



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.01.2009 Bulletin 2009/02

(51) Int Cl.:
D03J 1/22 (2006.01)

(21) Application number: **08011269.1**

(22) Date of filing: **20.06.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK RS

(72) Inventors:
• **Minamitani, Norio**
Kanazawa-shi
Ishikawa-ken, 921-8650 (JP)
• **Shu, Nobuhisa**
Kanazawa-shi
Ishikawa-ken, 921-8650 (JP)

(30) Priority: **06.07.2007 JP 2007178333**

(71) Applicant: **TSUDAKOMA KOGYO KABUSHIKI KAISHA**
Kanazawa-shi,
Ishikawa-ken 921-8650 (JP)

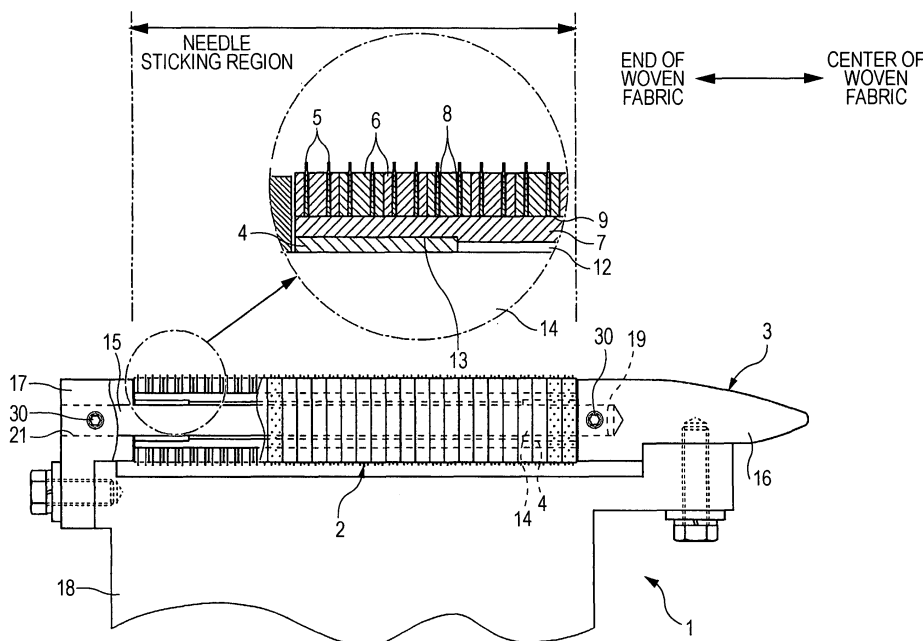
(74) Representative: **Samson & Partner**
Widenmayerstrasse 5
80538 München (DE)

(54) **Roller temple for loom and method manufacturing temple body**

(57) A roller temple (1) for a loom includes a temple body (2) having a plurality of needles (5) protruding at intervals in circumferential and axial directions, thereby providing a needle sticking region extending in a weaving-width direction; a supporting member (3) rotatably supporting the temple body (2); and a pair of axially spaced bearings (4) interposed between the temple body (2) and the supporting member (3). The temple body (2)

includes a plurality of rings (6) having a plurality of insertion holes (8) arranged at intervals in the circumferential direction and the needles (5) protruding therefrom; and a shaft member (7) supported by the supporting member (3) with the pair of bearings (4). The rings (6) are adjacently arranged in parallel, and press-fitted onto the shaft member (7). The needle sticking region is defined by the rings (6) integrated with the shaft member (7).

FIG. 1



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a roller temple for a loom, the roller temple being capable of preventing weaving crimp of a woven fabric by an action of keeping a weaving width of the woven fabric constant, and a method of manufacturing a temple body.

2. Description of the Related Art

[0002] In many cases, a loom has temples arranged near a cloth fell at positions corresponding to both ends of a woven fabric in a weaving-width direction. Needles protruding from the temples stick into a woven fabric. Accordingly, a woven fabric to be obtained immediately after weaving is prevented from becoming rapidly crimped by beating (weaving crimp of a woven fabric).

[0003] A roller temple is a type of temple. The roller temple differs from a ring temple in that the roller temple keeps a weaving width of a woven fabric constant, whereas the ring temple positively increases a weaving width of a woven fabric by making rotation axes of individual rings having needles inclined with respect to an axis of a ring temple body. That is, the roller temple merely applies a reaction force of a weaving crimp force to a woven fabric, but does not apply an excessive force to the woven fabric. Hence, the woven fabric can be prevented from being damaged, for example, with a needle-sticking defect. The applicant searched the related art, but could not find any relevant example of the related art with figures attached. The applicant could find only an example of the related art including a term "roller type" (see Claim 4 in Claims of Japanese Unexamined Patent Application Publication No. 58-220850).

