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(54) **WASTE END STRETCHING DEVICE FOR A WEAVING MACHINE**

ABFALLENDSTRECKVORRICHTUNG FÜR EINE WEBMASCHINE

DISPOSITIF D'ÉTIREMENT D'EXTRÉMITÉS INUTILISÉES DESTINÉ À UNE MACHINE À TISSER

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Description

TECHNICAL FIELD AND PRIOR ART

[0001] The invention relates to a waste end stretching device for a weaving machine and a weaving machine comprising a waste end stretching device, in particular an airjet weaving machine.

[0002] In an airjet weaving machine, a weft thread is inserted by means of air supplied by one or more main nozzles and successive relay nozzles provided along a weft insertion channel. An airjet weaving machine is shown for example in US 3,901,286. The portion of an inserted weft thread extending beyond a side edge of a fabric and not woven into the fabric is referred to as waste end. For a removal of the waste ends after being cut off, US 3,901,286 discloses a conduit arranged below the fabric at the height of a temple provided for the woven fabric, wherein the conduit has a mouth facing towards the fabric from below.

[0003] During the time interval between two weft insertions, a portion of the weft thread remains in the main nozzle or the associated main nozzle, and the main nozzle continues to blow against the portion of the weft thread arranged inside the main nozzle. This may cause damage to the weft thread. For example, when weaving a weft thread having a high twist, the longer blowing time may result in the weft thread to untwist. Similar, when weaving multifilament weft threads, where several fine yarns together form one weft thread, due to the comparatively longer blowing time, the portion of the weft thread subjected to the longer blowing time may become "unraveled". The untwisted or unraveled ends of the weft thread have other properties than the remaining part of the weft thread and can cause visually perceptible weaving defects.

[0004] CH 512 606 A shows a weft receiving and guiding block for use with an insertion device which each time brings a weft of double pick length and hairpin shape into a cloth, wherein the block is vertically moveable between a first position and a second position, and wherein the block is provided both with a suction passage and with a weft guiding passage. In the second position of the block, the weft guiding passage is aligned with a jet nozzle opening of a weft insertion device and bridges the space between said insertion device and the shed whereas, in the first position of the block, the said passage has a position which is staggered relative to the jet nozzle opening. The block is constructed as a separate part of an otherwise fixed suction mouth, wherein the weft suction passage is bending from an opening in the block side facing the shed gradually into the warp direction towards an opening in the adjacent block side, which adjacent block side is slidably engaging the open end of the suction mouth. The weft suction passage is communicated with both of said block sides by means of a slot.

[0005] In order to solve the above discussed problem, it is known to use longer waste ends, in other words, to

weave weft threads with such a waste end length that a damaged or deteriorated leading end of the weft thread after a weft insertion extends beyond an edge of a fabric to be woven. In other words, the damaged or deteriorated leading end of the weft thread is not woven into the fabric, but projects beyond the woven fabric.

[0006] The long waste ends can get entangled in each other and form a tangled mess near the fabric that disturbs the following inserted weft threads. Also, there is a risk that such long waste ends jump back into a following shed, in other words re-enter the shed and be woven in between warp threads.

SUMMARY OF THE INVENTION

[0007] It is an object of the invention to provide a waste end stretching device for a weaving machine and a weaving machine comprising a waste end stretching device, wherein also comparatively long waste ends can be securely held. It is further an object of the invention to provide a use of a waste end stretching device in a weaving machine.

[0008] This object is solved by the waste end stretching device with the features of claim 1, the weaving machine with the features of claim 13 and the use of a waste end stretching device with the features of claim 15. Preferred embodiments are defined in the dependent claims.

[0009] According to a first aspect a waste end stretching device for a weaving machine is provided, the waste end stretching device comprising a suction nozzle adapted to be arranged in the path of a waste end of an inserted weft thread projecting beyond an edge of a woven fabric, wherein the suction nozzle is adapted for applying a suction force along a longitudinal direction of the suction nozzle, wherein the suction nozzle is adapted for being attached to the weaving machine such that the longitudinal direction of the suction nozzle extends in parallel to the weft insertion direction, wherein the suction nozzle is provided with a lateral suction slit extending along the longitudinal direction of the suction nozzle for sucking waste ends into the suction nozzle and with an opening provided at a first end of the suction nozzle facing the edge of the woven fabric for conveying waste ends held in the suction nozzle in a direction perpendicular to the longitudinal direction of the suction nozzle, and wherein a deflecting element is provided between the opening and the edge of the woven fabric, which deflecting element at least partly projects beyond the opening for deflecting a portion of the waste ends held in the suction nozzle in their path between the edge of the woven fabric and the opening.

[0010] An end of the suction nozzle facing the edge of the woven fabric is referred to as first end. A wall at that first end is referred to as first end wall. Leading ends or waste ends of inserted weft threads are sucked into the suction nozzle via the lateral suction slit. Prior to being cut-off from the fabric, the waste ends are moved together with the fabric in a fabric pull-off direction, wherein generally the movement path of the fabric is not a linear path.

Usually, the fabric is guided along a temple and in some cases in addition along guide rollers. By means of the opening provided at the first end, the waste ends can move with the fabric while being held by the suction nozzle. By means of the deflecting element, the opening is shielded to deflect a portion of the waste ends held in the suction nozzle and extending between the suction nozzle and the edge of the fabric radially away from the opening, such that waste ends held in the suction nozzle are deflected in their path between the edge of the woven fabric and the opening, thereby avoiding that the fabric or if applicable a waste band is drawn into the suction nozzle.

[0011] The waste ends in one embodiment leave the suction nozzle via the opening after the fabric has been conveyed over a defined distance. In other embodiments, the waste ends are cut off and removed via a second end provided opposite the first end of the suction nozzle.

[0012] In preferred embodiments, the waste ends are guided along a lower part of the opening. In particular, the weaving machine may comprise a temple for expanding the woven fabric. Therefore, in preferred embodiments, the deflecting element projects at least with its lower border beyond the opening for deflecting waste ends held in the suction nozzle in their path between the edge of the woven fabric and the opening.

[0013] In one embodiment, the deflecting element is formed integrally with a body of the suction nozzle. In preferred embodiments, the deflecting element and the body of the suction nozzle are formed as separate members, wherein the deflecting element is positioned with respect to the body of the suction nozzle such that a gap is provided between a first end wall of the body of the suction nozzle and the deflecting element, wherein the size of the gap is chosen large enough to avoid waste ends being caught between the first end wall of the body of the suction nozzle and the deflecting element. The size or width of the gap is chosen suitably by the person skilled in the art depending on the properties of the material to be woven. In preferred embodiments, the width of the gap is between about 2 mm and about 4 mm.

[0014] In one embodiment, the first end wall of the body of the suction nozzle is stepped such that a lower part of the first end wall that is arranged below the lateral suction slit is positioned further away from the deflecting element than an upper part of the first end wall. Due to the deflection of the waste ends by means of the deflecting element, the waste ends are guided along the edge of the opening at the lower part of the first end wall. By means of the step, a sufficient free space for guiding the waste ends is provided.

[0015] In one embodiment, an opening is provided that extends in a direction perpendicular to the longitudinal direction of the suction nozzle. In preferred embodiments, the opening and the deflecting element have complementary ring-shaped, circular or semi-circular cross sections. In some embodiments, the fabric is deflected by means of the temple. By providing a ring-shaped, circular or semi-circular opening and a respective deflecting

element, a length of a non-linear path of a weft thread extending between the opening and the edge of the fabric via the deflecting element is at least essentially constant during the conveyance along the opening. Hence, a relative movement of the waste ends held by the suction nozzle in the longitudinal direction of the suction nozzle is avoided or at least kept to a minimum.

[0016] The deflecting element in one embodiment is attached directly to a frame of the weaving machine. In preferred embodiments, the deflecting element is attached to the body of the suction nozzle. For this purpose, in one embodiment, the deflecting element is attached to the first end wall of the body of the suction nozzle in an area above the opening. In preferred embodiments, the upper part of the first end wall of the body of the suction nozzle is provided with a fastening projection, which fastening projection is delimiting an interior channel of the suction nozzle towards the first end, wherein the deflecting element is attached to the fastening projection.

[0017] In one embodiment, the waste end stretching device further comprises a mounting body, wherein the suction nozzle is attached to or is formed integrally with the mounting body, and which mounting body is adapted to be attached adjustable in position to a frame of the weaving machine. The position is for example only adjustable in the longitudinal direction of the suction nozzle for adjusting the position of the waste end stretching device for different fabric widths and/or different waste end lengths.

[0018] For providing a suction force, the waste end stretching device in one embodiment further comprises a ring-jet device.

[0019] In one embodiment, the ring-jet device is attached to the mounting body and/or the suction nozzle and, hence, displaceable together with the suction nozzle.

[0020] In one embodiment, the waste ends are tucked into the fabric. Preferably, due to the poor quality of the leading ends of the waste ends, the waste ends are not tucked in. The weaving machine in one embodiment is provided with catching threads or waste warp threads for forming a waste band and thereby keeping the inserted weft threads stretched. For guiding the catching threads or a waste band woven using the catching threads, in one embodiment a temple is provided having a length that exceeds the width of the fabric. In preferred embodiments, the waste end stretching device comprises a guide element for guiding the catching threads, wherein the guide element is positioned between the deflecting element and the edge of the woven fabric, for example at a distance from the temple.

[0021] In one embodiment, the guide element is attached to the frame of the weaving machine between the deflecting element and the edge of the woven fabric, which edge for example is guided by means of a temple. In preferred embodiments the deflecting element is formed integrally or as a structural unit with the guide

element.

