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(54) **WEFT INSERTION DEVICE FOR AIR JET LOOM**

SCHUSSFADENEINTRAGSVORRICHTUNG FÜR LUFTDÜSENWEBMASCHINE

DISPOSITIF D'INSERTION DE TRAME POUR MÉTIER À TISSER À JET D'AIR

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(56) References cited:

BE-A5- 1 015 312 DE-A1- 3 336 893
JP-A- 2003 239 160

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Description

TECHNICAL FIELD

[0001] The present invention relates to a weft insertion device for an air jet loom including a plurality of supply devices each including: one solenoid valve; and a distributor configured to distribute, to two sub-nozzles, air supplied from a source via the solenoid valve, in which the distributor includes: a main channel having an inlet end that is joined to the solenoid valve and an outlet end that is closed by an end wall; and a pair of branch channels each having an inlet end that is joined to the outlet end of the main channel and an outlet end that is connectable to a corresponding one of the sub-nozzles, and each of the branch channels is formed such that, when the weft insertion device is attached to the air jet loom, it faces in a direction having at least a component parallel to the front-rear direction of the air jet loom.

BACKGROUND

[0002] A weft insertion device for an air jet loom is disclosed, for example, in PTL 1. In the weft insertion device disclosed in PTL 1, a plurality of sub-nozzles for carrying a weft that is ejected from a main nozzle toward a warp shed is arranged in the width direction of the loom. The weft insertion device includes a plurality of supply devices configured to supply air from a source to the sub-nozzles. In the weft insertion device, a predetermined number of the sub-nozzles that are adjacent to one another are grouped together, and each group of the sub-nozzles is connected to a corresponding one of the supply devices. PTL 2 discloses a flow distributor for a fluid circuit that is especially applicable for use in a shuttleless loom with pneumatic insertion of the weft and comprises a body of revolution, produced from two parts assembled coaxially and forming therebetween an annular inner chamber defined by a conical wall and by a frusto-conical wall. The annular chamber connects a tubular mouthpiece for the inlet of fluid disposed on the central axis body with a plurality of outlet holes provided concentrically and at regular angular intervals around the central axis and able to receive screw-threaded couplings. This flow distributor is especially used for supplying compressed air to groups of relay nozzles on a shuttleless loom.

[0003] Each of the supply devices includes: one solenoid valve; and a distributor configured to distribute, to the sub-nozzles, the air supplied from the source via the solenoid valve. Formed in the distributor are: a main channel having an inlet end that is joined to the solenoid valve and an outlet end that is closed by an end wall; and a plurality of branch channels each having an inlet end that communicates with the main channel in the vicinity of its outlet end and an outlet end that is connectable to a corresponding one of the sub-nozzles. The air that has been supplied from the source to the supply devices is sent to the main channels via the solenoid valves and is

then supplied to the sub-nozzles through the branch channels.

CITATION LIST

PATENT LITERATURE

[0004]

PTL 1: JP2003-239160A
PTL 2: DE 33 36 893 A1

TECHNICAL PROBLEMS

[0005] In the supply devices of the weft insertion device disclosed in PTL 1, the inlet end of each of the branch channels is joined to a surrounding wall of the main channel in the vicinity of its outlet end. Air supplied from the solenoid valve to the main channel flows along an axis of the main channel (that is, along the surrounding wall of the main channel) toward the branch channels. Therefore, in the configuration disclosed in PTL 1 (hereinafter, referred to as a "conventional configuration"), the air that has reached before the inlet ends of the branch channels heads for the outlet end of the main channel for the most part passing by the inlet ends of the branch channels. The air that has reached the outlet end of the main channel then bumps against the end wall toward the inlet ends of the branch channels and, colliding with the air supplied from the solenoid valve, flows into the branch channels.

[0006] In the conventional configuration, the air flows more to the outlet end of the main channel (and bumps against the end wall) than to the inlet ends of the branch channels. Consequently, collision between the air that is supplied from the solenoid valve and the air that has bumped against the end wall causes turbulence, which can inflict ill effects on weft insertion.

[0007] In addition, the turbulence can prolong time for jet pressure in the sub-nozzles to rise to a desired pressure. Although an earlier start of supplying air (earlier opening of the solenoid valve) may ensure that the jet pressure has risen to the desired pressure by arrival of a weft to the sub-nozzles, a longer-term jet of air consumes a larger amount of air.

[0008] An object of the present invention is to provide a configuration of a weft insertion device that can reduce turbulence in air flowing into the branch channels to reduce ill effects of the turbulence on weft insertion and the amount of air consumed.

SOLUTION TO PROBLEMS

[0009] In order to achieve the object, in a weft insertion device of the present invention, the inlet end of each of the branch channels communicates with the main channel such that at least part of the inlet end of each of the branch channels covers the end wall of the main channel.

[0010] The branch channels may be formed such that,

as viewed from the weft insertion direction, an angle between an axis (which passes through the center of the channel and extends along the channel) of the main channel and an axis of one of the branch channels (first branch channel) that is connectable to the one of the sub-nozzles that is on an upstream side is greater than or equal to an angle between the axis of the main channel and an axis of one of the branch channels (second branch channel) that is connectable to one of the sub-nozzles that is on a downstream side.

[0011] The branch channels are formed such that their inlet ends overlap with each other. Moreover, each of the branch channels may be formed such that, as viewed from the length direction of the main channel, the center of its inlet end is within the main channel.

ADVANTAGEOUS EFFECTS

[0012] In the weft insertion device of the present invention, the inlet end of each of the branch channels communicates with the main channel such that at least part of the inlet end of each of the branch channels covers the end wall of the main channel. Compared to the conventional configuration, air that has been introduced into the main channel toward each of the branch channels flows more directly into each of the branch channels. Since the air bumps less against the end wall of the main channel compared to the conventional configuration, turbulence in the air flowing into the branch channels can be reduced in the main channel.

[0013] The configuration of the weft insertion device of the present invention reduces the turbulence in the air flowing into each of the branch channels, thereby reducing ill effects of the turbulence on weft insertion. In addition, reduction in turbulence shortens the time for the jet pressure to rise to a desired pressure. Since jet duration in the sub-nozzles can be shortened, the amount of air consumed can be reduced.