[0004] In particular, a typical roller temple is configured such that an outer circumferential surface of a temple body, which is a long shaft-like member extending in a weaving-width direction, is processed by scraping to make a plurality of needles sticking into the temple body at intervals in a circumferential direction and an axial direction of the temple body; and shaft portions at both sides of the temple body are rotatably supported with supporting members.

[0005] To make needles protrude by scraping, a high-level technique is necessary. Hence, the inventors have attempted to manufacture a roller temple by the following manufacturing method.

[0006] The method includes boring a plurality of insertion holes in an outer circumferential surface of a cylinder extending in an axial direction at intervals in a circumferential direction and an axial direction of the cylinder; stud-

ding (press-fitting) needles into all the insertion holes; and then inserting a shaft into the cylinder. Unfortunately, a diameter of each insertion hole is small if a diameter of each needle is small, and hence, it is difficult to make an insertion hole in the cylinder by drilling. A drill may be damaged (breaking, bending, or the like), resulting in dimensional accuracy and roundness of the insertion hole being degraded. Thus, it is difficult to press-fit the needle into the insertion hole, and the needle may easily become detached from the insertion hole after the needle is press-fitted. For example, a problem in press-fitting may be that the needle is bent at an intermediate portion of the needle. If such defects are found in a part of the cylinder, the entire cylinder is considerable to be a defective product.

SUMMARY OF THE INVENTION

[0007] The invention is made in light of the above situations, and it is an object of the invention to facilitate manufacturing of a roller temple, and minimize production of a defective product.

[0008] It is presupposed that the invention provides a roller temple for a loom including a temple body having a plurality of needles protruding at intervals in a circumferential direction and an axial direction, thereby providing a needle sticking region extending in a weaving-width direction; a supporting member rotatably supporting the temple body; and a pair of bearings interposed between the temple body and the supporting member and spaced apart from each other in the axial direction.

[0009] According to a first aspect of the invention, the temple body includes a plurality of rings and a shaft member. The rings have a plurality of insertion holes arranged at intervals in the circumferential direction, and the plurality of needles protruding from the insertion holes. The plurality of rings are adjacently arranged in parallel, and press-fitted onto the shaft member. The shaft member is supported by the supporting member with the pair of bearings. The needle sticking region is defined by the plurality of rings integrated with the shaft member.

[0010] To rotatably support the temple body with the supporting member, a configuration may be employed.

[0011] In particular, the shaft member may have bearing fitting holes in first and second ends or portions near the first and second ends of the shaft member. Also, the supporting member may have a pair of supporting shaft portions to which the bearings are fitted.

[0012] Another configuration may add limitations for the shaft member and the supporting member in the above configuration.

[0013] In particular, the shaft member may have a through hole at a center axis thereof in the axial direction, and the bearing fitting holes may be formed in first and second ends or portions near the first and second ends of the through hole. The supporting member may include a supporting shaft and supporting bodies. The supporting shaft penetrates through the through hole, and the portions near the first and second ends of the supporting shaft are respectively fitted to the pair of bearings so as to define the pair of supporting shaft portions. The supporting bodies have a pair of holding holes for holding

first and second ends of the supporting shaft and fixes at least one of the first and second ends of the supporting shaft so as to inhibit the supporting shaft from rotating or moving in the axial direction.

[0014] To rotatably support the temple body with the supporting member, still another configuration may be employed.

[0015] In particular, the supporting member may have a pair of bearing fitting holes. Also, first and second ends of the shaft member protruding to the outside of the needle sticking region may be respectively fitted to the pair of bearings.

[0016] According to a second aspect of the invention, a method of manufacturing a temple body is provided. The method includes the step of press-fitting a plurality of rings, which have a plurality of insertion holes arranged at intervals in the circumferential direction and a plurality of needles protruding from the insertion holes, onto a shaft member, thereby integrating the plurality of adjacently arranged rings with the shaft member, to manufacture the temple body having the needle sticking region.

