person and preventing the sock from adversely affecting the aesthetic impression centered on the shoe.

[0015] Optionally, in the sock according to the aspect of the present invention, the ankle connecting portion is knitted with a width dimension such that the ankle connecting portion is hidden behind the ankle and invisible from a front side of the foot in the worn state.

[0016] As described above, in this sock, the ankle connecting portion located between the body portion and the heel portion of the sock is knitted with the width dimension that fits the ankle connecting portion to the back side of the ankle in the worn state, and is hidden behind the ankle to be invisible from the front side of the foot. This enables the sock to be further hard to see in the foot when the shoe is worn, and to be worn without making another person aware of the existence of the sock while ensuring difficulty of slipping off, so that the sock does not impair the aesthetic impression based on the shoe.

[0017] Optionally, in the sock according to the aspect of the present invention, the ankle connecting portion is knitted in a different knitting method from that for a knitted fabric of the other portions of the sock as the knitted fabric that causes a stronger elastic contraction force in a course direction, and is in a state of the knitted fabric being more shrunk in the course direction with respect to the other portions of the sock.

[0018] As described above, in this sock, the ankle connecting portion is knitted in a different knitting method from that for the other portions of the sock, wherein the knitted fabric of the ankle connecting portion causes the stronger elastic contraction force in a circumferential direction compared to the knitted fabric of the other portions of the sock to be more shrunk in the circumferential direction than the knitted fabric of the other portions of the sock. This reduces the width dimension of the ankle connecting portion, thus enabling the width dimension of the ankle connecting portion to be surely suppressed to such a width dimension that fits the ankle connecting portion to the back side of the ankle. This enables the sock to be hard to see, and to be worn without making another person aware of the existence of the sock while ensuring difficulty of slipping off, preventing the sock from impairing the impression of wearing shoes on bare feet.

[0019] Optionally, in the sock according to the aspect of the present invention, the toe portion, the foot connecting portion, the heel portion, the ankle connecting portion, and the body portion are knitted to include at least one continuous common yarn in their knitted fabrics, and the ankle connecting portion is knitted by inserting a predetermined insertion yarn having larger elasticity than that of the common yarn while continuously inserting the insertion yarn in a course direction, and more shrinks in the course direction by an elastic force of the insertion yarn compared to other portions of the sock.

[0020] As described above, this sock is knitted to include the continuous common yarn in the knitted fabrics of the respective portions of the sock, and in particular, the ankle connecting portion is knitted by inserting the insertion yarn having larger elasticity than that of the common yarn to more shrink in a circumferential direction by the elastic force of the insertion yarn compared to the other portions of the sock. This reduces the width dimension of the ankle connecting portion, thus enabling the width dimension of the ankle connecting portion to be surely suppressed to such a width dimension that fits the ankle connecting portion to the back side of the ankle. This enables the sock to be hard to see, and to be worn without making another person aware of the existence of the sock while ensuring difficulty of slipping off, preventing the sock from impairing the impression of wearing shoes on bare feet.

Brief Description of Drawings

[0021]

FIG. 1 is a side view of a sock according to an embodiment of the present invention;

FIG. 2 is an illustration of a cylinder area used for knitting portions other than a body portion in a proc-

ess of manufacturing the sock according to the embodiment of the present invention;

FIG. 3 is an illustration of the state of knitting a toe portion in the process of manufacturing the sock according to the embodiment of the present invention;

FIG. 4 is an illustration of the state of knitting a foot connecting portion in the process of manufacturing the sock according to the embodiment of the present invention;

FIG. 5 is an illustration of the state of knitting a heel portion in the process of manufacturing the sock according to the embodiment of the present invention;

FIG. 6 is an illustration of the state of knitting an ankle connecting portion in the process of manufacturing the sock according to the embodiment of the present invention;

FIG. 7 is an illustration of the state in the process of knitting a body portion in the process of manufacturing the sock according to the embodiment of the present invention;

FIG. 8 is a schematic perspective view seen from the instep side in a worn state of the sock according to the embodiment of the present invention; and

FIG. 9 is a schematic perspective view seen from the sole side in the worn state of the sock according to the embodiment of the present invention.

Description of Embodiments

[0022] Hereinafter, a sock according to an embodiment of the present invention will be described with reference to FIGS. 1 to 9.

[0023] In these respective figures, a sock 1 according to the present embodiment has a toe portion 11 that covers a toe of a foot, a heel portion 12 that covers a heel of the foot, a body portion 13 that surrounds a lower leg of a leg, a foot connecting portion 14 that integrally connects the toe portion 11 and the heel portion 12, and an ankle connecting portion 15 that integrally connects the heel portion 12 and the body portion 13. An opening 16 is provided in a predetermined area that corresponds to the front side of the foot in a worn state.

[0024] The toe portion 11 is knitted into a bag shape corresponding to the shape of the toe of the foot, and can cover the toe of the foot in the worn state.

[0025] The bag-shaped knitted fabric forming the toe portion 11 is knitted by a known knitting method in which a knitted fabric bulging in a bag shape is obtained by using a predetermined partial area set in advance, such as a half circumference instead of the entire circumference of a cylinder 50 of a circular knitting machine, and knitting while reducing and increasing the number of stitches to form a gore line on the side in the forward and reverse reciprocating rotational motion of the cylinder 50.

[0026] The heel portion 12 is knitted into a bag shape corresponding to the shape of the heel of the foot, and can cover the heel of the foot in the worn state. Similar to the toe portion 11, the heel portion 12 is also formed of a knitted fabric that is knitted using the known knitting method in which the bag-shaped knitted fabric is knitted while the gore line is formed on the side with the circular knitting machine.

[0027] The body portion 13 is knitted into a cylindrical shape corresponding to a shape in a predetermined area from under the lower leg corresponding to an area for the sock 1 being worn on the leg, and can surround and cover the predetermined area of the lower leg of the leg in the worn state. The body portion 13 is formed of a circular knitted cylindrical shaped fabric obtained by a general knitting of the circular knitting machine.

[0028] The foot connecting portion 14 is knitted between the toe portion 11 and the heel portion 12, and is formed of a non-cylindrical knitted fabric that integrally connects the toe portion 11 and the heel portion 12. This foot connecting portion 14 is formed of a knitted fabric having a predetermined knitting width, which is knitted in the time between the knitting of the toe portion 11 and the heel portion 12 as an arrangement located on the sole side in the worn state.

[0029] The ankle connecting portion 15 is knitted between the heel portion 12 and the body portion 13, and is formed of a non-cylindrical knitted fabric that integrally connects the heel portion 12 and the body portion 13. This ankle connecting portion 15 is formed of a knitted fabric having a predetermined knitting width, which is knitted in the time between the knitting of the heel portion 12 and the body portion 13 as an arrangement located on the back side of the ankle in the worn state.

[0030] It is desirable that the knitting width of the ankle connecting portion 15 has a width dimension such that the ankle connecting portion 15 is hidden behind the ankle and cannot be seen from the front side of the foot in the worn state. For example, when the ankle connecting portion 15 is knitted with a knitting width such that an opening edge around the opening 16 in the ankle connecting portion 15 is located behind the ankle of the foot in the worn state, the ankle connecting portion 15 will be hard to see, giving another person the impression that the sock is not worn.

