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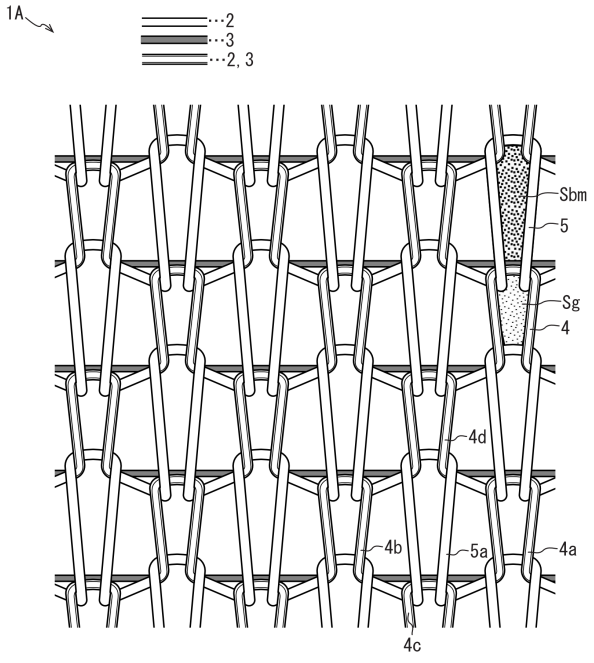
(54) MESH KNITTED FABRIC AND METHOD FOR KNITTING ONE-FEEDER MESH KNITTED FABRIC

(57) Provided is a mesh knitted fabric and a method for knitting a one-feeder mesh knitted fabric, in which the area ratio of openings per unit area of the mesh knitted fabric is increased without changing the arrangement and the number of mesh loops. A mesh knitted fabric 1A is formed by a combination of a ground loop formed by a first yarn 2 and a second yarn 3 in an overlapped state and a mesh loop formed by the first yarn 2 without including the second yarn 3. The mesh loop includes a large mesh loop 5 having a circumference longer than that of the ground loop 4.

FIG. 1



EP 4 741 552 A1

Description

TECHNICAL FIELD

[0001] The present teaching relates to a mesh knitted fabric and a method for knitting a one-feeder mesh knitted fabric.

BACKGROUND ART

[0002] In a knitted fabric in which loops are formed by two yarns in an overlapped state, there is known a mesh knitted fabric in which a loop at a predetermined position is formed by a single yarn. In the mesh knitted fabric, loops formed by two yarns and loops formed by a single yarn are mixed. The loop formed by the single yarn is thinner than the loop formed by the two yarns. Accordingly, the knitted fabric is knitted as a mesh knitted fabric having gaps in portions where the loops formed by the single yarn are located.

[0003] Patent Document 1 discloses a single-knit fabric knitted using two feeders in a circular knitting machine and a method for knitting the single-knit fabric. In the knitting method described in Patent Document 1, it is possible to selectively perform a step of forming a knit loop (ground loop) by two yarns, a step of forming a mesh loop by a single yarn, and a step of forming a pile loop by a single yarn. Accordingly, the knitting method can knit a mesh knitted fabric, a mesh knitted fabric having pile loops, and a pile knitted fabric. By combining the knitting structures of the ground loop, the mesh loop, and the pile loop, the knitting method can knit fabrics having various configurations.

CITATION LIST

PATENT DOCUMENT

[0004] Patent Document 1: Japanese Patent Application Publication No. 2016-204769

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0005] The mesh knitted fabric is knitted by a combination of the ground loop and the mesh loop. The ground loop is formed by lowering a knitting needle holding two yarns to support the yarns on a sinker top of a sinker, and then moving the knitting needle to a knit position while the yarns remain supported on the sinker top. The mesh loop is formed by lowering a knitting needle holding a single yarn to support the yarn on the sinker top of the sinker, and then moving the knitting needle to the knit position while the yarn remains supported on the sinker top. The structure of the mesh knitted fabric can be adjusted by a combination of a ratio between the number of the ground loops and the number of the mesh loops per unit area, and the arrangement of the mesh loops relative to the ground loops.

[0006] The knitting method in the circular knitting machine described in Patent Document 1 uses two feeders for knitting, and therefore the production amount of the knitted fabric is smaller compared to a knitting method using one feeder. In addition, in the knitting method, the knit position of the knitting needle in the circular knitting machine is mechanically defined by a cam for the knitting needle. Accordingly, the ground loop and the mesh loop are formed in approximately the same size. For this reason, to increase an area of a region appearing as an opening defined by the yarn of the mesh loop on the front surface of the mesh knitted fabric, this knitting method uses an approach to change the arrangement and the number of the mesh loops. However, in a knitted fabric formed on condition that the arrangement and the number of the mesh loops are not changed, it is not possible to increase the area of the inner region of the mesh loop defined by its yarn. Thus, there is a need for a method for knitting a mesh knitted fabric with an increased area of the inner region of each mesh loop defined by its yarn on the front surface of the mesh knitted fabric, without changing the arrangement and the number of the mesh loops, and also for such a mesh knitted fabric, in a method for knitting a one-feeder mesh knitted fabric using one feeder.

[0007] It is, therefore, an object of the present teaching to provide a mesh knitted fabric and a method for knitting a one-feeder mesh knitted fabric, in which an area of an inner region (opening) of a mesh loop defined by its yarn on the front surface of the mesh knitted fabric is increased without changing the arrangement and the number of mesh loops.

SOLUTION TO PROBLEM

[0008] The inventors of the present teaching have studied a mesh knitted fabric and a method for knitting a one-feeder mesh knitted fabric, in which an area of an inner region of a mesh loop defined by its yarn in the mesh knitted fabric is increased without changing the arrangement and the number of mesh loops (Hereinafter, the inner region of each loop defined by its yarn is simply referred to as "an inner region of a loop". The inner regions of respective loops defined by their yarns are referred to as an inner region of a ground loop, an inner region of a mesh loop, an inner region of a large mesh loop, and an inner region of a medium mesh loop). As a result of diligent examination, the inventors have arrived at the following configuration.

[0009] A mesh knitted fabric according to one embodiment of the present teaching is formed by a combination of: a ground loop formed by a first yarn and a second yarn in an overlapped state; and a mesh loop formed by the first yarn without including the second yarn. The mesh loop includes a large mesh loop having a circumference (the yarn length constituting a needle loop) longer than a

circumference of the ground loop.

[0010] As described above, the circumference of the ground loop is shorter than that of the large mesh loop. An area of an inner region of each large mesh loop in the mesh knitted fabric including the large mesh loops is greater than an area of an inner region of each ground loop. In a case where an area of an inner region of each mesh loop other than the large mesh loop is substantially the same as the area of the inner region of the ground loop, an area of the inner regions of the large mesh loops and the ground loops each defined by the yarns per unit area on the front surface of the mesh knitted fabric knitted with these loops is greater than an area of the inner regions of the ground loops and the mesh loops other than the large mesh loops per the same unit area on the front surface of the mesh knitted fabric knitted with these loops. Thus, by constituting the mesh loops by the large mesh loops, it is possible to increase the area of the inner region of the mesh loop on the front surface of the mesh knitted fabric or the area ratio of regions not occupied by the yarns within the same surface area on the front surface of the mesh knitted fabric, without changing the arrangement and the number of the mesh loops. This can also increase the openness (see-through appearance) of the knitted fabric without significant modification of a design constituted by the arrangement of the ground loops and the mesh loops.

[0011] In another aspect, the mesh knitted fabric according to the present teaching may have the following configuration. The mesh loop further includes a medium mesh loop having a circumference shorter than the circumference of the large mesh loop.

[0012] As described above, an area of an inner region of each medium mesh loop in the mesh knitted fabric including the medium mesh loops is smaller than the area of the inner region of the large mesh loop. That is, an area of the inner regions of the medium mesh loops and the ground loops each defined by the yarns per unit area on the front surface of the mesh knitted fabric knitted with these loops is smaller than an area of the inner regions of the large mesh loops and the ground loops per the same unit area on the front surface of the mesh knitted fabric knitted with these loops. Thus, by constituting the mesh loops by the large mesh loops and the medium mesh loops, it is possible to increase the area of the inner region of the mesh loop in the mesh knitted fabric, without changing the arrangement and the number of the mesh loops. This can also increase the openness of the knitted fabric without significant modification of a design constituted by the arrangement of the ground loops and the mesh loops.

[0013] In another aspect, the mesh knitted fabric according to the present teaching may have the following configuration. The mesh knitted fabric further includes a pile loop that is formed by the first yarn and is adjacent to the ground loop.

[0014] As described above, the pile loop is a sinker loop formed by the first yarn constituting the ground loop, at a position adjacent to the ground loop. That is, the pile loop maintains a loop shape at the position adjacent to the ground loop by the intertwining of an already formed old loop with the ground loop that includes the first yarn constituting the pile loop. By forming the large mesh loops, it is possible to increase the area of the inner region of the mesh loop on the front surface of the mesh knitted fabric including the pile loops, without changing the arrangement and the number of the mesh loops.

[0015] In another aspect, the mesh knitted fabric according to the present teaching may have the following configuration. The first yarn or the second yarn forms the loop while overlapped with a spandex yarn.

[0016] In another aspect, the mesh knitted fabric according to the present teaching may have the following configuration. At least the ground loop among the ground loop and the large mesh loop is formed with the first and second yarns overlapping a spandex yarn.

[0017] As described above, in the mesh knitted fabric, the ground loop formed by the first and second yarns or the large mesh loop formed by the first yarn includes the spandex yarn having high elasticity. Accordingly, the mesh knitted fabric provides elasticity due to the combined effect of the elasticity of the inner regions of the large mesh loops and the elasticity of the loops themselves that include the spandex yarn.

[0018] A method for knitting a one-feeder mesh knitted fabric according to one embodiment of the present teaching is performed by a circular knitting machine including an electronic control device for a knitting needle and a sinker, wherein the mesh knitted fabric is knitted using one feeder by a combination of: a ground loop formed by a first yarn and a second yarn in an overlapped state; and a mesh loop that is welted with the second yarn and formed by the first yarn.

[0019] The method for knitting the one-feeder mesh knitted fabric according to one embodiment of the present teaching includes: a yarn feeding step of feeding the first yarn to a position above an upper support portion of the sinker and feeding the second yarn to a position above a lower support portion of the sinker but below the upper support portion; a ground loop forming step of causing the sinker to move to a first sinker position in which the first and second yarns fed in the yarn feeding step are supported on the lower support portion, and causing the knitting needle to move along a first needle track along which the knitting needle holds the first and second yarns and forms a loop by the first and second yarns, thereby forming the ground loop by the first and second yarns in the overlapped state that are supported on the lower support portion; and a large mesh loop forming step of causing the sinker to move to a second sinker position in which the first yarn fed in the yarn feeding step is supported on the upper support portion, and causing the knitting needle to move along a second needle track along which the knitting needle holds the first yarn and forms a loop by the first yarn, thereby forming a large mesh loop by the first yarn supported on the upper

support portion.

[0020] As described above, in the method for knitting the one-feeder mesh knitted fabric, the mesh knitted fabric including the ground loops and the large mesh loops is knitted through the yarn feeding step, the ground loop forming step, and the large mesh loop forming step performed in the one feeder. In the yarn feeding step, the first yarn is fed to a position above the upper support portion, and the second yarn is fed to a position above the lower support portion. In the ground loop forming step, the sinker is caused to move to the first sinker position, and the knitting needle at an ascending position is lowered to a descending position (knit position) along the first needle track. The first and second yarns held by the knitting needle are supported on the lower support portion. This allows the formation of the ground loop by the first and second yarns. In the large mesh loop formation step, the sinker is caused to move to the second sinker position, and the knitting needle at an ascending position is lowered to the descending position along the second needle track. The first yarn held by the knitting needle is supported on the upper support portion. This allows the formation of the large mesh loop. The second yarn is not held by the knitting needle. Thus, the second yarn does not form a loop.

[0021] The circumference of each of the ground loop and the large mesh loop formed in this manner is defined by a distance between the portion supporting the first yarn or the second yarn and the descending position of the knitting needle. Accordingly, the large mesh loop formed while supported on the upper support portion has a circumference longer than that of the ground loop formed while supported on the lower support portion. This allows the formation of the large mesh loops in the mesh knitted fabric by adjusting the sinker position, without changing the arrangement and the number of the mesh loops. It is thus possible to increase the area of the inner region of the mesh loop on the front surface of the mesh knitted fabric or the area ratio of regions not occupied by the yarns within the same surface area on the front surface of the mesh knitted fabric. Further, productivity can be increased compared to a mesh knitted fabric knitted by two feeders.

[0022] In another aspect, the method for knitting the one-feeder mesh knitting fabric according to the present teaching may have the following configuration. The method further includes a medium mesh loop forming step of causing the sinker to move to the first sinker position and causing the knitting needle to move along the second needle track, thereby forming a medium mesh loop by the first yarn supported on the lower support portion.

[0023] As described above, in the method for knitting the one-feeder mesh knitted fabric, the mesh knitted fabric including the ground loops, the large mesh loops, and the medium mesh loops is knitted through the yarn feeding step, the ground loop forming step, the large mesh loop forming step, and the medium mesh loop forming step performed in one feeder. In the medium mesh loop forming step, the sinker is caused to move to the first sinker position, and the knitting needle at the ascending position is lowered to the descending position along the second needle track. The first yarn held by the knitting needle is supported on the lower support portion. This allows the formation of the medium mesh loop with the first yarn. In this case, the second yarn that is not held by the knitting needle does not form a loop.

[0024] In the method for knitting the one-feeder mesh knitted fabric, the first yarn is supported on the lower support portion and the knitting needle holding the first yarn is lowered to the descending position, thereby forming the medium mesh loop having a circumference shorter than that of the large mesh loop formed by the first yarn supported on the upper support portion. By adjusting the sinker position in this manner, the large mesh loops and the medium mesh loops can be formed in the mesh knitted fabric, without changing the arrangement and the number of the mesh loops. It is thus possible to increase the area of the inner region of the mesh loop on the front surface of the mesh knitted fabric. Further, productivity can be increased compared to a mesh knitted fabric knitted by two feeders.

[0025] In another aspect, the method for knitting the one-feeder mesh knitting fabric according to the present teaching may have the following configuration. The method further includes a pile loop forming step of causing the sinker to move to the second sinker position and causing the knitting needle to move along the first needle track, thereby forming a pile loop by the first yarn supported on the upper support portion.