[0017] The method of forming a ring with needles sticking may be a method of inserting needles from an outer circumferential surface of a ring into insertion holes, or a method of inserting needles from an inner circumferential surface of a ring into insertion holes. In particular, the insertion holes of the ring for the needles are through holes penetrating to the inner circumferential surface, and dimensions are properly determined for a width (length in an axial direction) and an inner diameter of a hole, and a length of a needle. Accordingly, the needles can be easily inserted into all the insertion holes from the inner circumferential surface of the ring. The needles are inserted into all the insertion holes from the inner circumferential surface, and then, a pressing jig with a predetermined diameter is inserted from an end of the ring into a space surrounded by the inner circumferential surface of the ring. Hence, the needles are press-fitted into all the insertion holes, and tip portions of the needles can protrude to the outside of the ring. With the method of forming the ring with the needles, in which the needles are inserted from the inner circumferential surface of the ring, since base portions of the needles, but not tip portions thereof, are pushed, the thin tip portions are prevented from being damaged. Also, since the thin tip portions advance in the insertion holes, press-fitting can be efficiently performed.

[0018] The roller temple according to the first aspect of the invention has the temple body including the plurality of rings with the needles sticking, and the shaft member. Also, the plurality of rings press-fitted onto the shaft member define the needle sticking region. Accordingly, as compared with a configuration in which a needle sticking region is defined by a single cylinder, a total length of an individual ring in the weaving-width direction can be markedly reduced. Thus, a defective product is hardly produced in the manufacturing process for boring the in-

sertion holes and inserting the base portions of the needles into the insertion holes, thereby facilitating the manufacturing. If a single ring becomes defective in the manufacturing process until when the needles protrude from the insertion holes, other acceptable product can be used to form the roller temple. Therefore, a single defective ring does not affect the quality of the entire rings for forming the roller temple.

[0019] Also, with the method of manufacturing the temple body according to the second aspect of the invention, the plurality of rings with the needles protruding are press-fitted onto the shaft member, so as to be integrated and to form the needle sticking region. Hence, a ring, which is made defective during the manufacturing process until when the needles protrude from the insertion holes can be removed, and only acceptable rings, can be press-fitted onto the shaft member. Therefore, production of a defective product during the manufacturing process until when the needles protrude from the insertion holes can be overcome.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020]

Fig. 1 is a front view with a partially enlarged view showing a roller temple according to a first embodiment;

Figs. 2A and 2B are work process diagrams showing a work process of press-fitting needles into rings; and Fig. 3 is a front view showing a roller temple according to a second embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0021] Referring to Fig. 1, a roller temple 1 is arranged near a cloth fell at a position corresponding to each end of a woven fabric in a weaving-width direction. The roller temple 1 is fixed to a loom frame (not shown).

[0022] The roller temple 1 according to a first embodiment includes a cylindrical temple body 2 extending in the weaving-width direction, a supporting member 3 that supports first and second ends of the temple body 2, and two bearings 4 respectively interposed between inner circumferential surfaces of the first and second ends of the temple body 2 and an outer circumferential surface of the supporting member 3.

[0023] In the temple body 2, needles 5 protrude from the outer circumferential surface thereof, and a total length of that region with the needles 5 in the weaving-width direction defines a needle sticking region. The needles 5 are configured to stick into a woven fabric while being rotated in accordance with advancement of the woven fabric. The temple body 2 includes a plurality of rings 6 from which the needles 5 protrude, and a shaft member 7 that allows the plurality of rings 6 to be press-fitted thereonto while the rings 6 are adjacently arranged in parallel in the weaving-width direction. By press-fitting

the plurality of rings 6 onto the shaft member 7, the plurality of rings 6 and the shaft member 7 can be integrated. That is, the plurality of rings 6 and the shaft member 7 are inhibited from being relatively rotated or relatively moved in an axial direction. The plurality of rings 6 arranged in parallel in the weaving-width direction define the needle sticking region.

[0024] Each ring 6 has insertion holes 8 for the needles 5 in an outer circumferential surface thereof at even intervals in the circumferential direction. The needles 5 are provided at a plurality of circumferences, or three circumferences in this embodiment, being spaced apart from each other in the axial direction. Phases of the insertion holes 8 provided on the adjacent circumferences are shifted. Accordingly, the insertion holes 8 are provided on the outer circumferential surface of the ring 6 in a staggered manner. Each insertion hole 8 is bored from the outer circumferential surface of the ring 6 toward the center axis, and penetrates through the ring 6 to an inner circumferential surface 9 thereof. A base portion of the needle 5 is press-fitted into the insertion hole 8, and a tip portion of the needle 5 protrudes from the outer circumferential surface of the ring 6. Accordingly, the plurality of needles 5 protrude from the outer circumferential surface of the ring 6 in a staggered manner.