[0031] By continuously and integrally knitting the toe portion 11, the foot connecting portion 14, the heel portion 12, the ankle connecting portion 15, and the body portion 13, the opening 16 is surrounded by these toe portion 11, foot connecting portion 14, heel portion 12, ankle connecting portion 15, and body portion 13 and formed as an arrangement that opens a predetermined area on the front side of the foot from the ankle to the instep of a wearer in the worn state.

[0032] Next, a process of manufacturing the sock according to the present embodiment will be described. The premise is that the sock is knitted with the circular knitting machine.

[0033] First, the toe portion 11 that accommodates the toe of the wearer is knitted (see FIG. 3). As a cylinder area of the circular knitting machine for knitting the toe portion 11, a cylinder area A having an area of a little

over a half circumference of a circumferential direction area of the cylinder 50 in the circular knitting machine is used (see FIG. 2). A ratio of the cylinder region A to the entire circumference of the cylinder is determined according to the width dimension of the toe of the foot of the wearer. The ratio may be a half circumference of the cylinder 50, for example.

[0034] Knitting the toe portion 11 includes knitting, by using the cylinder area A of the cylinder 50, a toe upper portion 11a, which is an upper portion of the toe portion 11, while reducing the number of stitches from the starting course of the knitting in the forward and reverse reciprocating rotational motion of the cylinder 50. Subsequently, a toe lower portion 11b, which is a lower portion of the toe portion 11, is knitted, also by using the cylinder region A, while increasing the number of stitches. This knitting is performed by appropriately picking up, on the opposite side edges of the toe lower portion 11b, corresponding eyes of the opposite side edges of the toe upper portion 11a. This forms a gore line GL1 indicating the boundary between the side edge of the toe upper portion 11a and the side edge of the toe lower portion 11b.

[0035] The bag-shaped toe portion 11 is finally obtained with the number of courses set in advance.

[0036] Additionally, it may be possible to form a double knitted fabric having an end portion folded back in a wale direction by a known double welt knitting immediately after the starting course at the start of knitting the toe portion 11, assuming this double knitted fabric as a mouth edge that faces the opening of the toe portion. This enhances the fitting property at the toe in contact with such an edge of the opening.

[0037] This double knitted fabric portion imparts predetermined support, so that it may be knitted by inserting a yarn having appropriate elasticity, such as a double covered yarn.

[0038] Continuously from the toe portion 11, the foot connecting portion 14 that covers the wearer's sole until the vicinity of the wearer's heel is knitted (see FIG. 4). In this case, the foot connecting portion 14 is knitted by using as much area as the cylinder area A of the cylinder 50 and performing the forward and reverse reciprocating rotational motion of the cylinder 50. The knitting length of the foot connecting portion 14 is determined according to the length dimension of the part corresponding to the wearer's sole until the wearer's heel.

[0039] Subsequently, the heel portion 12 that accommodates the wearer's heel is knitted continuously to the foot connecting portion 14 (see FIG. 5). As a cylinder area of the circular knitting machine for knitting the heel portion 12, a cylinder area B having an area of a little over a half circumference of a circumferential direction area of the cylinder 50 in the circular knitting machine is used (see FIG. 2). A ratio of the cylinder region B to the entire circumference of the cylinder is determined according to the width dimension of the heel of the wearer. The ratio may be a half circumference of the cylinder 50, for example.

[0040] Knitting the heel portion 12 includes knitting, by using the cylinder area B of the cylinder 50, a heel lower portion 12a, which is a lower portion of the heel portion 12, while reducing the number of stitches from the end of the foot connecting portion 14 in the forward and reverse reciprocating rotational motion of the cylinder 50.

[0041] This is followed by knitting, also using the cylinder region B, a heel upper portion 12b, which is an upper portion of the heel portion 12, while increasing the number of stitches in the forward and reverse reciprocating rotational motion of the cylinder 50. The bag-shaped heel portion 12 is finally obtained. This knitting is performed by appropriately picking up, on the opposite side edges of the heel upper portion 12b, corresponding eyes of the opposite side edges of the heel lower portion 12a. This forms a gore line GL2 indicating the boundary between the side edge of the heel lower portion 12a and the side edge of the heel upper portion 12b.

[0042] The bag-shaped heel portion 12 is finally obtained with the number of courses set in advance.

[0043] Further, continuously from the heel portion 12, the ankle connecting portion 15 that covers the back side of the wearer's ankle until the upper side of the wearer's ankle is knitted (see FIG. 6). In this case, the ankle connecting portion 15 is knitted by using as much area as the cylinder area B of the cylinder 50 and performing the forward and reverse reciprocating rotational motion of the cylinder 50. The knitting length of the ankle connecting portion 15 is determined according to the length dimension of the part corresponding to the wearer's ankle.

[0044] Then, the body portion 13 that surrounds and covers the lower leg above the wearer's ankle is knitted continuously to the ankle connecting portion 15 (see FIG. 7). For the knitting of this body portion 13, a cylindrical knitted fabric corresponding to the body portion 13 is knitted with circular knitting by using the entire circumference of a circumferential direction area of the cylinder 50 in the circular knitting machine and rotating the cylinder 50. The knitting length of this body portion 13 is determined according to the specification of the sock. Additionally, in the knitting of the body portion 13, an elastic yarn may be inserted over the entire body portion 13 to perform the knitting, causing a predetermined wearing pressure on the body portion 13, thus obtaining a wearing pressure type sock in which such a wearing pressure on the body portion 13 contributes to a reduction in leg fatigue.

[0045] On the other hand, due to the knitting of this cylindrical body portion 13, edges of the respective knitted fabrics of the non-cylindrical toe portion 11, foot connecting portion 14, heel portion 12, and ankle connecting portion 15 that have been knitted so far will be continuous as a closed mouth edge by an edge of the body portion 13 obtained by the additional knitting. Thus, the opening 16 will be formed at a position corresponding to a predetermined area on the front side of the foot from the ankle to the instep of the sock with the opening 16 being surrounded by these toe portion 11, foot connecting portion 14, heel portion 12, ankle connecting portion 15, and

body portion 13.

[0046] When the body portion 13 has been knitted for the number of courses set in advance, a foot entrance portion 13a of a double knitted fabric is formed by folding back the upper end of the body portion 13 inward for a predetermined length, and sewing an end edge thereof and a predetermined portion of the body portion 13 in contact with the end edge shut by overcast. When this foot entrance portion 13a has been formed, the process of manufacturing the sock 1 is completed.

[0047] Additionally, the portion corresponding to the foot entrance portion 13a of the body portion 13 may be knitted with the circular knitting machine by, for example, pouring in which a plurality of courses of a rubber yarn are inserted while performing rib knitting. In this case, the presence or absence of the rubber yarn and the number of courses can be set appropriately. For example, about 3 to 10 courses of the rubber yarn are inserted in an area having a length of about 4 to 10 mm.

