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(54) **Manufacturing method and apparatus for a tubular knitted fabric with a fleecy inner surface**

Verfahren und Vorrichtung zur Herstellung eines Rundgestricks mit vliesartiger Innenfläche

Procédé et dispositif pour la fabrication d'un tricot tubulaire possédant une surface intérieure molletonnée

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US-A- 3 967 470

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Description

(Utility-Model Document 1)

[Technical Field of the Invention]

[0010] Japanese Published Examined Utility-Model Application No. Sho 58-42476**[0001]** The present invention relates to a fleecy tubular knitted fabric manufacturing method and apparatus.

(Utility-Model Document 2)

[Prior Art]

[0011] Japanese Published Examined Utility-Model Application No. Sho 59-17912**[0002]** A fabric used as underwear is desirably a fleecy product for the sake of warm keeping purpose. Generally, a fleecy knitted fabric is made by raising as post processing after knitting like in EP 1176240 A. In this case, as a tubular knitted fabric is generally cut and set on a raising machine, over edging is required after raising.

(Utility-Model Document 3)

[0003] On the other hand, a raising machine which raises a tubular knitted fabric has appeared. Since the raising machine, priced for 40,000,000 to 50,000,000 yen, is very expensive, it is not widely put into practical use.**[0012]** Japanese Published Examined Utility-Model Application No. Sho 62-6155**[0004]** Accordingly, simultaneous knitting and raising on a knitting machine has been studied. In our country, the technique is a series of techniques in patent applications filed personally by Kunio Washio of Washio Co. Ltd., one of the inventors of the present invention (for example, Patent Document 1, Patent Document 2, Patent Document 3, Patent Document 4, Patent Document 5, Utility-Model Document 1, Utility-Model Document 2, Utility-Model Document 3, and Utility-Model Document 4).

(Utility-Model Document 4)

[0013] Japanese Published Examined Utility-Model Application No. Sho 62-23829**[0014]** These patents and utility-model applications relate to B-type and K-type knitting machines to knit a plain knitted fabric. That is, in these single knitting machines, as a cylinder upper part is open, a wide-width adapter is provided on a cylinder upper surface, a raising brush is attached to a position above a knitted fabric, such that raising is performed.**[0015]** However, in a tubular knitting machine capable of double knitting to make-up knit a rib top, having a dial for knitting a plain knitted fabric, a tuck knitted fabric, a rib knitted fabric, a pile knitted fabric and a double-face knitted fabric, there is no open space in the cylinder upper portion, and the raising brush cannot be attached to a position above a knitted fabric. For this reason, upon use of tubular knitting machine, simultaneous raising of inner surface on the knitting machine cannot be made without difficulty.

(Patent Document 1)

[0005] Japanese Published Examined Patent Application No. Sho 59-14585

(Patent Document 2)

[0006] Japanese Published Examined Patent Application No. Sho 61-22058

(Patent Document 3)

[0007] Japanese Published Examined Patent Application No. Sho 63-39701

(Patent Document 4)

[0008] Japanese Published Examined Patent Application No. Hei 3-23663

(Patent Document 5)

[0016] In a case where a double tubular knitting machine is used, the machine described in the Patent Document 6 can be given as prior art to perform simultaneous raising on the knitting machine. However, in this invention, as raising means is provided on the outside of toothed opening as an intersection between the dial and the cylinder, raising is performed on an intermediate layer in a cross section of knitted fabric. The inner surface cannot be raised, and further, the raising position of the product cannot be easily selected. Further, in the machine described in the Patent Document 7 invented by the applicant of the present invention, as raising means is provided on a cylinder outer surface, raising cannot be performed on an inner surface.

(Patent Document 6)

[0009] Japanese Published Examined Patent Application No. Hei 3-51812**[0017]** Japanese Published Unexamined Patent Application No. Sho 52-18969

(Patent Document 7)

[0018] Japanese Published Unexamined Patent Application No. 2002-20948

[0019] Further, in the above tubular knitting machines, as a raising brush is made of rigid metal, it cannot perform raising on a knitted fabric using synthetic yarn filament as raw material.

[Problems to Be Solved by the Invention]

[0020] In view of the above situation, the present invention has an object to provide method and apparatus capable of knitting on a tubular knitting machine having a device including a transfer jack and a cylinder and raising an inner surface of necessary fabric portion, and to provide an inner surface fleecy tubular knitted fabric without patchy portion knitted by plain knitting, tuck knitting, rib knitting, pile knitting, rib knitting and double-face knitting or the like using synthetic yarn filament as raw material, and further, to provide a fleecy inner surface tubular knitted fabric having a soft feel.

[Means to Solve the Problems]

[0021] To attain the above object, the present invention provides a method and an apparatus to manufacture a tubular knitted fabric knitted by plain knitting, tuck knitting, pile knitting, rib knitting or double face knitting, in which an appropriate portion of an inner surface of the fabric, knitted with filament knitting yarn, is selectively raised with a raising brush.

[0022] In the tubular knitted fabric, the filament knitting yarn is covering yarn with spandex yarn as core yarn.

[0023] Further, the filament knitting yarn is nylon yarn and rayon yarn.

[0024] According to claim 1 there is provided a tubular knitted fabric manufacturing method for knitting with a tubular knitting machine having a dial and a cylinder, comprising positioning a fabric knitted on the knitting machine between a fabric guide provided in the cylinder and a raising brush advanceable/withdrawable with respect to the cylinder upon opening of the dial, and raising an appropriate portion of an inner surface of the fabric at the same time of knitting of the fabric.

[0025] According to claim 2 there is provided a tubular knitted fabric manufacturing apparatus having a transfer dial device and a cylinder, comprising transfer dial support means for lifting and opening the dial, a raising brush, raising brush support means for advancing/withdrawing the raising brush to/from the cylinder, and a fabric guide to support a fabric knitted on the apparatus between the guide and the raising brush, for raising an appropriate portion of an inner surface of the fabric at the same time of knitting of the fabric.

[Working Examples]

[0026] Working examples of the present invention will be described in detail with reference to the drawings.

[Brief Explanation of the Drawings]

[0027]

[Fig. 1]

A front view showing the tubular knitting made as the working example of the tubular knitted fabric manufacturing apparatus of the present invention including a partial-cutaway cross section.

[Fig. 2]

(a) is a diagrammatic vertically sectional view showing the transfer dial device of the tubular knitting machine as the working example of the tubular knitted fabric manufacturing apparatus of the present invention; and (b) is a plan view.

[Fig. 3]

A schematic diagram showing the order of knitting upon make-up

[Fig. 4]

A schematic diagram showing a transfer status.

[Fig. 5]

A schematic diagram showing a status where the dial is lifted and opened and the raising brush is inserted.

[Fig. 6]

An expanded view showing the raising brush is inserted.

[Fig. 7]

(a) is a front view showing the means for supporting the raising brush; and (b) is its side view.

[Fig. 8]

A view of knitting of the working example of the tubular knitted fabric of the present invention.