[0014] As for a configuration of the branch channels in the weft insertion device of the present invention, that is, angles between the axis of the main channel and the axis of each of the branch channels as viewed from the weft insertion direction, if the branch channels are formed such that the angle between the axis of the main channel and the axis of the first branch channel is greater than that between the axis of the main channel and the axis of the second branch channel, hydrodynamic resistance to the air flowing through each of the branch channels is lower in the first branch channel than in the second branch channel. In this case, the air flows more smoothly into the first branch channel than into the second branch channel, and the time for the jet pressure to rise to the desired pressure is shorter in one of the sub-nozzles that is on the upstream side than in one of the sub-nozzles that is on the downstream side. Since the jet pressure in the sub-nozzle on the upstream side, by which a weft passes earlier than the weft passes by the sub-nozzle on the downstream side, rises earlier than in the sub-

nozzle on the downstream side automatically, the jet duration of the sub-nozzles can be further shortened and thus the amount of air consumed can be further reduced.

[0015] If the branch channels in the weft insertion device of the present invention are formed such that their inlet ends overlap with each other, air can be jetted from each of the sub-nozzles more appropriately for the configuration of the branch channels than if the branch channels are formed such that their inlet ends are separate from each other.

[0016] If the air flows into the branch channels inappropriately for the configuration, properties, such as a start-up pressure, of the air jetted from the sub-nozzles are expected to be inappropriate for the configuration. If the branch channels are formed such that they are separate from each other, flow of the air may be inappropriate for the configuration at least when the air starts to flow into the branch channels from the main channel. In this case, a rise of the jet pressure may be delayed, and thus the air may be jetted from the sub-nozzles inappropriately for the configuration.

[0017] In contrast, if the branch channels are formed such that their inlet ends overlap with each other, both of the branch channels communicate with the main channel through the overlap. Therefore, the air that has been supplied from the solenoid valve to the main channel first flows into the overlap, which is part of the branch channels, and then flows downstream. Since the flow when the air starts to flow into the branch channels is more appropriate for the configuration than if the branch channels are formed such that they are separate from each other, the air can be jetted from each of the sub-nozzles appropriately for the configuration.

[0018] Moreover, if each of the branch channels is formed such that, as viewed from the length direction of the main channel, the center of its inlet end is within the main channel, it communicates with the main channel at a position closer to the end wall than the surrounding wall. Since the air flows more smoothly into each of the branch channels than if each of the branch channels is formed such that the center of its inlet end is out of the main channel, the jet pressure in each of the sub-nozzles rises faster and thus the amount of air consumed can be further reduced.

BRIEF DESCRIPTION OF DRAWINGS

[0019]

FIG. 1 is a front view of a weft insertion device according to an embodiment of the present invention. FIG. 2 is a cross-sectional view taken along a line A-A shown in FIG. 1.

FIG. 3 is a cross-sectional view taken along a line B-B shown in FIG. 1.

FIG. 4 is a front view of FIG. 3.

FIG. 5 is a side view of a main channel and branch channels of a supply device shown in FIG. 4.

DESCRIPTION OF EMBODIMENTS

[0020] In the following, an embodiment of a weft insertion device for an air jet loom (hereinafter, simply referred to as a "loom") of the present invention will be described with reference to FIGS. 1 to 5.

[0021] The loom 1 includes a beating device 3, which is configured to drive a reed 5 in a swinging manner. In the beating device 3, the reed 5 is supported on a rocking shaft 11 by the intermediacy of a sley 7 and a sley sword 9. The rocking shaft 11 is swingably supported between loom frames. The loom frames includes: a pair of side frames 12 (only one of them is shown), which are provided apart from each other in the width direction (parallel to the weft insertion direction) of the loom 1; and a plurality of (generally, four) beams configured to connect the side frames 12, although shown is only one of them that is a front top stay 13, which is provided in an upper end part of the side frames 12 and closer to the winding side of a woven fabric W than a cloth fell.

[0022] The loom further 1 includes a weft insertion device 2 for inserting a weft into a warp shed. The weft insertion device 2 includes: a main nozzle MN; and a plurality of sub-nozzles SN. The main nozzle MN and the sub-nozzles SN are attached to the sley 7. The sub-nozzles SN are arranged at predetermined intervals in the width direction. During a weft insertion process of weaving, each of the sub-nozzles SN is supplied with air for a predetermined period of time, and the air is jetted from each of the sub-nozzles SN.

[0023] The loom 1 further includes an air tank configured to store the air. In the present embodiment, the front top stay 13 is configured as the air tank. In this regard, the front top stay 13 has a prismatic shape and is hollow inside. The front top stay 13 (hereinafter, also referred to as the air tank) has an inlet 13a, through which air with a pressure regulated by a regulator or the like is supplied from a source (not shown).

[0024] The weft insertion device 2 further includes a plurality of supply devices 14. Every adjacent two of the sub-nozzles SN are grouped together and are provided with a corresponding one of the supply devices 14. In the present embodiment, the supply devices 14 are fixed to a sidewall of the air tank (front top stay) 13 with screws 20.

[0025] Each of the supply devices 14 includes: a solenoid valve 15, which is configured to let the air supplied from the source through or shut off the air switchably; and a distributor 16, which is configured to distribute, to the two sub-nozzles SN, the air supplied from the air tank 13 via the solenoid valve 15. Each of the solenoid valves 15 is controlled, for example, by a controller of the loom 1. The distributor 16 includes a supply channel 17, which is configured to convey the air supplied from the air tank 13 to the solenoid valve 15. The supply channel 17 is formed in the distributor 16 such that, when the supply device 14 is attached to the air tank 13, an inlet end of the supply channel 17 is joined to an outlet 13b, which is formed in the air tank 13. An outlet end of the supply

channel 17 is joined to an inlet of the solenoid valve 15.

[0026] The distributor 16 further includes: a main channel 18, which has an inlet end that is joined to an outlet of the solenoid valve 15 and an outlet end that is partially closed; a pair of branch channels 19, each of which is formed such that it is joined to the main channel 18. Therefore, in the supply device 14, the air that has been introduced from the air tank 13 to the supply channel 17 of the distributor 16 is introduced into the main channel 18 and the branch channels 19 via the solenoid valve 15. The solenoid valve 15 and the distributor 16 are integrated. The outlet end of the main channel 18 of the distributor 16 is partially closed by an end wall 18a, which is perpendicular to the length direction of the main channel 18.