[0022] The guide element in one embodiment is provided with a groove for maintaining the waste band in parallel to the edge of the fabric. In preferred embodiments, the guide element comprises a cone-shaped, double-cone-shaped, diabolo-shaped or hourglass-shaped intermediate element arranged adjacent to the deflecting element, wherein the intermediate element comprises at least a cone-shaped first part having an increasing diameter in a direction away from the deflecting element, and wherein the smallest diameter of the first part is smaller than the diameter of the deflecting element. In this case, the waste band is guided in parallel to the edge of the fabric by means of the intermediate element together with the deflecting element. In one embodiment, the intermediate element further comprises a cone-shaped second part having a decreasing diameter in a direction away from the deflecting element, which second part is arranged between the deflecting element and the first part. In the context of the application, such an intermediate element comprising two cone-shaped parts is referred to as a double-cone shaped, diabolo-shaped or hourglass-shaped intermediate element. However, the first and second cone-shaped part in one embodiment differ in length and/or angle of aperture and/or the first and the second part both have the shape of a truncated cone. The intermediate element is made of a material having a small coefficient of friction when used with the weft threads, such that the waste band is conveyed smoothly along the intermediate element.

[0023] In one embodiment, the guide element further comprises a ring arranged adjacent to the intermediate element at a side away from the deflecting element, wherein the ring is mounted rotatably with respect to the intermediate element about an axis parallel to the weft insertion direction. The ring is adapted to be rotated due to the contact with the weft threads conveyed along the guide element. For this purpose, the ring preferably is made of a material having a higher coefficient of friction when used with the weft threads than the intermediate element. In addition, in one embodiment the ring is arranged slightly eccentrically with respect to the intermediate element, wherein the ring preferably has a diameter that is slightly larger than the largest diameter of the intermediate element, such that the weft threads contact the ring and not the intermediate element.

[0024] In a preferred embodiment, the lateral suction slit of the suction nozzle is confined by a lower lip and an upper lip, wherein the waste end stretching device is adapted to be mounted to the weaving machine with the lateral suction slit extending close to and in parallel to a support bar of a fabric support of the weaving machine, wherein the lower lip is arranged at least essentially at the height of the support bar for guiding waste ends via the support bar and the lower lip into the suction nozzle.

[0025] According to a second aspect, a weaving machine comprising a temple along which temple a fabric is guided and a waste end stretching device is provided,

wherein the waste end stretching device comprises a suction nozzle adapted for applying a suction force along a longitudinal direction of the suction nozzle, wherein the suction nozzle is arranged stationary on the weaving machine at an extension of the temple in an axial direction of the temple and with the longitudinal direction of the suction nozzle extending in parallel to the weft insertion direction. In other words, the waste end stretching device is arranged on the weaving machine such that the longitudinal direction of the suction nozzle is arranged coaxially with or in parallel to the axial direction of the temple.

[0026] According to a third aspect, a use of a waste end stretching device in a weaving machine comprising a temple along which temple a fabric is guided is provided, wherein the waste end stretching device comprises a suction nozzle adapted for applying a suction force along the longitudinal direction of the suction nozzle, wherein the suction nozzle is arranged stationary on the weaving machine at an extension of the temple in an axial direction of the temple and with the longitudinal direction of the suction nozzle extending in parallel to the weft insertion direction. In other words, the waste end stretching device when used with the weaving machine is arranged such that the longitudinal direction of the suction nozzle is arranged coaxially with or in parallel to the axial direction of the temple.

BRIEF DESCRIPTION OF THE DRAWINGS

[0027] In the following, an embodiment of the invention will be described in detail with reference to the drawings. Throughout the drawings, the same elements will be denoted by the same reference numerals.

- FIG. 1 is a perspective view of a waste end stretching device from the front;
- FIG. 2 is a perspective view of the waste end stretching device of FIG. 1 from the back;
- FIG. 3 is a cross view of a weaving machine having a fabric support and a waste end stretching device;
- FIG. 4 is a perspective view of a fraction of the waste end stretching device of FIG. 2;
- FIG. 5 is a perspective view of the weaving machine with the fabric support, the temple and a waste end stretching device from the back of the weaving machine and from above;
- FIG. 6 is a perspective view of the weaving machine from the back;
- FIG. 7 is a view of the weaving machine of FIG. 4 from above; and

FIG. 8 is a cross view of a weaving machine having a fabric support and a temple.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

[0028] FIGS. 1 and 2 are perspective views of a waste end stretching device 30 from the front and the back, respectively. The waste end stretching device 30 shown in FIGS. 1 and 2 comprises a mounting body 31, a suction nozzle 32, a guide element 40 with a deflecting element 41 attached to the body of the suction nozzle 32 at its first end 58, and a ring-jet device 33 attached to the mounting body 31 at a second end 59 of the suction nozzle 32. In the context of the application, an end of the suction nozzle 32, which in use is arranged to face an edge of a woven fabric is referred to as first end 58. An opposite end of the suction nozzle 32 is referred to as second end 59. A wall at the first end 58 is referred to as first end wall 46.

[0029] The suction nozzle 32 has a lateral suction slit 34 extending along the longitudinal direction 52 of the suction nozzle 32 for sucking leading ends or waste ends of inserted weft threads (not shown) into the suction nozzle 32. The suction nozzle 32 further comprises an opening 35 provided at its first end 58. The opening 35 at the first end 58 allows the waste ends to move in a direction perpendicular to the longitudinal direction 52 of the suction nozzle 32 of the waste end stretching device 30 while the waste ends are held in the suction nozzle 32 and are stretched by the suction force applied. For avoiding that waste ends are sucked too deep into the suction nozzle 32 when being conveyed perpendicular to the longitudinal direction 52 along the opening 35, the opening 35 is shielded by means of the deflecting element 41 such that waste ends of inserted weft threads (not shown in FIGS. 1 and 2), which are held in the suction nozzle 32 are deflected in their path between the edge of the woven fabric and the opening 35. In the embodiment shown, the opening 35 is provided with a ring-shaped cross section and the deflecting element 41 is provided with a circular cross section, wherein the diameter of the deflecting element 41 is larger than the diameter of the opening 35. The deflecting element 41 projects at least with its lower border 47 beyond the opening 35 for deflecting waste ends held in the suction nozzle 32 in their path between the edge of the woven fabric 3 and the opening 35.

[0030] A suction force along a longitudinal direction 52 of the suction nozzle 32 is applied by means of the ring-jet device 33 having a nipple 36 for an air supply. Preferably, compressed air is supplied to the ring-jet device 33 via the nipple 36 in a pulsating manner, in particular in a not continuous manner, so that the waste ends can be sucked easily into the suction nozzle 32, and can be moved easily along the opening 35.

[0031] An interior channel 49 of the suction nozzle 32 in the embodiment shown has an at least essentially circular cross section. In the embodiment shown, the suc-

tion nozzle 32 is attachable to a weaving machine 11 (see FIGS. 3 to 7) by means of two bolts 37, wherein the position is adjustable or settable in a direction parallel to the weft insertion direction. In the embodiment shown, a support 22 comprising two support bolts 26 is provided, which is attached fixed in position to a frame 2 (see FIGS. 3 to 7) of the weaving machine 11, wherein the mounting body 31 is attached settable in position to the support 22 by means of the two bolts 37. When adjusting the position of the mounting body 31, the ring-jet device 33 attached to the mounting body 31 and the suction nozzle 32 attached to the mounting body 31 are conjointly adjusted in position.

[0032] The guide element 40 shown is provided (seen in the longitudinal direction 52) with the deflecting element 41, an intermediate element 42, and a ring 43. The intermediate element 42 shown has a double-cone shape with a cone-shaped first part having an increasing diameter in a direction away from the first end wall 46 and a cone-shaped second part arranged between the first part and the deflecting element 41 having a decreasing diameter in a direction away from the first end wall 46. In the embodiment shown, the second part is considerably shorter than the first part, for example the length of the second part is approximately a third of the length of the first part. In the embodiment shown, the deflecting element 41 and the intermediate element 42 are for example formed integrally from a material applying only small frictional forces on the waste ends or a waste band conveyed along the guide element 40. The ring 43 is formed separately and is mounted rotatably to the intermediate element 42 and/or the body of the suction nozzle 32 by means of a bolt 45. In one embodiment, the ring 43 is made of rubber applying a higher frictional force on the waste ends than the remainder of the guide element 40. The diameter of the ring 43 in the embodiment shown is slightly larger than the largest diameter of the intermediate element 42. Further, the ring 43 in the embodiment shown is arranged slightly eccentrically with respect to the intermediate element 42, and extends more to the vicinity of the lower part for guiding the weft threads. The diameter of the deflecting element 41 is larger than the smallest diameter of the intermediate element 42. Preferably the diameter of the deflecting element 41 is at least essentially equal to the largest diameter of the intermediate element 42. In an alternative embodiment, instead of a guide element 40 only the deflecting element 41 is provided at the first end 58 of the body of the suction nozzle 32.

[0033] In the context of the application, a part of the first end wall 46 of the body of the suction nozzle 32 arranged below the lateral suction slit 34 is referred to as lower part 50 of the first end wall 46. A part of the first end wall 46 of the body of the suction nozzle 32 arranged above the lateral suction slit 34 is referred to as upper part 51 of the first end wall 46.

[0034] In the embodiment shown, the upper part 51 of the first end wall 46 is provided with a fastening projection

44, which fastening projection 44 is delimiting the interior channel 49 of the suction nozzle 32 towards the first end 58. The guide element 40 is attached to the fastening projection 44.

[0035] In the embodiment shown, the first end wall 46 of the body of the suction nozzle 32 is stepped such that the lower part 50 of the first end wall 46 is positioned further away from the deflecting element 41 than the upper part 51 of the first end wall 46. Thereby, a sufficient free space for the waste ends held in the suction nozzle 32 is provided between the lower part 50 of the first end wall 46 and the deflecting element 41 below the opening 35. Preferably, the deflecting element 41 is attached in such manner that a small gap 48 remains also between the upper part 51 of the first end wall 46 and the deflecting element 41 for avoiding weft threads being caught between the body of the suction nozzle 32 and the deflecting element 41.

[0036] FIG. 3 is a cross view of the waste end stretching device 30 of FIGS. 1 and 2 attached to a weaving machine having a fabric support 1 with a support bar 20 extending in a beat-up direction into a channel of a reed 4, wherein only the suction nozzle 32 is shown and, for the sake of clarity, the deflecting element 41 is not shown. As shown in FIG. 4, the fastening projection 44 is protruding from the upper part 51 of the first end wall 46, delimiting the interior channel 49 of the suction nozzle 32 towards the first end 58. As shown in FIG. 3, the opening 35 thus formed has essentially a ring shape, in other words the opening 35 is formed by a clear span between the interior channel 49 and the fastening projection 44.