[0026] As described above, in the method for knitting the one-feeder mesh knitted fabric, the mesh knitted fabric including the ground loops, the large mesh loops, and the pile loops is knitted through the yarn feeding step, the ground loop forming step, the large mesh loop forming step, and the pile loop forming step performed in one feeder. In the pile loop forming step, the sinker is caused to move to the second sinker position, and the knitting needle at the ascending position is lowered to the descending position along the first needle track. The first yarn held by the knitting needle is supported on the upper support portion of the sinker. The second yarn held by the knitting needle is supported on the lower support portion of the sinker. Accordingly, the ground loop is formed by the first and second yarns. In addition, a portion, which is supported on the upper support portion, of the first yarn forms the pile loop.

[0027] In the method for knitting the one-feeder mesh knitted fabric, the pile loop is formed by the first yarn constituting the ground loop, at a position adjacent to the ground loop. That is, the pile loop maintains a loop shape at the position adjacent to the ground loop by the intertwining of an already formed old loop with the ground loop that includes the first yarn constituting the pile loop. Thus, it is possible to provide the mesh knitted fabric that allows the area of the inner region of the mesh loop on the fabric front surface to be increased by forming the large mesh

loop, without changing the arrangement and the number of the mesh loops, and also includes the pile loop, while improving productivity compared to a mesh knitted fabric knitted by two feeders.

[0028] In another aspect, the method for knitting the one-feeder mesh knitting fabric according to the present teaching may have the following configuration. In the yarn feeding step, a spandex yarn is fed to the knitting needle that moves along the first needle track or the second needle track.

[0029] As described above, in the method for knitting the one-feeder mesh knitted fabric, the ground loop, the large mesh loop, or the medium mesh loop that include the spandex yarn can be formed. Thus, the elasticity of the mesh knitted fabric can be improved due to the combined effect of the elasticity by deformation of the openings of the large mesh loops, and the elasticity of the loops themselves that include the spandex yarn.

[0030] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the teaching.

[0031] As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items.

[0032] It will be further understood that the terms "including," "comprising" or "having" and variations thereof when used in this specification specify the presence of stated features, steps, operations, elements, components, and/or their equivalents, but do not preclude the presence or addition of one or more steps, operations, elements, components, and/or groups thereof.

[0033] It will be further understood that the terms "mounted," "connected," "coupled," and/or their equivalents are used broadly and encompass both direct and indirect mounting, connecting and coupling. Further, "connected" and "coupled" are not restricted to physical or mechanical connections or couplings, and can include electrical connections or couplings, whether direct or indirect.

[0034] Unless otherwise defined, all terms (including technical and scientific terms) used herein have the same meaning as commonly understood by one having ordinary skill in the art to which this teaching belongs.

[0035] It will be further understood that terms, such as those defined in commonly used dictionaries, should be interpreted as having a meaning that is consistent with their meaning in the context of the relevant art and the present disclosure and will not be interpreted in an idealized or overly formal sense unless expressly so defined herein.

[0036] In describing the teaching, it will be understood that a number of techniques and steps are disclosed. Each of these has individual benefit and each can also be used in conjunction with one or more, or in some cases all, of the other disclosed techniques.

[0037] Accordingly, for the sake of clarity, this description will refrain from repeating every possible combination of the individual steps in an unnecessary fashion. Nevertheless, the specification and claims should be read with the understanding that such combinations are entirely within the scope of the teaching.

[0038] Embodiments of a mesh knitted fabric and a method for knitting a one-feeder mesh knitted fabric according to the present teaching will be herein described.

[0039] In the following description, numerous specific details are set forth in order to provide a thorough understanding of the present teaching. It will be evident, however, to one skilled in the art that the present teaching may be practiced without these specific details.

[0040] The present disclosure is to be considered as an exemplification of the teaching, and is not intended to limit the teaching to the specific embodiments illustrated by the figures or description below.

[Loop]

[0041] "Loop" herein refers to a portion of a yarn that is curved by a knitting needle and a sinker. The loop is formed in an omega shape with a part thereof being opened.

[Old Loop]

[0042] "Old loop" herein refers to a portion that has already been formed into a loop in an upstream process. A yarn drawn into the old loop by the knitting needle forms a new loop (a new old loop) in a state of being intertwined with the old loop.

[Needle Loop]

[0043] "Needle loop" herein refers to a loop that extends toward the front surface of a knitted fabric from a portion of the yarn in contact with the old loop as a result of the yarn being drawn into the old loop by the knitting needle. That is, the needle loop extends from the portion of the yarn in contact with the old loop in the direction in which the knitting needle is located. The needle loop is in contact with the knitting needle during loop formation.

[Sinker Loop]

[0044] "Sinker loop" herein refers to a loop that extends toward the back surface of the knitted fabric from a portion of the yarn in contact with the old loop as a result of the yarn being drawn into the old loop by the knitting needle. The sinker loop extends from the portion of the yarn in contact with the old loop in the direction in which the sinker is located. The sinker loop is in contact with the sinker during loop formation.

[Circular Knitting Machine]

[0045] A circular knitting machine herein refers to an apparatus for producing a tubular knitted fabric. The

circular knitting machine includes a cylindrical rotating cylinder (needle bed) that rotates with a plurality of knitting needles accommodated therein, and a disc-shaped sinker dial (needle bed) that rotates with a plurality of sinkers accommodated therein. The circular knitting machine knits a tubular knitted fabric by using the knitting needles and the sinkers. A plurality of yarns are fed to the circular knitting machine. The circular knitting machine can efficiently knit a tubular knitted fabric by stacking the plurality of fed yarns in a helical manner.

[Intertwine, Be Intertwined]

[0046] "Intertwine" or "be intertwined" refers to a state in which one yarn is brought into contact around another yarn. When one yarn is passed through a loop of another yarn so that a loop of the one yarn is formed, the loop of the one yarn is formed by the intertwining with the other yarn. By forming loops through intertwining yarns with each other, the loops are restrained, for example by frictional force, so that the size of the loops does not easily change.

[Knit]

[0047] "Knit" herein refers to an operation in which a loop is formed by a knitting needle in one feeder. The knit includes: an ascending step of raising the knitting needle from a knit position (descending position) located below the old loop to a clearing position (ascending position) where a latch is located above the old loop; a holding step of holding a new yarn by the knitting needle at the clearing position; and a descending step of moving the knitting needle holding the new yarn from the clearing position to the knit position so that the new yarn is passed through the old loop. The knit position (descending position) refers to the lowest position to which the knitting needle descends guided by a cam. By holding the yarn and descending to the knit position, the knitting needle forms a loop. The clearing position (ascending position) refers to a position where the latch is located above the old loop. At the clearing position, the old loop is released from the latch and is caught on the stem. Thereafter, when the knitting needle descends to the knit position, the old loop is released from the knitting needle.

[Welt]

[0048] "Welt" herein refers to an operation in which a knitting needle does not hold a new yarn in one feeder. The welt refers to a step of maintaining a state in which the old loop is held in the feeder.

ADVANTAGEOUS EFFECTS OF INVENTION

[0049] According to one embodiment of the present teaching, it is possible to increase an area of an inner region (opening) of a mesh loop on the front surface of a mesh knitted fabric without changing the arrangement and the number of mesh loops.

BRIEF DESCRIPTION OF DRAWINGS

[0050]

[FIG. 1] FIG. 1 is a structure diagram of a mesh knitted fabric as viewed from the fabric front surface according to a first embodiment of the present teaching.

[FIG. 2] FIG. 2 is a structure diagram of a mesh knitted fabric as viewed from the fabric front surface according to a first variation of the first embodiment of the present teaching.

[FIG. 3] FIG. 3 is a structure diagram of a mesh knitted fabric as viewed from the fabric front surface according to a second variation of the first embodiment of the present teaching.

[FIG. 4] FIG. 4 is a cross-sectional view of a main knitting portion of a circular knitting machine that uses a method for knitting a one-feeder mesh knitted fabric according to a second embodiment of the present teaching.

[FIG. 5] FIG. 5 is a side view of a sinker inserted into a sinker groove of the circular knitting machine that uses the method for knitting a one-feeder mesh knitted fabric according to the second embodiment of the present teaching.

[FIG. 6] FIG. 6 is a diagram of the needle and sinker tracks and a yarn feeding diagram in the method for knitting a one-feeder mesh knitted fabric according to the second embodiment of the present teaching.

[FIG. 7] FIG. 7 is a schematic diagram showing the positional relationship among a knitting needle, a first yarn, and a second yarn relative to a sinker located at a first sinker position in a yarn feeding step of the method for knitting a one-feeder mesh knitted fabric according to the second embodiment of the present teaching.

[FIG. 8] FIG. 8 is a schematic diagram showing the positional relationship among the knitting needle, the first yarn, and the second yarn relative to the sinker located at a second sinker position in the yarn feeding step of the method for knitting a one-feeder mesh knitted fabric according to the second embodiment of the present teaching.

[FIG. 9] FIG. 9 is a schematic diagram showing the positional relationship among the sinker, the knitting needle, the first yarn, and the second yarn in a ground loop forming step of the method for knitting a one-feeder mesh knitted fabric according to the second embodiment of the present teaching.

[FIG. 10] FIG. 10 is a schematic diagram showing the positional relationship among the sinker, the knitting needle, the first yarn, and the second yarn in a large mesh loop forming step of the method for knitting a one-feeder mesh knitted fabric according to the sec-

ond embodiment of the present teaching.

[FIG. 11] FIG. 11 is a schematic diagram showing the positional relationship among the sinker, the knitting needle, the first yarn, and the second yarn in a medium mesh loop forming step of the method for knitting a one-feeder mesh knitted fabric according to the second embodiment of the present teaching.

[FIG. 12] FIG. 12 is a schematic diagram showing the positional relationship among the sinker, the knitting needle, the first yarn, and the second yarn in a pile loop forming step of the method for knitting a one-feeder mesh knitted fabric according to the second embodiment of the present teaching.

[FIG. 13] FIG. 13 is a diagram of the needle and sinker tracks and a yarn feeding diagram in a method for knitting a one-feeder mesh knitted fabric according to another embodiment of the present teaching.

DESCRIPTION OF EMBODIMENTS

[0051] In the following, each embodiment will be described with reference to the drawings. In each drawing, the same reference numerals are assigned to the same parts, and descriptions of such identical parts will not be repeated. It should be noted that the dimensions of the components shown in the drawings do not necessarily represent the actual dimensions, dimensional ratios or the like of the components. Further, even when the same reference numerals or names are used, the corresponding parts are not necessarily identical in all embodiments, and may differ except for matters explicitly mentioned in the text. Examples of such differences include material, size, shape, yarn composition in the knitted fabric, and function.

<First Embodiment>

<Mesh Knitted Fabric>

<Ground Loop + Large Mesh Loop>

[0052] With reference to FIG. 1, a mesh knitted fabric 1A according to a first embodiment of the present teaching will be described. FIG. 1 is a structure diagram of the mesh knitted fabric 1A as viewed from the fabric front surface according to the first embodiment of the present teaching. In the mesh knitted fabric 1A of FIG. 1, the front surface is defined as the side facing the viewer.

[0053] As shown in FIG. 1, the mesh knitted fabric 1A is knitted with a first yarn 2 and a second yarn 3. The mesh knitted fabric 1A is knitted by a combination of a ground loop 4 and a large mesh loop 5.

[0054] The ground loop 4 is a loop formed by plating the first yarn 2 and the second yarn 3 together. The ground loop 4 is a needle loop that extends toward the front surface of the knitted fabric from portions of the yarns in contact with an already formed old loop. The ground loop 4 is a loop that constitutes the base of the mesh knitted fabric 1A. The ground loop 4 is formed by the first yarn 2 and the second yarn 3 in an overlapped state.

[0055] The large mesh loop 5 is a mesh loop formed by the first yarn 2. The large mesh loop 5 is a needle loop that extends toward the front surface of the knitted fabric from portions of the yarn in contact with an already formed old loop. The large mesh loop 5 is a loop constituting a portion (opening) that appears as a gap in the mesh knitted fabric 1A. The large mesh loop 5 is formed by the first yarn 2 without including the second yarn 3. The circumference of the large mesh loop 5 is longer than that of the ground loop 4. Accordingly, an area Sbm (see the dark gray portion) of an inner space (inner region) of the large mesh loop 5 defined by the yarn is greater than an area Sg (see the light gray portion) of an inner space (inner region) of the ground loop 4 defined by the yarn.

[0056] In the mesh knitted fabric 1A in this embodiment, the ground loop 4 and the large mesh loop 5 are alternately arranged in a lateral direction (course direction) of the knitted fabric. A first ground loop 4a and a first large mesh loop 5a adjacent to each other in the lateral direction are connected via a sinker loop that extends toward the back surface of the knitted fabric from portions of the yarn in contact with an old loop. The first yarn 2 constituting the first ground loop 4a is connected to the first yarn 2 constituting the first large mesh loop 5a adjacent to the first ground loop 4a in the lateral direction. The second yarn 3 constituting the first ground loop 4a is connected to the second yarn 3 constituting a second ground loop 4b adjacent to the first large mesh loop 5a in the lateral direction, without constituting the first large mesh loop 5a. The first yarn 2 constituting the first large mesh loop 5a is connected to the first yarn 2 constituting the second ground loop 4b.

[0057] In the mesh knitted fabric 1A, the ground loop 4 and the large mesh loop 5 are alternately arranged in a longitudinal direction (wale direction) of the knitted fabric. The first large mesh loop 5a is intertwined with a third ground loop 4c serving as an old loop. The first large mesh loop 5a passes through the third ground loop 4c from the back surface to the front surface of the knitted fabric. The first large mesh loop 5a, serving as an old loop, is intertwined with a fourth ground loop 4d. That is, the fourth ground loop 4d passes through the first large mesh loop 5a from the back surface to the front surface of the knitted fabric.

[0058] In the mesh knitted fabric 1A in which the ground loop 4 and the large mesh loop 5 are alternately arranged in the lateral direction and the longitudinal direction of the knitted fabric in this manner, the area Sbm of the inner region of the large mesh loop 5, which appears as a larger opening than the area Sg of the inner region of the ground loop 4 that also appears as an opening when viewed from the front surface, are arranged in the longitudinal direction and the lateral direction. In the mesh knitted fabric 1A, the ground loop 4 and the large mesh loop 5 can be combined in any arrangement.