[0027] The supply device 14 is connectable to the two sub-nozzles SN by tubes 22 with each of the tubes 22 connected to a corresponding one of the branch channels 19 by a joint 21. Therefore, the air that has been introduced into the branch channels 19 is supplied to the sub-nozzles SN via the tubes 22.

[0028] As described above, the supply device 14 of the weft insertion device 2 is configured to split the air that has been introduced into the distributor 16 from the air tank 13 into two in the branch channels 19 and to supply the air to the two sub-nozzles SN. In the present invention, the inlet end of each of the branch channels 19 communicates with the main channel 18 such that at least part of the inlet end of each of the branch channels 19 covers the end wall 18a, which partially closes the outlet end of the main channel 18. That is, at least part of the inlet end of each of the branch channels 19 is joined to an opening covering the end wall 18a. Specifically, in the supply device 14 of the present embodiment, the branch channels 19 are formed such that their inlet ends overlap with each other as below.

[0029] In the supply device 14, the inlet end of each of the branch channels 19 communicates with the main channel 18 such that at least part of the inlet end of each of the branch channels 19 covers the end wall 18a. As shown in FIG. 3, which is drawn from the weft insertion direction, each of the branch channels 19 is formed such that it faces in the rear direction (direction of the locking shaft 11 from the air tank 13) of the loom and diagonally upward. In addition, as shown in FIG. 4, each of the branch channels 19 is inclined to the left or the right at an angle β from an axis of the main channel 18 as viewed from the front-rear direction of the loom 1.

[0030] Further, as shown in FIG. 4, the branch channels 19a and 19b are formed such that their inlet ends overlap with each other. Therefore, each of the branch channels 19 communicates with the main channel 18 through the overlap between their inlet ends. The inlet end of each of the branch channels 19a and 19b, or the overlap communicates with the main channel 18 such that it covers the end wall 18a as described above. Additionally, it further covers part of a surrounding wall 18b of the main channel 18 (it straddles a border between the end wall 18a and the surrounding wall 18b) in the

present embodiment, although it is, for the most part, within the end wall 18a. Therefore, the center of the inlet end of each of the branch channels 19 is not within the surrounding wall 18b but within the end wall 18a. That is, each of the branch channel 19 is formed such that, as viewed from the length direction of the main channel 18, the center of its inlet end is within the main channel 18.

[0031] In the present embodiment, on the axis of the main channel 18 is an intersection of: an axis of the first branch channel 19a (left branch channel in FIG. 4) of the two branch channels 19, which is connectable to one of the two sub-nozzles SN that is on the upstream side in the weft insertion direction; and an axis of the second branch channel 19b (right branch channel in FIG. 4) of the two branch channels 19, which is connectable to one of the two sub-nozzles SN that is on the downstream side in the weft insertion direction. Further, as shown in FIG. 5, the branch channels 19a and 19b are formed such that, as viewed from the weft insertion direction, an angle α_1 between the axis of the main channel 18 and the axis of the first branch channel 19a is greater than an angle α_2 between the axis of the main channel 18 and the axis of the second branch channel 19b.

[0032] As described above, the inlet end of each of the branch channels 19 of the supply device 14 (distributor 16) in the weft insertion device 2 of the present embodiment communicates with the main channel 18 such that it covers part of the end wall 18a for the most part. The weft insertion device 2, which includes the supply device 14, the air that has been introduced into the main channel 18 toward each of the branch channels 19 flows more directly into each of the branch channels 19 compared to the conventional configuration, in which the inlet end of each of the branch channels of the distributor communicates with the main channel such that it covers only part of the surrounding wall of the main channel. Since the air bumps less against the tip wall 18a of the main channel 18 compared to the conventional configuration, turbulence in the air flowing into the branch channels 19 can be reduced.

[0033] As a result, ill effects of the turbulence of on weft insertion can also be reduced. In addition, reduction in turbulence shortens the time for the jet pressure in each of the sub-nozzles SN to rise to a desired pressure. Since the jet duration in each of the sub-nozzles SN can be shortened, the amount of air consumed can be reduced.

[0034] In the present embodiment, as viewed from the weft insertion direction, the angle α_1 between the axis of the main channel 18 and the axis of the first branch channel 19a is greater than the angle α_2 between the axis of the main channel 18 and the axis of the second branch channel 19b. With such a configuration of the branch channels 19, the hydrodynamic resistance to the air flowing through each of the branch channels 19 is lower in the first branch channel 19a than in the second branch channel 19b. For this reason, the air flows more smoothly into the first branch channel 19a than into the second

branch channel 19b, and the time for the jet pressure to rise to the desired pressure is shorter in one of the sub-nozzles SN that is on the upstream side than in one of the sub-nozzles SN that is on the downstream side. Since the jet pressure in the sub-nozzle SN on the upstream side, by which a weft passes earlier than the weft passes by the sub-nozzle SN on the downstream side, rises earlier than in the sub-nozzle SN on the downstream side automatically, the jet duration of the sub-nozzles SN in each group can be further shortened and thus the amount of air consumed can be further reduced.

[0035] In the present embodiment, each of the branch channels 19a and 19b communicate with the main channel 18 through the overlap between the branch channels 19a and 19b on the main channel 18. Therefore, the air that has been introduced into the main channel 18 first flows into the overlap, which is part of the branch channels 19, and then flows downstream. Since the flow is more appropriate for the configuration than if the branch channels 19 are formed such that they are separate from each other at least when the air starts to flow into the branch channels 19, properties, such as a start-up pressure, of the air jetted from the sub-nozzles SN are appropriate for the configuration.

[0036] In the present embodiment, the branch channels 19a and 19b are formed such that they overlap with each other as described above and, as viewed from the length direction of the main channel 18, the center of the inlet end of each of them is within the main channel 18. That is, each of the branch channels 19 communicates with the main channel 18 at a position closer to the end wall 18a than the surrounding wall 18b. Since the air flows more smoothly into each of the branch channels 19 than if the center of the inlet end of each of the branch channels 19 is out of the main channel 18, the jet pressure in each of the sub-nozzles SN rises faster and thus the amount of air consumed can be further reduced.