[0025] The needle 5 sticks into a woven fabric, and hence, the tip portion of the needle 5 is thin, and the base portion thereof has a diameter larger than that of the insertion hole 8. As shown in Fig. 2, when the needles 5 are to be press-fitted into the insertion holes 8, the tip portions of the needles 5 are temporarily inserted into all the insertion holes 8 from the inner circumferential surface 9 of the ring 6. The needles 5 are held with friction so as not to become detached while only the base portions of the needles 5 protrude from the inner circumferential surface 9. Then, a pressing jig 11 having a predetermined diameter and a tip portion thereof being tapered is inserted from an end of the ring 6 into a space surrounded by the inner circumferential surface 9 thereof, and is moved along the axial direction. The pressing jig 11 pushes all the needles 5 collectively, so as to press-fit the needles 5 into the insertion holes 8. Accordingly, the needles 5 are press-fitted into the insertion holes 8 and fixed thereto, and the tip portions of the needles 5 protrude from the outer circumferential surface of the ring 6.

[0026] The shaft member 7 fixes the plurality of rings 6 so as to be integrated with the plurality of rings 6. The shaft member 7 is a pipe-like member having a through hole 12 penetrating through the shaft member 7 at the center axis in the axial direction. Bearing fitting holes 13 each having a larger diameter than a diameter at an intermediate portion of the through hole 12 are respectively formed at first and second ends of the through hole 12. An outer diameter of the shaft member 7 is larger than an inner diameter of the rings 6. The rings 6 are fitted onto the shaft member 7 by interference fitting. That is, the rings 6 are press-fitted onto the shaft member 7.

[0027] A method of manufacturing the temple body 2 merely performs a process in which the shaft member 7 is inserted into the space surrounded by the inner circumferential surface 9 of the ring 6 with the needles 5 protruding therefrom so as to press-fit the needles 5, by a number of times corresponding to the number of rings 6 to be arranged in parallel in the needle sticking region. Accordingly, the plurality of rings 6 is integrated with the shaft member 7.

[0028] Each bearing 4 is a sliding bearing, which particularly employs contained metal made of metal or resin, and hence the bearing 4 need not be lubricated for a long period. Alternatively, a rolling bearing such as a needle bearing with grease sealed therein may be employed. The pair of bearings 4 are respectively press-fitted into the bearing fitting holes 13 of the shaft member 7 after the plurality of rings 6 are press-fitted.

[0029] The supporting member 3 supports the temple body 2 so as to be rotatable but not movable in the weaving-width direction by way of the bearings 4 located at first and second ends of the supporting member 3. The supporting member 3 includes a supporting shaft 15 penetrating through the through hole 12 of the shaft member 7 and protruding from first and second ends of the shaft member 7, a pair of supporting bodies 16 and 17 arranged at an interval in the weaving-width direction and holding first and second ends of the supporting shaft 15, and a bracket 18 integrating the pair of supporting bodies 16 and 17. Portions near the first and second ends of the supporting shaft 15 are fitted to the bearings 4. The supporting shaft 15 has a pair of supporting shaft portions 14 at portions near first and second ends thereof. The first and second ends of the supporting shaft 15 are inserted to holding holes 19 and 21 respectively formed in the supporting bodies 16 and 17. At least one of, or both the first and second ends of the supporting shaft 15 in this embodiment, are fixed to the supporting bodies 16 and 17 with hexagon socket set screws 30 or pins which respectively reach the holding holes 19 and 21 provided at the supporting bodies 16 and 17.

[0030] As described above, the supporting shaft 15 has the pair of supporting bodies 16 and 17 arranged at the first and second ends of the temple body 2 and sandwiching the temple body 2, so as to inhibit the temple body 2 from moving in the axial direction. Also, the supporting shaft 15 rotatably supports the first and second ends of the temple body 2 with the pair of bearings 4.

[0031] One of the pair of supporting bodies 16 and 17, which holds a first end (end near the center of a woven fabric) of the supporting shaft 15, and a diameter of which is gradually decreased toward the center of a woven fabric into a tapered shape, is called head piece 16. The other of the pair of supporting bodies 16 and 17, which holds a second end (end near the end of the woven fabric) of the supporting shaft 15 is called end piece 17.

[0032] The bracket 18 integrates the head piece 16 and the end piece 17 into a unit with bolts. In a case of a bottom-mounted temple in which a woven fabric passes

an upper side of a temple body 2, or in a case of a top-mounted temple in which a woven fabric a lower side of the temple body 2, the bracket 18 is arranged below or above a passing region of a woven fabric. The bracket 18 is fixed to a loom frame (not shown).