[0059] The area Sbm of the opening of the large mesh

loop 5 that constitutes the mesh knitted fabric 1A is greater than the area Sg of the opening of the ground loop 4. Thus, by substituting the large mesh loops 5 for mesh loops each having substantially the same size as the ground loop 4, the area ratio of regions not occupied by the yarns within the same surface area on the front surface of the mesh knitted fabric 1A can be increased, without changing the arrangement and the number of the mesh loops. This can also increase the openness of the knitted fabric without significant modification of a design constituted by the arrangement of the ground loops 4 and the mesh loops.

<First Variation of First Embodiment>

<Ground Loop + Large Mesh Loop + Medium Mesh Loop>

[0060] With reference to FIG. 2, a mesh knitted fabric 1B according to a first variation of the first embodiment of the present teaching will now be described. FIG. 2 is a structure diagram of the mesh knitted fabric 1B as viewed from the fabric front surface.

[0061] As shown in FIG. 2, the mesh knitted fabric 1B is knitted with the first yarn 2 and the second yarn 3. The mesh knitted fabric 1B is knitted by a combination of the ground loop 4, the large mesh loop 5, and a medium mesh loop 6.

[0062] The medium mesh loop 6 is a mesh loop formed by the first yarn 2. The medium mesh loop 6 is a needle loop that extends toward the front surface of the knitted fabric from portions of the yarn in contact with an old loop. The medium mesh loop 6 is a loop constituting a portion that appears as a gap in the mesh knitted fabric 1B. The medium mesh loop 6 is formed by the first yarn 2 without including the second yarn 3. The circumference of the medium mesh loop 6 is shorter than that of the large mesh loop 5. Accordingly, an area Ssm (see the light gray portion) of an inner region of the medium mesh loop 6 is smaller than the area Sbm (see the dark gray portion) of the inner region of the large mesh loop 5.

[0063] In the mesh knitted fabric 1B in this first variation, the ground loop 4, the large mesh loop 5, and the medium mesh loop 6 are arranged in a lateral direction of the knitted fabric in a predetermined order. A first ground loop 4a and a first large mesh loop 5a adjacent to each other in the lateral direction are connected via a sinker loop. The first large mesh loop 5a is connected to a first medium mesh loop 6a adjacent to the first large mesh loop 5a in the lateral direction via a sinker loop. The first medium mesh loop 6a is connected to a second large mesh loop 5b in the lateral direction via a sinker loop. The first yarn 2 constituting the second large mesh loop 5b is connected to the first yarn 2 constituting the first medium mesh loop 6a. The second yarn 3 constituting the first ground loop 4a is connected to the second yarn 3 constituting a second ground loop 4b adjacent to the second large mesh loop 5b in the lateral direction, without constituting the first large mesh loop 5a, the first medium mesh loop 6a, and the second large mesh loop 5b. The first yarn 2 constituting the first medium mesh loop 6a is connected to the first yarn 2 constituting the second large mesh loop 5b.

[0064] In the mesh knitted fabric 1B, the ground loop 4, the large mesh loop 5, and the medium mesh loop 6 are alternately arranged in a longitudinal direction of the knitted fabric in a predetermined order. The first large mesh loop 5a is intertwined with a third ground loop 4c serving as an old loop. The first large mesh loop 5a passes through the third ground loop 4c from the back surface of the knitted fabric to the front surface. The first large mesh loop 5a, serving as an old loop, is intertwined with a second medium mesh loop 6b. That is, the second medium mesh loop 6b passes through the first large mesh loop 5a from the back surface of the knitted fabric to the front surface. The second medium mesh loop 6b, serving as an old loop, is intertwined with a third large mesh loop 5c. That is, the third large mesh loop 5c passes through the second medium mesh loop 6b from the back surface of the knitted fabric to the front surface. The third large mesh loop 5c, serving as an old loop, is intertwined with a fourth ground loop 4d. That is, the fourth ground loop 4d passes through the third large mesh loop 5c from the back surface of the knitted fabric to the front surface.

[0065] In the mesh knitted fabric 1B in which the ground loops 4, the large mesh loops 5, and the medium mesh loops 6 are arranged in the lateral direction and the longitudinal direction of the knitted fabric in a predetermined order in this manner, the knitted fabric includes the different-sized inner regions of the loops including the large mesh loops 5 each having a greater area of the inner region than that of the ground loop 4 and the medium mesh loops 6 each having a smaller area of the inner region than that of the large mesh loop 5. In the mesh knitted fabric 1B, the ground loop 4, the large mesh loop 5, and the medium mesh loop 6 can be combined in any arrangement.

[0066] The area Ssm of the inner region of the medium mesh loop 6 that constitutes the mesh knitted fabric 1B is smaller than the area Sbm of the inner region of the large mesh loop 5. Constituting mesh loops by the large mesh loops 5 and the medium mesh loops 6 allows an increase in the area of the inner regions of mesh loops per unit area of the mesh knitted fabric 1B, without changing the arrangement and the number of the mesh loops. In addition, the mesh knitted fabric 1B including the large mesh loops 5 and the medium mesh loops 6 allows for various combination patterns of the mesh loops with the ground loops 4, so that the design of the mesh knitted fabric 1B can be improved.

<Second Variation of First Embodiment>

<Ground Loop + Large Mesh Loop + Pile Loop>

[0067] With reference to FIG. 3, a mesh knitted fabric

1C according to a second variation of the first embodiment of the present teaching will now be described. FIG. 3 is a structure diagram of the mesh knitted fabric 1C as viewed from the fabric front surface.

[0068] As shown in FIG. 3, the mesh knitted fabric 1C is knitted with the first yarn 2 and the second yarn 3. The mesh knitted fabric 1C is knitted by a combination of the ground loop 4, the large mesh loop 5, and a pile loop 7.

[0069] The pile loop 7 is a loop formed by the first yarn 2. The pile loop 7 is a sinker loop that extends toward the back surface of the knitted fabric from portions of the yarn in contact with already formed old loops. The pile loop 7 is a loop formed by pile knitting in the mesh knitted fabric 1C. The pile loop 7 is formed as a sinker loop connected to adjacent ground loops 4.

[0070] The mesh knitted fabric 1C in this embodiment is formed by the repetition of two courses: one in which two ground loops 4 and one large mesh loop 5 are alternately arranged in a lateral direction (course direction) of the knitted fabric; and the other in which one ground loop 4 and two large mesh loops 5 are alternately arranged in the lateral direction. A pile loop 7 is formed between two ground loops 4 in the lateral direction. For example, a first group loop 4a and a second ground loop 4b are connected to each other via a first pile loop 7a that is as a sinker loop. The first yarn 2 constituting the first ground loop 4a is connected to the first yarn 2 constituting the first pile loop 7a. The second yarn 3 constituting the first ground loop 4a is connected to the second yarn 3 constituting the second ground loop 4b adjacent to a first large mesh loop 5a in the lateral direction. That is, the second yarn 3 constituting the first ground loop 4a does not constitute the first pile loop 7a. The first yarn 2 constituting the first pile loop 7a is connected to the first yarn 2 constituting the second ground loop 4b.

[0071] In this manner, the mesh knitted fabric 1C, in which two ground loops 4 and one large mesh loop 5 are alternately arranged in the lateral direction of the knitted fabric, is knitted as a mesh knitted fabric having piles by forming a pile loop 7 between adjacent ground loops 4.

[0072] The first pile loop 7a is formed by the first yarn 2 constituting the first ground loop 4a at a position adjacent to the first ground loop 4a. That is, the first pile loop 7a maintains a loop shape at the position adjacent to the first ground loop 4a by the intertwining of the first yarn 2 constituting the first ground loop 4a with an old loop. The large mesh loops 5 can be formed in the mesh knitted fabric 1C. Thus, by forming the large mesh loops 5, the area of the inner region of each mesh loop on the mesh knitted fabric 1C can be increased without changing the arrangement and the number of the mesh loops. Further, by forming the first pile loop 7a in the mesh knitted fabric 1C, the fabric becomes a novel design with the pile loops arranged therein and an increased area of the inner region of each mesh loop .

[0073] The mesh knitted fabrics 1A, 1B, and 1C may include a spandex yarn 8 that is a highly elastic material. The mesh knitted fabrics 1A and 1B may include the spandex yarn 8 overlapped with the first yarn 2 or the second yarn 3. At least the ground loop 4 among the ground loop 4, the large mesh loop 5, and the medium mesh loop 6 that form the mesh knitted fabrics 1A and 1B is constituted by the first yarn 2 and the second yarn 3 that are overlapped with the spandex yarn 8. At least the ground loop 4 among the ground loop 4 and the large mesh loop 5 that form the mesh knitted fabric 1C is constituted by the first yarn 2 and the second yarn 3 that are overlapped with the spandex yarn 8.

[0074] In the mesh knitted fabrics 1A, 1B, and 1C including the spandex yarn 8 as described above, the elasticity of the knitted fabric can be improved due to the combined effect of the elasticity by deformation of the openings of the large mesh loops 5 or the medium mesh loops 6, and the elasticity of the loops themselves that include the spandex yarn 8.

<Second Embodiment>

<Method for Knitting One-Feeder Mesh Knitted Fabric>

<Overall Configuration of Circular Knitting Machine 100>

[0075] With reference to FIG. 4 and 5, a circular knitting machine 100 according to one embodiment of the present teaching will be described. FIG. 4 is a cross-sectional view of a main knitting portion of the circular knitting machine 100 that uses a method for knitting a one-feeder mesh knitted fabric. FIG. 5 is a side view of a sinker 109 inserted into a sinker groove 106a of the circular knitting machine 100. The circular knitting machine 100 is configured to knit a one-feeder mesh knitted fabric (hereinafter simply referred to as "mesh knitted fabric") that is knitted by one feeder.

[0076] As shown in FIG. 4, the circular knitting machine 100 is a machine for knitting a tubular knitted fabric. The circular knitting machine 100 mainly includes a frame 101, a rotary cylinder 102, a knitting needle cam holder 103, a knitting needle cam 104, a knitting needle 105, a sinker dial 106, a sinker cap 107a, a cap ring 107b, a sinker cam 108, a sinker track selecting device 108a, a sinker 109, a yarn carrier ring support 110, a yarn carrier ring 111, a yarn carrier holder 112, a yarn carrier 113, and a needle selecting device (not shown). The circular knitting machine 100 is installed with an axis of the rotary cylinder 102 oriented in the vertical direction.

[0077] The frame 101 supports main components of the circular knitting machine 100. The frame 101 is formed in an approximately cylindrical shape. The rotary cylinder 102 and the sinker dial 106 are supported within the frame 101. An unillustrated winding device, and an unillustrated power source for driving the rotary cylinder 102 or the like, for example, are also disposed within the frame 101. The sinker cap 107a is disposed on an inner peripheral portion of the cap ring 107b. The yarn carrier ring support 110 is disposed on an outer peripheral por-

tion of the cap ring 107b.

[0078] The rotary cylinder 102 is a member that successively moves a plurality of knitting needles 105. The rotary cylinder 102 is formed in an approximately cylindrical shape. The rotary cylinder 102 is configured to be rotatable with its axis as the center of rotation by an unillustrated power source. A plurality of knitting needle grooves 102a for accommodating and guiding the knitting needles 105 are formed on an outer peripheral surface of the rotary cylinder 102. The knitting needle grooves 102a are formed so as to extend in the axial direction of the rotary cylinder 102. The knitting needle grooves 102a are formed at equal intervals in a circumferential direction of the rotary cylinder 102. That is, the knitting needle grooves 102a are formed on the outer peripheral surface of the rotary cylinder 102 at equal central angles about the axis of the rotary cylinder 102.

[0079] The knitting needle cam holder 103 is a member that accommodates the knitting needle cam 104 for moving the knitting needles. The knitting needle cam holder 103 is installed in an approximately cylindrical shape. The axis of the rotary cylinder 102 and an axis of the knitting needle cam holder 103 coincide with each other. Accordingly, the inner periphery of the knitting needle cam holder 103 and the outer periphery of the rotary cylinder 102 are arranged concentrically when viewed in the axial direction.

[0080] The knitting needle cam 104 is a groove cam that determines a position in the vertical direction (the axial direction of the rotary cylinder 102) of each knitting needle 105 depending on a rotational angle of the rotary cylinder 102. The knitting needle cam 104 is accommodated in the knitting needle cam holder 103. The knitting needle cam 104 is disposed so as to face the knitting needle grooves 102a of the rotary cylinder 102. The knitting needle cam 104 has a cam groove for moving the knitting needles 105 along a needle track, which is a trajectory of the knitting needles 105.

[0081] The knitting needle cam 104 moves the knitting needles 105 along a needle track for knitting yarn with one feeder by the cam groove. The knitting needles 105 can be guided to either a first needle track Rn1 (see FIG. 6) or a second needle track Rn2 (see FIG. 6) during one feeder, by the knitting needle cam 104 and an unillustrated needle selecting device. The needle selecting device can guide the knitting needles not only to a knit track but also to welt and tuck tracks. By using the needle selecting device, it is possible to insert not only knit stitches but also welts and tucks. In addition, even without the needle selecting device, the present teaching can be practiced using a mechanism alternative to the needle selecting device. For example, the present teaching can be implemented by using knitting needle cams for respective needle tracks and knitting needles each having a needle butt corresponding to each knitting needle cam.

[0082] Each of the knitting needles 105 is a needle for fabric formation that knits the first yarn 2 and the second yarn 3by passing intermediate portions of the first yarn 2 and the second yarn 3 through an old loop (knocking over). A hook 105a for holding yarns is formed at a tip portion of the knitting needle 105. A latch 105b is provided at the hook 105a to open and close an opening of the hook 105a. When the opening of the hook 105a is closed by the latch 105b, the knitting needle 105 does not hold the first yarn 2 and the second yarn 3 with the hook 105a. A needle butt 105c, which protrudes from a flat surface of the knitting needle 105 in a direction perpendicular to the longitudinal direction of the needle, is formed at an intermediate portion of the knitting needle 105. Each knitting needle 105 is inserted into one of the knitting needle grooves 102a of the rotary cylinder 102. The needle butt 105c is inserted into the cam groove of the knitting needle cam 104. Accordingly, each knitting needle 105 rotates integrally with the rotary cylinder 102 and is moved in the vertical direction along the cam groove of the knitting needle cam 104.

[0083] The sinker dial 106 is a member that successively moves a plurality of sinkers 109. The sinker dial 106 is formed in an approximately disc shape. The sinker dial 106 is fixed to the rotary cylinder 102 such that an axis of the sinker dial 106 coincides with the axis of the rotary cylinder 102. A plurality of sinker grooves 106a for accommodating and guiding the sinkers 109 are formed on an upper surface of the sinker dial 106. The sinker grooves 106a extend in a radial direction of the sinker dial 106 at equal central angles about the axis of the sinker dial 106. The sinker dial 106 is fixed to the rotary cylinder 102 such that the sinker grooves 106a are positioned between adjacent knitting needle grooves 102a of the rotary cylinder 102.