[0037] Although a weft insertion device for an air jet loom of an embodiment (hereinafter, referred to as an "above embodiment") has been described above, the present invention is not limited to the above embodiment and some variants can be conceived as other embodiments.

[0038] First, although the inlet end of each of the branch channels 19a and 19b communicates with the main channel 18 such that it straddles the border between the end wall 18a and the surrounding wall 18b in the above embodiment, the present invention is not limited thereto: the inlet ends of the branch channels 19a and 19b may communicate with the main channel 18 such that one or both of them cover only part of the end wall 18a.

[0039] In addition, although each of the inlet ends of the branch channels 19a and 19b is, for the most part, within the end wall 18a in the above embodiment, the present invention is not limited thereto as long as at least part of the inlet end of each of the branch channels covers the end wall 18a. That is, the inlet end of the branch

channel 19a or 19b may cover a larger part of the surrounding wall 18b and a smaller part of the end wall 18a. In this case, as viewed from the length direction of the main channel 18, the center of the inlet end of the branch channel 19a or 19b is out of the main channel 18. Therefore, the present invention is not limited to the above embodiment, in which each of the branch channels 19a and 19b are formed such that, as viewed from the length direction of the main channel 18, the center of its inlet end is within the main channel 18: the center of the inlet end of the branch channel 19a or 19b may be out of the main channel 18.

[0040] Second, although the branch channels 19a and 19b are formed such that, as viewed from the weft insertion direction, the angle $\alpha 1$ between the axis of the main channel 18 and the axis of the first branch channel 19a is greater than the angle $\alpha 2$ between the axis of the main channel 18 and the axis of the second branch channel 19b in the above embodiment, the present invention is not limited thereto: the angle $\alpha 1$ may be equal to the angle $\alpha 2$.

[0041] In addition, although the branch channels 19a and 19b are formed such that, as viewed from the front-rear direction of the loom 1, each of them is inclined to the left or the right at the same angle β from the axis of the main channel 18 in the above embodiment, the present invention is not limited thereto: the angle for the first branch channel 18a and that for the second branch channel 18b may be different from each other.

[0042] Further, although the branch channels 19a and 19b are formed such that the axes of them cross, each of the axes cross the axis of the main channel 18, and the intersection of the axes is on the axis in the above embodiment, the present invention is not limited thereto.

[0043] For example, even if the branch channels 19a and 19b are formed such that the axes of them cross, they may be formed such that the intersection is off the axis of the main channel 18. In addition, even if they are formed such that the axes of them cross, only one of the axes and the axis of the main channel 18 may cross. Further, they may be formed such that the axes of them do not cross. In this case, they may be formed such that both, one, or none of the axes and the axis of the main channel 18 cross.

[0044] Third, although the supply devices 14 are directly attached to the sidewall of the front top stay 13 in the above embodiment, the present invention is not limited thereto.

[0045] For example, each of the supply devices 14 may be attached to the front top stay 13 by the intermediacy of a support member, such as a bracket. In this case, the outlet 13b of the front top stay 13 and the supply channel 17 of the distributor 16 of the supply device 14 are connected by a joint, a tube, or the like.

[0046] Using such a support member, positions or directions of the supply devices 14 in the front-rear direction can be adjusted more freely compared to the above embodiment. The supply devices 14 can be provided such

that each of the branch channels 19 faces frontward, although it faces rearward in the above embodiment.

[0047] In addition, although the distributor 16 is configured (the branch channels 19 are formed in the distributor 16) such that each of the branch channels 19 faces diagonally upward in consideration of a position or a manner of the supply device 14 installed, each of the branch channels 19 may face levelly (parallelly to the front-rear direction) or diagonally downward if the support member as described above is used. That is, when the supply device 14 is installed, each of the branch channels 19 may face in the horizontal direction or in the diagonally downward direction as long as it faces in a direction having a front-rear component, although it faces in the diagonally upward direction in the above embodiment. In addition, both of the branch channels 19 do not have to face in the same direction: each of them may face in a different direction as long as it faces in the diagonally upward or downward direction or in the horizontal direction.

[0048] Fourth, although the main channel 18 is formed such that the end wall 18a is orthogonal to the length direction of the main channel 18 in the above embodiment, the present invention is not limited thereto: the main channel 18 may be formed such that the end wall 18a has, for example, a conical shape. In this case, the end wall 18a is diagonal to the length direction of the main channel 18.

[0049] Fifth, each channel (main or branch channel) of the distributor 16 may be formed such that its cross section has a circular, elliptical, or polygonal shape.

[0050] The scope of the invention is set out in the appended set of claims. The present invention is not limited to the above embodiment and can be altered without departing from the scope of the invention.

LIST OF REFERENCE SIGNS

[0051]

1:	loom
2:	weft insertion device
MN:	main nozzle
SN:	sub-nozzle
3:	beating device
5:	reed
7:	sley
9:	sley sword
11:	rocking shaft
12:	side frame
13:	front top stay (air tank)
13a:	inlet
13b:	outlet
14:	supply device
15:	solenoid valve
16:	distributor
17:	supply channel
18:	main channel
18a:	end wall

18b: surrounding wall
 19a: branch channel (first branch channel)
 19b: branch channel (second branch channels)
 21: joint
 22: tube

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such that, as viewed from a length direction of the main channel (18), a center of its inlet end is within the main channel (18).

Patentansprüche

Claims

1. A weft insertion device (2) for an air jet loom (1), the weft insertion device (2) comprising a plurality of supply devices (14) each including:

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one solenoid valve (15); and
 a distributor (16) configured to distribute, to two sub-nozzles (SN), air supplied from a source via the solenoid valve (15), wherein the distributor (16) includes:

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a main channel (18) having an inlet end that is joined to the solenoid valve (15) and an outlet end that is closed by an end wall (18a); and

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a pair of branch channels (19, 19a, 19b) each having an inlet end that is joined to the outlet end of the main channel and an outlet end that is connectable to a corresponding one of the sub-nozzles (SN),

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each of the branch channels (19, 19a, 19b) is formed such that, when the weft insertion device (2) is attached to the air jet loom (1), it faces in a direction having at least a component parallel to a front-rear direction of the air jet loom (1), and the inlet end of each of the branch channels (19, 19a, 19b) communicates with the main channel (18) such that at least part of the inlet end of each of the branch channels (19, 19a, 19b) covers the end wall (18a), **characterized in that** the branch channels (19, 19a, 19b) are formed such that their inlet ends overlap with each other.