[0048] In addition, it is also possible to knit a plurality of courses of the terminal end of the body portion 13 with a thermally adhesive yarn and integrate the resultant thermally adhesive yarn portions by applying heat in set processing or the like so as not to be unraveled. This can simplify edge finish of a knitted fabric.

[0049] Then, the use state of the sock according to the present embodiment will be described. First, the tip of the foot is put into the opening end portion of the body portion 13 of the sock 1 where the foot entrance portion 13a is located, and the foot is covered with the sock 1 as it is. The respective portions of the sock 1 are pulled such that the opening 16 is positioned from the instep to the front side of the ankle, and the toe portion 11 and the heel portion 12 are positioned at the corresponding parts of the foot, respectively, to fit them exactly to the foot. Finally, when the body portion 13 has been raised and positioned around the leg, the sock 1 is in a worn state.

[0050] In this state, the respective portions of the sock 1 fit and adhere to the foot, and the body portion 13 that surrounds and adheres to the leg has a function for holding the position of the respective portions of the sock 1 beyond the ankle so as not to move. This prevents the part of the sock 1 that covers the foot from moving significantly toward the tip of the foot even in the large movement of the foot, such as in walking, thus causing no change in the positional relationship between the respective portions of the sock 1 and the foot nor no change in the feeling of wearing. Further, an area of the sock 1 from the instep to the front side of the ankle has an opening 16 and has no knitted fabric, so that when a shoe having a large instep opening is worn, the sock 1 does not appear on the surface from an instep opening of the shoe, and thus the sock does not adversely affect the aesthetic impression based on the appearance of the shoe.

[0051] Further, when the shoe being worn is taken off, the body portion 13 of the sock 1 being worn adheres to the leg to obtain a force to hold the position of the sock. This makes it possible to, if a force to slip off the sock is applied based on friction between the sock and the shoe, counter this force without any problem, thus reliably preventing the heel portion 12 of the sock from slipping or falling off with respect to the foot.

[0052] As described above, the sock 1 according to the present embodiment provides the foot connecting portion 14 between the toe portion 11 and the heel portion 12 that form the sock 1 and the ankle connecting portion 15 between the heel portion 12 and the body portion 13 that form the sock 1, wherein the foot connecting portion 14 and the ankle connecting portion 15 that sandwich the heel portion 12 are knitted as the non-cylindrical knitted fabrics having the predetermined knitting widths, respectively, to form the opening 16 on the instep side of the sock, and this opening 16 is surrounded by the toe portion 11, the foot connecting portion 14, the heel portion 12, the ankle connecting portion 15, and the body portion 13 to open the large area from the ankle to the instep in the worn state. This prevents an instep portion of the sock 1 from protruding from the shoe and becoming visible from the outside, while positioning the body portion 13 on the leg to exert a holding force based on the wearing pressure and suppressing unnecessary movement of the sock 1 to the toe side even if a force to slip off the sock 1 to the toe side is applied during walking or the like, thus making it possible to maintain the worn state of the sock 1 from the start of wearing as it is, without causing adverse effect such as a change in wearing feeling.

[0053] In particular, in the case of pants style, for example, the body portion 13 is hidden under the pants, and the ankle connecting portion 15 is positioned behind the ankle to be inconspicuous when viewed from the front of the foot, so that even in a state where a shoe having a large instep opening is worn, the opening 16 of the sock is sufficiently larger than the opening of the shoe, and the portions other than the ankle connecting portion 15 and the body portion 13 of the sock 1 do not protrude out of the shoe, thus enabling the existence of the sock 1 not to be easily recognized by another person and preventing the sock 1 from adversely affecting the aesthetic impression centered on the shoe.

[0054] In addition, the process of manufacturing the sock according to the above embodiment starts knitting from the toe portion 11 and finishes the knitting at the body portion 13 through the heel portion 12. However, the process is not limited to this. The process may start knitting from the body portion 13 and finish the knitting at the toe portion 11 through each knitting of the ankle connecting portion 15, the heel portion 12, and the foot connecting portion 14.

[0055] Further, in the sock according to the above embodiment, the toe portion 11 and the heel portion 12 are knitted as the bag-shaped knitted fabric in which the gore line is formed as a single line. However, the present invention is not limited to this. The toe portion and the heel portion may be knitted to obtain a predetermined bulging shape by repeating the knitting for reducing and increasing the number of stitches a plurality of times such that

the gore line is formed with a plurality of branches such as a Y shape.

[0056] Further, in the sock according to the above embodiment, the structure of the knitted fabric of the ankle connecting portion 15 is not changed with respect to the knitted fabrics of the other portions of the sock when the knitted fabric of the ankle connecting portion 15 is knitted with the width dimension such that the ankle connecting portion is hidden behind the ankle and invisible from the front side of the foot in the worn state. However, the present invention is not limited to this. For example, the ankle connecting portion may be knitted in a different knitting method from that for knitted fabrics of the other portions of the sock to form a knitted fabric that causes a stronger elastic contraction force in a course direction, resulting in a state of this knitted fabric being more shrunk in the course direction with respect to the other portions of the sock.

[0057] As still another example, the toe portion, the foot connecting portion, the heel portion, the ankle connecting portion, and the body portion in the sock may be knitted to include at least one continuous common yarn in their knitted fabrics, and in particular, the ankle connecting portion may be knitted by continuously inserting a predetermined insertion yarn having larger elasticity than that of the common yarn in a course direction, making the obtained knitted fabric of the ankle connecting portion more shrink in the course direction by an elastic force of the insertion yarn compared to other portions of the sock.

[0058] Thus, the knitted fabric of the ankle connecting portion causes the stronger elastic contraction force in the course direction compared to the knitted fabric of the other portions of the sock to be more shrunk in the course direction than the knitted fabric of the other portions of the sock. This reduces the width dimension of the ankle connecting portion, thus enabling the width dimension of the ankle connecting portion to be surely suppressed to such a width dimension that fits the ankle connecting portion to the back side of the ankle. This enables the sock to be hard to see, and to be worn without making another person aware of the existence of the sock while ensuring difficulty of slipping off, preventing the sock from impairing the impression of wearing shoes on bare feet.

[0059] Further, in the sock according to the above embodiment, its toe portion is configured to collectively cover the toes as the toe portion 11 of the bag-shaped knitted fabric. However, the present invention is not limited to this. The toe portion of the sock may be configured to have a shape having three divided sections: a thumb bag section that covers a thumb, a little toe bag section that covers a little toe, and a central bag section that collectively covers the remaining other toes, or configured to have a shape having two sections: a thumb bag section that covers a thumb and a toes bag section that collectively cover the other toes, or configured to have a shape having separate bag sections that cover the toes independently for each toe.