[0084] The sinker cap 107a is a member that accommodates the sinker cam 108 for moving the sinkers 109. The sinker cap 107a is supported by the cap ring 107b. The sinker cam 108 is accommodated on a lower surface of the sinker cap 107a. A lower surface of the sinker cam 108 faces an upper surface of the sinker dial 106.

[0085] The sinker cam 108 is a plate cam that determines a position of each sinker 109 in the radial direction of the sinker dial 106 depending on a rotational angle of the sinker dial 106. The sinker cam 108 is disposed so as to face the sinker grooves 106a of the sinker dial 106. The sinker cam 108 has a cam groove for moving the sinkers 109 along a sinker track, which is a trajectory of the sinkers 109. The sinker cam 108 moves the sinkers 109 along a sinker track for knitting yarn with one feeder by the cam groove. The sinkers 109 are guided to either a first sinker position Ps1 (see FIG. 6) or a second sinker position Ps2 (see FIG. 6) during one feeder by the sinker cam 108 and the sinker track selecting device 108a. The present teaching can be practiced by using a mechanism alternative to the sinker track selecting device without changing the tracks by the sinker track selecting device 108a as in this embodiment. For example, the present teaching can be carried out by using sinker cams for respective sinker tracks and sinkers each having a sinker butt corresponding to each sinker cam.

[0086] The sinker 109 is a member that performs feeding assistance of the first yarn 2 and the second yarn 3 fed to the knitting needles 105, holding of old loops, and assistance in passing through old loops of the knitting needles 105. The sinkers 109 are movably accommodated respectively in corresponding sinker grooves 106a of the sinker dial 106. Each sinker 109 is disposed between adjacent knitting needles 105 accommodated in the rotary cylinder 102. Accordingly, the sinkers 109 rotate integrally with the sinker dial 106 and are each independently moved in the radial direction of the rotary cylinder 102 (the radial direction of the sinker dial 106) by the sinker cam 108.

[0087] As shown in FIG. 5, the sinker 109 includes a sinker base portion 109a, a lower support portion109b, an upper support portion 109c, a sinker engaging portion 109d, a groove portion 109e, and a sinker butt 109f. The sinker 109 is configured to be movable within the sinker groove 106a of the sinker dial 106 in an arrow Ar1 direction, which is radially inward of the rotary cylinder 102 (hereinafter simply referred to as "radially inward"), and in an arrow Ar2 direction, which is radially outward of the rotary cylinder 102 (hereinafter simply referred to as "radially outward").

[0088] The sinker base portion 109a, which is a base portion of the sinker 109, is a platelike portion serving as a foundation that supports respective portions of the sinker 109. The sinker base portion 109a is inserted into the sinker groove 106a. One plate surface of the sinker base portion 109a is in slidable contact with a side surface of the sinker groove 106a. The sinker 109 has a circumferential position and a vertical position defined in the sinker dial 106, and slides in the radial direction.

[0089] The lower support portion 109b shown in FIG. 5 is a portion that supports the first yarn 2 and the second yarn 3. The lower support portion 109b is located above the sinker base portion 109a and is arranged so as to extend radially inward (in the arrow Ar1 direction) from the sinker base portion 109a. An upper end surface 109h (sinker top) of the lower support portion 109b protrudes above the sinker groove 106a. The lower support portion 109b supports the first yarn 2 and the second yarn 3 by the upper end surface 109h.

[0090] The upper support portion 109c is a portion that supports the first yarn 2. The upper support portion 109c is located above the lower support portion 109b and is arranged so as to extend radially inward from the sinker base portion 109a. The upper support portion 109c supports the first yarn 2 by an upper end surface 109g (sinker nose). The upper end surface 109g is located above the upper end surface 109h of the lower support portion 109b by a distance H. Further, the sinker engaging portion 109d protruding radially inward is formed on a front end surface of the upper support portion 109c.

[0091] The groove portion 109e is a portion formed between the lower support portion 109b and the upper support portion 109c. The groove portion 109e captures the first yarn 2 and the second yarn 3 between the upper end surface 109h of the lower support portion 109b and a lower end surface of the upper support portion 109c.

[0092] The sinker butt 109f is a portion guided by the sinker cam 108. The sinker butt 109f is formed at an intermediate portion of the sinker base portion 109a. The sinker butt 109f protrudes upward from the sinker base portion 109a above the sinker groove 106a so as to extend along a plate surface of the sinker 109. The sinker butt 109f is inserted into the cam groove of the sinker cam 108.

[0093] As shown in FIG. 4, the yarn carrier ring support 110 is a member that supports the yarn carrier ring 111. The yarn carrier ring supports 110 are fixed at a plurality of circumferential positions of the cap ring 107b so as to extend upward from the outer peripheral portion of the cap ring 107b. The yarn carrier ring 111 is fixed to tip portions of the plurality of yarn carrier ring supports 110. The plurality of yarn carrier holders 112 are provided on the yarn carrier ring 111. Further, the yarn carriers 113 for feeding the first yarn 2 and the second yarn 3 to vicinities of the knitting needles 105 and the sinkers 109 are provided on the yarn carrier holders 112. The yarn carriers 113 are disposed above the knitting needles 105 and the sinkers 109.

[0094] The circular knitting machine 100 configured as described above feeds the first yarn 2 and the second yarn 3 to vicinities of the knitting needles 105 and the sinkers 109 from the plurality of yarn carrier holders 112 via the yarn carriers 113. By rotating the rotary cylinder 102, the circular knitting machine 100 causes the knitting needles 105 to catch the respective yarns and the sinkers 109 to assist in feeding the yarns to the knitting needles 105 and in supporting loops. Further, the circular knitting machine 100, by rotating the rotary cylinder 102, continuously knits a knitted fabric by moving the knitting needles 105 up and down and moving the sinkers 109 in the radial direction of the rotary cylinder 102 in each feeder so as to intertwine the first yarn 2 and the second yarn 3 with old loops.

<Method for Knitting Mesh Knitted Fabric: Ground Loop + Large Mesh Loop>

[0095] With reference to FIGS. 4 to 10, a method for knitting a one-feeder mesh knitted fabric by the circular knitting machine 100 will now be described. FIG. 6 is a diagram showing the tracks of the knitting needle 105 and the sinker 109 and a yarn feeding diagram during one feeder 1Fd in the method for knitting a one-feeder mesh knitted fabric according to the second embodiment of the present teaching. FIG. 7 is a schematic diagram showing the positional relationship among the knitting needle 105, the first yarn 2, and the second yarn 3 relative to the sinker 109 located at the first sinker position Ps1 in a yarn feeding step S1 of the method for knitting a one-feeder mesh knitted fabric. FIG. 8 is a schematic diagram showing the positional relationship among the knitting needle 105, the first yarn 2, and the second yarn 3 relative to the

sinker 109 located at the second sinker position Ps2 in the yarn feeding step S1 of the method for knitting a one-feeder mesh knitted fabric. FIG. 9 is a schematic diagram showing the positional relationship among the sinker 109, the knitting needle 105, the first yarn 2, and the second yarn 3 in a ground loop forming step S2 of the method for knitting a one-feeder mesh knitted fabric. FIG. 10 is a schematic diagram showing the positional relationship among the sinker 109, the knitting needle 105, the first yarn 2, and the second yarn 3 in a large mesh loop forming step S3 of the method for knitting a one-feeder mesh knitted fabric.

[0096] In FIG. 6, the small broken line indicates the sinker track Rs of the sinker 109, and the solid line indicates the needle track Rn of the knitting needle 105. The chain line indicates the first yarn 2, and the two-dot chain line indicates the second yarn 3. The long dashed line indicates the spandex yarn 8. The sinker track Rs represents the movement of the sinker 109, which moves radially outward of the circular knitting machine 100 as it proceeds in an arrow Ar3 direction. The needle track Rn represents the movement of the knitting needle 105, which moves upward of the circular knitting machine 100 as it proceeds in an arrow Ar4 direction.

[0097] The one-feeder mesh knitted fabric is a mesh fabric knitted by one feeder. The circular knitting machine 100 knits the one-feeder mesh knitted fabric (hereinafter simply referred to as "mesh knitted fabric") with the respective yarns, in which the second yarn 3 and then the first yarn 2 are fed, and the first yarn 2 is fed from a position above the second yarn 3.

[0098] As shown in FIG. 6, in the circular knitting machine 100, the knitting needles 105 are configured to move along one of the needle tracks Rn, that is, the first needle track Rn1 or the second needle track Rn2, through selection of the needle track by an unillustrated needle selecting device. The knitting needle 105 moving along the first needle track Rn1 moves below the knitting needle 105 moving along the second needle track Rn2.

[0099] The first needle track Rn1 indicates the movement of the knitting needle 105 when the knitting needle 105 holds the first yarn 2 and the second yarn 3 and forms a loop by the first yarn 2 and the second yarn 3. The second needle track Rn2 indicates the movement of the knitting needle 105 when the knitting needle 105 holds the first yarn 2 without holding the second yarn 3 and forms a loop by the first yarn 2. For the knitting needle 105 moving along the first needle track Rn1, the first yarn 2 and the second yarn 3 are fed, by the yarn carrier 113, to a position above the lower end of the latch 105b in its open state. For the knitting needle 105 moving along the second needle track Rn2, the first yarn 2 is fed to a position above the lower end of the latch 105b in its open state and the second yarn 3 is fed to a position below the lower end of the latch 105b in its open state, by the yarn carrier 113.

[0100] The sinkers 109 are guided along one of two tracks that is selected by the sinker cam 108 and the sinker track selecting device 108a. That is, each of the sinkers 109 is moved to the first sinker position Ps1 or the second sinker position Ps2 by the sinker cam 108 and the sinker track selecting device 108a. The first sinker position Ps1 is located further radially outward of the circular knitting machine 100 than the second sinker position Ps2.

[0101] At the first sinker position Ps1, the first yarn 2 is fed to a position above the upper support portion 109c and the second yarn 3 is fed to a position above the lower support portion 109b but below the upper support portion 109c in the vicinity of the sinker 109 by the yarn carrier 113. At the first sinker position Ps1, the first yarn 2 and the second yarn 3 are held by the knitting needle 105 as the knitting needle 105 descends, and are supported on the upper end surface 109h of the lower support portion 109b.

[0102] At the second sinker position Ps2, the first yarn 2 is fed to a position above the upper support portion 109c and the second yarn 3 is fed to a position above the lower support portion 109b but below the upper support portion 109c in the vicinity of the sinker 109 by the yarn carrier 113. The sinker engaging portion 109d is located between the first yarn 2 and the second yarn 3. Thus, at the second sinker position Ps2, the first yarn 2 held by the knitting needle 105 is supported on the upper end surface 109g of the upper support portion 109c as the knitting needle 105 descends. Likewise, the second yarn 3 held by the knitting needle 105 is supported on the upper end surface 109h of the lower support portion 109b as the knitting needle 105 descends.

[0103] The method for knitting a one-feeder mesh knitted fabric includes the yarn feeding step S1, the ground loop forming step S2, and the large mesh loop forming step S3. The ground loop forming step S2 and the large mesh loop forming step S3 are carried out in an arbitrary combination based on the configuration of a mesh knitted fabric. In the method for knitting a one-feeder mesh knitted fabric of this embodiment, the mesh knitted fabric 1A (see FIG. 1) is knitted.

[0104] As shown in FIG. 7, the yarn feeding step S1 is a step of feeding the first yarn 2 and the second yarn 3 to the knitting needle 105 and the sinker 109. The first yarn 2 and the second yarn 3 are fed to the vicinity of the knitting needle 105 and the sinker 109 by the yarn carrier 113. The fed yarns 2 and 3 are held by the knitting needle 105.

[0105] As shown in FIG. 6, in the yarn feeding step S1, the first yarn 2 is fed to a position above the lower end of the latch 105b in its open state in the knitting needle 105 that moves along the first needle track Rn1 and the second knitting needle Rn2. The second yarn 3 is fed to a position above the lower end of the latch 105b in its open state in the knitting needle 105 that moves along the first needle track Rn1.

[0106] As shown in FIGS. 7 and 8, in the yarn feeding step S1, the first yarn 2 is fed to a position above the upper support portion 109c so as to be supported on the upper

end surface 109g of the upper support portion 109c. In the yarn feeding step S1, when the sinker 109 is at the second sinker position Ps2, the second yarn 3 is fed to a position above the lower support portion 109b but below the upper support portion 109c so as to be supported on the upper end surface 109h of the lower support portion 109b. In this case, the second yarn 3 is fed from a position upstream of the first yarn 2 (see FIG. 6).

[0107] As shown in FIG. 9, the ground loop forming step S2 is a step of forming the ground loop 4 by the knitting needle 105 and the sinker 109. In the ground loop forming step S2, the sinker 109 is moved to the first sinker position Ps1 by the sinker cam 108 (see FIG. 4). The sinker 109 supports the first yarn 2 and the second yarn 3 fed in the yarn feeding step S1, on the upper end surface 109h of the lower support portion 109b.

[0108] As shown in FIG. 6, the knitting needle 105 is caused to descend to a descending position Pnd along the first needle track Rn1 by the knitting needle cam 104. The knitting needle 105 holds the first yarn 2 and the second yarn 3 by its downward movement, and passes through an old loop Ro (see FIG. 7). The knitting needle 105 then moves upward to thereby form the ground loop 4 while intertwining the first yarn 2 and the second yarn 3 in an overlapped state with the old loop Ro (see FIG. 7).

[0109] As shown in FIG. 9, the size of the ground loop 4 is defined based on a distance H1 from the upper end surface 109h of the lower support portion 109b to the descending position Pnd. An area of the inner region of the ground loop 4 formed by the two yarns is smaller than an area of an inner region of a loop formed by a single yarn.

[0110] As shown in FIG. 10, the large mesh loop forming step S3 is a step of forming the large mesh loop 5 by the knitting needle 105 and the sinker 109. In the large mesh loop forming step S3, the sinker 109 is moved to the second sinker position Ps2 by the sinker cam 108 and the sinker track selecting device 108a (see FIG. 4). The sinker 109 supports the first yarn 2 fed in the yarn feeding step S1 on the upper end surface 109g of the upper support portion 109c. The second yarn 3 is supported on the upper end surface 109h of the lower support portion 109b.