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2. The weft insertion device (2) according to Claim 1, wherein the branch channels (19, 19a, 19b) are formed such that, as viewed from a weft insertion direction, an angle (α_1) between an axis of the main channel (18) and an axis of one of the branch channels (19a) that is connectable to one of the sub-nozzles (SN) that is on an upstream side is greater than or equal to an angle (α_2) between the axis of the main channel (18) and an axis of one of the branch channels (19b) that is connectable to one of the sub-nozzles (SN) that is on a downstream side.

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3. The weft insertion device (2) according to Claim 2, wherein, each of the branch channels (19, 19a, 19b) is formed

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1. Schussfadeneintragsvorrichtung (2) für eine Luftdüsenwebmaschine (1), die Schussfadeneintragsvorrichtung (2) umfassend eine Vielzahl von Zuführungsvorrichtungen (14), die jeweils aufweisen:

ein Magnetventil (15); und
 einen Verteiler (16), der konfiguriert ist, um an zwei Nebendüsen (SN) Luft, die von einer Quelle über das Magnetventil (15) zugeführt wird, zu verteilen, wobei der Verteiler (16) aufweist:

einen Hauptkanal (18), der ein Einlassende, das mit dem Magnetventil (15) verbunden ist, und einem Auslassende, das durch eine Endwand (18a) verschlossen ist, aufweist; und

ein Paar Zweigkanäle (19, 19a, 19b), von denen jeder ein Einlassende, das mit dem Auslassende des Hauptkanals verbunden ist, und ein Auslassende, das mit einer entsprechenden der Nebendüsen (SN) verbindbar ist, aufweist, jeder der Zweigkanäle (19, 19a, 19b) so derart geformt ist, dass wenn die Schussfadeneintragsvorrichtung (2) an der Luftdüsenwebmaschine (1) angebracht ist, er in eine Richtung weist, die mindestens eine Komponente parallel zu einer Vorwärts-Rückwärts-Richtung der Luftdüsenwebmaschine (1) aufweist, und das Einlassende jedes der Zweigkanäle (19, 19a, 19b) mit dem Hauptkanal (18) in Verbindung steht, derart, dass mindestens ein Teil des Einlassendes jedes der Zweigkanäle (19, 19a, 19b) die Endwand (18a) bedeckt, **dadurch gekennzeichnet, dass** die Zweigkanäle (19, 19a, 19b) ausgebildet sind, derart, dass ihre Einlassenden einander überlappen.

2. Schussfadeneintragsvorrichtung (2) nach Anspruch 1, wobei

die Zweigkanäle (19, 19a, 19b) derart ausgebildet sind, dass, aus einer Schusseintragsrichtung betrachtet, ein Winkel (α_1) zwischen einer Achse des Hauptkanals (18) und einer Achse eines der Zweigkanäle (19a), der mit einer der Nebendüsen (SN) verbindbar ist, die sich auf einer stromaufwärtigen Seite befindet, größer als oder gleich einem Winkel (α_2) zwischen der Achse des Hauptkanals (18) und

einer Achse eines der Zweigkanäle (19b), der mit einer der Nebendüsen (SN) verbindbar ist, die sich auf einer stromabwärtigen Seite befindet, ist.

3. Schussfadeneintragsvorrichtung (2) nach Anspruch 2, wobei:
jeder der Zweigkanäle (19, 19a, 19b) ist derart geformt, dass, aus einer Längsrichtung des Hauptkanals (18) betrachtet, die Mitte seines Einlassendes innerhalb des Hauptkanals (18) liegt.

