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(54) NOZZLE WITH INTEGRATED SCISSORS FOR PNEUMATIC TUCK-IN DEVICE

DÜSE MIT INTEGRIERTER SCHERE FÜR PNEUMATISCHEN EINLEGELEISTENAPPARAT

TUYÈRE AVEC CISEAUX INTEGRÉS POUR APPAREIL PNEUMATIQUE DE LISIÈRES RENTRÉES

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(56) References cited:

EP-A1- 0 438 973 EP-B1- 1 280 950

EP-B1- 2 176 455

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EP 2 920 346 B1

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Description

Technical Field of the Invention

[0001] The invention relates to a multi-function weft inserting nozzle for a pneumatic filler for blowing a weft thread into a shed of a weaving loom. The multi-function weft inserting nozzle consists of a fixed and a movable part, wherein the fixed part is equipped with nozzles for inserting the weft back into the fabric. The nozzles are connected to holes for air intake and a slot connected with an inner nozzle, wherein the slot continues with a lead-in key for the weft lead-in.

State of the Art

[0002] The hitherto design of equipment for inserting the weft of a weaving loom is solved by using additional mechanic or pneumatic weft fillers. The disadvantage of hitherto known mechanic weft fillers is the large number of movable parts significantly reducing the speed of the weaving loom. Another disadvantage is the high operation temperature caused by a high number of mechanic components of the filler. Furthermore, it required a regular set-up which is a necessary precondition for its correct function. Other indispensable feature is also frequent wear and tear of filler components and its frequent faults. Thanks to significant dimensions of the whole set of a mechanic filler, the filler is not favourable for machine operation due to difficult lead-in of warp ends to heads and the beam in the field of the shed feeder.

[0003] On the other hand, the advantage of the pneumatic weft filler compared to the mechanic filler is its simple design, when the large number of mechanical parts is eliminated. The pneumatic weft filler can be used for high-speed machines, it has considerate weft inserting using air pressure, as the possible mechanical damage of the weft and the warp with the inserting hook taking the weft back into the fabric in case of mechanic filler is eliminated. The pneumatic filler of the weft is of small dimensions and so it is suitable for machine operation as it does not make an obstacle when inserting the warp threads in the field of the spreader.

[0004] The way of inserting the weft in both fillers is based on cutting of the weaved weft thread approximately 12 - 15 mm from the fabric edge and inserting the weft thread end using a hook (in case of the mechanic weft filler) or using the nozzle air pressure (in case of the pneumatic weft filler) back to the shed consisting of warp threads, when the end of the weft is tucked in the fabric by consequent shot. In case of manufacturing a fabric with the firm edge and the total width of the edge of 5 mm (so-called optic edge), the end of the inserted weft thread enters the fabric pattern in 7 - 10 mm. In such a case, the inserted weft thread doubles the texture of the fabric to approximately 12 - 15 mm from the fabric edge, which negatively affects not only the weaving on the machine, but also the consequent final finishing of the fabric.

This is caused by the construction of mechanic as well as pneumatic versions of weft fillers, when the minimal length of the cut end of the weft from the fabric is 12 - 15 mm. It is not possible to reduce the length of the cut weft end due to construction design of both filler types. The conditions are set by the constructional design of weft shears layout out of the weft inserting nozzle, as it can be seen in Fig. 3.

[0005] The ends of weft threads intervening with the pattern area of the fabric 12 - 15 mm from the fabric edge cause development of double texture / slay of the weft, which causes:

- increased number of warp breaks 12 - 15 mm from the fabric edge, which causes reduction of weaving loom productivity,
- disturbing appearance of the fabric pattern,
- corrugation of both edges of the fabric due to different tension of warp threads,
- difficult dying of the fabric due to double texture / slay of the weft in the pattern 12 - 15 mm from the edge of the fabric.

[0006] EP 2176455 B1 describes a design of commonly used pneumatic fillers, where a separate section of the weft inserting nozzle and a separate section of weft shears are fundamentals thereof. In this solution, the pneumatic nozzle does not form a fixed part on one side of weft shears. However, it is attached to the carrier of the nozzle which is fixed onto the frame. The section of the weft shears consists of the fixed part on which a stationary blade of the shears is mounted as well as of a movable blade of the shears. Therefore it is not a combination of the nozzle and the weft shears in one compact unit. The constructional design of the pneumatic weft filler as it is described in EP 2176455 does not enable cutting off and tucking in the weft-end back into the fabric in a comparable length, which results in higher consumption of the weft material and an undesirable effect on the appearance and the formation of the fabric's optical edge.

[0007] EP 1280950 B1 describes the design of commonly used pneumatic fillers, where a separate section of the weft inserting nozzle and a separate section of weft shears are fundamentals thereof. In this solution, the pneumatic nozzle does not form a fixed part on one side of weft shears, however, it serves for carrying the mount of the weft shears and thus the whole section of the weft shears. The section of the weft shears is attached to the carrier of the weft shears which is bolted onto the side of the nozzle body. The section of the weft shears consists of the fixed part to which a stationary blade of the shears is pinned and a movable blade of the shears is also a part thereof. It is thus not a combination of the nozzle and the weft shears in one integral unit. The constructional design of the pneumatic weft filler as it is described

in EP 1280950 B1 does not enable cutting off and tucking in the weft-end back into the fabric in a comparable length, which results in higher consumption of the weft material and an undesirable effect on the appearance and the formation of the fabric's optical edge.