[0037] The guide element 40 is attached to the intermediate element 42 by means of a bolt 45, such that the ring 43 of the guide element 40 remains rotatably with respect to the intermediate element 42. The deflecting element 41 and the intermediate element 42, which form one assembly, are stationary attached to the suction nozzle 32 by a bolt 57 (shown in FIG. 4). The bolt 57 extends through the opening 54 (shown in FIG. 3) of the fastening projection 44, and can be tightened by a tool that in use extends through the suction nozzle 32. In order to avoid rotation of the deflecting element 41 and the intermediate element 42 about the bolt 57, in the embodiment shown in FIGS. 3 and 4, a pin 55 protruding from an end surface 56 of the fastening projection 44 is provided and can cooperate with an opening (not shown) in the deflecting element 41 and/or the intermediate element 42. The deflecting element 41 is clamped against the end surface 56.

[0038] As shown in FIG. 3 the lateral suction slit 34 is confined by a lower lip 38 and an upper lip 39. The waste end stretching device 30 is mounted to the frame 2 of the weaving machine with the lateral suction slit 34 extending in parallel to the support bar 20 of the fabric support 1, wherein the lower lip 38 is arranged at least essentially at the height of the support bar 20 of the fabric support 1 to guide waste ends via the support bar 20 and the lateral suction slit 34 into the suction nozzle 32.

[0039] FIG. 8 schematically shows a cross view of a weaving machine 11 with a fabric support 1 and a temple 23. The fabric support 1 shown is attached to a frame 2 of a weaving machine in order to support a fabric 3. The fabric support 1 extends at least across the width of the fabric 3, for example across a length in the order of magnitude of several meters. In addition, a reed 4, a sley 5, a clamping bar 6, sley legs 7 and a sley shaft 8 are shown. In the embodiment shown, the reed 4 is clamped to the sley 5 by means of the clamping bar 6 and bolts 25. Further, in the embodiment shown, a guide roller 24 for the fabric 3 is provided downstream of the temple 23 near the fabric support 1. For a weft insertion, the weft thread is blown into a shed by means of a main blowing device (not shown) and a plurality of relay blowers 9, which are attached to the sley 5 in a known manner.

[0040] The fabric support 1 comprises at least one profiled support bar 20, supported by a plurality of supporting elements 10, which are attached to the frame 2 by means of screw elements 21. The profiled support bar 20 is attached in such manner that its end facing the reed 4 extends into a channel of the reed 4 upon beat-up. In the embodiment shown, the supporting element 10 is provided with a collar 27 which allows attaching the supporting element 10 with high accuracy to the frame 2. Such a fabric support 1 is shown for example in US 7,770,605 B2, the content of which is herewith incorporated by reference.

[0041] The waste end stretching device 30 and its use in a weaving machine will be described in more detail with reference to FIGS. 5 to 7 further below.

[0042] FIGS. 5, 6 and 7 schematically show the weaving machine 11 with the fabric support 1, the temple 23 and the waste end stretching device 30 shown in FIGS. 1 and 2 in a perspective view from the back of the weaving machine and from above, in a perspective view from the back and in a view from above, respectively. As shown in FIG. 3, the lateral suction slit 34 is confined by the lower lip 38 and the upper lip 39. The waste end stretching device 30 is mounted to the frame 2 of the weaving machine with the opening 35 facing an edge of the fabric 3 and, thus, towards the temple 23 and the lateral suction slit 34 extending in parallel to the weft insertion direction 29, in other words in parallel to a beat-up line of the fabric 3, wherein the lower lip 38 is arranged at least essentially at the height of the support bar 20 of the fabric support 1 to guide waste ends via the support bar 20 and the lateral suction slit 34 into the suction nozzle 32. Hereby the suction nozzle 32 is arranged stationary on the weaving machine 11, and at an extension of the temple 23 in an axial direction 53 of the temple 23 and with the longitudinal direction 52 of the suction nozzle 32 extending in parallel to the weft insertion direction 29.

[0043] In the embodiment shown in FIGS. 5 to 7, catching threads 12 (also referred to as waste warp threads) are provided for catching the waste ends of the inserted weft threads 13. The fabric band woven by means of the catching threads 12 is referred to as waste band 18. In

an alternative embodiment, no catching threads are provided and the waste ends are tucked in, for example using a device as described in WO 2015/189033 A1 and/or EP 2176455 B1, the content of which is herewith incorporated by reference.

[0044] In the embodiment shown, a separate auxiliary reed 14 (see FIGS. 4 and 6) is provided for the catching threads 12, which is attached to the sley 5. Weft thread detectors 15, 16 are provided at the arrival end of the reed 4 and the auxiliary reed 14. The waste band 18 and the waste ends are cut off from the fabric 3 by means of a schematically shown cutting device 17. As best seen in FIGS. 6 and 7, in the embodiment shown, a tensioning device 19 comprising nozzles, for example two nozzles, is provided at the auxiliary reed 14 for tensioning already inserted weft threads. Such a tensioning device 19 is described for example in WO 2015/177155 A1, the content of which is herewith incorporated by reference.

[0045] In the embodiment shown, the guide element 40 is positioned at a distance from the temple 23, wherein the position of the temple 23 is chosen to at least essentially match the width of the fabric 3. The waste band 18 is guided along the intermediate element 42 of the guide element 40, wherein the deflecting element 41 having a larger diameter than the suction nozzle 32 mechanically and fluid mechanically hinders the waste band 18 from being sucked into the suction nozzle 32.

[0046] As described above, the rotatably mounted ring 43 of the guide element 40 has a slightly larger diameter than the largest diameter of the intermediate element 42. Hence, the ring 43 will contact the weft threads extending between the temple 23 and the suction nozzle 32 via the guide element 40, and the weft threads are guided upon the movement of the fabric 3 along the ring 43.

[0047] In use, the weft threads are inserted and tensioned by the tensioning device 19, then beaten up while the leading end or waste end of the inserted weft thread extending beyond the catching threads 12 is sucked into the suction nozzle 32 via the lateral suction slit 34. Upon a further conveyance of the fabric 3, the waste ends remain stretched by means of the waste end stretching device 30 while they are conveyed with the fabric 3 in the pull-off direction, wherein the waste ends are moved along the opening 35. The waste band 18 is guided by means of the intermediate element 42. The deflecting element 41 hinders the waste band 18 from being sucked into the suction nozzle 32. In the embodiment shown, upon a further conveyance of the fabric 3, the waste ends will eventually be removed from the suction nozzle 32 via the opening 35. In other embodiments, the waste ends are cut-off and removed via the second end 59 of the suction nozzle 32.

[0048] It is clear that the attachment of the suction nozzle 32 in a weaving machine is not limited to the use of the support 22 and the mounting body 31, but to this end according to an alternative fastening elements can be used allowing for a setting of the position of the suction nozzle 32 with respect to the weaving machine.

[0049] The waste end stretching device, the weaving machine and the use of a waste end stretching device according to the invention are not limited to the embodiments described by way of example and illustrated in the drawings. Alternatives and combinations of the described and illustrated embodiments that fall under the claims are also possible.

10 Claims

1. Waste end stretching device for a weaving machine comprising a suction nozzle (32) adapted to be arranged in the path of a waste end of an inserted weft thread (13) projecting beyond an edge of a woven fabric (3), wherein the suction nozzle (32) is adapted for applying a suction force along a longitudinal direction (52) of the suction nozzle (32), wherein the suction nozzle (32) is adapted for being attached to the weaving machine (11) such that the longitudinal direction (52) of the suction nozzle (32) extends in parallel to the weft insertion direction (29), **characterized in that** the suction nozzle (32) is provided with a lateral suction slit (34) extending along the longitudinal direction (52) of the suction nozzle (32) for sucking waste ends into the suction nozzle (32) and with an opening (35) provided at a first end (58) of the suction nozzle (32) facing the edge of the woven fabric (3) for conveying waste ends held in the suction nozzle (32) in a direction perpendicular to the longitudinal direction (52) of the suction nozzle (32), and wherein a deflecting element (41) is provided between the opening (35) and the edge of the woven fabric (3), which deflecting element (41) at least partly projects beyond the opening (35) for deflecting waste ends held in the suction nozzle (32) in their path between the edge of the woven fabric (3) and the opening (35).
2. Waste end stretching device according to claim 1, **characterized in that** the deflecting element (41) projects at least with its lower border (47) beyond the opening (35) for deflecting waste ends held in the suction nozzle (32) in their path between the edge of the woven fabric (3) and the opening (35).
3. Waste end stretching device according to claim 1 or 2, **characterized in that** the deflecting element (41) and a body of the suction nozzle (32) are formed as separate members, wherein the deflecting element (41) is positioned with respect to the body of the suction nozzle (32) such that a gap (48) is provided between a first end wall (46) of the body of the suction nozzle (32) and the deflecting element (41), wherein the size of the gap (48) is chosen large enough to avoid waste ends being caught between the first end wall (46) of the body of the suction nozzle (32) and the deflecting element (41).