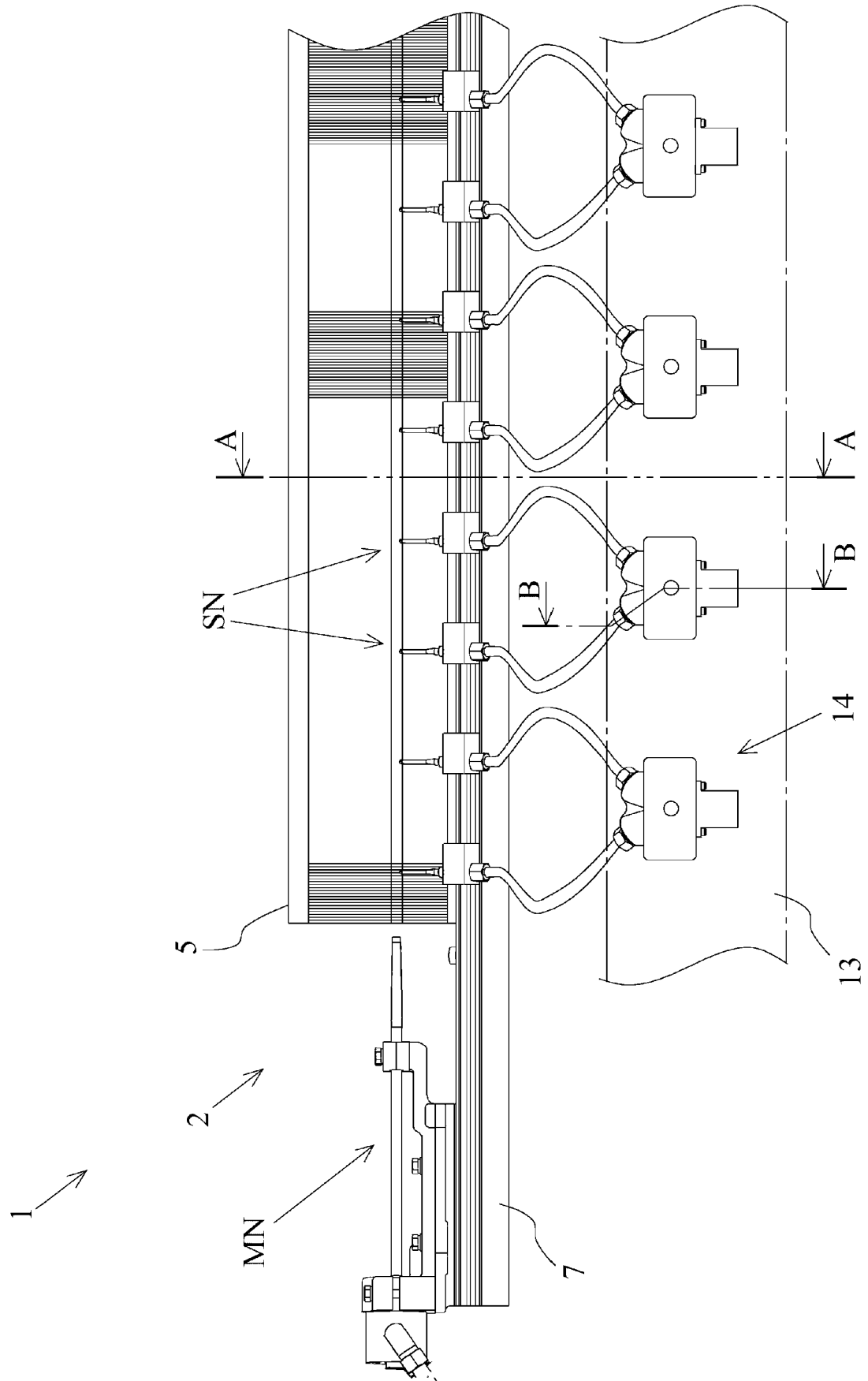
Revendications

1. Dispositif d'insertion de trame (2) pour un métier à tisser à jet d'air (1), le dispositif d'insertion de trame (2) comprenant une pluralité de dispositifs de fourniture (14) comportant chacun :
- une électrovanne (15) ; et
 - un distributeur (16) configuré pour distribuer, à deux buses secondaires (SN), de l'air fourni par une source via l'électrovanne (15), dans lequel le distributeur (16) comporte :
 - un canal principal (18) ayant une extrémité d'entrée qui est jointe à l'électrovanne (15) et une extrémité de sortie qui est fermée par une paroi d'extrémité (18a) ; et
 - une paire de canaux de ramification (19, 19a, 19b) ayant chacun une extrémité d'entrée qui est jointe à l'extrémité de sortie du canal principal et une extrémité de sortie qui peut être reliée à une correspondante parmi les buses secondaires (SN),
 - chacun des canaux de ramification (19, 19a, 19b) est formé de sorte que, lorsque le dispositif d'insertion de trame (2) est fixé au métier à tisser à jet d'air (1), il fasse face à une direction ayant au moins une composante parallèle à une direction avant-arrière du métier à tisser à jet d'air (1), et l'extrémité d'entrée de chacun des canaux de ramification (19, 19a, 19b) communique avec le canal principal (18) de sorte qu'au moins une partie de l'extrémité d'entrée de chacun des canaux de ramification (19, 19a, 19b) couvre la paroi d'extrémité (18a),
 - caractérisé en ce que**
 - les canaux de ramification (19, 19a, 19b) sont formés de sorte que leurs extrémités d'entrée se chevauchent les unes les autres.
2. Dispositif d'insertion de trame (2) selon la revendication 1, dans lequel
les canaux de ramification (19, 19a, 19b) sont formés de sorte que, tel qu'il est vu depuis une direction

d'insertion de trame, un angle (α_1) entre un axe du canal principal (18) et un axe de l'un des canaux de ramification (19a) qui peut être relié à l'une des buses secondaires (SN) qui est sur un côté amont soit supérieur ou égal à un angle (α_2) entre l'axe du canal principal (18) et un axe de l'un des canaux de ramification (19b) qui peut être relié à l'une des buses secondaires (SN) qui est sur un côté aval.

3. Dispositif d'insertion de trame (2) selon la revendication 2, dans lequel, chacun des canaux de ramification (19, 19a, 19b) est formé de sorte que, tel qu'il est vu depuis une direction de longueur du canal principal (18), un centre de son extrémité d'entrée soit dans le canal principal (18).