[0033] While all the rings 6 have a uniform number of needles 5 with a uniform protruding length from the outer circumferential surfaces of the rings 6 in this embodiment, the protruding length and the number of needles 5 may be varied in accordance with arrangement positions of the needles 5 in the weaving-width direction. In particular, as the rings 6 are arranged close to the center of the woven fabric, the protruding length of the needles 5 is decreased, or the number of needles 5 is decreased. In an extreme case, a ring 6 arranged closest to the center of the woven fabric may lack a needle 5. Accordingly, a tensile start position with the roller temple 1, that is, the boundary between a low tensile portion near the center and a high tensile portion where the needles 5 stick into the woven fabric becomes unclear, thereby preventing a weaving defect such as a warp streak from appearing.

[0034] While the insertion holes 8 for the needles 5 are provided in the outer circumferential surface of the ring 6 at the plurality of circumferences spaced apart from each other in the axial direction in this embodiment, the insertion holes 8 may be provided only at a single circumference. Also, while the pair of bearing fitting holes 13 are provided at the first and second ends of the through hole 12 formed in the shaft member 7 in this embodiment, at least one of the pair of bearing fitting holes 13 may be formed at a position spaced apart from an end of the through hole 12.

[0035] While the temple body 2 has thirty rings 6, or ten or more rings 6 in this embodiment, the temple body 2 need not have the ten or more rings 6. In view of manufacturing, the temple body 2 may preferably have three or more rings 6 as a plurality of rings 6. The length of a ring 6 in the axial direction is determined in accordance with the number of rings 6, thereby obtaining a predetermined needle sticking region.

[0036] While the shaft member 7 has the through hole 12 at the center axis thereof in this embodiment, it is not limited thereto. For example, the shaft member 7 may be a solid round bar member and have bearing fitting holes 13 at first and second ends thereof. A pair of supporting bodies 16 and 17 may respectively have shafts protruding toward the bearing fitting holes 13 by welding or the like. The shafts are fitted to the bearings 4; functioning as supporting shaft portions 14. Accordingly, the supporting shaft portions 14 are respectively provided at the pair of supporting bodies 16 and 17.

[0037] As shown in Fig. 3, a roller temple 1 according to a second embodiment includes a temple body 2 with first and second ends thereof protruding to the outside of a needle sticking region, a supporting member 3 having a pair of bearing fitting holes 13 and rotatably supporting the first and second ends of the temple body 2, and a pair of bearings 4 interposed between the first and sec-

ond ends of the temple body 2 and the supporting member 3. The temple body 2 includes a plurality of rings 6 having insertion holes 8 from which needles 5 protrude, and a shaft member 7 onto which the plurality of rings 6 are press-fitted, first and second ends of the shaft member 7 respectively being fitted to the bearings 4. The second embodiment differs from the first embodiment in that the shaft member 7 is a solid member having no though hole at the center axis thereof, and the bearings 4 are fitted onto the outer circumferential surface.

[0038] The first and second ends of the shaft member 7 protrude to the outside of the needle sticking region. That is, the plurality of rings 6 with the needles 5 protruding from the outer circumferential surfaces of the rings 6 are adjacently arranged in parallel in the weaving-width direction, and in the parallel arrangement state, the shaft member 7 is press-fitted into a space surrounded by inner circumferential surfaces 9 of the rings 6. Accordingly, the shaft member 7 and the plurality of rings 6 are integrated to define the needle sticking region, and the first and second ends of the shaft member 7 protrude to the outside of the rings 6 arranged in parallel.

[0039] The supporting member 3 includes a pair of supporting bodies 16 and 17, which respectively serve as a head piece 16 and an end piece 17. The head piece 16 and the end piece 17 have bearing fitting holes 13. The bearings 4 are press-fitted into the bearing fitting holes 13, and the supporting member 3 supports the first and second ends of the shaft member 7 rotatably with the bearings 4.

[0040] The invention is not limited to any of the above-described embodiments, and may be modified as desired within the scope of the invention.

Claims

1. A roller temple (1) for a loom, comprising:

a temple body (2) having a plurality of needles (5) protruding at intervals in a circumferential direction and an axial direction, thereby providing a needle sticking region extending in a weaving-width direction;

a supporting member (3) rotatably supporting the temple body (2); and

a pair of bearings (4) interposed between the temple body (2) and the supporting member (3) and spaced apart from each other in the axial direction,

wherein the temple body (2) includes

a plurality of rings (6) having a plurality of insertion holes (8) arranged at intervals in the circumferential direction, and the plurality of needles (5) protruding from the insertion holes (8), and a shaft member (7), the plurality of rings (6) being adjacently arranged in parallel, and press-fitted onto the shaft member (7), the shaft member (7)

being supported by the supporting member (3) with the pair of bearings (4), and wherein the needle sticking region is defined by the plurality of rings (6) integrated with the shaft member (7).