Reference Signs List

[0060]

1	Sock
11	Toe portion
11a	Toe upper portion
11b	Toe lower portion
12	Heel portion
12a	Heel lower portion
12b	Heel upper portion
13	Body portion
13a	Foot entrance portion
14	Foot connecting portion
15	Ankle connecting portion
16	Opening
50	Cylinder

Claims

1. A sock that is integrally knitted as a whole with a circular knitting machine and has at least a toe portion covering a toe of a foot, a heel portion covering a heel of the foot, and a body portion cylindrically surrounding a lower leg of a leg, the sock comprising:

   a non-cylindrical foot connecting portion that is knitted between the toe portion and the heel portion and integrally connects the toe portion and the heel portion; and
   a non-cylindrical ankle connecting portion that is knitted between the heel portion and the body portion and integrally connects the heel portion and the body portion, wherein
   the foot connecting portion is knitted between the toe portion and the heel portion as a knitted fabric having a predetermined knitting width located on a sole side in a worn state,
   the ankle connecting portion is knitted between the heel portion and the body portion as a knitted fabric having a predetermined knitting width located on a back side of an ankle in the worn state, and
   a predetermined opening surrounded by the toe portion, the foot connecting portion, the heel portion, the ankle connecting portion, and the body portion is formed as an arrangement that opens a predetermined area on a front side of the foot from the ankle to an instep in the worn state.

2. The sock according to claim 1, wherein the ankle connecting portion is knitted with a width dimension such that the ankle connecting portion is hidden behind the ankle and invisible from a front side of the foot in the worn state.

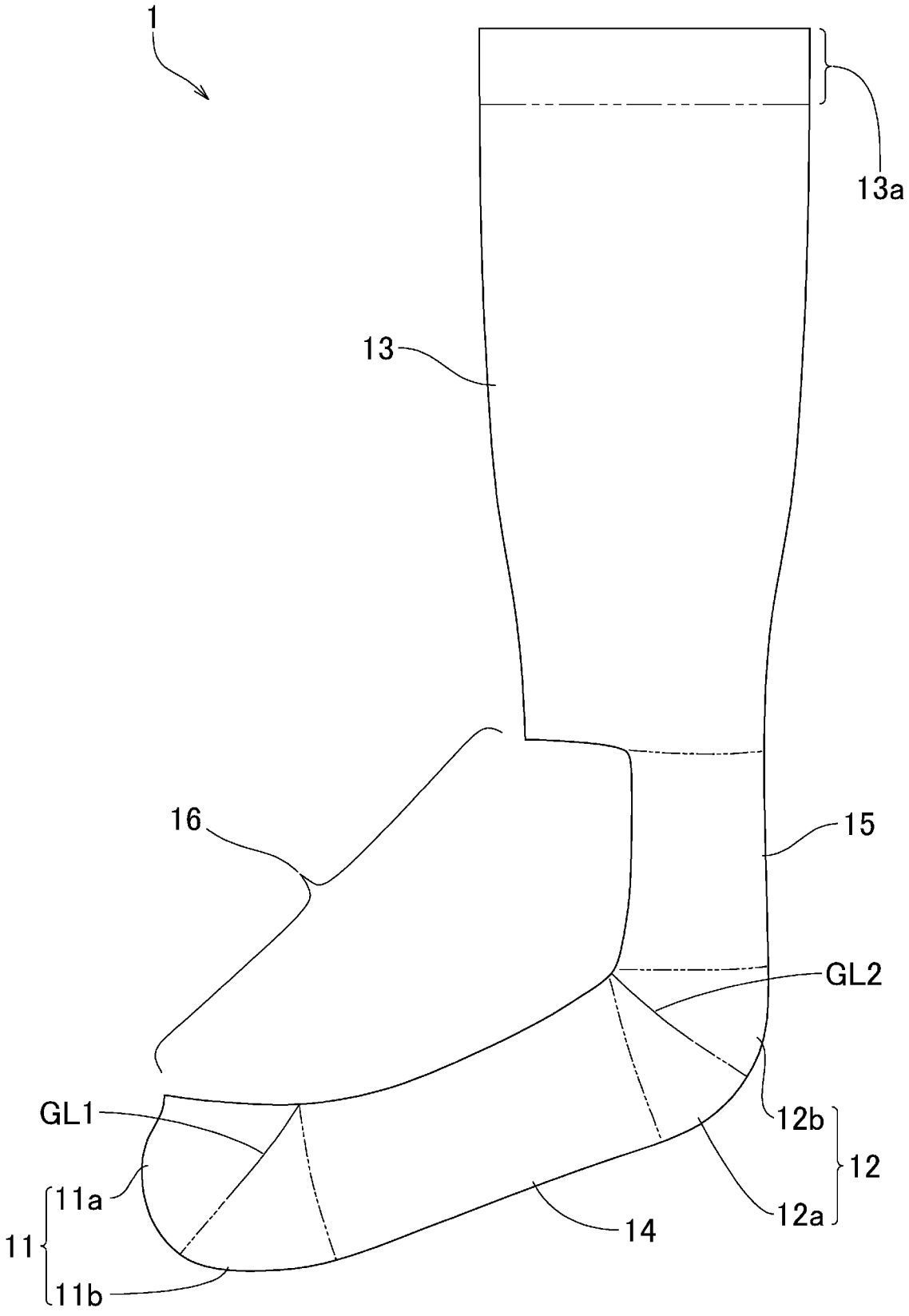
3. The sock according to claim 2, wherein the ankle

connecting portion is knitted in a different knitting method from that for a knitted fabric of the other portions of the sock as the knitted fabric that causes a stronger elastic contraction force in a course direction, and is in a state of the knitted fabric being more shrunk in the course direction with respect to the other portions of the sock.

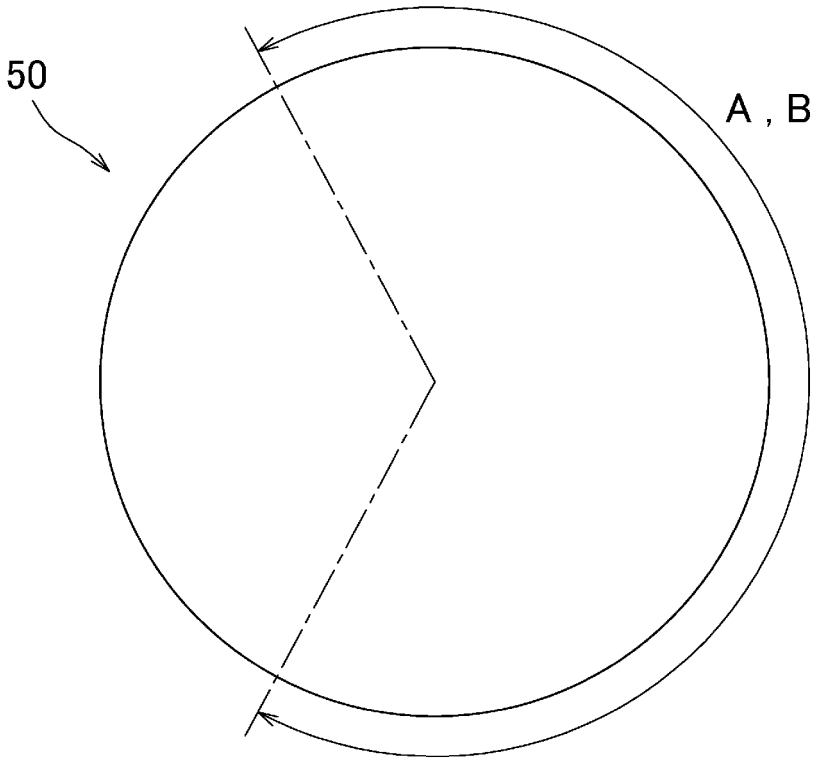
4. The sock according to claim 2, wherein

the toe portion, the foot connecting portion, the heel portion, the ankle connecting portion, and the body portion are knitted to include at least one continuous common yarn in their knitted fabrics, and
the ankle connecting portion is knitted by inserting a predetermined insertion yarn having larger elasticity than that of the common yarn while continuously inserting the insertion yarn in a course direction, and more shrinks in the course direction by an elastic force of the insertion yarn compared to other portions of the sock.