FIG. 1



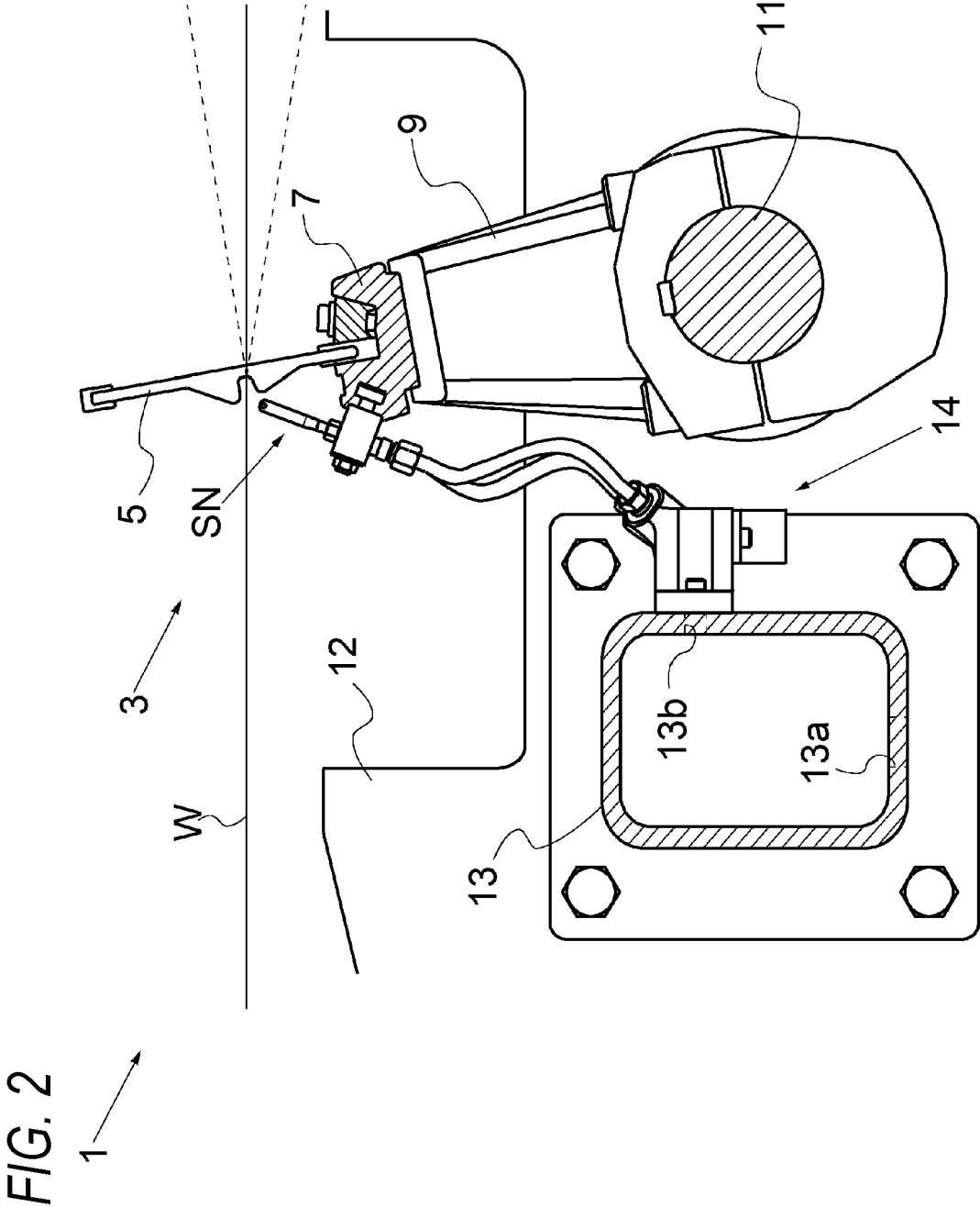


FIG. 3

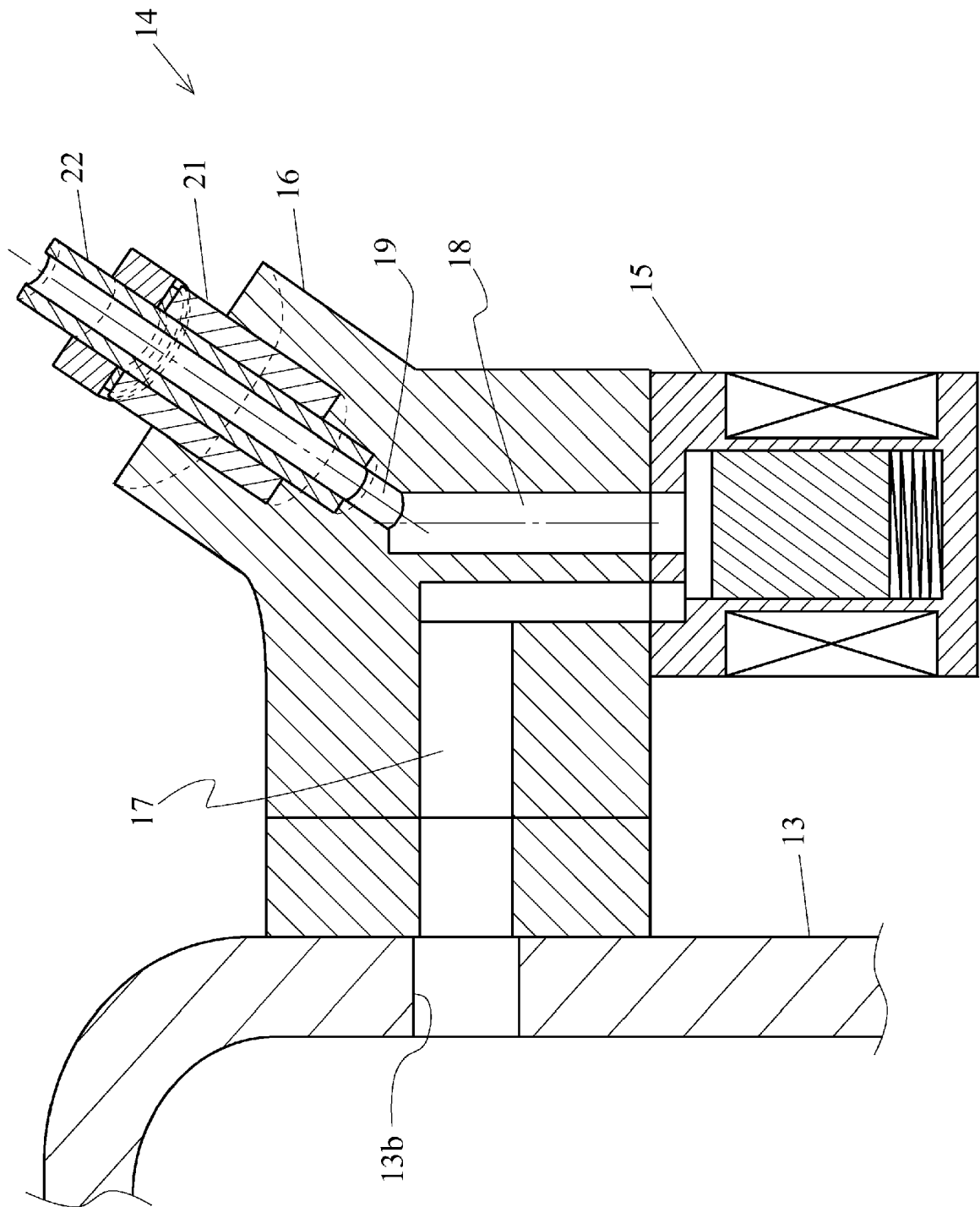


FIG. 4

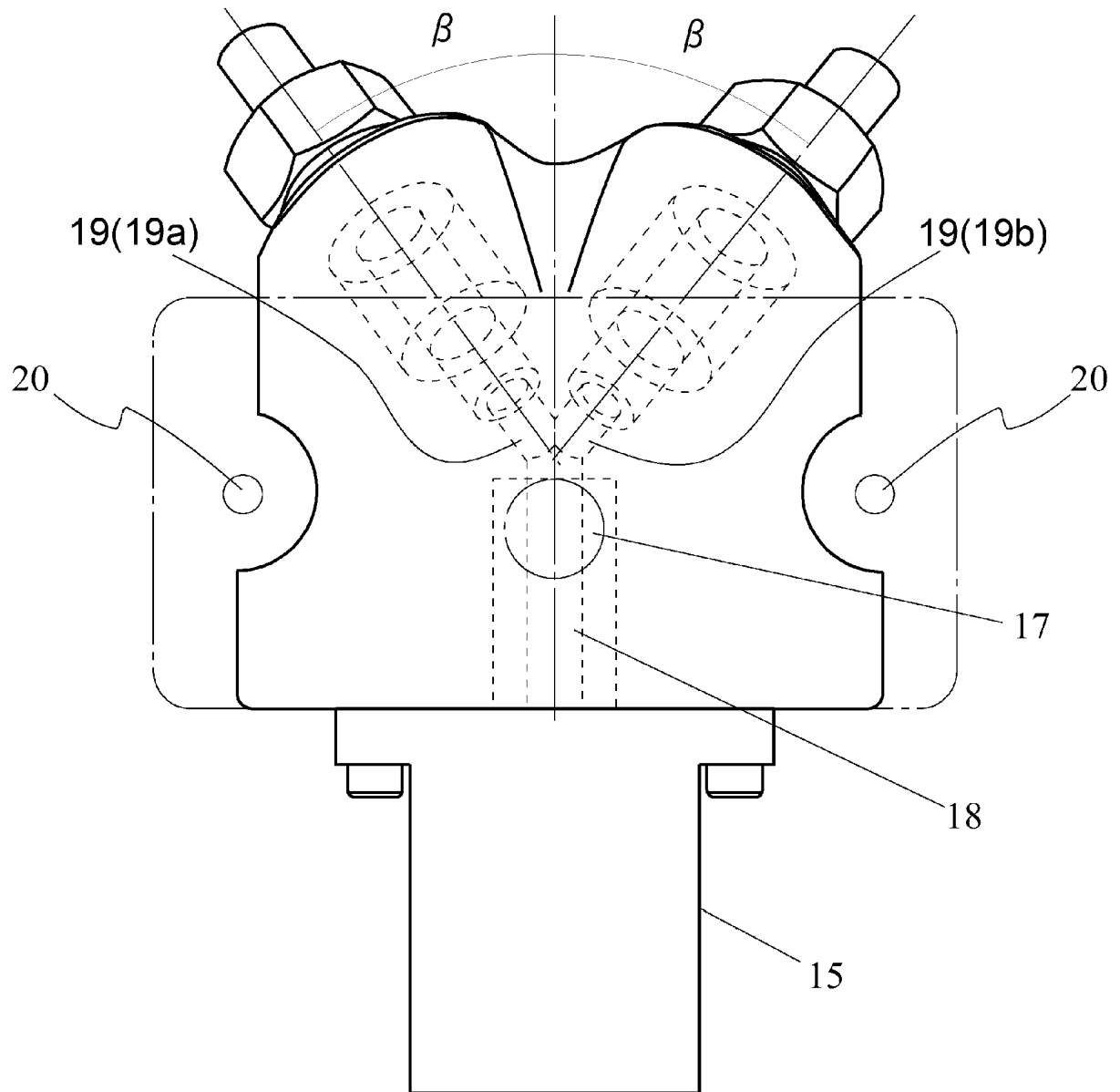