5

dles (5) protruding from the insertion holes (8), onto a shaft member (7), thereby integrating the plurality of adjacently arranged rings (6) with the shaft member (7), to manufacture the temple body (2) having the needle sticking region.

2. The roller temple (1) for the loom according to Claim 1, wherein the shaft member (7) has bearing fitting holes (13) in first and second ends or portions near the first and second ends of the shaft member (7), and wherein the supporting member (3) has a pair of supporting shaft portions (14) to which the bearings (4) are fitted.

10

15

3. The roller temple (1) for the loom according to Claim 2, wherein the shaft member (7) has a through hole (12) at a center axis thereof in the axial direction, the bearing fitting holes (13) being formed in first and second ends or portions near the first and second ends of the through hole (12), and wherein the supporting member (3) includes a supporting shaft (15) which penetrates through the through hole (12) and the portions near the first and second ends of which are respectively fitted to the pair of bearings (4) so as to define the pair of supporting shaft portions (14), and supporting bodies (16, 17) which has a pair of holding holes (19, 21) for holding first and second ends of the supporting shaft (15) and fixes at least one of the first and second ends of the supporting shaft (15) so as to inhibit the supporting shaft (15) from rotating or moving in the axial direction.

20

25

30

35

4. The roller temple (1) for the loom according to Claim 1, wherein the supporting member (3) has a pair of bearing fitting holes (13), and wherein first and second ends of the shaft member (7) protruding to the outside of the needle sticking region are respectively fitted to the pair of bearings (4).

40

45

5. A method of manufacturing a temple body (2) of a roller temple (1) for a loom, the roller temple (1) including a temple body (2) having a plurality of needles (5) protruding from the temple body (2) at intervals in a circumferential direction and an axial direction, thereby defining a needle sticking region extending in a weaving-width direction, and a supporting member (3) rotatably supporting the temple body (2), the method comprising the step of press-fitting a plurality of rings (6), which have a plurality of insertion holes (8) arranged at intervals in the circumferential direction and a plurality of nee-