4. Waste end stretching device according to claim 1, 2 or 3, **characterized in that** a first end wall (46) of a body of the suction nozzle (32) is stepped such that a lower part (50) of the first end wall (46) below the lateral suction slit (34) is positioned further away from the deflecting element (41) than an upper part (51) of the first end wall (46).
5. Waste end stretching device according to claim 3 or 4, **characterized in that** an upper part (51) of the first end wall (46) of the body of the suction nozzle (32) is provided with a fastening projection (44), which fastening projection (44) is delimited by an interior channel (49) of the suction nozzle (32) towards the first end (58), wherein the deflecting element (41) is attached to the fastening projection (44).
6. Waste end stretching device according to any one of claims 1 to 5, **characterized in that** the opening (35) and the deflecting element (41) have complementary ring-shaped, circular or semi-circular cross sections.
7. Waste end stretching device according to any one of claims 1 to 6, **characterized in that** the waste end stretching device (30) further comprises a mounting body (31), wherein the suction nozzle (32) is attached to or formed integrally with the mounting body (31), and which mounting body (31) is adapted to be attached adjustable in position to a frame (2) of the weaving machine (11).
8. Waste end stretching device according to any one of claims 1 to 7, **characterized in that** the waste end stretching device (30) comprises a mounting body (31) and further comprises a ring-jet device (33) for providing a suction force, wherein preferably the ring-jet device (33) is attached to the mounting body (31) and/or the suction nozzle (32).
9. Waste end stretching device according to any one of claims 1 to 8, **characterized in that** a guide element (40) for guiding catching threads (12) is provided, wherein the guide element (40) is positioned between the deflecting element (41) and the edge of the woven fabric (3).
10. Waste end stretching device according to claim 9, **characterized in that** the deflecting element (41) is formed integrally or as a structural unit with the guide element (40).
11. Waste end stretching device according to claim 9 or 10, **characterized in that** the guide element (40) comprises a cone-shaped, double-cone-shaped or hourglass-shaped intermediate element (42) arranged adjacent to the deflecting element (41), wherein the intermediate element (42) comprises at least a cone-shaped first part having an increasing diameter in a direction away from the deflecting element (41), and wherein the smallest diameter of the first part is smaller than the diameter of the deflecting element (41).
12. Waste end stretching device according to claim 11, **characterized in that** the guide element (40) further comprises a ring (43) arranged adjacent to the intermediate element (42) at a side away from the deflecting element (41), wherein the ring (43) is mounted rotatably with respect to the intermediate element (42) about an axis parallel to the weft insertion direction (29).
13. Weaving machine comprising a temple (23) along which temple (23) a fabric (3) is guided and a waste end stretching device (30) according to any one of claims 1 to 12, wherein the waste end stretching device (30) comprises a suction nozzle (32) adapted for applying a suction force along the longitudinal direction (52) of the suction nozzle (32), wherein the suction nozzle (32) is arranged stationary on the weaving machine (11) at an extension of the temple (23) in an axial direction (53) of the temple (23) and with the longitudinal direction (52) of the suction nozzle (32) extending in parallel to the weft insertion direction (29).
14. Weaving machine according to claim 13, **characterized in that** the lateral suction slit (34) of the suction nozzle (32) is confined by a lower lip (38) and an upper lip (39), wherein the waste end stretching device (30) is mounted to the weaving machine (11) with the lateral suction slit (34) extending close to and in parallel to a support bar (20) of a fabric support (1) of the weaving machine (11), such that the lower lip (38) is arranged at least essentially at the height of the support bar (20) for guiding waste ends via the support bar (20) and the lower lip (38) into the suction nozzle (32).
15. Use of a waste end stretching device according to any one of claims 1 to 12 in a weaving machine (11) comprising a temple (23) along which temple (23) a fabric (3) is guided, wherein the waste end stretching device (30) comprises a suction nozzle (32) adapted for applying a suction force along the longitudinal direction (52) of the suction nozzle (32), wherein the suction nozzle (32) is arranged stationary on the weaving machine (11) at an extension of the temple (23) in an axial direction (53) of the temple (23) and with the longitudinal direction (52) of the suction nozzle (32) extending in parallel to the weft insertion direction (29).

Patentansprüche

1. Abfallende-Streckvorrichtung für eine Webmaschine umfassend eine Saugdüse (32), die zur Anordnung in der Bahn eines Abfallendes eines eingetragenen Schussfadens (13), der über eine Kante eines gewebten Gewebes (3) hinausragt, ausgebildet ist, wobei die Saugdüse (32) zur Anwendung einer Saugkraft entlang einer Längsrichtung (52) der Saugdüse (32) ausgebildet ist, wobei die Saugdüse (32) zur Befestigung an der Webmaschine (11) derart ausgebildet ist, dass sich die Längsrichtung (52) der Saugdüse (32) parallel zur Schusseintragsrichtung (29) erstreckt, **dadurch gekennzeichnet, dass** die Saugdüse (32) mit einem seitlichen Saugschlitz (34), der sich entlang der Längsrichtung (52) der Saugdüse (32) erstreckt, um Abfallenden in die Saugdüse (32) einzusaugen, und mit einer Öffnung (35), die an einem der Kante des gewebten Gewebes (3) zugewandten ersten Ende (58) der Saugdüse (32) vorgesehen ist, zum Fördern von Abfallenden, die in der Saugdüse (32) in einer Richtung senkrecht zur Längsrichtung (52) der Saugdüse (32) gehalten werden, versehen ist, und wobei ein Umlenkelement (41) zwischen der Öffnung (35) und der Kante des gewebten Gewebes (3) vorgesehen ist, welches Umlenkelement (41) mindestens teilweise über die Öffnung (35) hinausragt, um die in der Saugdüse (32) gehaltenen Abfallenden in ihrer Bahn zwischen der Kante des gewebten Gewebes (3) und der Öffnung (35) umzulenken.
2. Abfallende-Streckvorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** das Umlenkelement (41) mindestens mit seinem unteren Rand (47) über die Öffnung (35) herausragt, um die in der Saugdüse (32) gehaltenen Abfallenden in ihrer Bahn zwischen der Kante des gewebten Gewebes (3) und der Öffnung (35) umzulenken.
3. Abfallende-Streckvorrichtung nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** das Umlenkelement (41) und ein Körper der Saugdüse (32) als separate Bauteile ausgebildet sind, wobei das Umlenkelement (41) bezüglich des Körpers der Saugdüse (32) derart positioniert ist, dass zwischen einer ersten Stirnwand (46) des Körpers der Saugdüse (32) und dem Umlenkelement (41) ein Spalt (48) vorgesehen ist, wobei die Grösse des Spaltes (48) gross genug gewählt wird, um zu vermeiden, dass Abfallenden zwischen der ersten Stirnwand (46) des Körpers der Saugdüse (32) und dem Umlenkelement (41) aufgefangen werden.
4. Abfallende-Streckvorrichtung nach Anspruch 1, 2 oder 3, **dadurch gekennzeichnet, dass** eine erste Stirnwand (46) eines Körpers der Saugdüse (32) derart abgestuft ist, dass ein unterer Teil (50) der ersten Stirnwand (46) unterhalb des seitlichen Saugschlitzes (34) weiter weg vom Umlenkelement (41) positioniert ist als ein Oberteil (51) der ersten Stirnwand (46).
5. Abfallende-Streckvorrichtung nach Anspruch 3 oder 4, **dadurch gekennzeichnet, dass** ein Oberteil (51) der ersten Stirnwand (46) des Körpers der Saugdüse (32) mit einem Befestigungsvorsprung (44) versehen ist, welcher Befestigungsvorsprung (44) durch einen Innenkanal (49) der Saugdüse (32) zum ersten Ende (58) hin begrenzt ist, wobei das Umlenkelement (41) an dem Befestigungsvorsprung (44) befestigt ist.
6. Abfallende-Streckvorrichtung nach einem der Ansprüche 1 bis 5, **dadurch gekennzeichnet, dass** die Öffnung (35) und das Umlenkelement (41) komplementäre ringförmige, kreisförmige oder halb-kreisförmige Querschnitte aufweisen.
7. Abfallende-Streckvorrichtung nach einem der Ansprüche 1 bis 6, **dadurch gekennzeichnet, dass** die Abfallende-Streckvorrichtung (30) weiter einen Montagekörper (31) umfasst, wobei die Saugdüse (32) an dem Montagekörper (31) befestigt oder einstückig ausgebildet ist, und welcher Montagekörper (31) ausgebildet ist, an einem Rahmen (2) der Webmaschine (11) lageverstellbar befestigt zu werden.
8. Abfallende-Streckvorrichtung nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass** die Abfallende-Streckvorrichtung (30) einen Montagekörper (31) umfasst und weiter eine Ringstrahlvorrichtung (33) zum Bereitstellen einer Saugkraft umfasst, wobei vorzugsweise die Ringstrahlvorrichtung (33) an dem Montagekörper (31) und/oder der Saugdüse (32) befestigt ist.
9. Abfallende-Streckvorrichtung nach einem der Ansprüche 1 bis 8, **dadurch gekennzeichnet, dass** ein Führungselement (40) zum Führen von Fangfäden (12) vorgesehen ist, wobei das Führungselement (40) zwischen dem Umlenkelement (41) und der Kante des gewebten Gewebes (3) positioniert ist.
10. Abfallende-Streckvorrichtung nach Anspruch 9, **dadurch gekennzeichnet, dass** das Umlenkelement (41) einstückig oder als Baueinheit mit dem Führungselement (40) ausgebildet ist.
11. Abfallende-Streckvorrichtung nach Anspruch 9 oder 10, **dadurch gekennzeichnet, dass** das Führungselement (40) ein kegelförmiges, doppelkegelförmiges oder sanduhrförmiges Zwischenelement (42) umfasst, das angrenzend zu dem Umlenkelement (41) angeordnet ist, wobei das Zwischenelement (42) mindestens einen kegelförmigen ersten Teil mit

zunehmendem Durchmesser in einer Richtung weg vom Umlenkelement (41) umfasst, und wobei der kleinste Durchmesser des ersten Teils kleiner ist als der Durchmesser des Umlenkelements (41).