[Fig. 9]

A view of knitting showing tuck knitting as the other working example of the tubular knitted fabric of the present invention.

[Fig. 10]

A view of knitting showing the tuck knitting as the further working example of the tubular knitted fabric of the present invention.

[0028] In Fig. 1, as a tubular knitted fabric manufacturing apparatus 1, a tubular knitting machine having a cylinder and a dial is shown. Note that the tubular knitting machine can be used as a cylinder knitting machine with a single needle bed such as a small tubular knitting machine or a dial cylinder knitting machine having a rib tubular knitting machine or double-face knitting machine. Note that the cylinder means a cylindrical needle bed and the dial means a transfer dial device having transfer jacks. Accordingly, a single needle bed knitting machine makes only a plain tubular knitted fabric, however, the

knitting machine 1 of the present invention can make a rib knitted fabric as a double-face knitted, i.e., a double rib knitted fabric.

[0029] As shown in Fig. 1, in the tubular knitting machine 1, a tubular knitted fabric is knitted with plural knitting needles N provided in a cylinder 3 and a sinker S using knitting yarn Y fed from a yarn feeding device 2. In a case where panty stockings P are knitted, the tubular knitted fabric is made from a wearing part, a panty part, leg parts and toe parts. Knitting is completed at the ends of openings of the tiptoe parts, and collected through a fabric blowoff port by each leg.

[0030] In the cylinder 3 of the knitting machine 1, the knitting needles N and jacks J are provided in grooves arrayed in up-and-down directions around the periphery. The jacks J are moved up and down by a cam 4, to move corresponding knitting needles N up and down along the grooves to slide between an actuated position and inactuated position.

[0031] A sinker bed 5 is provided so as to surround the cylinder 3 in an upper part of the cylinder 3. In the sinker bed 5, the sinker S is provided slidably in a cylinder radial direction. The sinker S is actuated by a cam device 6.

[0032] A transfer dial device 7 which rotates in synchronization with the cylinder 3 is provided above the cylinder 3. At normal operation times, the transfer dial device 7 is in a position as shown in Fig. 1. When a raising device to be described later is actuated, the transfer dial device is located to a slanted position as shown in Fig. 5.

[0033] As shown in Figs. 2 and 5, a knitted fabric guide 10 has a cylinder member 11 coaxially arranged with the cylinder 3 and a ring member 12 extending outward from the radial direction from an upper end of the cylinder member 11. The knitted fabric guide 10 supports the panty stockings P knitted in the cylinder 3 with the ring member 12 and guides the panty stockings to the cylinder member 11.

[0034] A brush 14 attached to an air cylinder 15, support means 16 for supporting the air cylinder 15, and a lever 17 to open the dial in a slanted state are provided in an upper part of the tubular knitting machine 1.

[0035] Fig. 2 shows the transfer dial device 7 provided in the cylinder upper part to knit a double knitted part at the wearing part of the panty stockings P. In the transfer dial device 7, radial grooves corresponding to 1/2 of the number of knitting needles in the cylinder are formed, and respective pairs of transfer jacks 71 are arrayed. The jacks 71 are pushed to the radial outward direction by an inner cam 72, and arranged between knitting needles N in the cylinder.

The jack 71 is made of a thin steel piece having a shape as shown in Fig. 2(a), and the end of the jack has a gap through which the knitting needle N advances and a hook 73 to hold fed yarn.

[0036] As shown in Fig. 3, at the beginning of knitting of the double knitted part at the wearing part of the panty stockings P, the knitting needles N are arranged in operating positions by every other needle. First, in yarn

feeding in the first course, a loop is knitted by every other stitch. Next, in yarn feeding in the second course, all the knitting needles operate to perform knitting. In yarn feeding in the third course, the knitting needles N are arranged in operating positions in every other needle again, such that every other needles are in the operating positions. Then the hooks of the jacks 71 advance above the non-operative needles to hold the loops then withdraw in the dial device, and keep the status until the completion of welt knitting. Further, from the yarn feeding in the fourth course, all the knitting needles are in knitting positions to continue the welt knitting. This is called make-up.

[0037] As shown in Fig. 4, (1) when a desired length of welt is knitted, (2-3) the jacks 71, holding the loops in the yarn feeding in the third course on the hooks, advance to positions above the knitting needles N in the non-operative positions. (4) The knitting needles move up for knitting to advance in the end gap portions of the jacks 71, (5) then in the jacks 71, when the hooks withdraw to move the held loops to the knitting needles, the loops moved from the ends of the jacks remain on the needles. In this manner, braid over braid knitting is made.

[0038] A knitted fabric P is collected on the inner surface of the cylinder 3 immediately after knitting. As the transfer dial device 7 is arranged in the position on the knitted fabric, there is no open space at normal times. Accordingly, generally the raising brush cannot be attached to the upper part of the cylinder 3, however, in the present invention, the raising brush can be inserted toward the inner surface of the cylinder 3 in an arrangement to be described later. A fabric guide 12 gradually curved toward the inner side is provided in a position adjacent to the inner side of the cylinder 3. The fabric guide 12 gradually guides the knitted fabric P downwards, and holds the fabric P between a raising brush 14 to be described later and the guide and supports the fabric P against a pressing force of the raising brush to the fabric P.

[0039] Fig. 5 shows a status where the transfer dial device 7 is lifted and opened in a diagonally upward direction by dial lift means 17. In the dial lift means 17, one end is pivotally supported with a rotary shaft provided in a frame of the apparatus main body, and is driven and lifted by an air cylinder or the like. The brush 14 is attached to an end of an air cylinder 15. The cylinder extends/contracts in arrow directions, to press the fabric P and raise the fabric while holding the fabric P between the fabric guide 12 and the brush. During such operation, the fabric knitting is continued in the cylinder 3.

[0040] Fig. 6 shows a status where the air cylinder 15 is extended while the transfer dial device 7 is lifted, to hold the fabric P between the brush 14 and the fabric guide 12 and raise the fabric P. During this operation, although knitting with the transfer dial device 7 cannot be performed, knitting in the cylinder 3 is continued. It is more effective for raising that the brush 14 is in a diagonally upper position comparatively close to the cylinder 3. Further, the air cylinder 15 can be advanced toward

the center of the transfer dial device 7 or can be advanced from an eccentric position.

[0041] Fig. 7 shows the air cylinder 15 in a supported status. In air cylinder support means 16, a long hole is formed in a base and an air cylinder support member. The air cylinder 15 can be supported position-adjustably in up-and-down and forward and backward directions by sliding screws 25 and 26 engaged with the long holes.

[0042] The air cylinder 15 can be more accurately positioned by providing a base with a guide groove and a table member sliding corresponding to the groove as well as the long holes. Further, a contact angle as well as a contact position of the brush 14 to the fabric can be controlled by adding rotatable support means in accordance with necessity. It may be arranged such that the brush 14 is attached to a shaft with a rack in place of the air cylinder and the brush is advanced/withdrawn with a pinion gear having drive means.