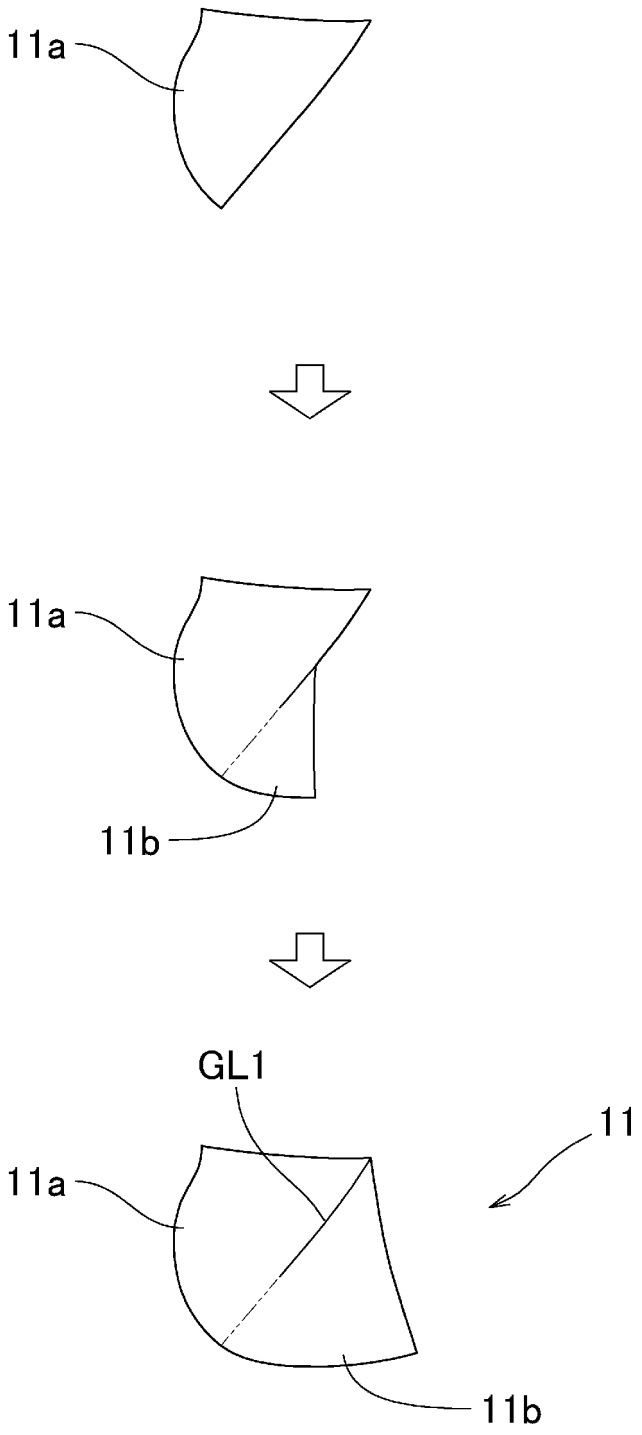
[Figure 1]



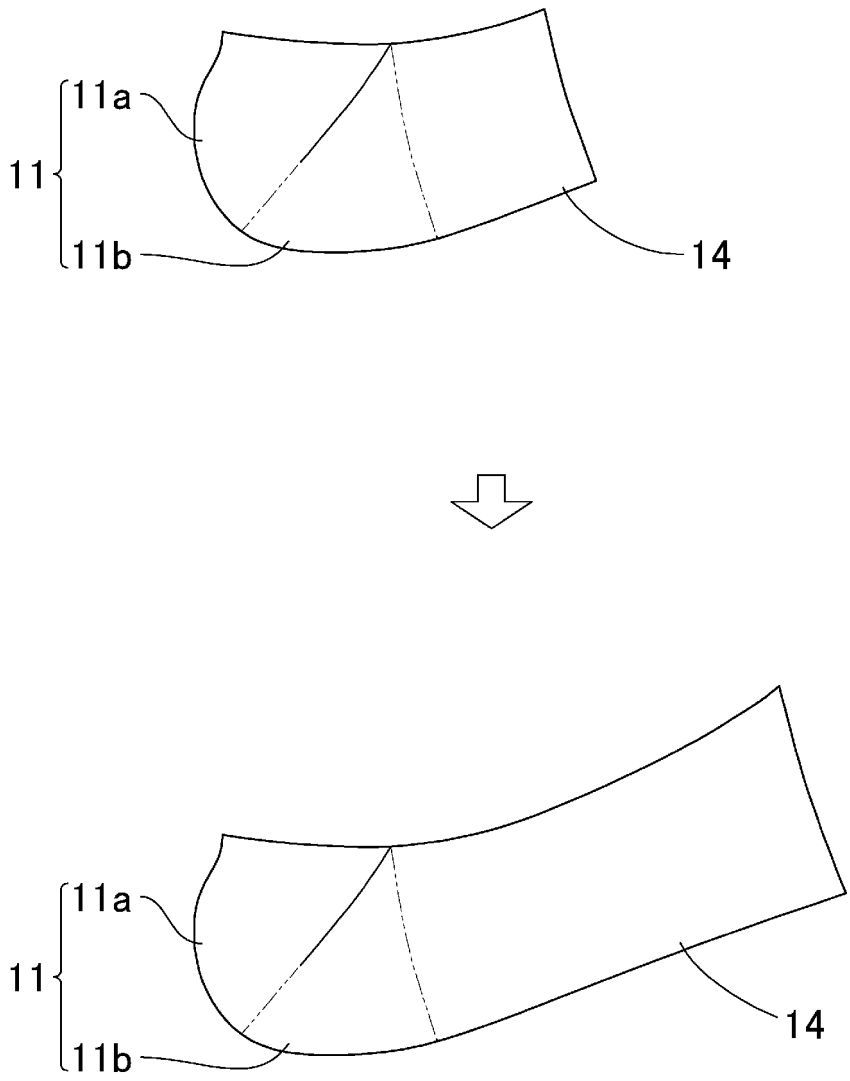
[Figure 2]