12. Abfallende-Streckvorrichtung nach Anspruch 11, **dadurch gekennzeichnet, dass** das Führungselement (40) weiter einen Ring (43), der angrenzend zu dem Zwischenelement (42) an einer Seite weg vom Umlenkelement (41) angeordnet ist, umfasst, wobei der Ring (43) bezüglich des Zwischenelements (42) um eine Achse parallel zur Schusseintragsrichtung (29) drehbar montiert ist.
13. Webmaschine umfassend einen Breithalter (23), wobei entlang dem Breithalter (23) ein Gewebe (3) geführt ist, und eine Abfallende-Streckvorrichtung (30) nach einem der Ansprüche 1 bis 12, wobei die Abfallende-Streckvorrichtung (30) eine Saugdüse (32), die zur Anwendung einer Saugkraft entlang der Längsrichtung (52) der Saugdüse (32) ausgebildet ist, umfasst, wobei die Saugdüse (32) stationär auf der Webmaschine (11) an einer Verlängerung des Breithalters (23) in einer axialen Richtung (53) des Breithalters (23) und mit der Längsrichtung (52) der Saugdüse (32) parallel erstreckt zur Schusseintragsrichtung (29) angeordnet ist.
14. Webmaschine nach Anspruch 13, **dadurch gekennzeichnet, dass** der seitliche Saugschlitz (34) der Saugdüse (32) durch eine untere Lippe (38) und eine obere Lippe (39) begrenzt ist, wobei die Abfallende-Streckvorrichtung (30) auf der Webmaschine (11) mit dem seitlichen Saugschlitz (34) sich nahe und parallel zu einer Tragstange (20) eines Gewebeträgers (1) der Webmaschine (11) erstreckend montiert ist, so dass die untere Lippe (38) mindestens im Wesentlichen in Höhe der Tragstange (20) zum Führen von Abfallenden über die Stützstange (20) und die untere Lippe (38) in die Saugdüse (32) angeordnet ist.
15. Verwendung einer Abfallende-Streckvorrichtung nach einem der Ansprüche 1 bis 12 in einer Webmaschine (11) umfassend einen Breithalter (23), wobei entlang dem Breithalter (23) ein Gewebe (3) geführt ist, wobei die Abfallende-Streckvorrichtung (30) eine Saugdüse (32), die zur Anwendung einer Saugkraft entlang einer Längsrichtung (52) der Saugdüse (32) ausgebildet ist, umfasst, wobei die Saugdüse (32) stationär auf der Webmaschine (11) an einer Verlängerung des Breithalters (23) in einer axialen Richtung (53) des Breithalters (23) und mit der Längsrichtung (52) der Saugdüse (32) parallel erstreckt zur Schusseintragsrichtung (29) angeordnet ist.

Revendications

1. Dispositif d'étirage d'extrémité de déchets pour une machine à tisser comprenant une buse d'aspiration (32) adaptée pour être disposée dans la voie d'une extrémité de déchets d'un fil de trame (13) inséré faisant saillie au-delà d'un bord d'un tissu tissé (3), dans lequel la buse d'aspiration (32) est adaptée pour appliquer une force d'aspiration le long d'une direction longitudinale (52) de la buse d'aspiration (32), dans lequel la buse d'aspiration (32) est adaptée pour être fixée à la machine à tisser (11) de telle sorte que la direction longitudinale (52) de la buse d'aspiration (32) s'étend parallèlement à la direction d'insertion de trame (29), **caractérisé en ce que** la buse d'aspiration (32) est prévue d'une fente d'aspiration latérale (34) s'étendant le long de la direction longitudinale (52) de la buse d'aspiration (32) pour aspirer d'extrémités de déchets dans la buse d'aspiration (32) et avec une ouverture (35) disposée sur une première extrémité (58) de la buse d'aspiration (32) faisant face au bord du tissu tissé (3) pour transporter d'extrémités de déchets maintenues dans la buse d'aspiration (32) dans une direction perpendiculaire à la direction longitudinale (52) de la buse d'aspiration (32), et dans lequel un élément de renvoi (41) est disposé entre l'ouverture (35) et le bord du tissu tissé (3), lequel élément de renvoi (41) fait saillie au moins partiellement au-delà de l'ouverture (35) pour dévier d'extrémités de déchets maintenues dans la buse d'aspiration (32) dans leur voie entre le bord du tissu tissé (3) et l'ouverture (35).
2. Dispositif d'étirage d'extrémité de déchets selon la revendication 1, **caractérisé en ce que** l'élément de renvoi (41) fait saillie au moins avec sa bordure inférieure (47) au-delà de l'ouverture (35) pour dévier d'extrémités de déchets maintenues dans la buse d'aspiration (32) dans leur voie entre le bord du tissu tissé (3) et l'ouverture (35).
3. Dispositif d'étirage d'extrémité de déchets selon la revendication 1 ou 2, **caractérisé en ce que** l'élément de renvoi (41) et un corps de la buse d'aspiration (32) sont formés comme des membres séparés, dans lequel l'élément de renvoi (41) est positionné par rapport au corps de la buse d'aspiration (32) de telle sorte qu'un espace (48) est prévu entre une première paroi d'extrémité (46) du corps de la buse d'aspiration (32) et l'élément de renvoi (41), dans lequel la largeur de l'espace (48) est choisie suffisamment grande pour éviter que d'extrémités de déchets sont capturées entre la première paroi d'extrémité (46) du corps de la buse d'aspiration (32) et l'élément de renvoi (41).
4. Dispositif d'étirage d'extrémité de déchets selon la revendication 1, 2 ou 3, **caractérisé en ce qu'une**

- première paroi d'extrémité (46) d'un corps de la buse d'aspiration (32) est étagée de telle sorte qu'une partie inférieure (50) de la première paroi d'extrémité (46) au-dessous de la fente d'aspiration latérale (34) est positionnée plus loin de l'élément de renvoi (41) qu'une partie supérieure (51) de la première paroi d'extrémité (46).
5. Dispositif d'étirage d'extrémité de déchets selon la revendication 3 ou 4, **caractérisé en ce qu'**une partie supérieure (51) de la première paroi d'extrémité (46) du corps de la buse d'aspiration (32) est prévue d'une saillie de fixation (44), laquelle saillie de fixation (44) est délimitée par un canal intérieur (49) de la buse d'aspiration (32) vers la première extrémité (58), dans lequel l'élément de renvoi (41) est fixé à la saillie de fixation (44).
 6. Dispositif d'étirage d'extrémité de déchets selon l'une quelconque des revendications 1 à 5, **caractérisé en ce que** l'ouverture (35) et l'élément de renvoi (41) ont des sections complémentaires de forme annulaire, circulaires ou semi-circulaires.
 7. Dispositif d'étirage d'extrémité de déchets selon l'une quelconque des revendications 1 à 6, **caractérisé en ce que** le dispositif d'étirage d'extrémité de déchets (30) comprend en outre un corps de montage (31), dans lequel la buse d'aspiration (32) est fixée au ou est formée intégralement avec le corps de montage (31), et lequel corps de montage (31) est adapté pour être fixé de manière réglable en position à un châssis (2) de la machine à tisser (11).
 8. Dispositif d'étirage d'extrémité de déchets selon l'une quelconque des revendications 1 à 7, **caractérisé en ce que** le dispositif d'étirage d'extrémité de déchets (30) comprend un corps de montage (31) et comprend en outre un dispositif à jet annulaire (33) pour fournir une force d'aspiration, dans lequel le dispositif à jet annulaire (33) est fixé de préférence au corps de montage (31) et/ou à la buse d'aspiration (32).
 9. Dispositif d'étirage d'extrémité de déchets selon l'une quelconque des revendications 1 à 8, **caractérisé en ce qu'**un élément de guidage (40) pour guider des fils auxiliaires (12) est prévu, dans lequel l'élément de guidage (40) est positionné entre l'élément de renvoi (41) et le bord du tissu tissé (3).
 10. Dispositif d'étirage d'extrémité de déchets selon la revendication 9, **caractérisé en ce que** l'élément de renvoi (41) est formé intégralement ou comme une unité structurale avec l'élément de guidage (40).
 11. Dispositif d'étirage d'extrémité de déchets selon la revendication 9 ou 10, **caractérisé en ce que** l'élément de guidage (40) comprend un élément intermédiaire (42) en forme de cône, en forme de cône double ou en forme de sablier disposé adjacent à l'élément de renvoi (41), dans lequel l'élément intermédiaire (42) comprend au moins une première partie en forme de cône ayant un diamètre croissant dans une direction s'éloignant de l'élément de renvoi (41), et dans lequel le plus petit diamètre de la première partie est inférieur au diamètre de l'élément de renvoi (41).
 12. Dispositif d'étirage d'extrémité de déchets selon la revendication 11, **caractérisé en ce que** l'élément de guidage (40) comprend en outre un anneau (43) disposé adjacente à l'élément intermédiaire (42) à un côté loin de l'élément de renvoi (41), dans lequel l'anneau (43) est monté rotatif par rapport à l'élément intermédiaire (42) autour d'un axe parallèle à la direction d'insertion de trame (29).
 13. Machine à tisser comprenant un temple (23) le long duquel temple (23) un tissu (3) est guidé et un dispositif d'étirage d'extrémité de déchets (30) selon l'une quelconque des revendications 1 à 12, dans laquelle le dispositif d'étirage d'extrémité de déchets (30) comprend une buse d'aspiration (32) adaptée pour appliquer une force d'aspiration le long d'une direction longitudinale (52) de la buse d'aspiration (32), dans laquelle la buse d'aspiration (32) est disposée stationnaire sur la machine à tisser (11) au niveau d'une extension du temple (23) dans une direction axiale (53) du temple (23) et avec la direction longitudinale (52) de la buse d'aspiration (32) s'étendant parallèlement à la direction d'insertion de trame (29).
 14. Machine à tisser selon la revendication 13, **caractérisée en ce que** la fente d'aspiration latérale (34) de la buse d'aspiration (32) est confinée par une lèvre inférieure (38) et une lèvre supérieure (39), dans laquelle le dispositif d'étirage d'extrémité de déchets (30) est monté à la machine à tisser (11) avec la fente d'aspiration latérale (34) s'étendant à proximité de et parallèlement à une barre de support (20) d'un support de tissu (1) de la machine à tisser (11), de sorte que la lèvre inférieure (38) est disposée au moins essentiellement à l'hauteur de la barre de support (20) pour guider d'extrémités de déchets par la barre de support (20) et la lèvre inférieure (38) dans la buse d'aspiration (32).
 15. Utilisation d'un dispositif d'étirage d'extrémité de déchets selon l'une quelconque des revendications 1 à 12 dans une machine à tisser (11) comprenant un temple (23) le long duquel temple (23) un tissu (3) est guidé, dans laquelle le dispositif d'étirage d'extrémité de déchets (30) comprend une buse d'aspiration (32) adaptée pour appliquer une force d'aspi-

ration le long de la direction longitudinale (52) de la buse d'aspiration (32), dans laquelle la buse d'aspiration (32) est disposée stationnaire sur la machine à tisser (11) au niveau d'une extension du temple (23) dans une direction axiale (53) du temple (23) et avec la direction longitudinale (52) de la buse d'aspiration (32) s'étendant parallèlement à la direction d'insertion de trame (29).