[0043] As the raising brush 14 is biased to contact with the surface of the knitted fabric P, a particular arrangement is required such that fabric without entanglement and patchy portion can be obtained. As the raising brush 14 of the present embodiment, reinforced nylon, metal, an abrasive wire, abrasive paper and the like can be used. Especially, as a brush to be brought into contact with a soft fabric 12, 0.4 ϕ or 0.5 ϕ nylon fibers are used, and further, preferably, distal ends of the fibers are rounded off and uniformly shaped.

[0044] Note that as yarn feeding ports, two yarn feeding ports for plain knitting and two yarn feeding ports for pile knitting are provided in respectively opposed positions, however, other combinations of yarn feeding ports may be employed.

[0045] A method for knitting panty stockings will be described. The knitting is started from a wearing part. As described above, the wearing part is a braid over braid knitting made with face side yarn and reverse side yarn. This part is knitted by using the both cylinder 3 and the transfer dial device 7. In this status, as shown in Fig. 1, the transfer dial device 7 is closed, and the brush 14 is in a withdrawn position. When the knitting of this part has been completed, continuously normal fabric is knitted only with the cylinder 3. In this case, the transfer dial device 7 is lifted with the dial lift means 17 such that the dial 7 is opened in a diagonally upward direction, and the raising brush 14 is advanced with the air cylinder 15. As shown in Figs. 5 and 6, the raising brush 14 enters inside the cylinder 3, to raise, e.g., a panty part, leg part or a tow part. As advance/withdrawal of the raising brush 14 can be freely selected as long as the transfer dial 7 is open, a raised part can be freely selected. Further, as opening/closing of the transfer dial 7 can be freely selected, a part knitted with the transfer dial device 7 and the cylinder 3 or a part knitted only with the cylinder 3 can be freely selected.

[0046] In the present invention, raising can be performed during knitting, further, raising can be performed by relative movement to a currently-knitted fabric without

providing the brush 14 as raising means with drive means for raising. However, to perform more efficient raising, if means for rotate the brush 14 is added to the brush, more efficient raising can be performed. After completion of raising, the raising brush 14 is withdrawn, then the transfer dial device 7 is closed, and the knitting-completed fabric is discharged through a suction pipe 19 from a fabric blowoff port 20.

[0047] Fig. 8 illustrates knitting of plated fabric as a working example of a tubular knitted fabric knitted and raised by the apparatus of the present invention where a face side yarn A plated with reverse side yarn B. As described above, the tubular knitted fabric of the present invention is manufactured by bringing the raising brush 14 into contact with the inner surface of the fabric P knitted on the knitting machine 1 and raising the inner surface of the fabric P at the same time of knitting.

[0048] As the raising brush is brought into contact with a back stitch wale where knitting yarn Y is in the inner surface, the wale is raised 30, thus the one side of the tubular knitted fabric 12 of the present invention is raised 30. At this time, to facilitate the raising 30, the wale knitting yarn Y is selected from various types of yarn.

[0049] Next, the knitting yarn used in the above-described apparatus and method will be described. As shown in Fig. 8, upon raising of the reverse side yarn Y, as the influence by raising is significant, the selection of the yarn is more important.

In the present invention, to perform raising, use of a long fiber, i.e., filament is necessary. A working example of knitting yarn used for this raising is as follows. For example, a false-twisted yarn obtained by false-twisting extra fine filament such as 50D/225F is used as nylon yarn for raising. As a result, soft surface fibers as in the case of fiber yarn can be obtained. In this case, a knitted fabric having a property which cannot be realized in the case of fiber yarn can be obtained. As an example, 50 denier yarn made of 225 filaments obtained by dividing 25 filament fluxes by 9 is used. Further, rayon yarn, polyester filament and the like can be used.

[0050] On the other hand, an example of the face side yarn, single covering yarn with spandex yarn as core yarn covered with natural fiber or wooly nylon yarn is used. The covering yarn is made with 10D to 30D core yarn and 50D/24F wooly nylon yarn wrapping the core yarn. Note that the spandex yarn may be replaced with yarn looped by using a false-twisting machine or stuffer box and subjected to heat treatment in consideration of secondary transition point temperature. The yarn is determined in consideration of property required as knitted fabric.

Further, as shown in Figs. 9 and 10, even in use of tuck knitted fabric, as long as the tubular knitted fabric of the present invention is used, the raising brush 14 is brought into contact with the inner surface of the fabric P knitted on the knitting machine 1, and at the same time of knitting, the inner surface of the fabric P is raised.

[0051] Upon raising, as the fabric has an unpleasant

feel if the end surfaces of fibers in raised part are projected, such projection must be avoided as much as possible, and it is necessary to form a loop raised portion where the end surfaces of the fibers are not projected. If this loop raised portion is obtained, the feel against user's skin can be greatly improved. Further, knitted fabric without patchy portion can be obtained.

[Effects of the Invention]

[0052] By the present invention, upon knitting a tubular knitted fabric using a tubular knitting machine, its inner surface can be raised at the same time of knitting. In the ground knitting part, a pile knitting is knitted with face side yarn and reverse side yarn, and at the same time of knitting, the tops of pile loops can be raised in a course direction.

[0053] According to the present invention, raising is not post-knitting raising as in the conventional art but raising can be performed on a knitting machine. Accordingly, the unit price of product can be lowered.

[0054] According to the present invention, a fleecy portion of a product can be arbitrarily selected in quick response to a change of requirement of the marketplace.

[0055] As the tubular knitted fabric of the present invention is formed by using an extra fine filament as knitting yarn, a loop raised portion can be made without projecting end surfaces of the fibers, and a raised surface without patchy portion can be obtained. As a soft property can be maintained, a high grade product can be obtained. Further, if a product is used with its raised surface as outer surface, the distinctive raised surface has a designing effect.

[0056] In a case where the tubular knitted fabric of the present invention is used as a towel cloth, it has a soft feel by the above-described distinctive raised surface and use of extra fine yarn and elasticity.

[Explanation of Reference Numerals]

[0057]

- 1 tubular knitting machine
- 2 yarn feeding device
- 3 cylinder
- 4 cam
- 5 sinker bed
- 6 cam device
- 7 transfer dial device
- 10 fabric guide

- 11 cylinder member
- 12 ring member
- 14 raising brush
- 15 air cylinder
- 16 support means
- 17 dial lift means
- 18 suction device
- 30 raising
- 71 transfer jack
- 72 cam
- A face side yarn
- B reverse side yarn
- P panty stockings (Fabric)
- Y knitting yarn

Claims

1. A tubular knitted fabric manufacturing method for knitting knitting yarns comprising a face side yarn (A) of single covering yarn with spandex yarn as core yarn and a reverse side yarn (B) of filament yarn with a tubular knitting machine (1) having a transfer dial device (7) and a cylinder (3),
characterised by the steps of: positioning a knitted fabric (P) knitted on the knitting machine between a guide cylinder (10, 11, 12) provided in the cylinder (3) and a raising brush (14) advanceable/withdrawable with respect to the cylinder upon opening of the transfer dial device (7); and raising an appropriate portion of an inner surface of the fabric at the same time of knitting of the fabric.
2. A tubular knitted fabric manufacturing apparatus having a transfer dial device (7) and a cylinder (3),
characterised by transfer dial support means (17) for lifting and opening the dial, a raising brush (14), raising brush support means (16) for advancing/withdrawing the raising brush to/from the cylinder, and a knitted fabric guide (12) to support a knitted fabric (P) knitted by knitting yarns (Y) comprising a face side yarn (A) of single covering yarn with spandex yarn as core yarn and a reverse side yarn (B) of filament yarn on the knitting machine between the guide and the raising brush.