50

55

FIG. 1

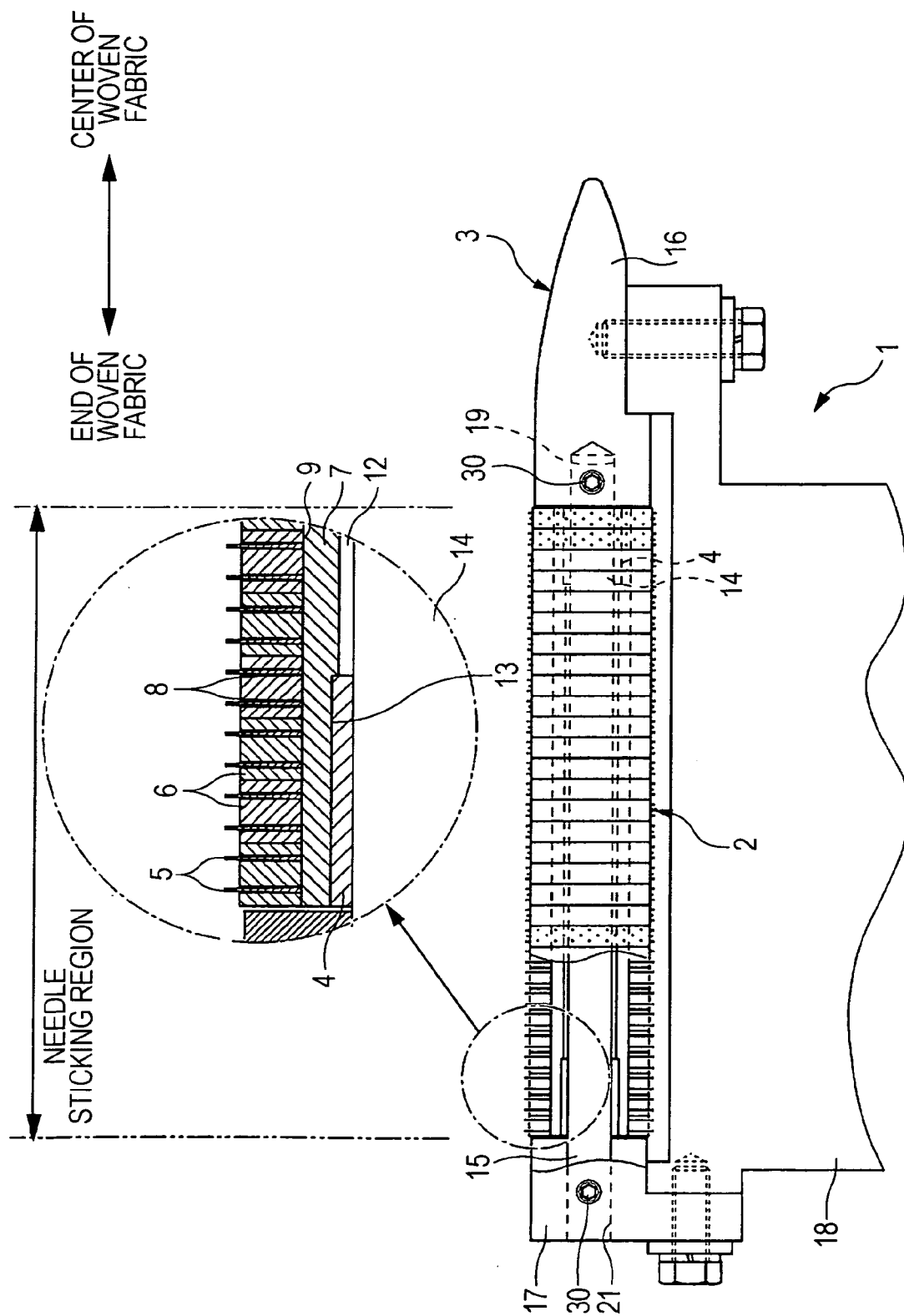


FIG. 2A

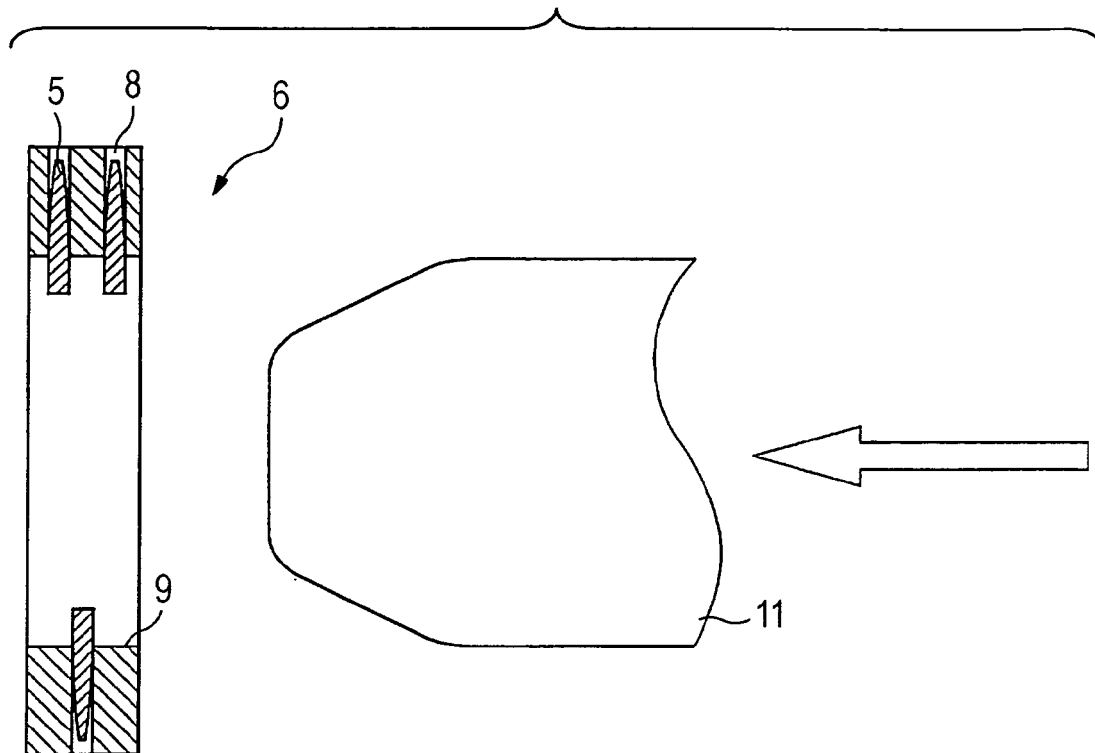


FIG. 2B

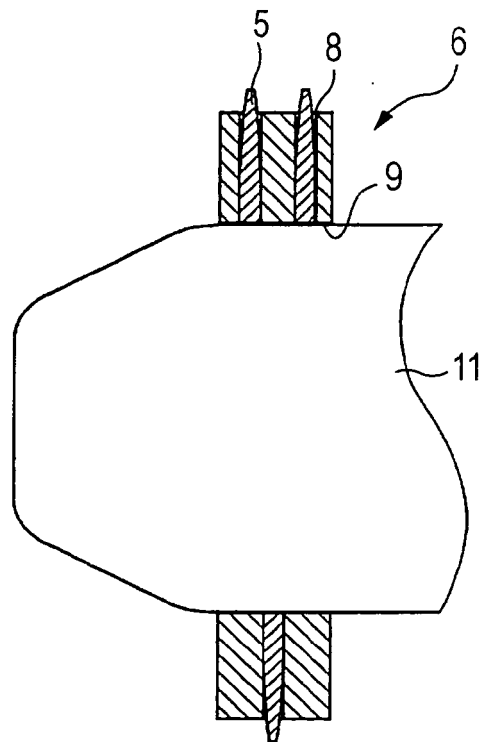