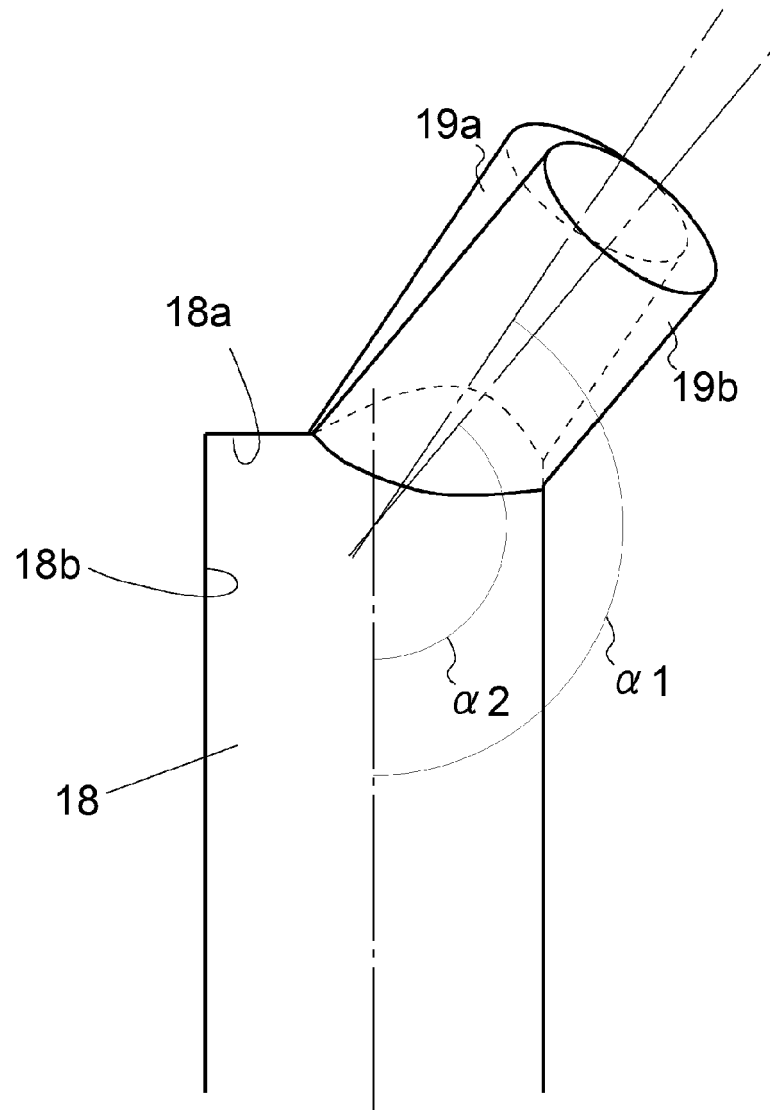


FIG. 5



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2003239160 A [0004]
- DE 3336893 A1 [0004]