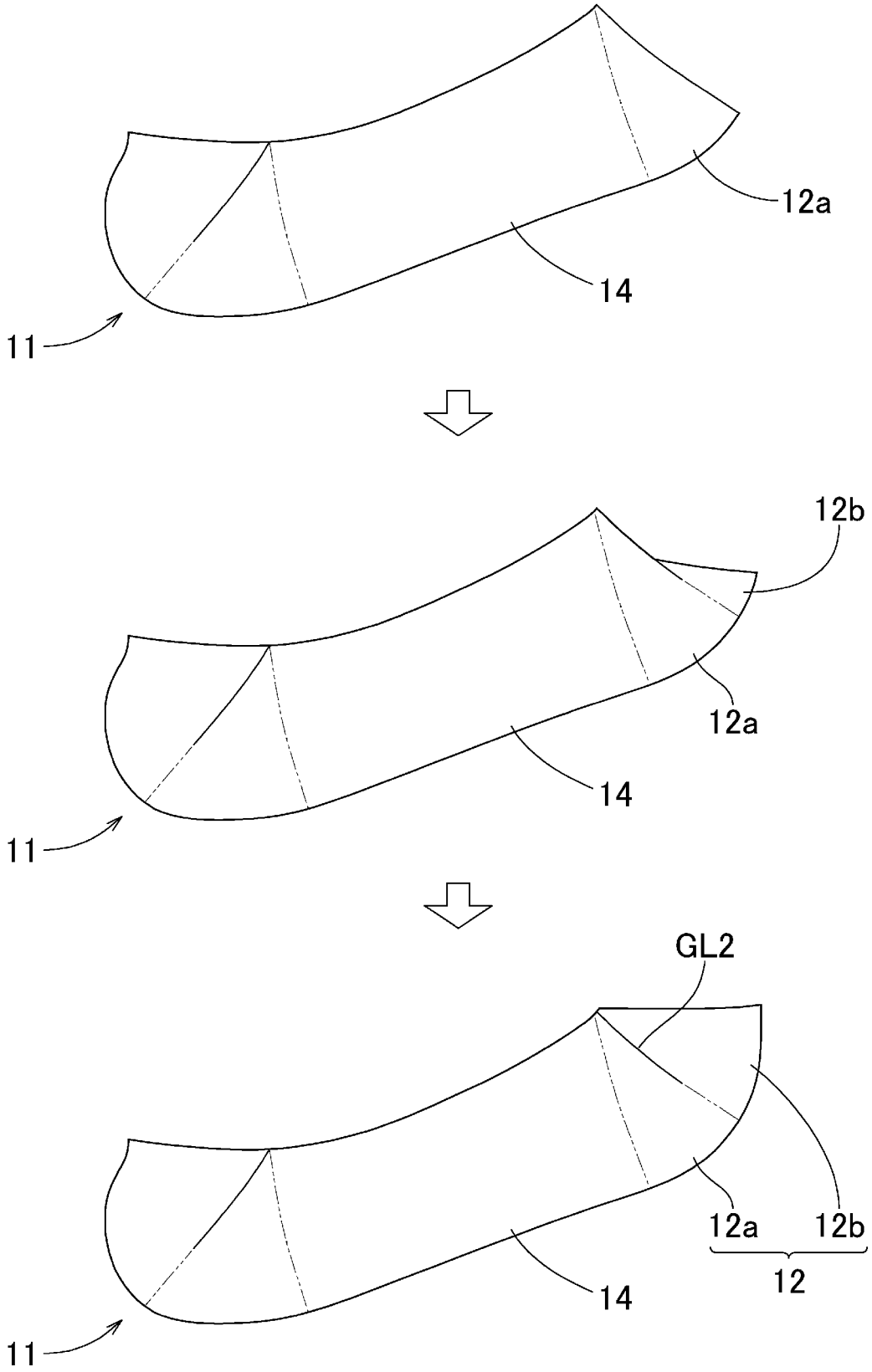
[Figure 3]



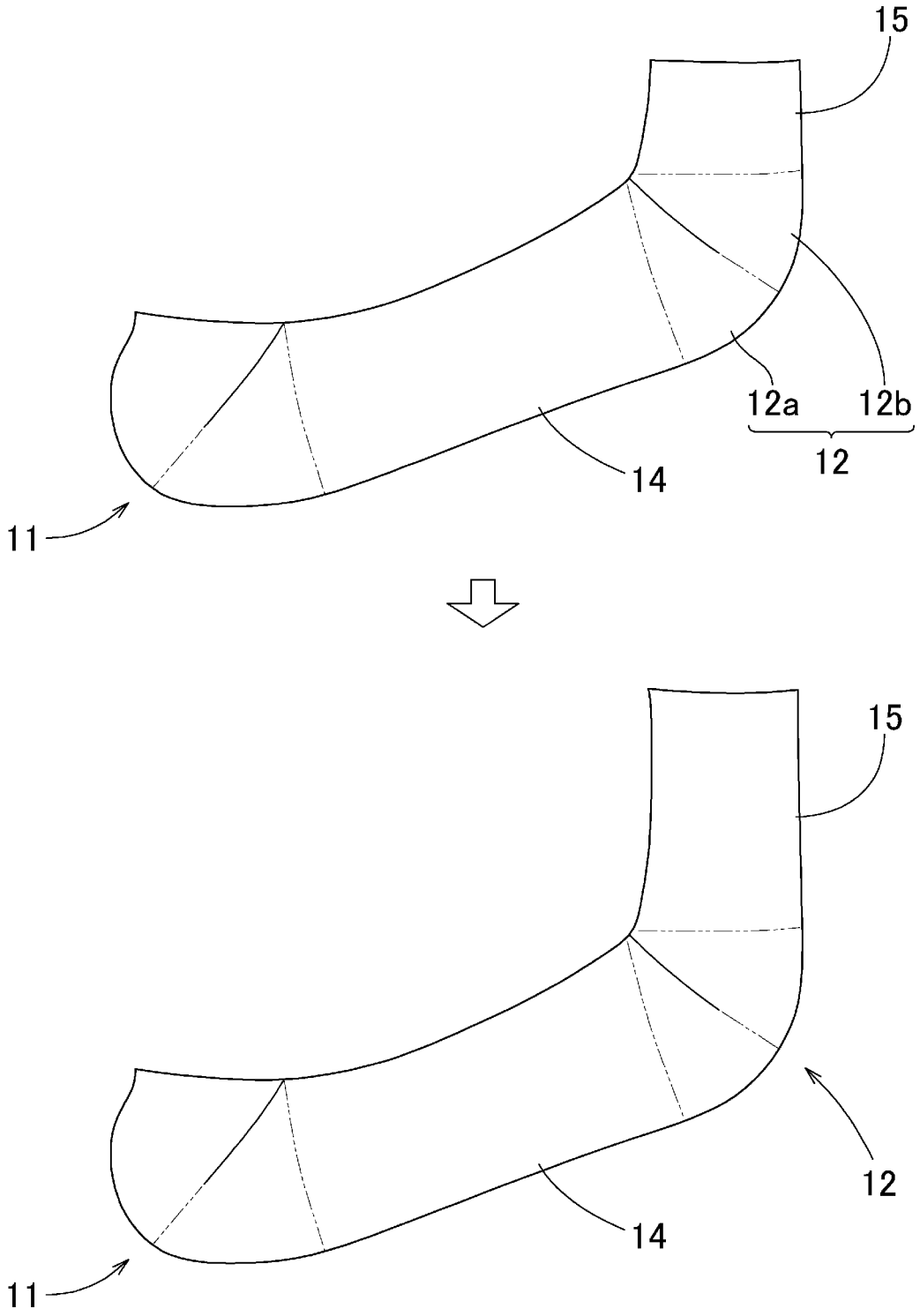
[Figure 4]