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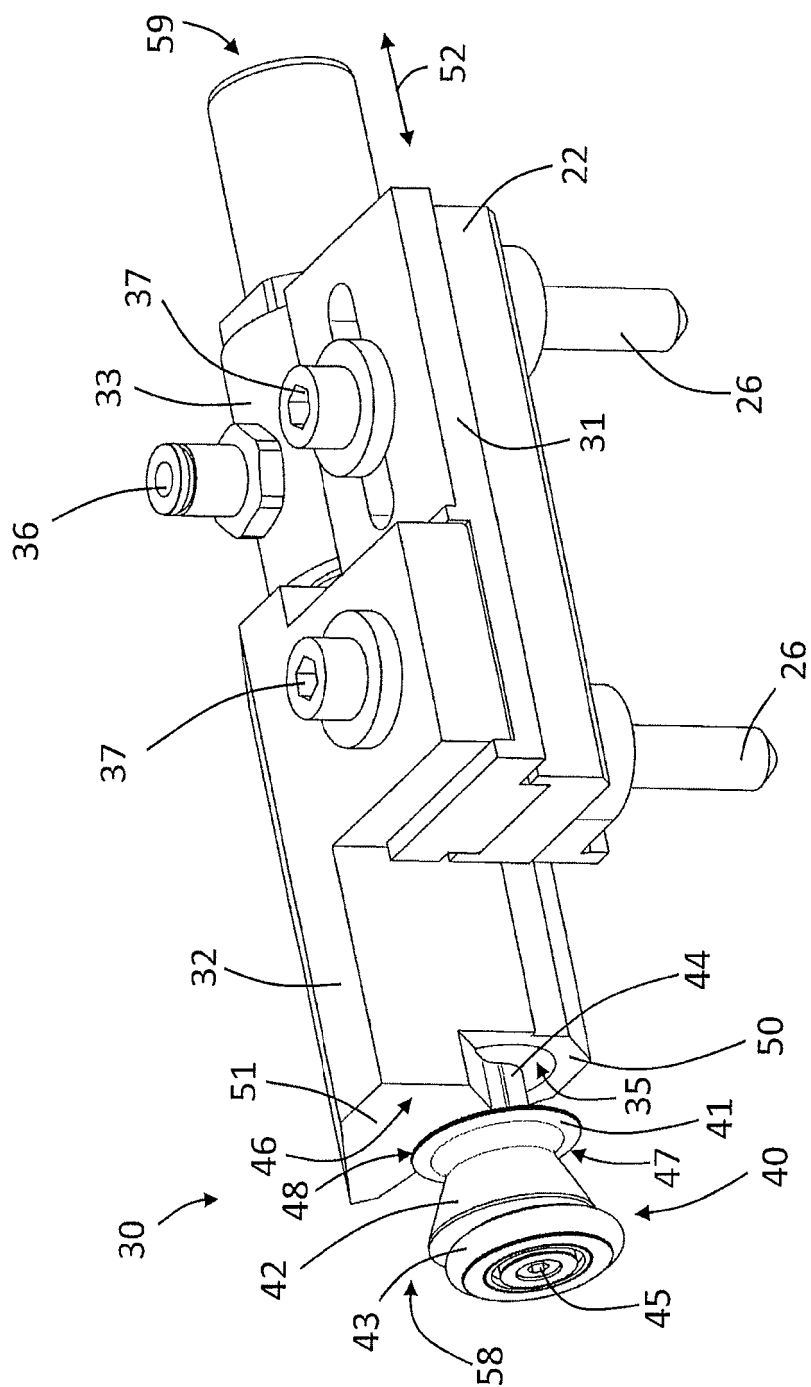


Fig. 1

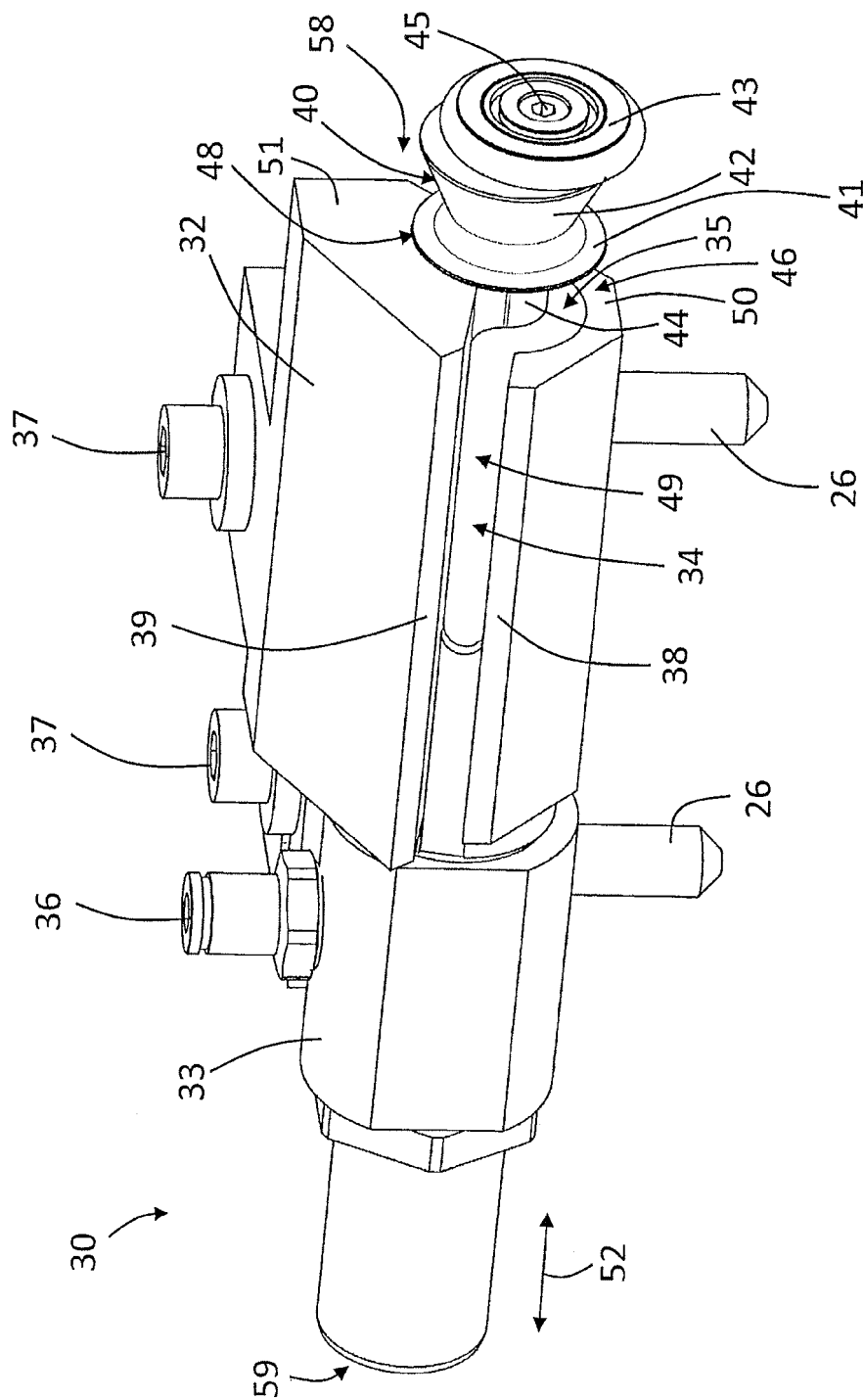
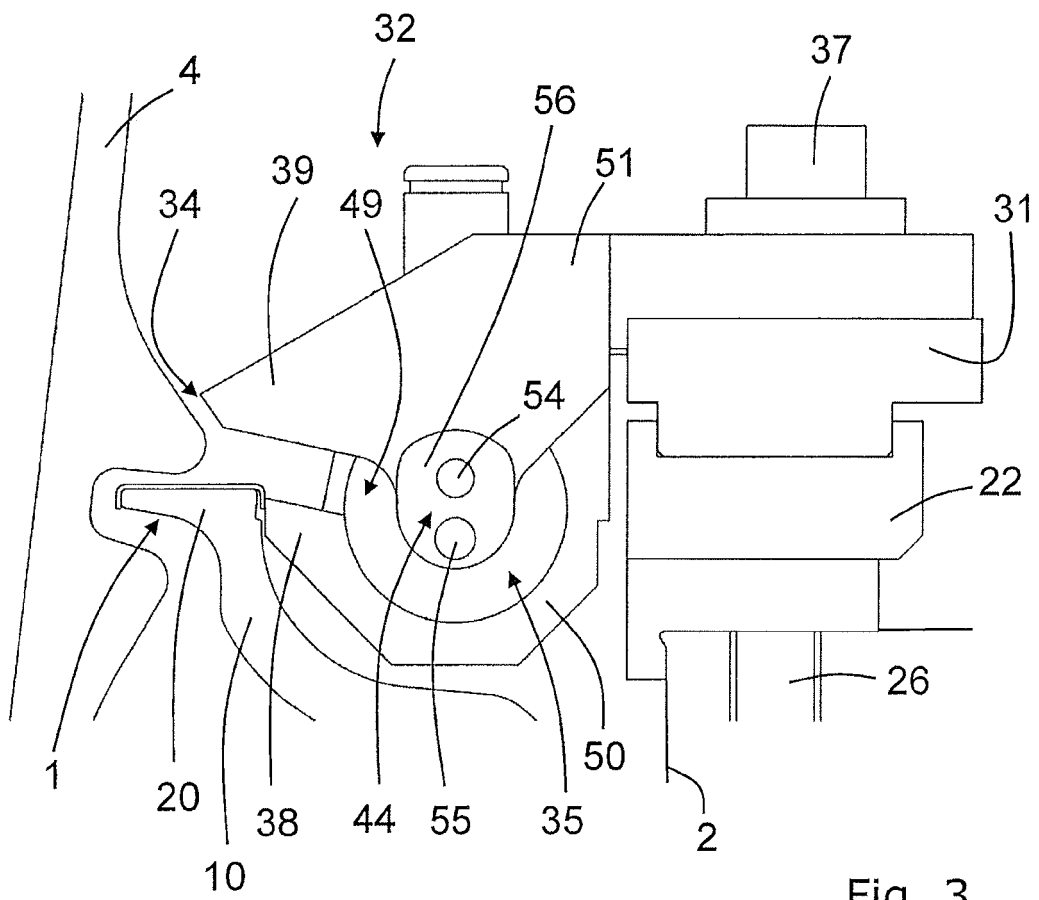