Patentansprüche

1. Verfahren zur Herstellung einer Rundstrickware zum Stricken von Strickfäden, bestehend aus einem Vorderseitenfaden (A) aus einem einzelnen Deckfaden mit einem Elasthanfaden als Kernfaden und einem Rückseitenfaden (B) aus einem Filamentfaden, mit einer Rundstrickmaschine (1), die eine Transferrippscheibenvorrichtung (7) und einen Zylinder (3) aufweist,

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gekennzeichnet durch die Schritte des Positionierens einer Strickware (P), die auf der Strickmaschine gestrickt wurde, zwischen einem Führungszylinder (10, 11, 12), der im Zylinder (3) angeordnet ist, und einer Aufraubürste (14), die bezüglich des Zylinders beim Öffnen der Transferrippscheibenvorrichtung (7) vorschiebbar/zurückziehbar ist, und des Aufrauens eines geeigneten Abschnitts der Innenfläche der Ware gleichzeitig mit dem Stricken der Ware.

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2. Maschine zum Herstellen einer Rundstrickware mit einer Transferrippscheibenvorrichtung (7) und einem Zylinder (3),

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gekennzeichnet durch eine Transferrippscheibenstützeinrichtung (17) zum Heben und Öffnen der Rippscheibe, eine Aufraubürste (14), eine Aufraubürstenhalterung (16) zum Vorrücken/Zurückziehen der Aufraubürste zum/vom Zylinder, und eine Strickwarenführung (12), um eine Strickware (P) zu halten, die **durch** Stricken von Strickfäden (Y), bestehend aus einem Vorderseitenfaden (A) aus einem einzelnen Deckfaden mit einem Elasthanfaden als Kernfaden und einem Rückseitenfaden (B) aus einem Filamentfaden, auf der Strickmaschine zwischen der Führung und der Aufraubürste gestrickt wird.

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Revendications

1. Procédé de fabrication d'un tricot tubulaire pour tricoter des fils à tricoter comprenant un fil de face (A) fait d'un fil de couvrage simple avec un fil en spandex en tant qu'âme du fil et un fil de verso (B) fait d'un fil de filament, avec une machine de tricotage tubulaire (1) possédant un plateau de transfert (7) et un cylindre (3), **caractérisé par** les étapes de :

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de positionnement d'un tricot (P), tricoté à l'aide de la machine à tricoter, entre un guide cylindre (10, 11, 12) prévu dans le cylindre (3) et une brosse molletonnée (14) pouvant être avancée ou reculée par rapport au cylindre sur l'ouverture du plateau de transfert (7), et

de molletonnage d'une portion appropriée d'une surface intérieure du tricot tout en tricotant le tricot.

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2. Dispositif de fabrication d'un tricot tubulaire compor-

tant un plateau de transfert (7) et un cylindre (3), **caractérisé par** des moyens de support du plateau de transfert (17) prévus pour soulever et ouvrir le plateau, une bosse molletonnée (14), des moyens de support de la brosse molletonnée (16) prévus pour avancer et reculer la brosse molletonnée vers ou depuis le cylindre, et un guide de tricot (12) prévu pour supporter un tricot (P) tricoté par des fils à tricoter (Y) comprenant un fil de face (A) fait d'un fil de couvrage simple avec un fil en spandex en tant qu'âme du fil et un fil de verso (B) fait d'un fil de filament, sur la machine de tricotage entre le guide et la brosse molletonnée.