[0111] As shown in FIG. 6, the knitting needle 105 is moved along the second needle track Rn2 by the knitting needle cam 104 (see FIG. 4) and the needle selecting device. The knitting needle 105 holds the first yarn 2 by its downward movement and passes through the old loop Ro (see FIG. 8). In this case, the knitting needle 105 does not hold the second yarn 3 fed to a position below the lower end of the latch 105b in its open state. The knitting needle 105 then moves upward to thereby form the large mesh loop 5 while intertwining the first yarn 2 with the old loop Ro.

[0112] As shown in FIG. 10, the size of the large mesh loop 5 is defined based on a distance H2 from the upper end surface 109g of the upper support portion 109c to the descending position Pnd. The circumference of the large mesh loop 5 defined based on the distance H2 greater than the distance H1 is thus longer than the circumference of the ground loop 4. Accordingly, an area of the inner region of the large mesh loop 5 is greater than the area of the inner region of the ground loop 4.

[0113] In the method for knitting a one-feeder mesh knitted fabric, the first yarn 2 is supported on the upper support portion 109c and the knitting needle 105 holding the first yarn 2 is moved to the descending position Pnd, so that the large mesh loop 5, which has the circumference longer than that of the ground loop 4 formed by the first yarn 2 and the second yarn 3 supported on the lower support portion 109b, is formed. Thus, by substituting the large mesh loops 5 for mesh loops each having substantially the same size as the ground loop 4, for example, the area ratio of the inner regions of the mesh loops per unit area of the mesh knitted fabric 1A can be increased without changing the arrangement and the number of the mesh loops, while also improving productivity compared to a mesh knitted fabric 1A knitted by two feeders.

<First Variation of Second Embodiment>

<Method for Knitting Mesh Knitted Fabric: Ground Loop + Large Mesh Loop + Medium Mesh Loop>

[0114] With reference to FIGS. 6 and 11, a method for knitting a one-feeder mesh knitted fabric according to a first variation of the second embodiment of the present teaching will now be described. FIG. 11 is a schematic diagram showing the positional relationship among the sinker 109, the knitting needle 105, the first yarn 2, and the second yarn 3 in a medium mesh loop forming step S4 of the method for knitting a one-feeder mesh knitted fabric.

[0115] The method for knitting a one-feeder mesh knitted fabric in this variation includes the yarn feeding step S1, the ground loop forming step S2, the large mesh loop forming step S3, and the medium mesh loop forming step S4. The ground loop forming step S2, the large mesh loop forming step S3, and the medium mesh loop forming step S4 are carried out in an arbitrary combination based on the configuration of a mesh knitted fabric.

[0116] As shown in FIGS. 6 and 11, the medium mesh loop forming step S4 is a step of forming the medium mesh loop 6 by the knitting needle 105 and the sinker 109. In the medium mesh loop forming step S4, the sinker 109 is moved to the first sinker position Ps1 by the sinker cam 108 and the sinker track selecting device 108a (see FIG. 4). The sinker 109 supports the first yarn 2 fed in the yarn feeding step S1 (see FIG. 7) on the upper end surface 109h of the lower support portion 109b.

[0117] As shown in FIG. 6, the knitting needle 105 is moved along the second needle track Rn2 by the knitting needle cam 104 (see FIG. 4) and the needle selecting device. The knitting needle 105 holds the first yarn 2 by its downward movement and passes through the old loop Ro (see FIG. 7). In this case, the knitting needle 105 does

not hold the second yarn 3 fed to a position below the lower end of the latch 105b in its open state. Further, the knitting needle 105 intertwines the first yarn 2 with the old loop Ro by its downward movement, to thereby form the medium mesh loop 6.

[0118] As shown in FIG. 11, the size of the medium mesh loop 6 is defined based on the distance H1 from the upper end surface 109h of the lower support portion 109b to the descending position Pnd of the knitting needle 105. The circumference of the medium mesh loop 6, which is defined based on the shorter distance H1 than the distance H2, is shorter than the circumference of the large mesh loop 5. The circumference of the medium mesh loop 6 defined based on the distance H1 is substantially the same as that of the ground loop 4 also defined based on the distance H1. Accordingly, the area Ssm of the inner region of the medium mesh loop 6 is smaller than the area Sbm of the inner region of the large mesh loop 5 (see FIG. 2). In addition, the second yarn 3 is thicker than the first yarn 2 in this embodiment, which allows the area Ssm of the inner region of the medium mesh loop 6 formed by the first yarn 2 to be greater than the area of the inner region of the ground loop 4 formed by the first yarn 2 and the second yarn 3.

[0119] In the method for knitting a one-feeder mesh knitted fabric according to the first variation, the first yarn 2 is supported on the lower support portion 109b by lowering the knitting needle 105 that holds the first yarn 2 to the descending position Pnd, thereby forming the medium mesh loop 6 that has a shorter circumference than that of the large mesh loop 5 formed by the first yarn 2 supported on the upper support portion 109c. The design variations can be expanded by forming the large mesh loop 5 and the medium mesh loop 6, which have different areas of the inner regions, in the mesh knitted fabric 1A. This also allows an increase in the area ratio of the openings per unit area of the mesh knitted fabric without changing the arrangement and the number of mesh loops, while also improving productivity compared to a knitting method for a mesh knitted fabric using two feeders.

<Second Variation of Second Embodiment>

<Method for Knitting Mesh Knitted Fabric: Ground Loop + Large Mesh Loop + Pile Loop>

[0120] With reference to FIGS. 6 and 12, a method for knitting a one-feeder mesh knitted fabric according to a second variation of the second embodiment of the present teaching will now be described. FIG. 12 is a schematic diagram showing the positional relationship among the sinker 109, the knitting needle 105, the first yarn 2, and the second yarn 3 in a pile loop forming step S5 of the method for knitting a one-feeder mesh knitted fabric.

[0121] The method for knitting a one-feeder mesh knitted fabric in this variation includes the yarn feeding step S1, the ground loop forming step S2, the large mesh loop forming step S3, and a pile loop forming step S5. The ground loop forming step S2, the large mesh loop forming step S3, and the pile loop forming step S5 are carried out in an arbitrary combination based on the configuration of a mesh knitted fabric.

[0122] As shown in FIG. 12, the pile loop forming step S5 is a step of forming the pile loop 7 by the knitting needle 105 and the sinker 109. In the pile loop forming step S5, the sinker 109 is moved to the second sinker position Ps2 by the sinker cam 108 and the sinker track selecting device 108a (see FIG. 4). The sinker 109 supports the first yarn 2 fed in the yarn feeding step S1 on the upper end surface 109g of the upper support portion 109c, and supports the second yarn 3 fed in the yarn feeding step S1 on the upper end surface 109h of the lower support portion 109b.

[0123] As shown in FIG. 6, the knitting needle 105 is moved along the first needle track Rn1 by the knitting needle cam 10 and the needle selecting device. The knitting needle 105 holds the first yarn 2 and the second yarn 3 by its downward movement, and passes through the old loop Ro (see FIG. 8). The knitting needle 105 then moves upward to thereby form the ground loop 4 while intertwining the first yarn 2 and the second yarn 3 with the old loop Ro. In this case, a portion, which is supported on the upper support portion 109c, of the first yarn 2 forms a larger pile loop 7 than when it is supported on the lower support portion 109b.

[0124] As shown in FIG. 12, in the pile loop forming step S5, the pile loop 7 is formed by the first yarn 2.

[0125] In the method for knitting a one-feeder mesh knitted fabric, the first yarn 2 is fed to a position above the upper support portion 109c, which allows formation of the large mesh loop 5 larger than the ground loop 4. In addition, the pile loop 7 is formed by the first yarn 2 constituting the ground loop 4 at a position adjacent to the ground loop 4. That is, the pile loop 7 maintains a loop shape at the position adjacent to the ground loop 4 by the intertwining of the old loop Ro with the ground loop 4 that includes the first yarn 2 constituting the pile loop 7. Thus, it is possible to provide the mesh knitted fabric that allows the area ratio of the inner regions of mesh loops per unit area of the mesh knitted fabric to be increased by forming the large mesh loops 5, without changing the arrangement and the number of the mesh loops, and also includes the pile loops 7, while improving productivity compared to a knitting method for a mesh knitted fabric using two feeders.

<Other Embodiments>

[0126] With reference to FIGS. 6 to 8 and 13, a method for knitting a one-feeder mesh knitted fabric using the first yarn 2, the second yarn 3, and the spandex yarn 8 will be described. FIG. 13 is a diagram of the tracks of the knitting needle 105 and the sinker 109 and a yarn feeding diagram in a method for knitting a one-feeder mesh knitted fabric according to another embodiment of the present

teaching.

[0127] In the yarn feeding step S1, the spandex yarn 8 constituted by rubber having elasticity or the like may be fed while overlapped with the first yarn 2 or the second yarn 3. The configurations shown in FIG. 6 and FIG. 13 differ in feeding position of the spandex yarn 8 relative to the knitting needle 105.

[0128] As shown in FIGS. 6 to 8, in the yarn feeding step S1, the first yarn 2, the second yarn 3, and the spandex yarn 8 are fed to the knitting needle 105 and the sinker 109. The first yarn 2, the second yarn 3, and the spandex yarn 8 are fed by the yarn carrier 113 to the vicinity of the knitting needle 105 and the sinker 109. The first yarn 2, the second yarn 3, and the spandex yarn 8 that have been fed are held by the knitting needle 105.

[0129] As shown in FIGS. 6 to 8, in the yarn feeding step S1, the first yarn 2 is fed to a position above the upper support portion 109c so as to be supported on the upper end surface 109g of the upper support portion 109c. In addition, in the yarn feeding step S1, the second yarn 3 and the spandex yarn 8 are fed to a position above the lower support portion 109b but below the upper support portion 109c so as to be supported on the upper end surface 109h of the lower support portion 109b. In this case, the spandex yarn 8 is fed from a position upstream of the first yarn 2.

[0130] As shown in FIG. 6, in the yarn feeding step S1, the first yarn 2 and the spandex yarn 8 are fed, by the yarn carrier 113, to a position above the lower end of the latch 105b in its open state in the knitting needle 105 that moves along the first needle track Rn1 and the second knitting needle Rn2. The second yarn 3 is fed, by the yarn carrier 113, to a position above the lower end of the latch 105b in its open state in the knitting needle 105 that moves along the first needle track Rn1.

[0131] In the ground loop forming stem S2 and the pile loop forming step S5, the knitting needle 105 holds the first yarn 2, the second yarn 3, and the spandex yarn 8 by its downward movement, and passes through the old loop Ro (see FIGS. 7 and 8). The knitting needle 105 then moves upward to thereby form the ground loop 4 while intertwining the first yarn 2, the second yarn 3, and the spandex yarn 8 with the old loop Ro. The spandex yarn 8 forms the ground loop 4 together with the first yarn 2 and the second yarn 3.

[0132] In the large mesh loop forming step S3, the knitting needle 105 holds the first yarn 2 and the spandex yarn 8 by its downward movement, and passes through the old loop Ro (see FIG. 8). The knitting needle 105 then moves upward to thereby form the large mesh loop 5 while intertwining the first yarn 2 and the spandex yarn 8 with the old loop Ro. The spandex yarn 8 forms the large mesh loop 5 together with the first yarn 2.

[0133] As shown in FIG. 13, in the yarn feeding step S1 according to another embodiment, the first yarn 2 is fed, by the yarn carrier 113, to a position above the lower end of the latch 105b in its open state in the knitting needle 105 that moves along the first needle track Rn1 and the second knitting needle Rn2. The second yarn 3 and the spandex yarn 8 are fed, by the yarn carrier 113, to a position above the lower end of the latch 105b in its open state in the knitting needle 105 that moves along the first needle track Rn1.

[0134] In the ground loop forming stem S2 and the pile loop forming step S5, the knitting needle 105 holds the first yarn 2, the second yarn 3, and the spandex yarn 8 by its downward movement, and passes through the old loop Ro (see FIGS. 7 and 8). The knitting needle 105 then moves upward to thereby form the ground loop 4 while intertwining the first yarn 2, the second yarn 3, and the spandex yarn 8 with the old loop Ro. The spandex yarn 8 forms the ground loop 4 together with the first yarn 2 and the second yarn 3.

[0135] In the large mesh loop forming step S3, the knitting needle 105 holds the first yarn 2 by its downward movement, and passes through the old loop Ro (see FIG. 8). The knitting needle 105 then moves upward to thereby form the large mesh loop 5 while intertwining the first yarn 2 with the old loop Ro. In this case, the knitting needle 105 does not hold the second yarn 3 and the spandex yarn 8 that have been fed to a position below the lower end of the latch 105b in its open state. The spandex yarn 8, together with the second yarn 3, is connected to the ground loop 4 adjacent to the large mesh loop 5.

[0136] The method for knitting a one-feeder mesh knitted fabric can form the ground loop 4, the large mesh loop 5, or the medium mesh loop 6 that include the spandex yarn 8. Thus, in the mesh knitted fabric 1A, the elasticity of the knitted fabric can be improved due to the combined effect of the elasticity by deformation of the openings of the large mesh loops 5, and the elasticity of the loops themselves that include the spandex yarn 8.

[0137] In the second embodiment described above, the method for knitting a mesh knitted fabric is a method for knitting a one-feeder mesh knitted fabric in which the mesh knitted fabric 1A is formed by one feeder 1Fd (see FIG. 6). Alternatively, the method for knitting a mesh knitted fabric may be a method for knitting a two-feeder mesh knitted fabric in which the mesh knitted fabric is formed using two feeders

[0138] In the second variation of the first embodiment described above, the mesh knitted fabric 1C is formed by combinations of the ground loops 4, the large mesh loops 5, and the pile loops 7. In addition, in the mesh knitted fabric 1C, at least the ground loops 4 among the ground loops 4 and the large mesh loops 5 are respectively formed by the first yarn 2, the second yarn 3, and the spandex yarn 8. Alternatively, the mesh knitted fabric may include the medium mesh loops 6 in substitution for part of the large mesh loops 5. The mesh knitted fabric is formed by combinations of the ground loops 4, the medium mesh loops 6, and the pile loops 7. In the mesh knitted fabric, at least the ground loops 4 among the ground loops 4 and the medium mesh loops 6 are respectively formed by the first yarn 2, the second yarn 3, and the spandex yarn 8.