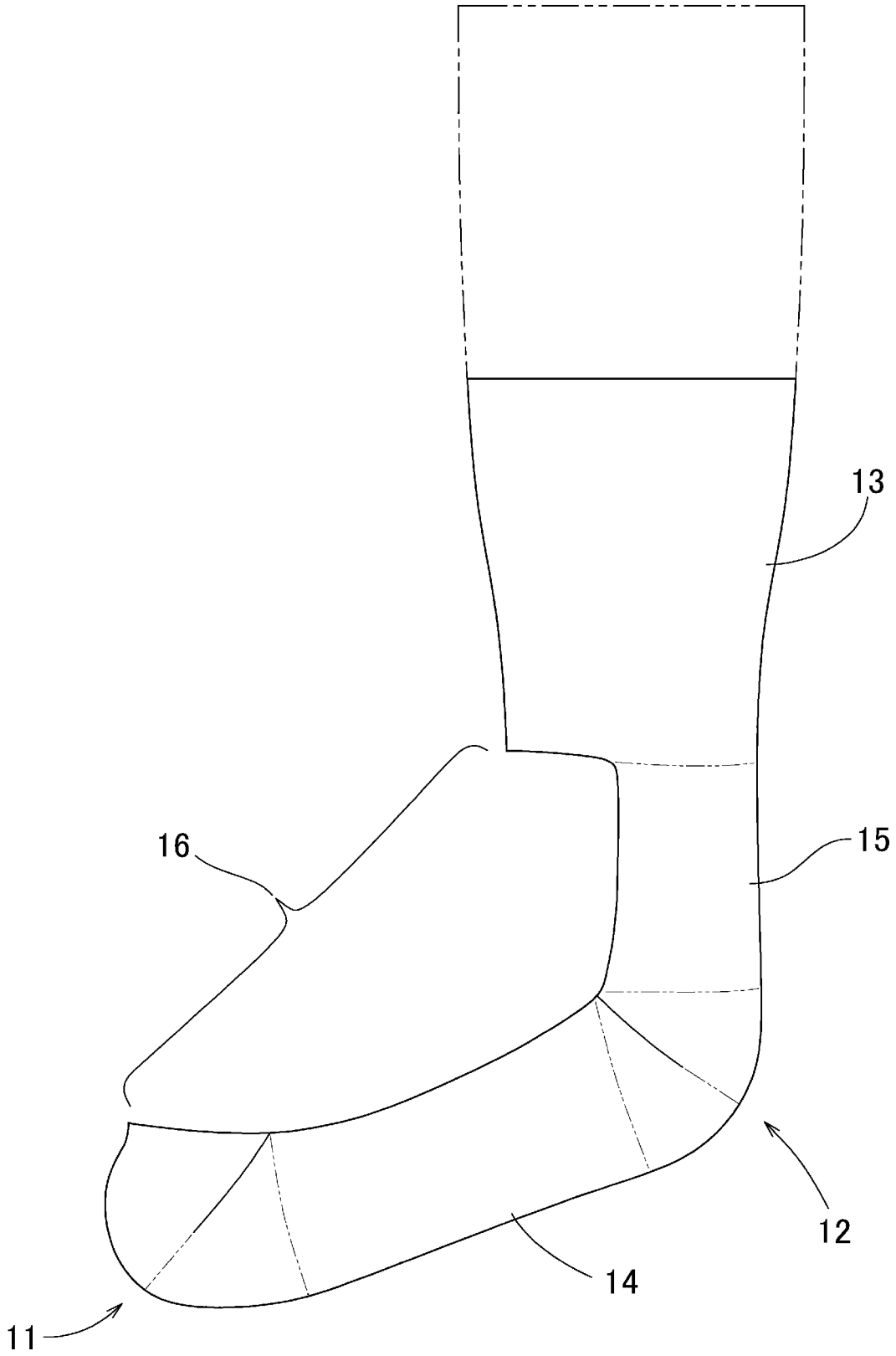
[Figure 5]



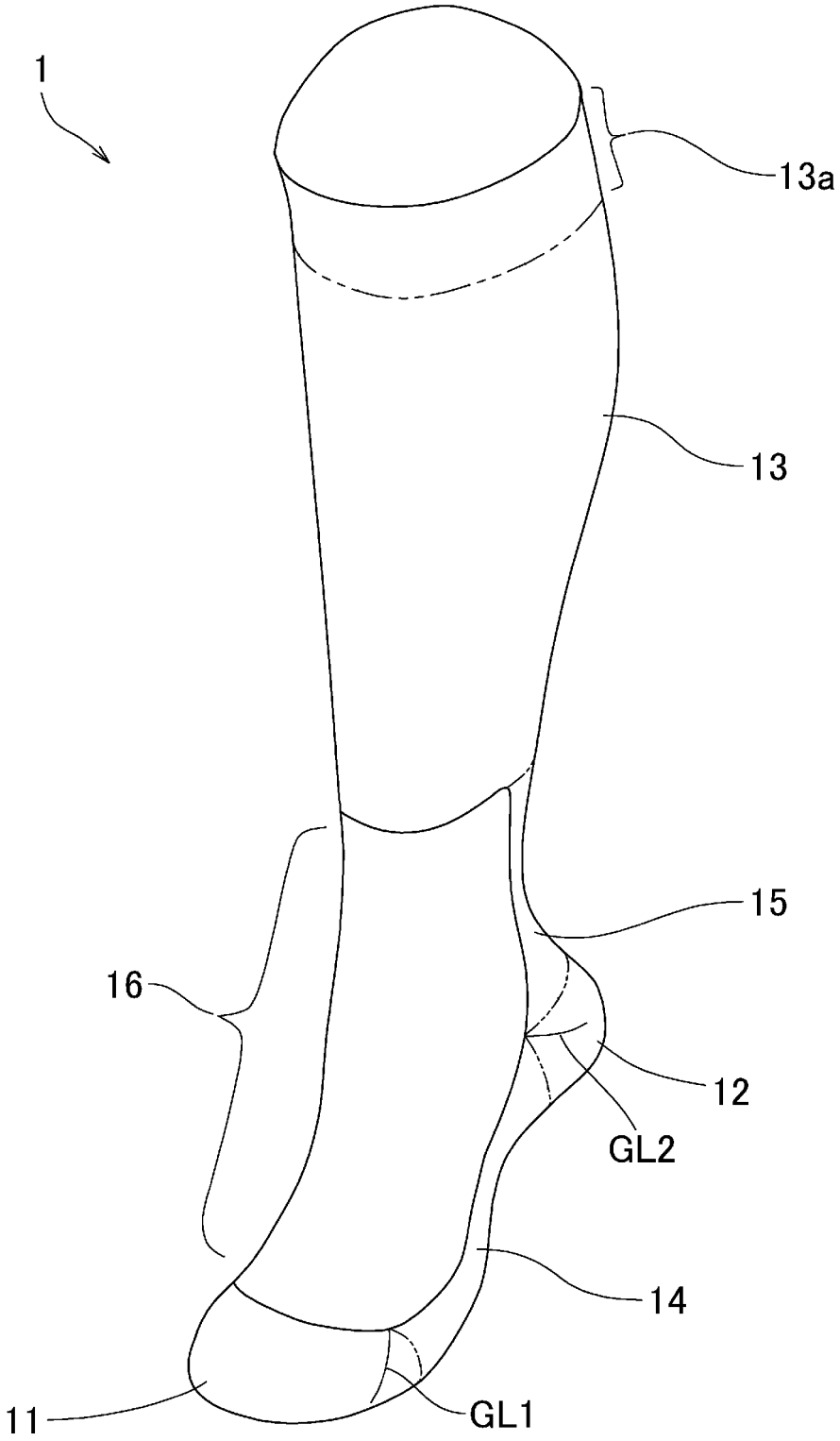
[Figure 6]