FIG 1

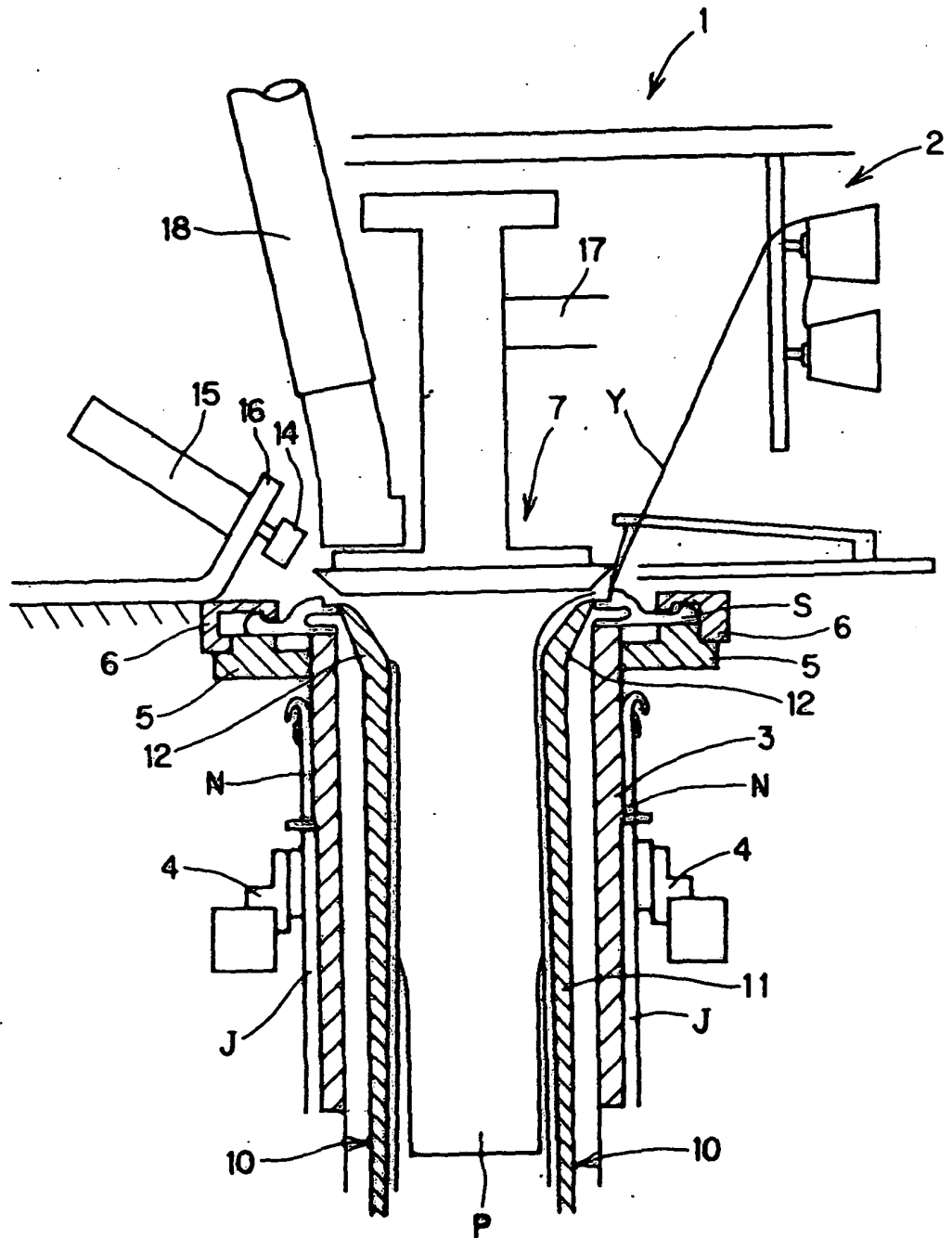


FIG 2

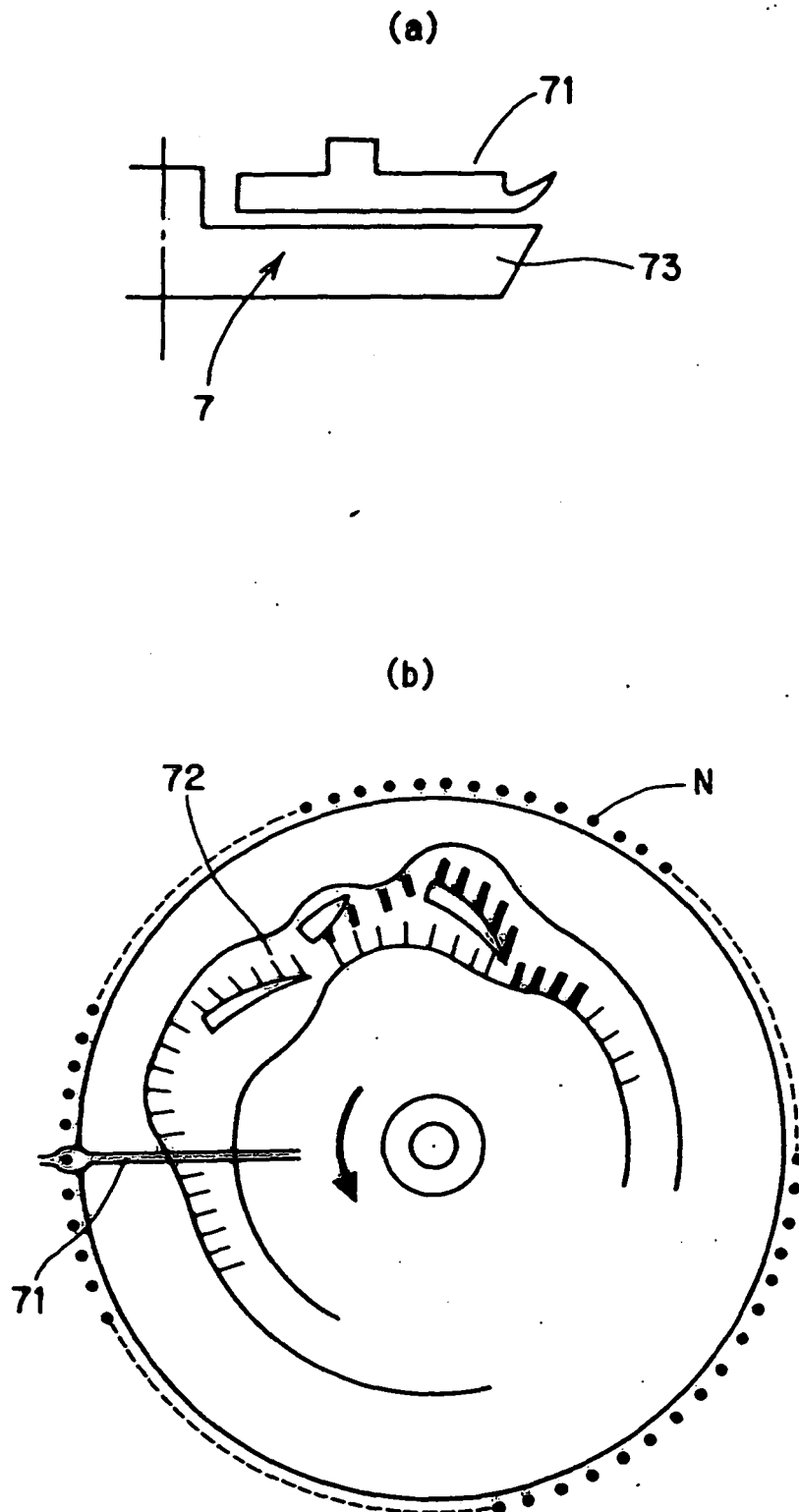


FIG 3

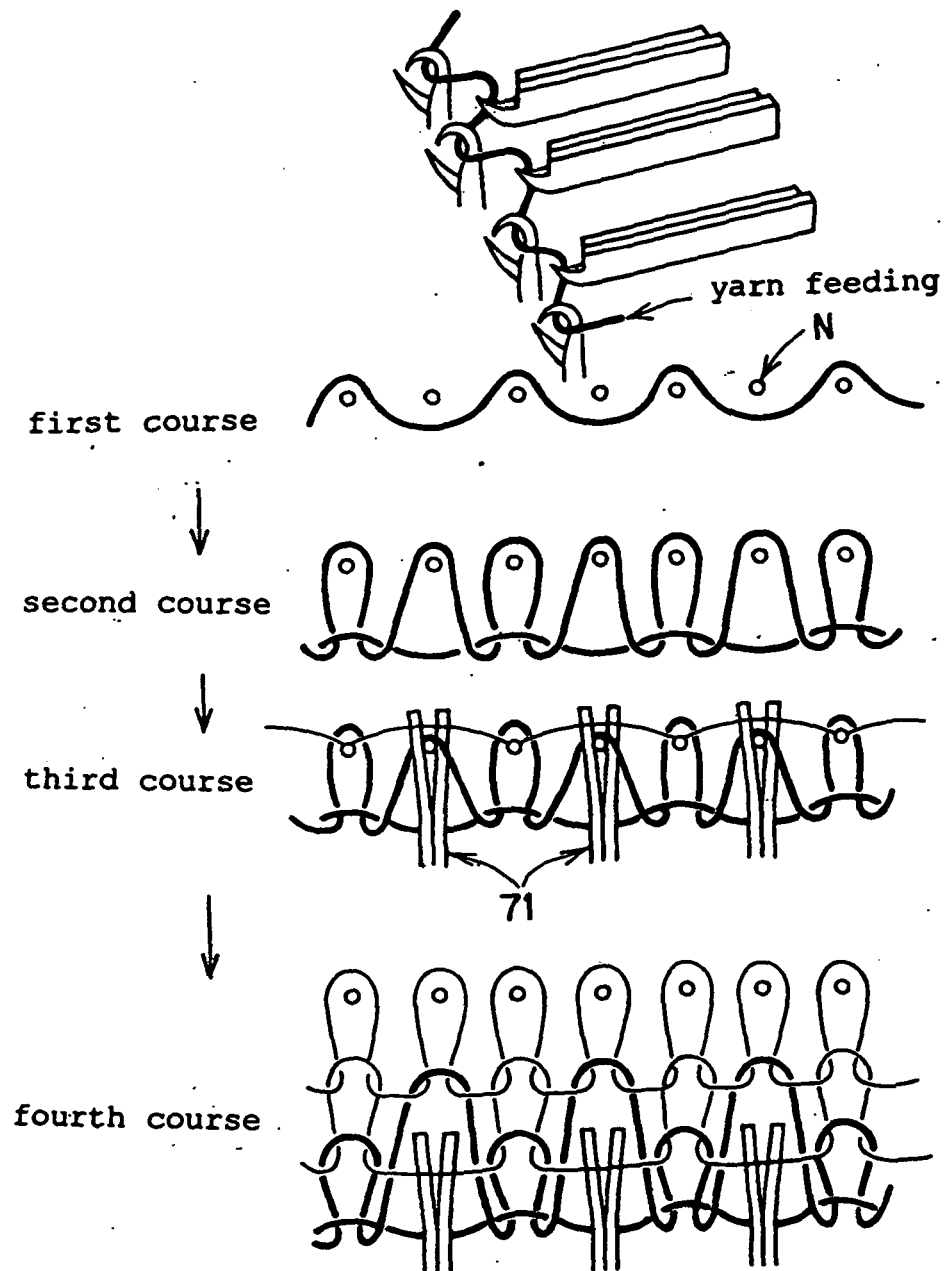