[0139] In the other embodiment described above, the method for knitting a one-feeder mesh knitted fabric includes the yarn feeding step S1, the ground loop forming step S2, the large mesh loop forming step S3, and the pile loop forming step S5. Further, in the ground loop forming step S2, the large mesh loop forming step S3, and the pile loop forming step S5, the ground loop 4 and the large mesh loop 5 that include the spandex yarn 8 are formed. Alternatively, the method for knitting a one-feeder mesh knitted fabric may include the yarn feeding step, the ground loop forming step, the large mesh loop forming step, the medium mesh loop forming step, and the pile loop forming step, wherein the ground loop, the large mesh loop, and the medium mesh loop that include the spandex yarn are formed in the ground loop forming step, the large mesh loop forming step, and the medium mesh loop forming step.

[0140] The embodiments of the present teaching have been described above, but the above-described embodiments are merely illustrative examples for carrying out the present teaching. Therefore, the present teaching is not limited to the above-described embodiments and the above-described embodiments can be appropriately modified and implemented without departing from the gist of the present teaching.

REFERENCE SIGNS LIST

[0141]

1A, 1B, 1C	mesh knitted fabric
2	first yarn
3	second yarn
4	ground loop
4a	first ground loop
4b	second ground loop
4c	third ground loop
4d	fourth ground loop
5	large mesh loop
5a	first large mesh loop
5b	second large mesh loop
5c	third large mesh loop
6	medium mesh loop
6a	first medium mesh loop
6b	second medium mesh loop
7	pile loop
7a	first pile loop
8	spandex yarn
100	circular knitting machine
101	frame
102	rotary cylinder
102a	knitting needle groove
103	knitting needle cam holder
104	knitting needle cam
105	knitting needle
105a	hook
105b	latch
105c	needle butt
106	sinker dial
106a	sinker groove
107a	sinker cap
107b	cap ring
108	sinker cam
108a	sinker track selecting device
109	sinker
109a	sinker base portion
109b	lower support portion
109c	upper support portion
109d	sinker engaging portion
109e	groove portion
109f	sinker butt
109g, 109h	upper end surface
110	yarn carrier ring support
111	yarn carrier ring
112	yarn carrier holder
113	yarn carrier
Ar1, Ar2, Ar3, Ar4	arrow
Rn	needle track
Rn1	first needle track
Rn2	second needle track
Rs	sinker track
Ps1	first sinker position
Ps2	second sinker position
Pnd	descending position
H, H1, H2	distance
Sbm, Ssm, Sg	area
Ro	old loop
S1	yarn feeding step
S2	ground loop forming step
S3	large mesh loop forming step
S4	medium mesh loop forming step
S5	pile loop forming step
1Fd	one feeder

Claims

1. A mesh knitted fabric formed by a combination of:

a ground loop formed by a first yarn and a second yarn in an overlapped state; and
a mesh loop formed by the first yarn without including the second yarn, wherein the mesh loop includes a large mesh loop having a circumference longer than a circumference of the ground loop.

2. The mesh knitted fabric according to claim 1, wherein the mesh loop further includes a medium mesh loop having a circumference shorter than the circumference of the large mesh loop.

3. The mesh knitted fabric according to claim 1, further comprising a pile loop that is formed by the first yarn and is adjacent to the ground loop.

4. The mesh knitted fabric according to claim 1 or 2,

wherein the first yarn or the second yarn forms the loop while overlapped with a spandex yarn.

5. The mesh knitted fabric according to claim 3, wherein at least the ground loop among the ground loop and the large mesh loop is formed with the first and second yarns overlapping a spandex yarn.

6. A method for knitting a one-feeder mesh knitted fabric, the method being performed by a circular knitting machine including a knitting needle and a sinker,

the mesh knitted fabric being knitted using one feeder by a combination of:

a ground loop formed by a first yarn and a second yarn in an overlapped state; and
a mesh loop formed by the first yarn,

the method comprising:

a yarn feeding step of feeding the first yarn to a position above an upper support portion of the sinker and feeding the second yarn to a position above a lower support portion of the sinker but below the upper support portion;
a ground loop forming step of causing the sinker to move to a first sinker position in which the first and second yarns fed in the yarn feeding step are supported on the lower support portion, and causing the knitting needle to move along a first needle track along which the knitting needle holds the first and second yarns and forms a loop by the first and second yarns, thereby forming the ground loop by the first and second yarns in the overlapped state that are supported on the lower support portion; and
a large mesh loop forming step of causing the sinker to move to a second sinker position in which the first yarn fed in the yarn feeding step is supported on the upper support portion, and causing the knitting needle to move along a second needle track along which the knitting needle holds the first yarn and forms a loop by the first yarn, thereby forming a large mesh loop by the first yarn supported on the upper support portion.

7. The method for knitting the one-feeder mesh knitting fabric according to claim 6, further comprising a medium mesh loop forming step of causing the sinker to move to the first sinker position and causing the knitting needle to move along the second needle track, thereby forming a medium mesh loop by the first yarn supported on the lower support portion.

8. The method for knitting the one-feeder mesh knitting fabric according to claim 6, further comprising a pile loop forming step of causing the sinker to move to the second sinker position and causing the knitting needle to move along the first needle track, thereby forming a pile loop by the first yarn supported on the upper support portion.

9. The method for knitting the one-feeder mesh knitted fabric according to any one of claims 6 to 8, wherein, in the yarn feeding step, a spandex yarn is fed to the knitting needle that moves along the first needle track or the second needle track.