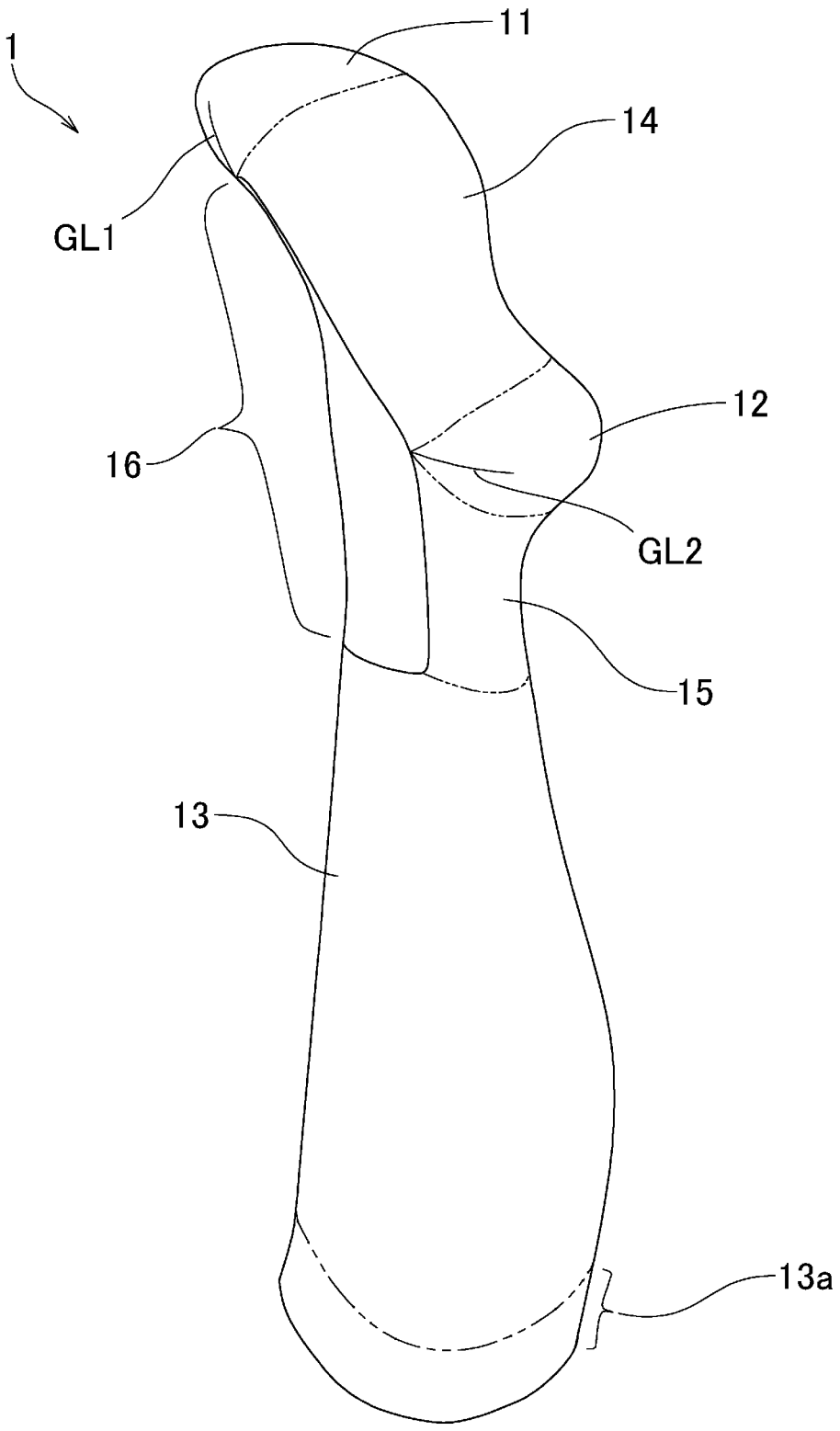
[Figure 7]



[Figure 8]



[Figure 9]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2021/001842

A. CLASSIFICATION OF SUBJECT MATTER
A41B 11/00(2006.01)i
FI: A41B11/00 Z; A41B11/00 D
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A41B11/00-11/14; D04B1/26

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan	1922-1996
Published unexamined utility model applications of Japan	1971-2021
Registered utility model specifications of Japan	1996-2021
Published registered utility model applications of Japan	1994-2021

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2014/0165267 A1 (MCKEE, Shelby Busemeyer) 19 June 2014 (2014-06-19) paragraphs [0027]-[0028], [0035], [0041]-[0043]. [0045], [0057]-[0058], fig. 1-3	1-2
Y	JP 2011-89234 A (NAIGAI CO., LTD.) 06 May 2011 (2011-05-06) paragraphs [0002], [0008], [0014], fig. 1-3	1-2
A	JP 2018-59245 A (NAIGAI CO., LTD.) 12 April 2018 (2018-04-12) paragraphs [0015], [0018], [0021], [0033], fig. 1-2	3-4
A	JP 2009-209483 A (OKAMOTO CORPORATION) 17 September 2009 (2009-09-17) paragraph [0029]	3-4
A	JP 3112115 U (KATSU, Akiko) 04 August 2005 (2005-08-04) claim 1, paragraphs [0004]-[0006], [0010], fig. 1-2	1-4

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Date of the actual completion of the international search	Date of mailing of the international search report
11 March 2021 (11.03.2021)	23 March 2021 (23.03.2021)

Name and mailing address of the ISA/	Authorized officer
Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2021/001842

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
US 2014/0165267 A1	19 Jun. 2014	US 2014/0165266 A1	
JP 2011-89234 A	06 May 2011	(Family: none)	
JP 2018-59245 A	12 Apr. 2018	(Family: none)	
JP 2009-209483 A	17 Sep. 2009	US 2009/0223254 A1 paragraph [0046]	
JP 3112115 U	04 Aug. 2005	(Family: none)	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2003342803 A **[0005] [0007]**
- JP 3112115 U **[0006] [0007]**