FIG 4

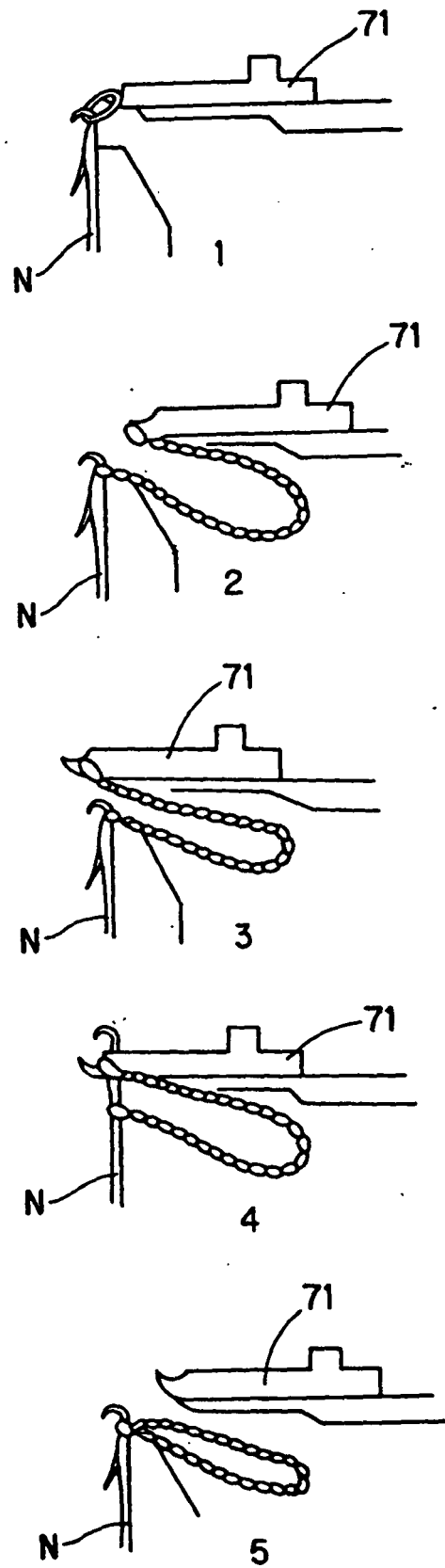


FIG 5

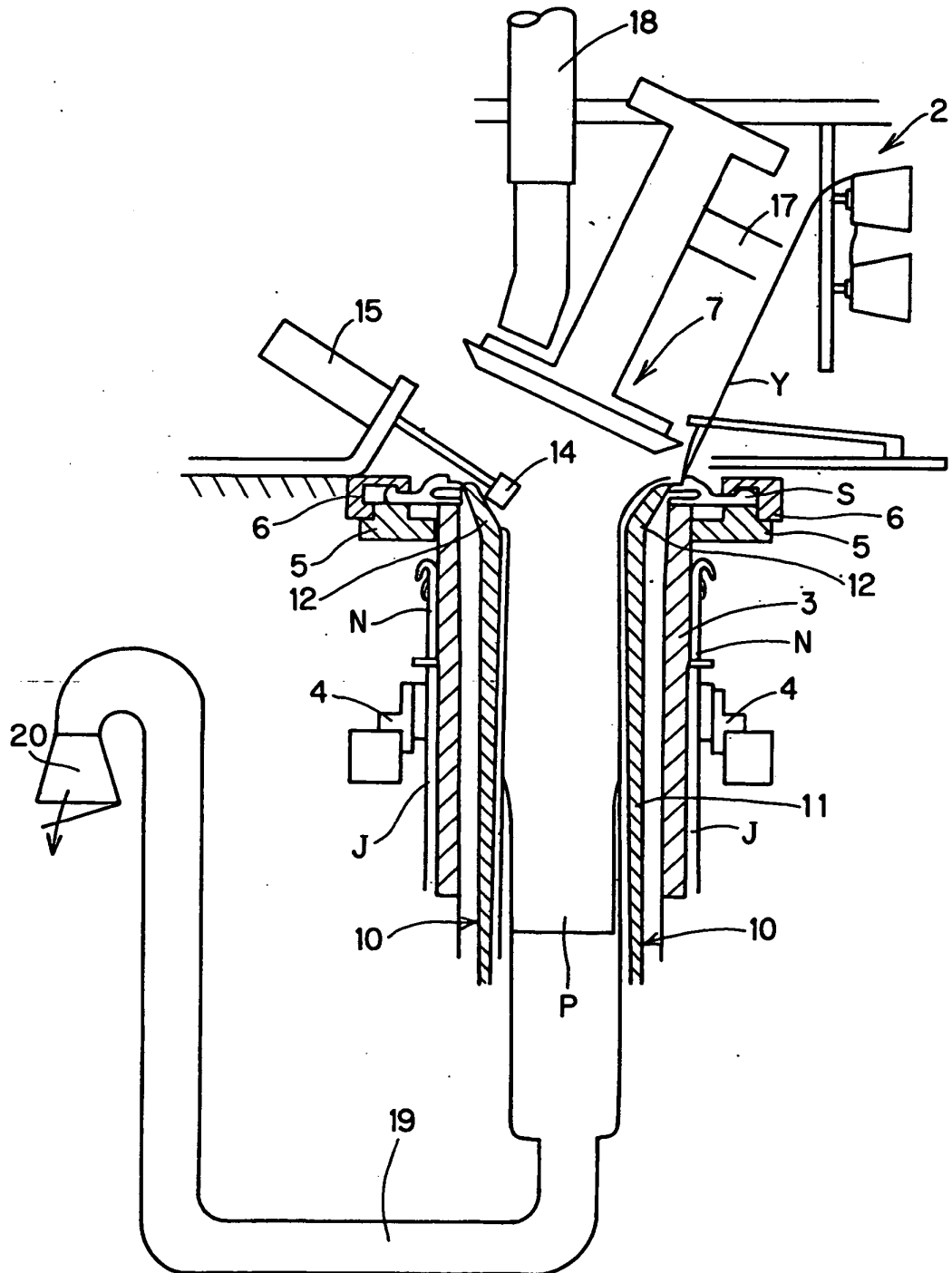


FIG 6

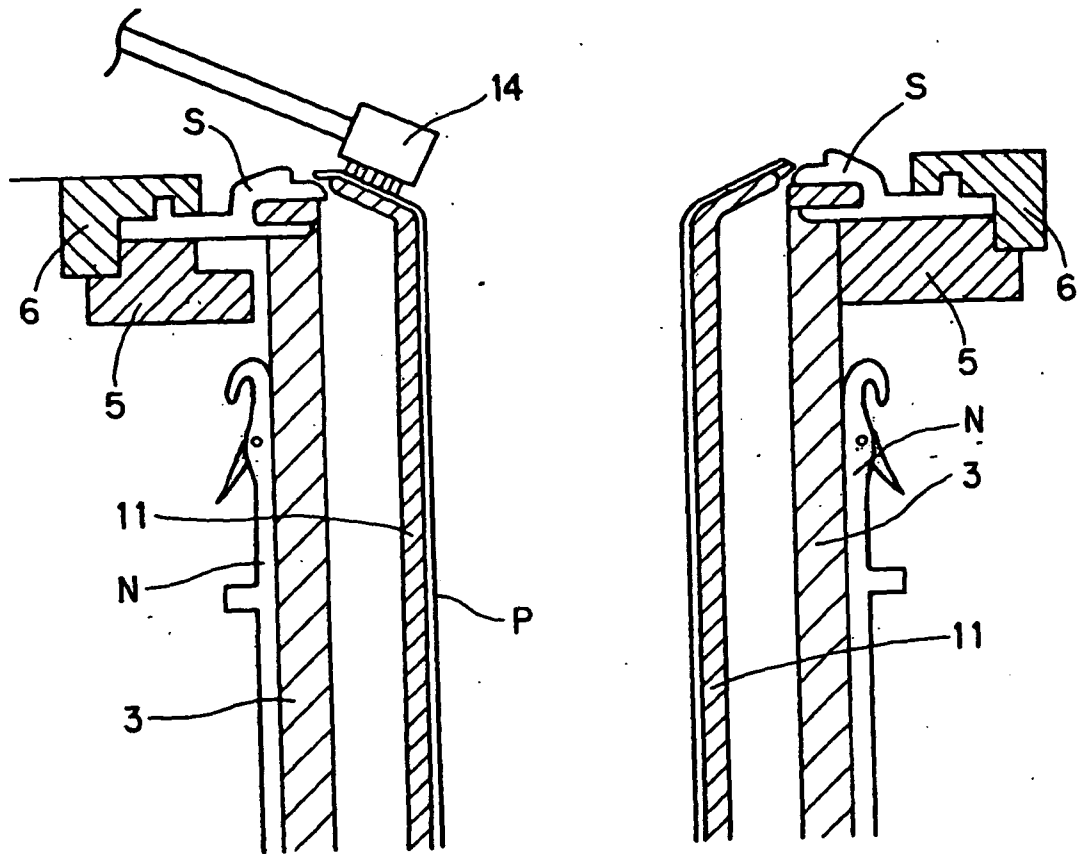