Fig. 2



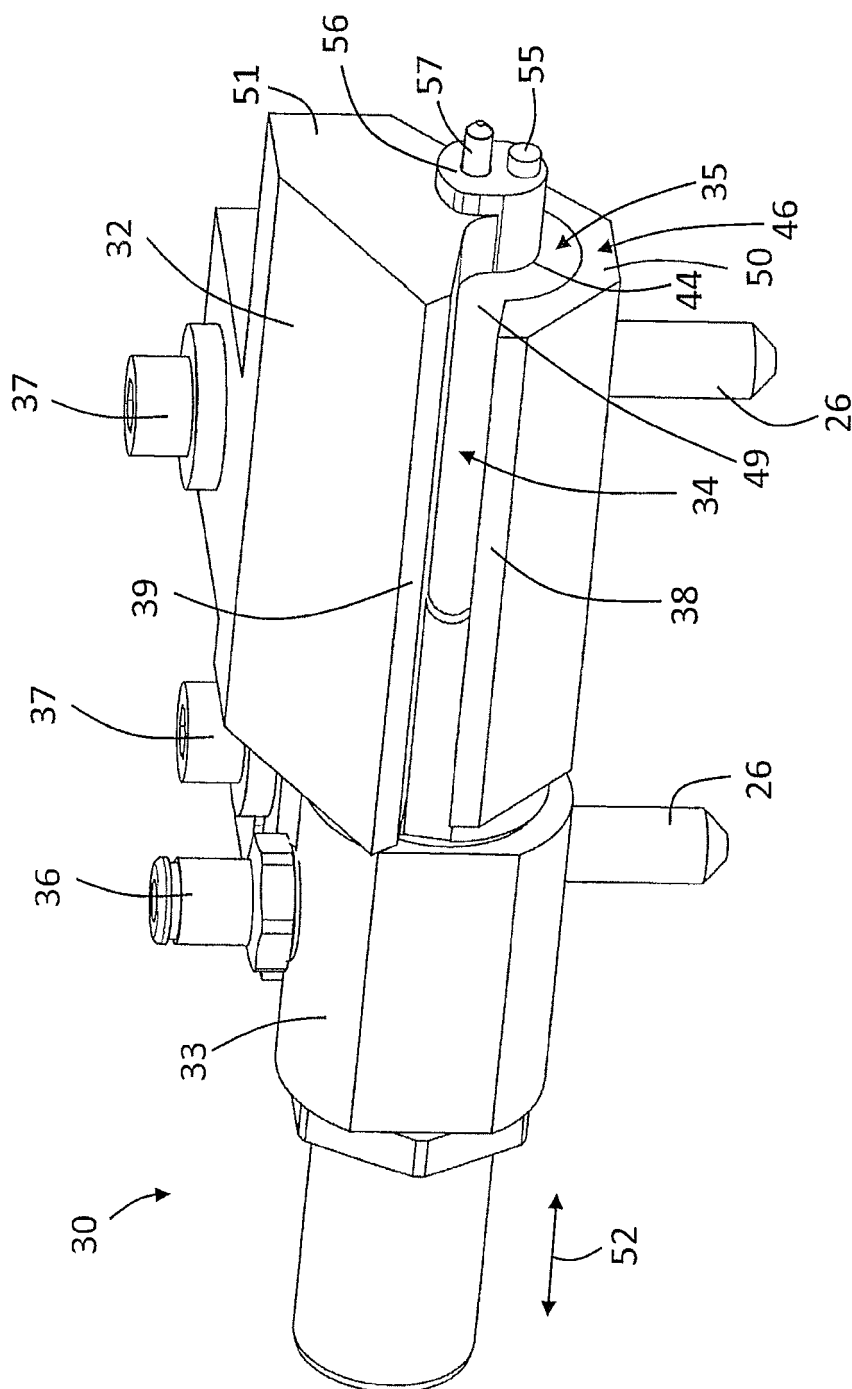


Fig. 4

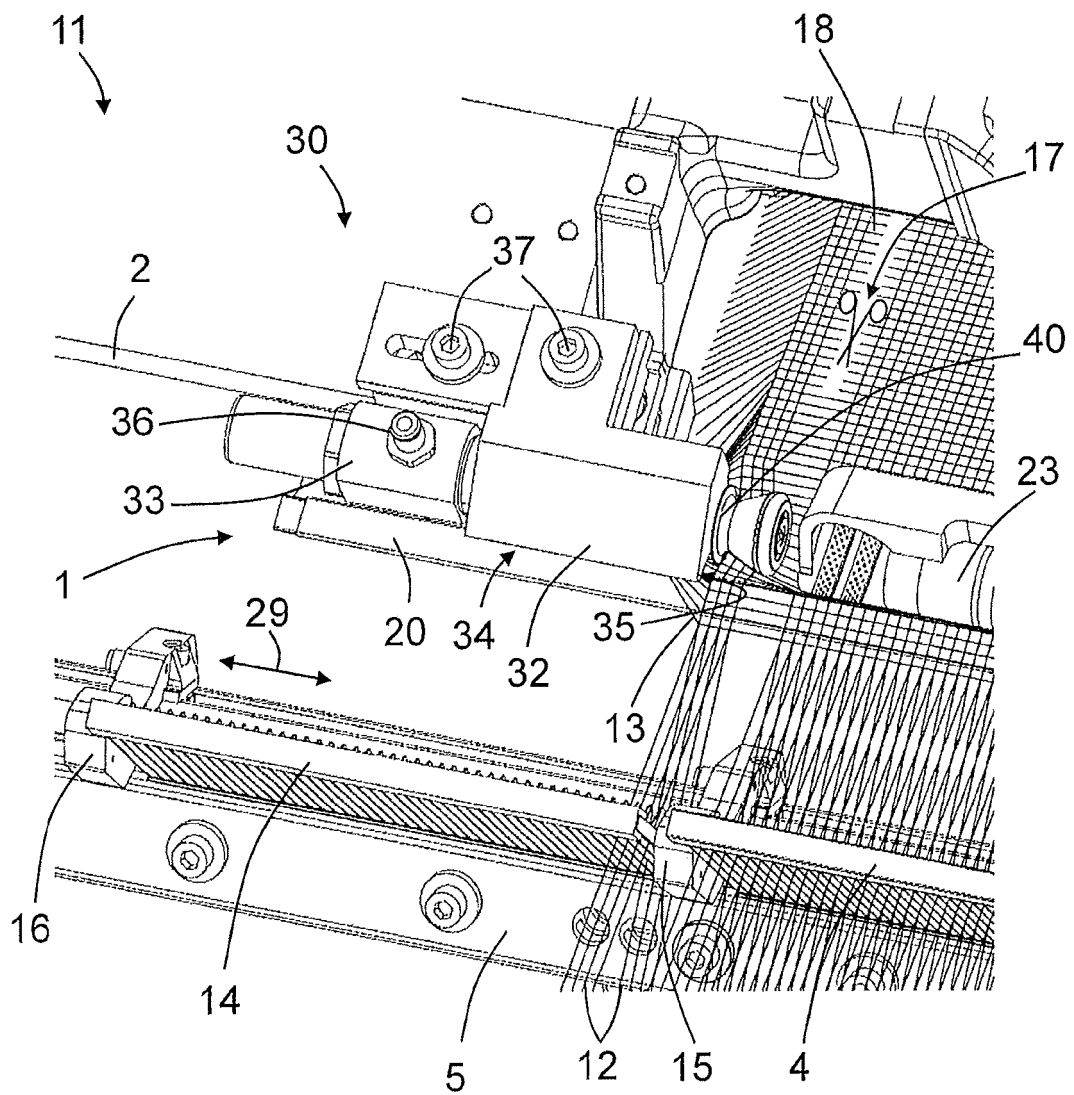


Fig. 5

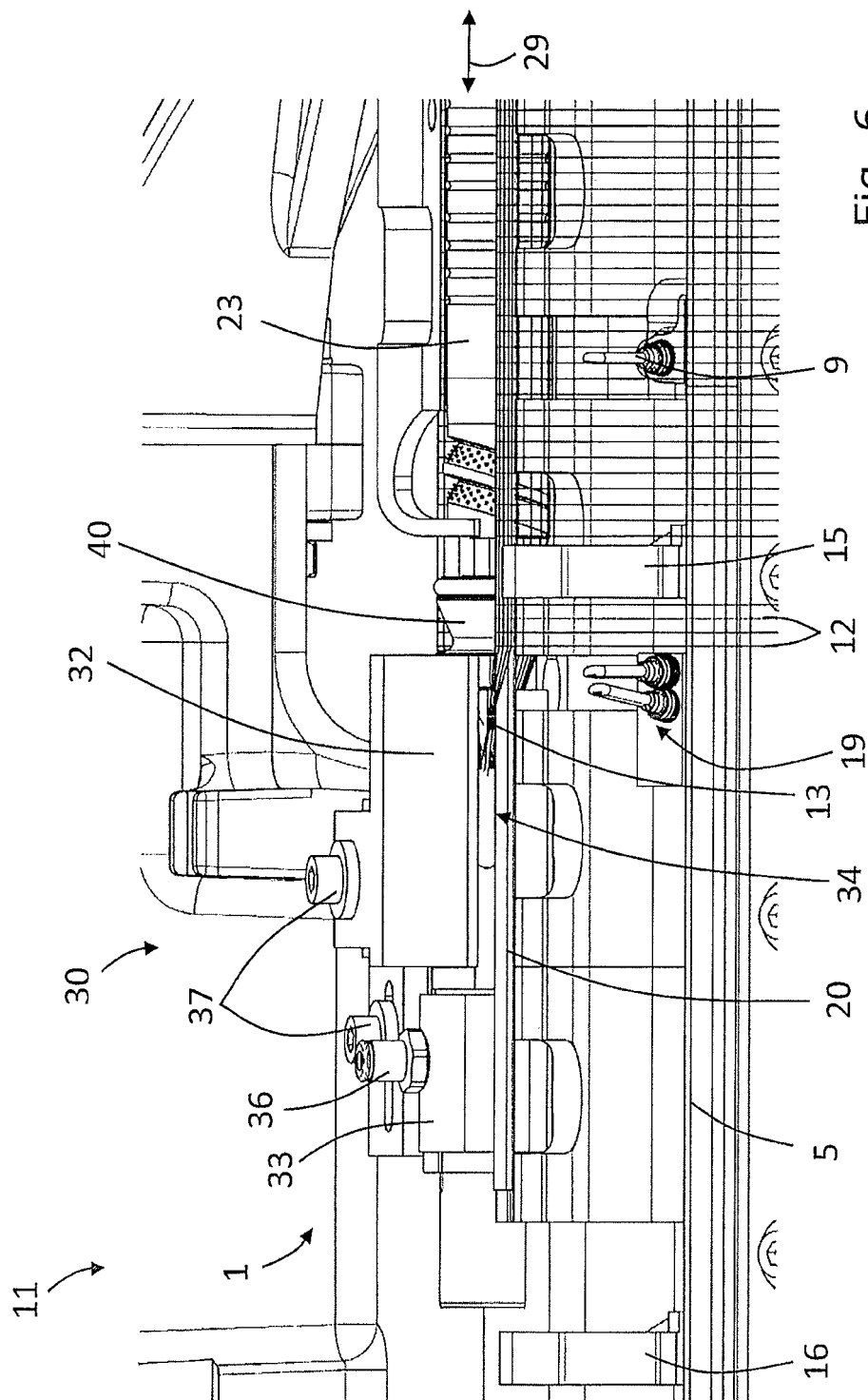


Fig. 6