Summary of the Invention

[0008] The aim of the invention is to design a new design solution of the multi-function nozzle inserting the weft by using air pressure for tucking it into the fabric and it simultaneously works as weft thread shears.

[0009] The above stated disadvantages of hitherto used weft fillers are eliminated by a multi-function weft inserting nozzle for a pneumatic filler for blowing a weft thread back into a shed of a weaving loom. The multi-function weft inserting nozzle consists of a fixed part and a movable part, wherein the fixed part is equipped with nozzles for inserting the weft back into the fabric. The nozzles are connected to holes for air intake. The multi-function weft inserting nozzle also comprises a slot connected with an inner nozzle, wherein the slot continues with a lead-in key. The movable part consists of a movable arm with a fastened movable edge, constituting a movable part of weft shears. The fixed part is on one of its sides equipped with a fixed edge, which is an integral part of the fixed part and which constitutes also a fixed part of the weft shears.

[0010] The main advantage of the multi-function weft inserting nozzle is based on the fact that it consists of the fixed part and the movable part, when the fixed part is equipped with nozzles for inserting the weft thread back into the fabric and it simultaneously makes the fixed part of the weft shears for cutting the weft with the movable arm with the shears edge, forming the movable part of the nozzle. It is thus a nozzle, which inserts the weft back into the fabric using air pressure and it simultaneously serves as the weft thread shears. This design of a multi-function weft inserting nozzle allows reducing the weft length inserted back into the fabric to max. 4 - 5 mm, when the end of the inserted weft does not extend beyond the fabric pattern, and thus it does not double the texture / slay of the weft in the pattern. The lead-in of the warp threads forming the lead-in of the fabric edge can be simultaneously adjusted so as to avoid different tension of warp threads of the fabric pattern and the edge.

[0011] The advantages of the multi-function weft inserting nozzle are as follows:

- possibility of use for all types of pneumatic fillers,
- reduction of the length of the inserted end of weft thread, which does not extend beyond the fabric pattern,
- weft material savings in approximately 16 - 20 mm per each pick,

- thanks to simplification of construction of the nozzle and weft shears it can be used also for high-speed machines with high reliability, when the edges of weft shears are - simultaneously, using the air intake to inserting nozzles - cooled down and this is independently cleaned from dust of weft material,

- thanks to the short end of the cut weft, the weft is placed in the shed more precisely and thus the total time of cut and weft inserting is reduced, while it is not necessary to brake and stabilise the weft before cutting,

- the multi-function weft inserting nozzle requires minimal maintenance and setup,

- due to balanced tension of warp threads in the pattern and in the fabric edge corrugation of the fabric edges and increased number of warp thread breaks does not appear, which secures higher productivity of the machine,

- disturbing appearance of the fabric due to smashed ends of the weft in the fabric pattern does not occur,

- problems during fabric finishing processes due to different tension of warp threads in the fabric and non-dyeing the fabric in the edge does not occur thanks to elimination of double texture/slay of the weft in 7 - 10 mm from the edge.

Brief Description of the Drawings

[0012] The invention will be explained using the drawings, where Fig. 1 shows the multi-function weft inserting nozzle from the side of nozzles for blowing the weft into the shed, Fig. 1a shows the detail of the slot for warp with inner nozzle, Fig. 2 shows the multi-function weft inserting nozzle with a movable and a fixed part equipped with edges creating the weft shears making its integral part and Fig. 3 shows the original version of the weft shears, which are always arranged as not being part of the inserting nozzle.

Exemplary Embodiment of the Invention

[0013] A multi-function weft inserting nozzle for a pneumatic weft filler will be explained in individual examples of its realisation. It is apparent that the below stated descriptions are an illustrative expression of application of the principles of this invention, but these are not limiting in any way and within the invention it is possible to perform technical and construction adjustments without going beyond the scope of the claim.

[0014] A multi-function weft inserting nozzle for a pneumatic weft filler, used for air-introduced edge of the fabric, is shown in Fig. 1, Fig. 1a and Fig. 2. The multi-function weft inserting nozzle consists of the fixed part **1** and the

movable part 2. The fixed part 1 of the multi-function weft inserting nozzle is equipped on one of its sides with a fixed edge 5, which forms its integral part. The fixed edge 5 is one of the parts of weft shears, while - so as to arrange long service life of weft shears - the fixed edge 5 is made of noble steel. When blowing (inserting) the weft 9 back to the shed, the other side of the fixed part 1 of the multi-function nozzle is equipped with several nozzles 7 for inserting the weft 9. The nozzles 7 serve for inserting the weft 9 to the shed and they are placed on both sides of the slot 6, which is connected with the inner nozzle. For lead-in of the weft 9 to the slot 6, the fixed part 1 of the multi-function weft inserting nozzle is also equipped with the lead-in key 8, which passes into the slot 6 designed for blowing the cut weft 9 from the slot 6. On the upper part of the fixed part 1 of the multi-function weft inserting nozzle, holes 3 are created for air intake to nozzles 7 for inserting the weft 9.