FIG 7

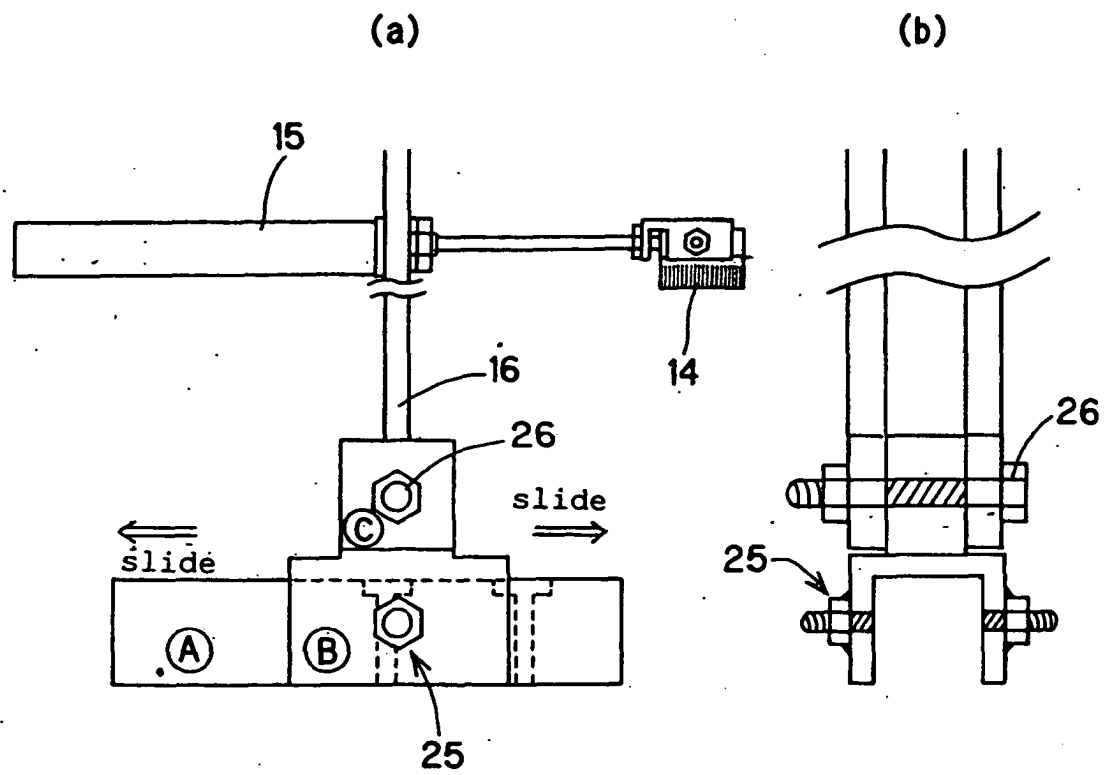


FIG 8

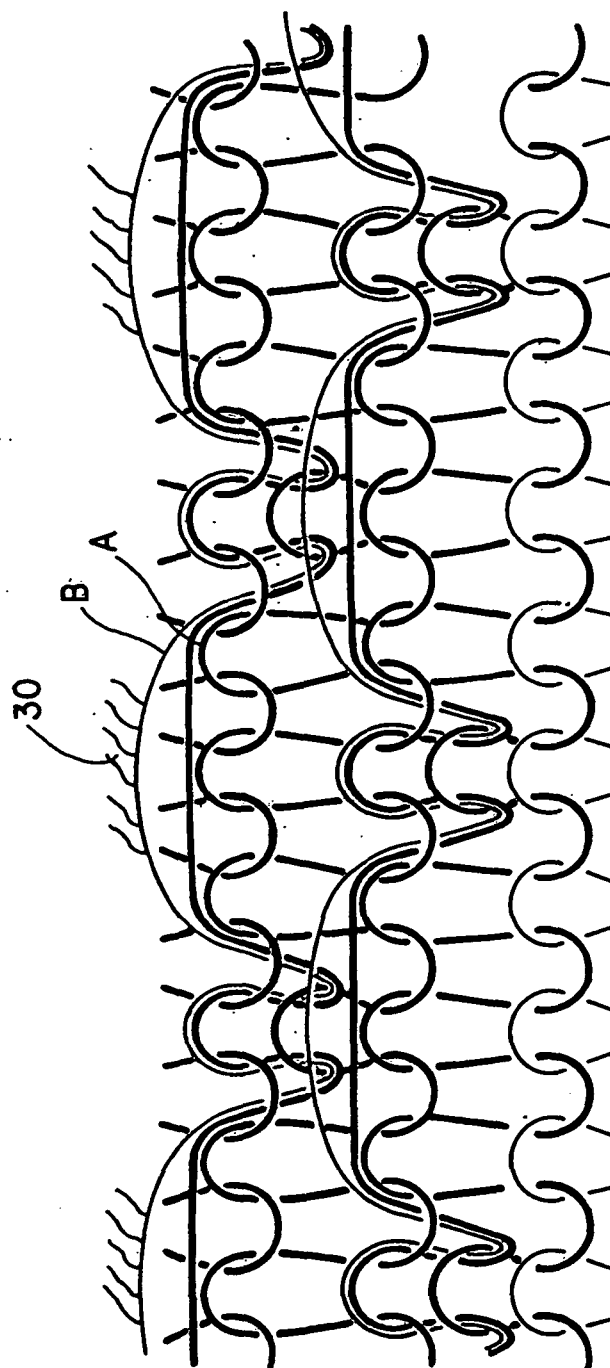


FIG 9

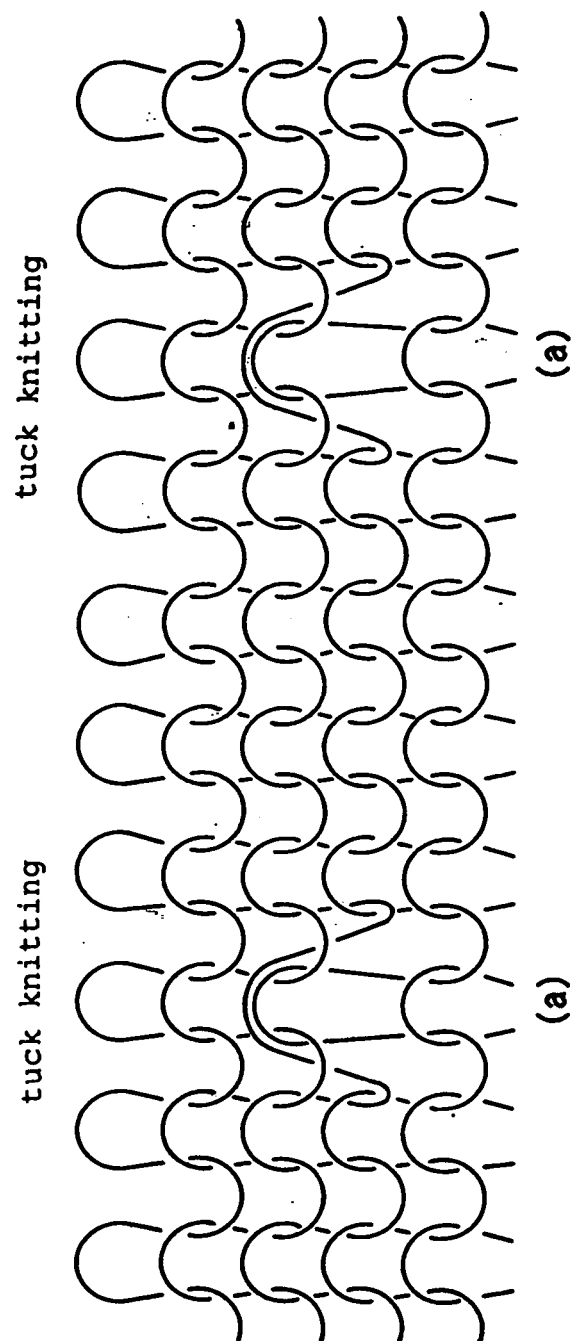