FIG. 1

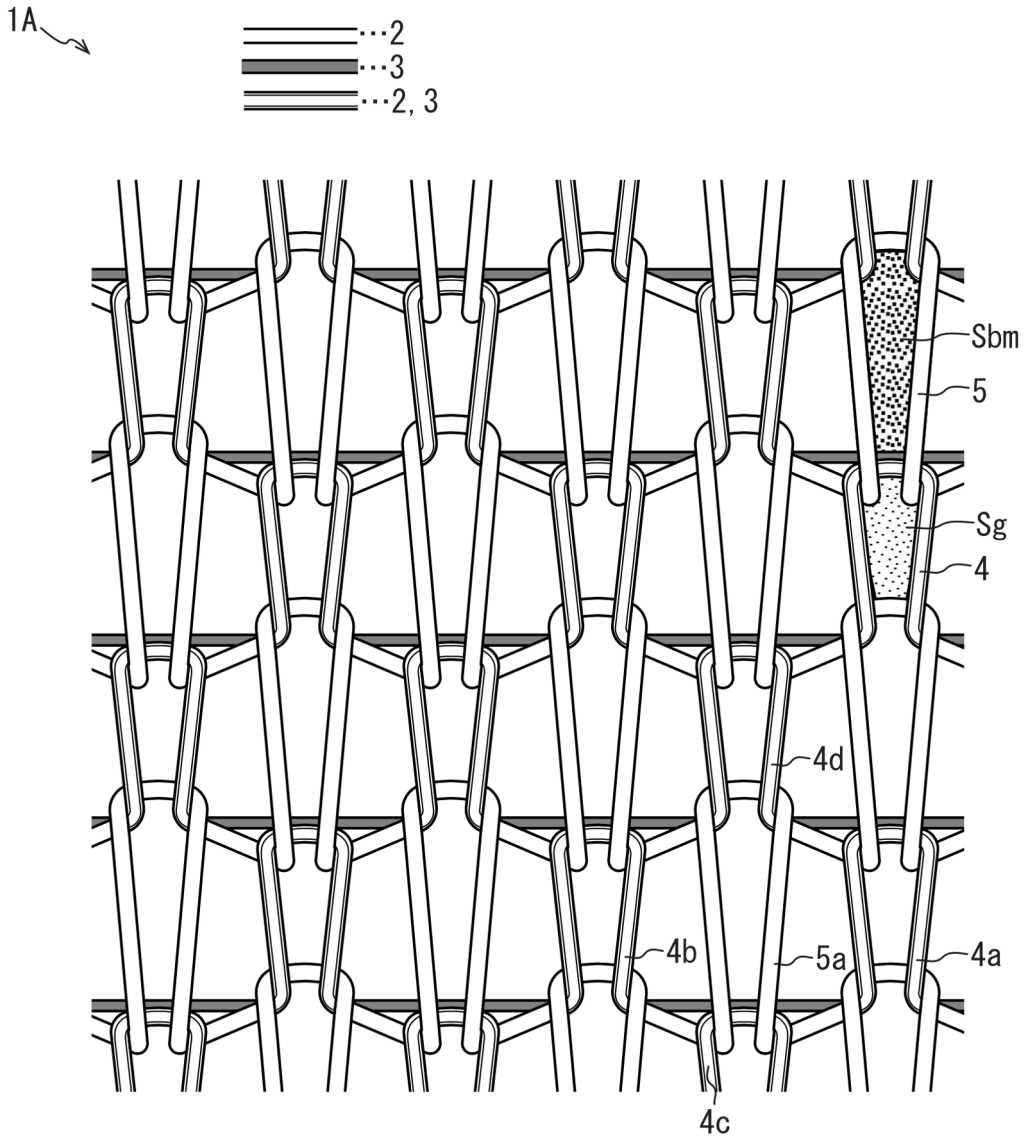


FIG. 2

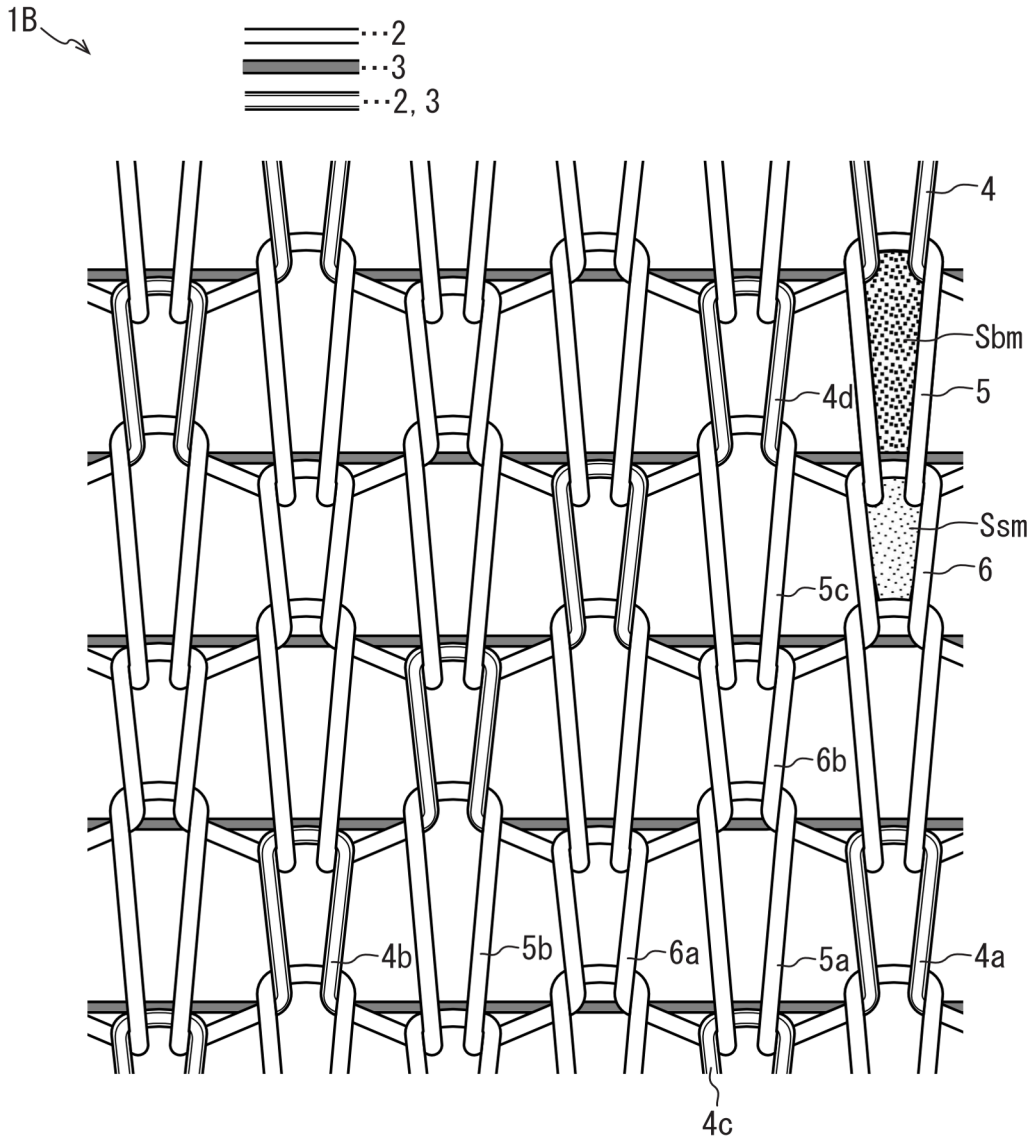


FIG. 3

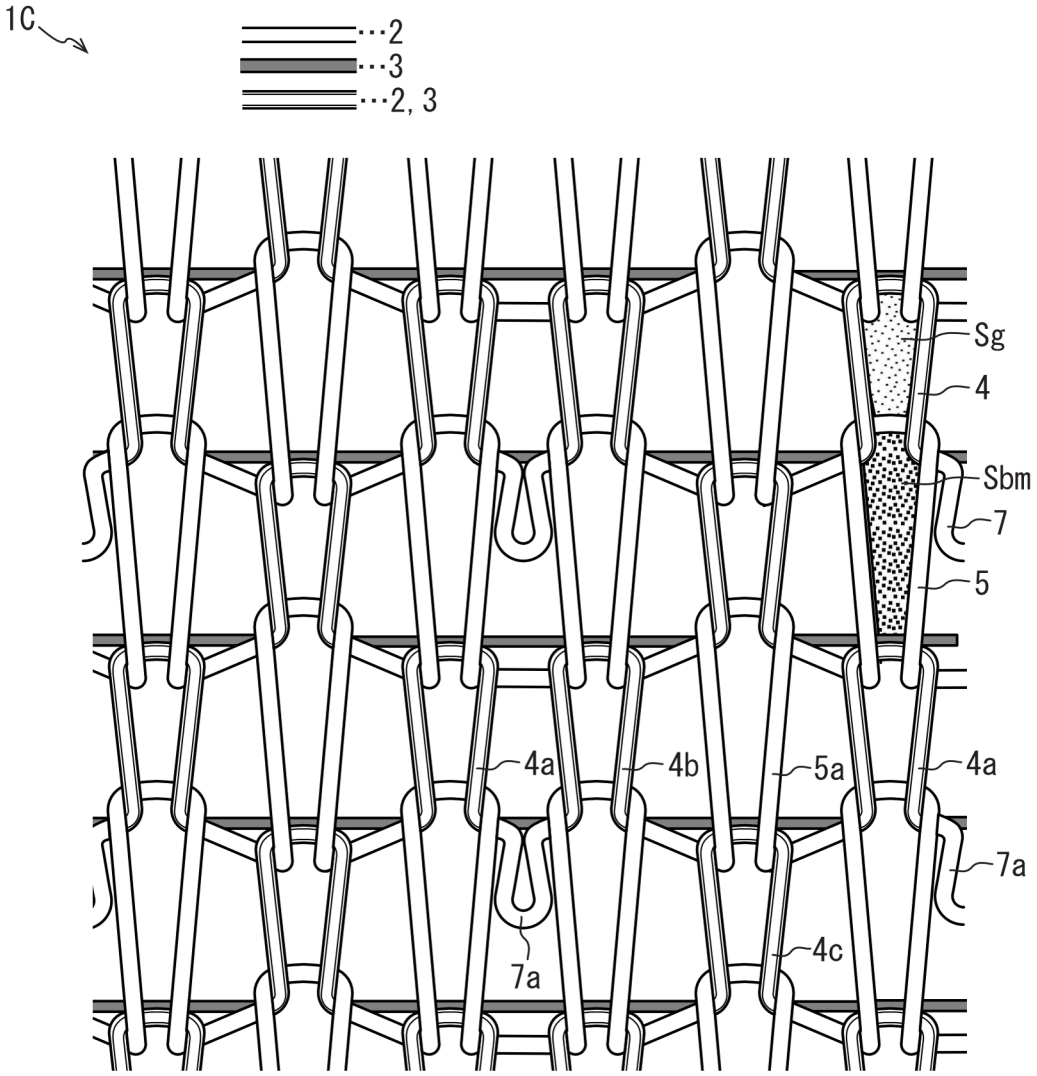


FIG. 4

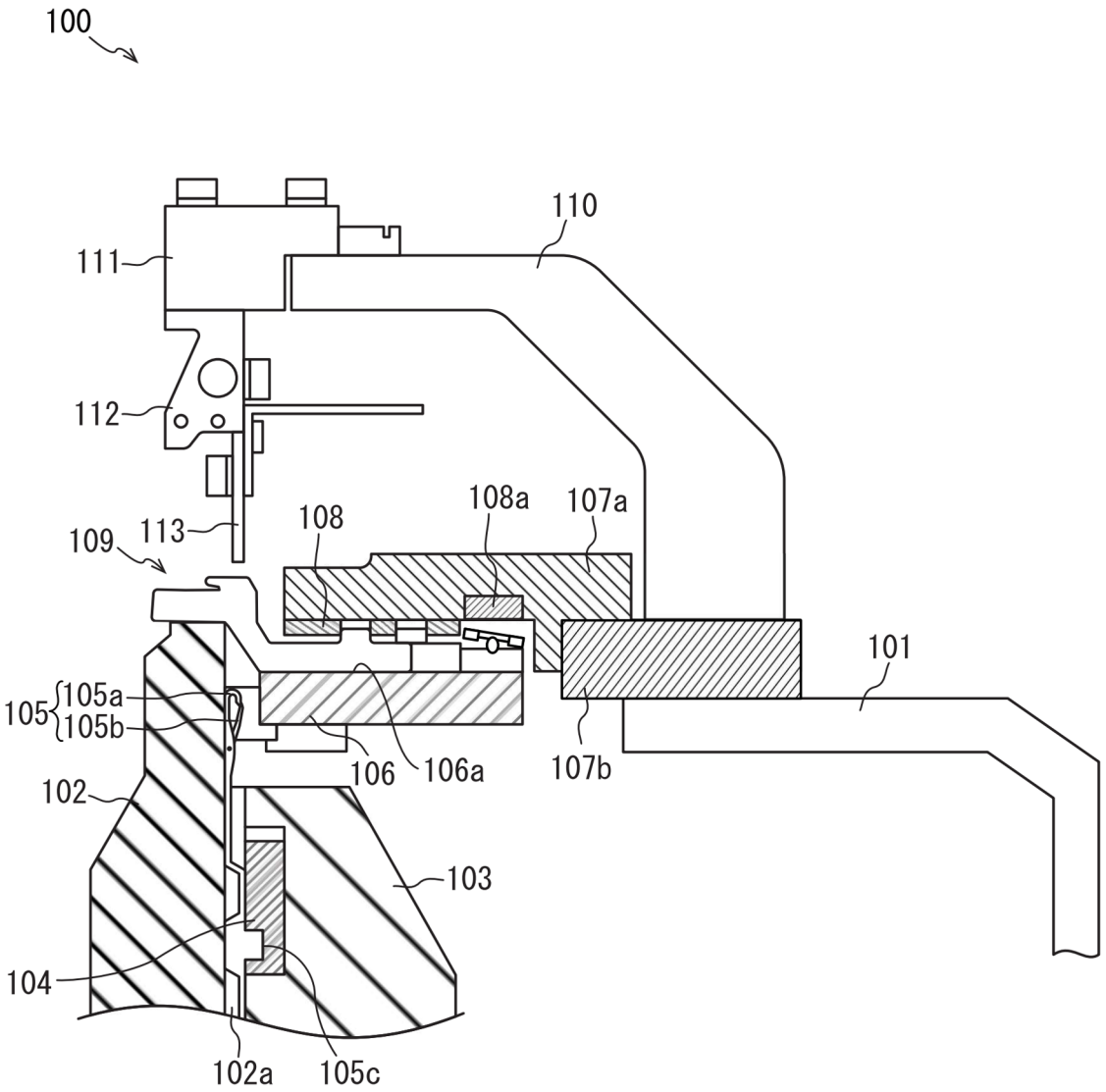

100
110
111
112
108a
107a
108
113
109
101
105a
105
105b
106
106a
107b
102
103
104
102a
105c