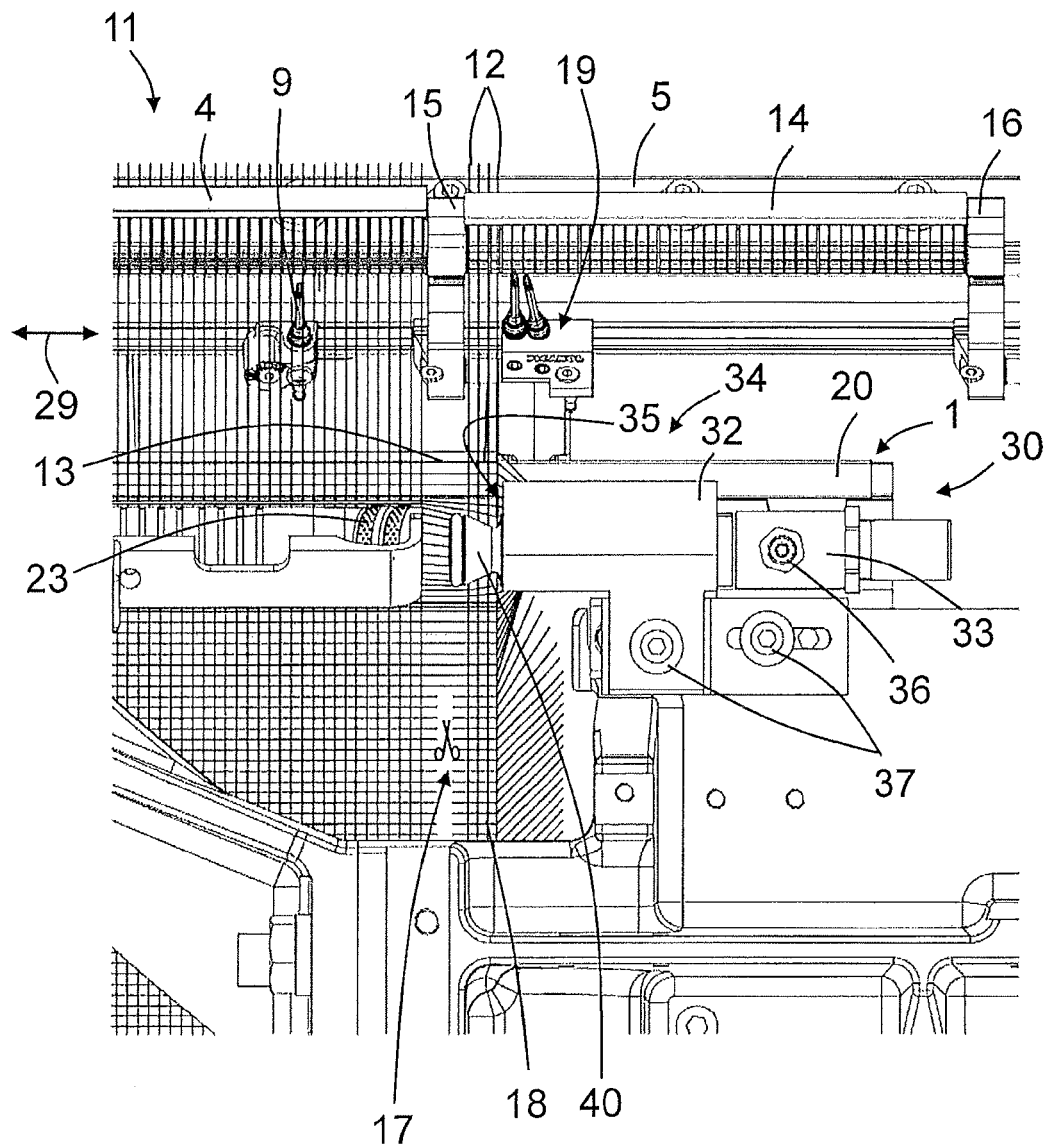


Fig. 7

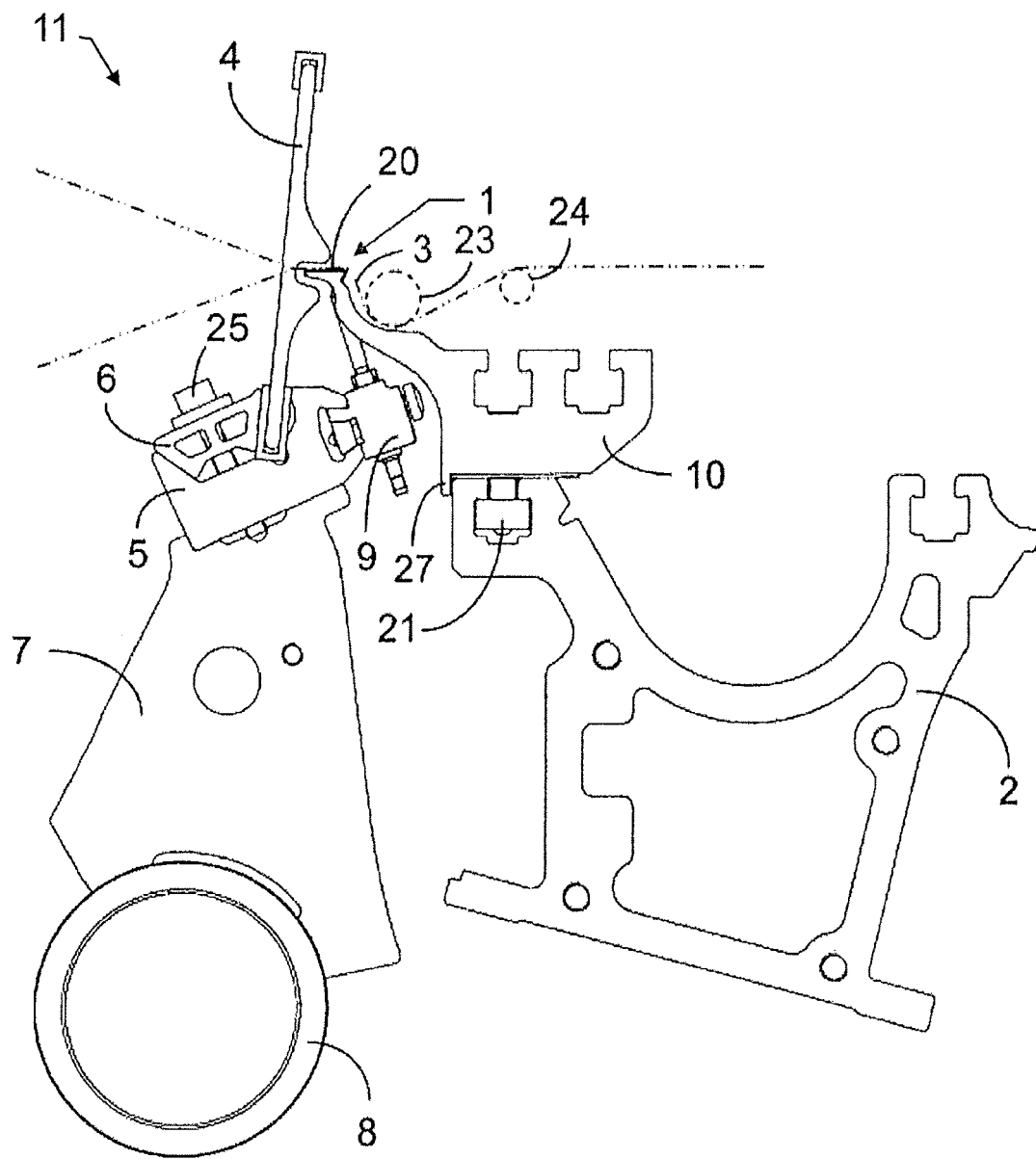


Fig. 8

REFERENCES CITED IN THE DESCRIPTION

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