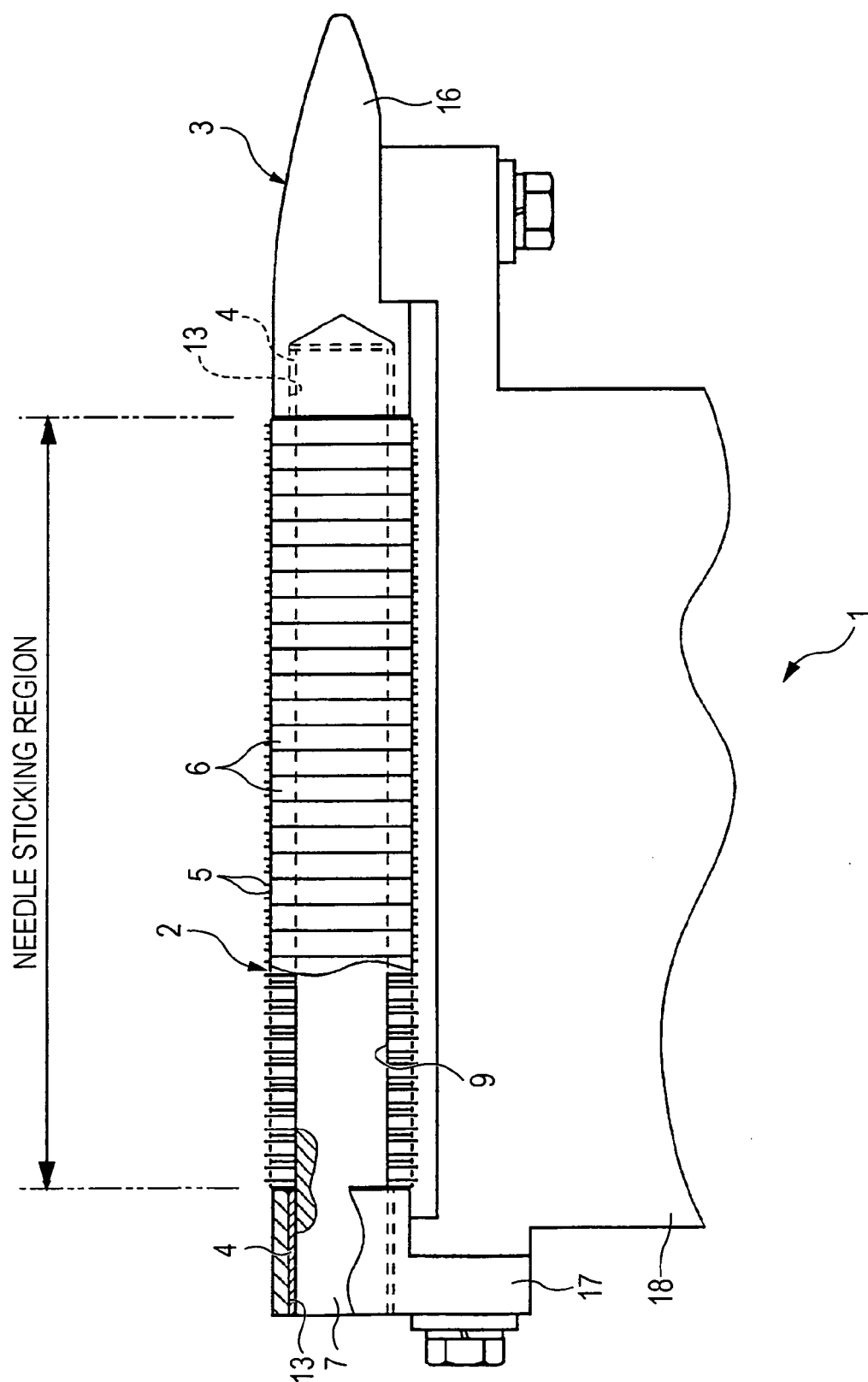


FIG. 3



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 58220850 A [0003]