FIG. 5

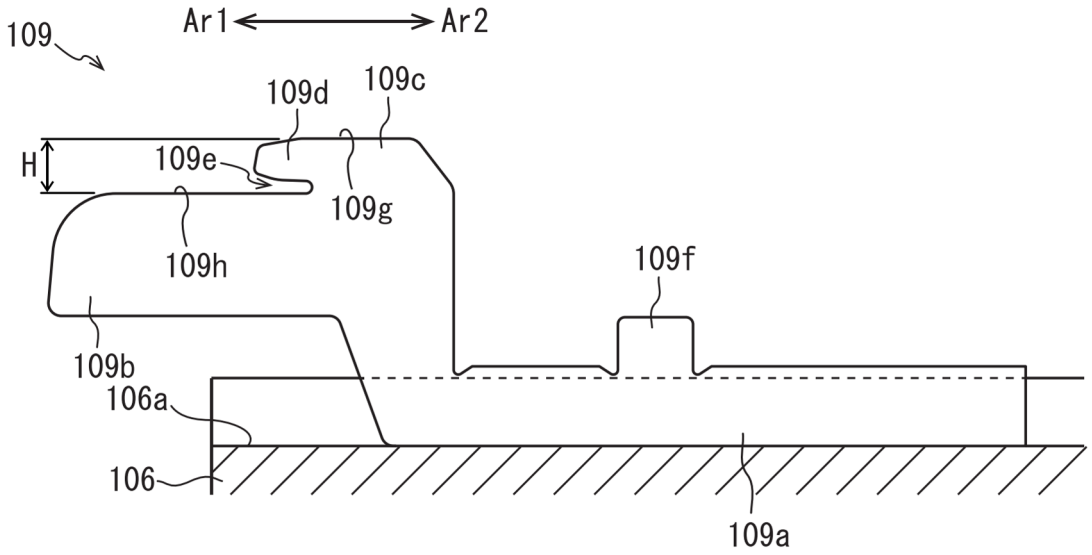

109
Ar1
Ar2
109d
109c
H
109e
109g
109h
109f
109b
106a
106
109a

FIG. 6

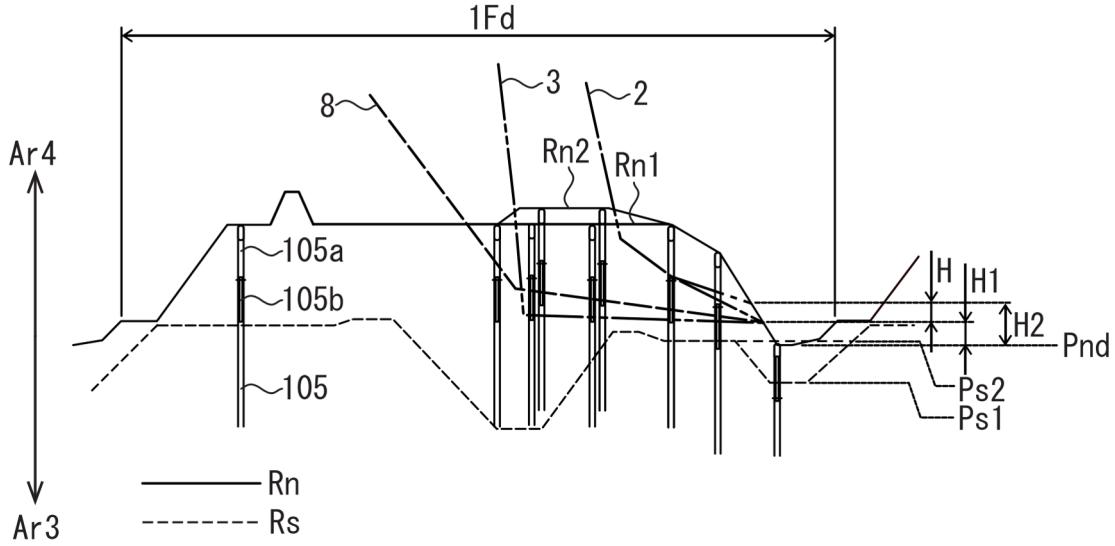

1Fd
3
2
8
Ar4
Rn2
Rn1
105a
105b
105
H
H1
H2
Pnd
Ps2
Ps1
Rn
Rs
Ar3

FIG. 7

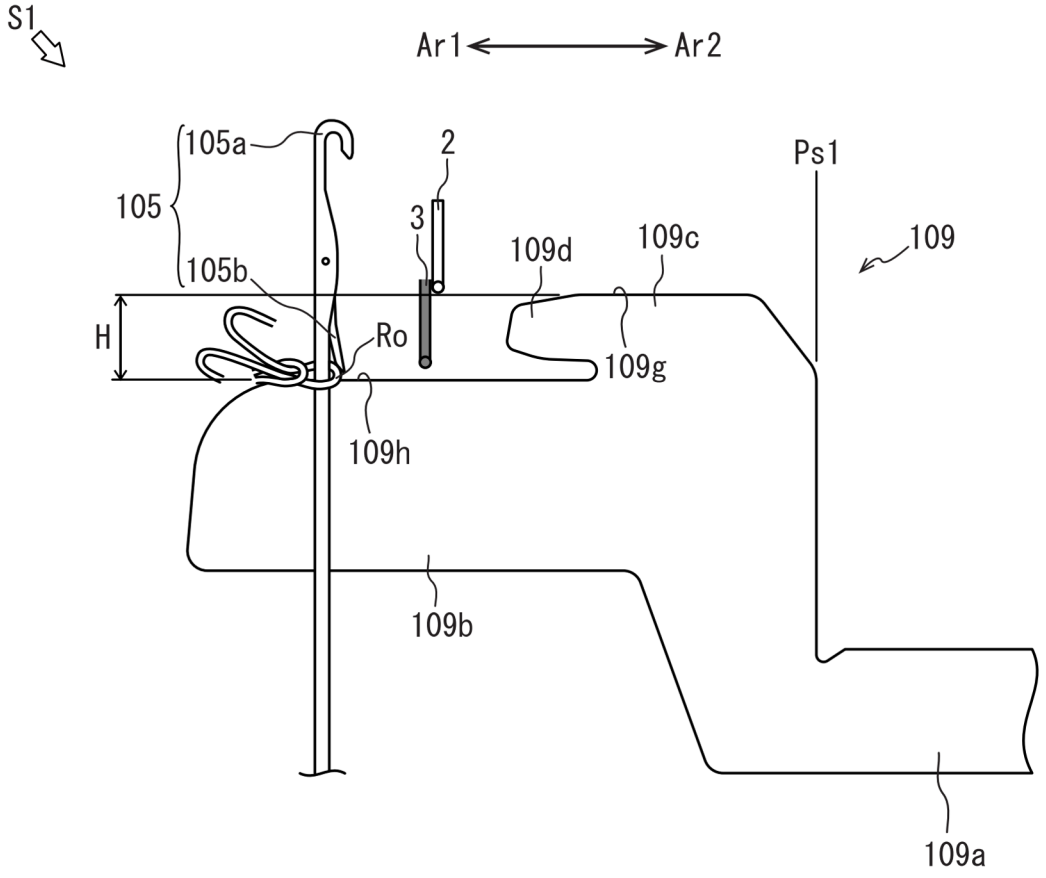

S1
Ar1
Ar2
105a
105
105b
2
3
Ps1
109
109d
109c
H
Ro
109g
109h
109b
109a

FIG. 8

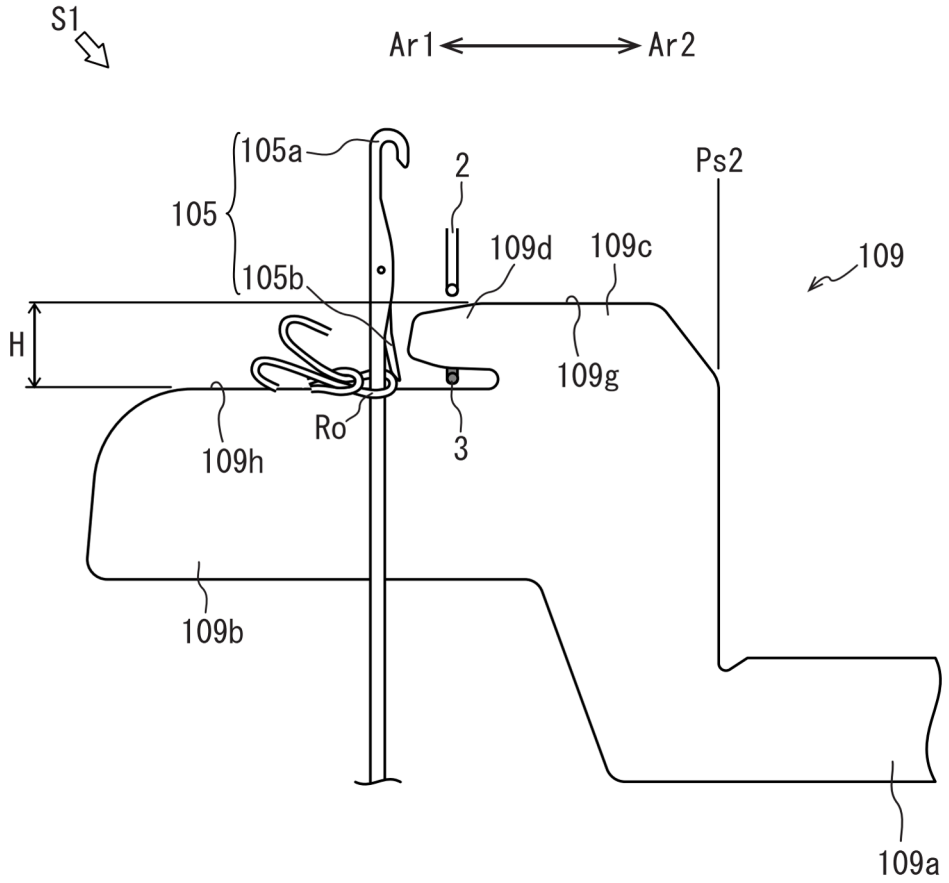

S1
Ar1
Ar2
105a
105
105b
2
109d
109c
Ps2
109
H
109g
Ro
3
109h
109b
109a

FIG. 9

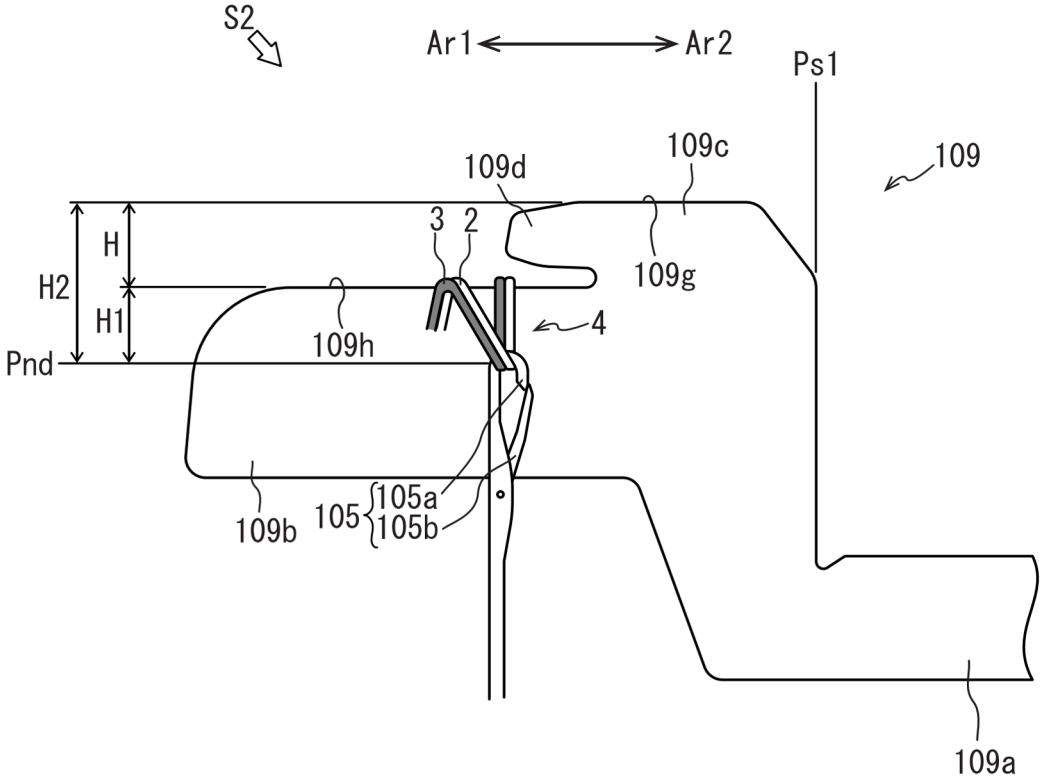

S2
Ar1
Ar2
Ps1
109
109c
109d
3
2
109g
H
H2
H1
109h
4
Pnd
105a
105
105b
109b
109a

FIG. 10

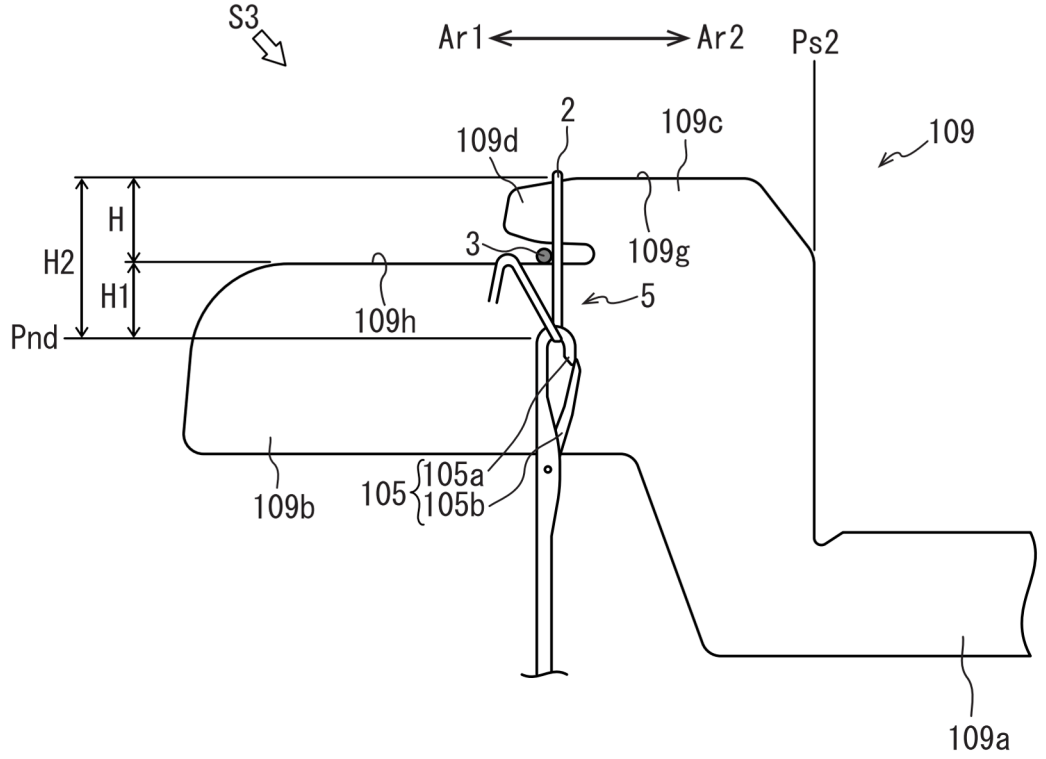

S3
Ar1
Ar2
Ps2
109
109c
109d
2
3
109g
H
H2
H1
5
109h
Pnd
105a
105
105b
109b
109a

FIG. 11

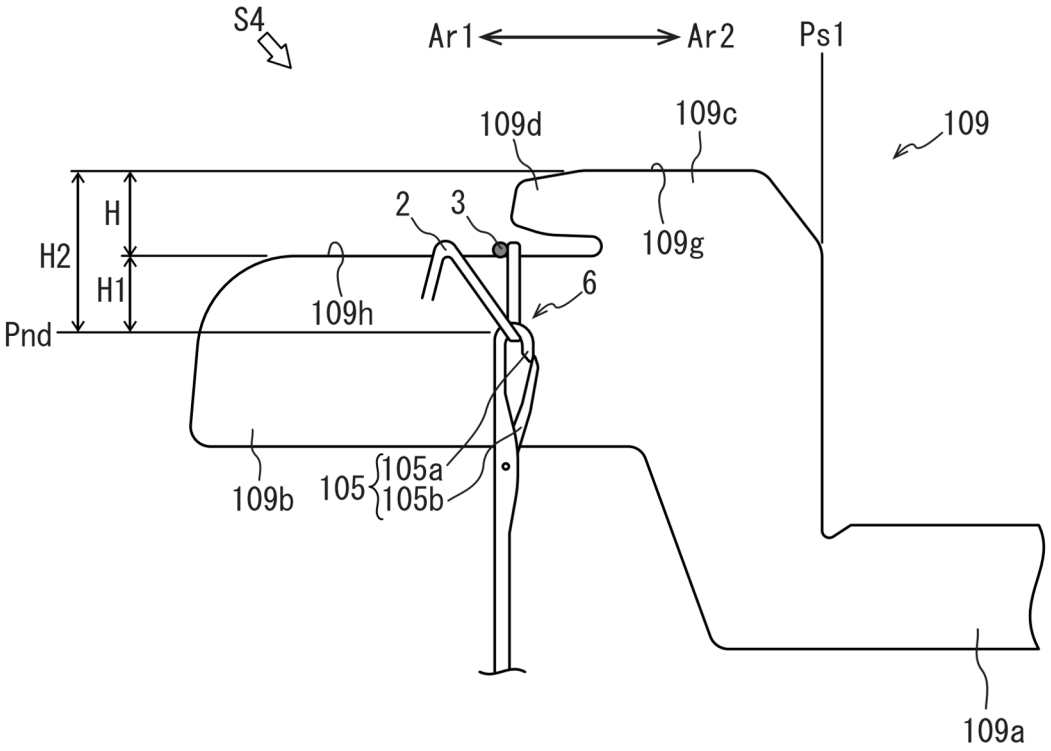

S4
Ar1
Ar2
Ps1
109d
109c
109
H
H2
H1
Pnd
2
3
109g
109h
6
109b
105
105a
105b
109a

FIG. 12

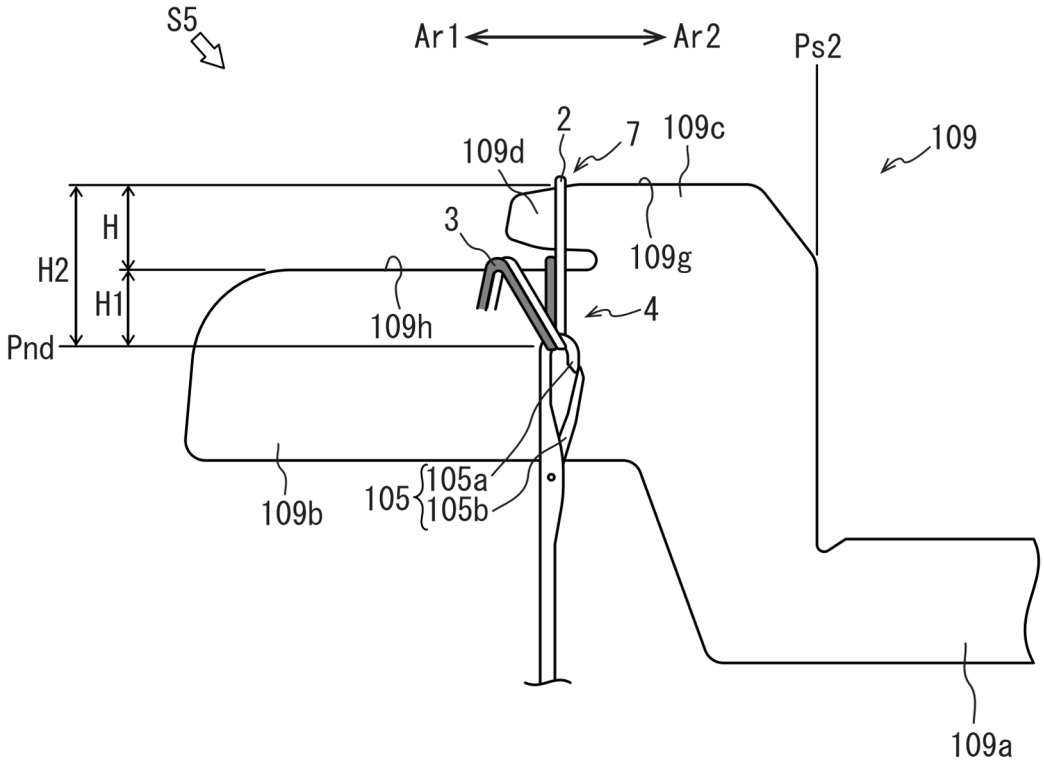
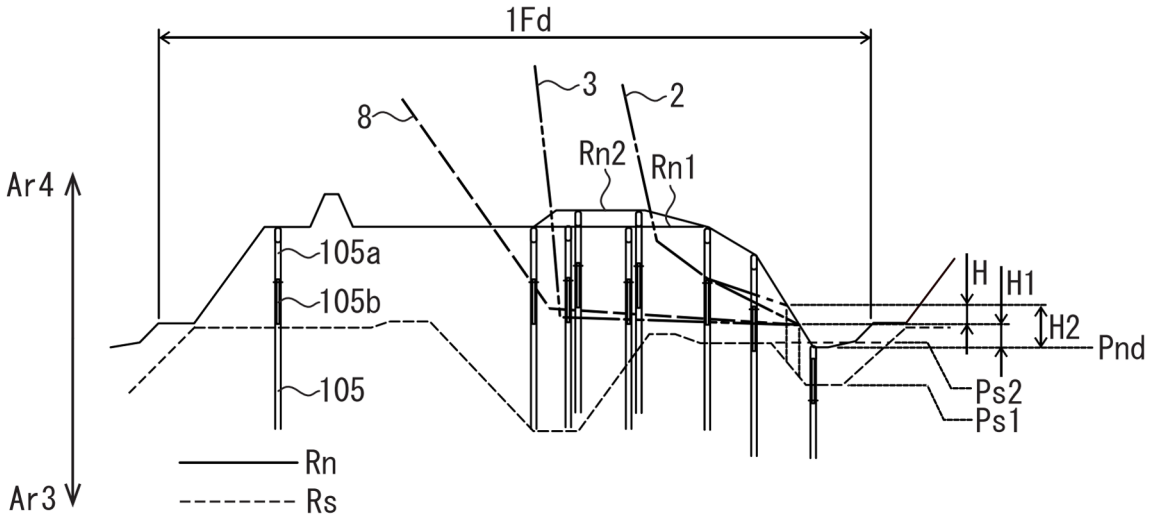

S5
Ar1
Ar2
Ps2
2
7
109c
109d
109
H
H2
H1
Pnd
3
109g
4
109h
109b
105
105a
105b
109a

FIG. 13



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EUROPEAN SEARCH REPORT

Application Number
EP 25 21 3865

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 March 2026	Wendl, Helen

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 25 21 3865

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11-03-2026

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