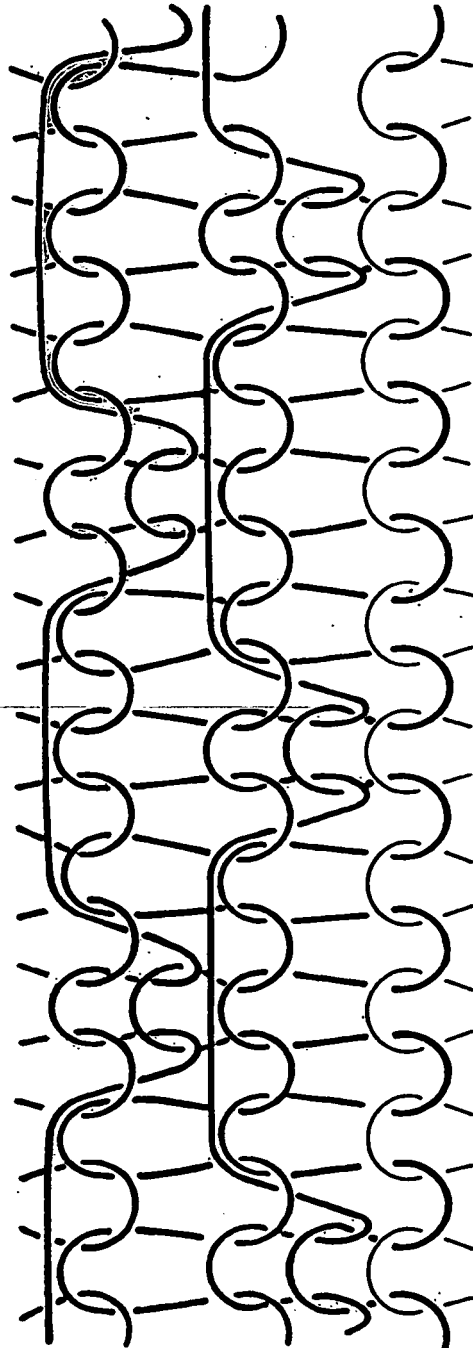


FIG 10



REFERENCES CITED IN THE DESCRIPTION

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