[0015] The movable part 2 of the multi-function weft inserting nozzle consists of a movable arm which meets the function of a movable edge of weft shears. The movable arm holds a movable edge 4, made of noble steel, which guarantees its long service life as well as a long service life of weft shears as a whole.

[0016] The multi-function weft inserting nozzle forms a part of the complete set of pneumatic filler. The weaving loom includes two pneumatic fillers. One of them is designed for inserting the weft 9 of the fixed edge for the left side of the fabric and the other one for inserting the weft 9 of the fixed edge for the right side of the fabric. In the course of the weaving process, the inserted weft 9 in the shed is hit by the beam to the fabric, when the weft 9 goes perpendicularly to the fixed part 1 of the multi-function weft inserting nozzle and it leads in across the lead-in key 8 of the weft 9 to the slot 6 with the inner nozzle for blowing out the cut weft 9 from the slot 6. After the hit of the weft 9 by the beam to the fabric, the weft 9 is cut by the edge 4 of the weft shears, which is movable, and then the weft 9 is blown out of the slot 6 using the inner nozzle 6 and the end of the weft 9 is blown by nozzles 7 to a new shed. The whole procedure of inserting the weft 9 into the fabric is performed simultaneously on the left and the right filler of the weft 9. The length of the cut end of the weft for inserting it back to the fabric depends on the total thickness of the wall of the fixed part 1 of the multi-function weft inserting nozzle.

Industrial Applicability

[0017] The multi-function weft inserting nozzle makes a part of the complete set of the pneumatic filler. Such a device is used as an additional device to a weaving loom, when fixed edge of the fabric is required.

LIST OF REFERENCE SIGNS

[0018]

- 1 Fixed part
- 2 Movable part
- 3 Air intake holes
- 4 Movable edge
- 5 Fixed edge
- 6 Slot for weft with an inner nozzle
- 7 Nozzle for weft insertion
- 8 Lead-in key
- 9 Weft

Claims

1. A multi-function weft inserting nozzle for a pneumatic filler for blowing a weft thread back into a shed of a weaving loom, wherein the multi-function weft inserting nozzle consists of a fixed part (1) and a movable part (2), wherein the fixed part (1) is equipped with nozzles (7) for inserting the weft back into the fabric, and the nozzles (7) are connected to holes (3) for air intake, wherein the multi-function weft inserting nozzle also comprises a slot (6) connected with an inner nozzle, wherein the slot (6) continues with a lead-in key (8), wherein the movable part (2) consists of a movable arm with a fastened movable edge (4), constituting a movable part of weft shears, and **characterised in that** the fixed part (1) is on one of its sides equipped with a fixed edge (5) which is an integral part of the fixed part (1) and which constitutes also a fixed part of the weft shears.

Patentansprüche

1. Mehrzweck-Schussfülldüse für einen pneumatischen Füller zum Zurückwehen eines Schussfadens in ein Fach eines Webstuhles, wobei die Mehrzweck-Schussfülldüse aus einem festen Teil (1) und einem beweglichen Teil (2) besteht, wobei der feste Teil (1) mit Düsen (7) zum Zurückfüllen des Schusses ins Gewebe versehen ist, und die Düsen (7) mit Lufteinlasslöchern (3) verbunden sind, wobei die Mehrzweck-Schussfülldüse auch einen mit einem Innendüse verbundenen Schlitz (6) aufweist, wobei der Schlitz (6) mit einem Einführungskeil (8) fortsetzt, wobei der bewegliche Teil (2) aus einem beweglichen Arm mit einer befestigten beweglichen Schneide (4) besteht, wodurch der bewegliche Teil einer Schussschere gebildet wird, und **dadurch gekennzeichnet, dass** der feste Teil (1) mit einer festen Schneide (5) auf einer seiner Seiten versehen ist, die einen integralen Teil des festen Teiles (1) bildet und die den festen Teil der Schussschere bildet.

Revendications

1. Buse de remplissage de trame multifonction pour un

remplisseur pneumatique pour resouffler un fil de trame dans une foule d'un métier à tisser, où la buse de remplissage de trame multifonction est constituée d'une partie (1) fixe et d'une partie (2) mobile, où la partie (1) fixe est munie des buses (7) pour remplir la trame dans le tissu, et les buses (7) sont reliées à des trous (3) d'entrée d'air, où la buse de remplissage de trame multifonction comprend aussi une fente (6) reliée à une buse intérieur, où la fente (6) continue avec une clavette (8) d'entrée, où la partie (2) mobile est constituée d'un bras mobile avec un tranchant (4) attaché mobile, constituant la partie mobile d'une cisaille à trame, et **caractérisée en ce que** la partie (1) fixe est munie sur l'une de ses faces d'un tranchant (5) fixe qui fait partie intégrale de la partie (1) fixe et qui constitue également la partie fixe de la cisaille à trame.

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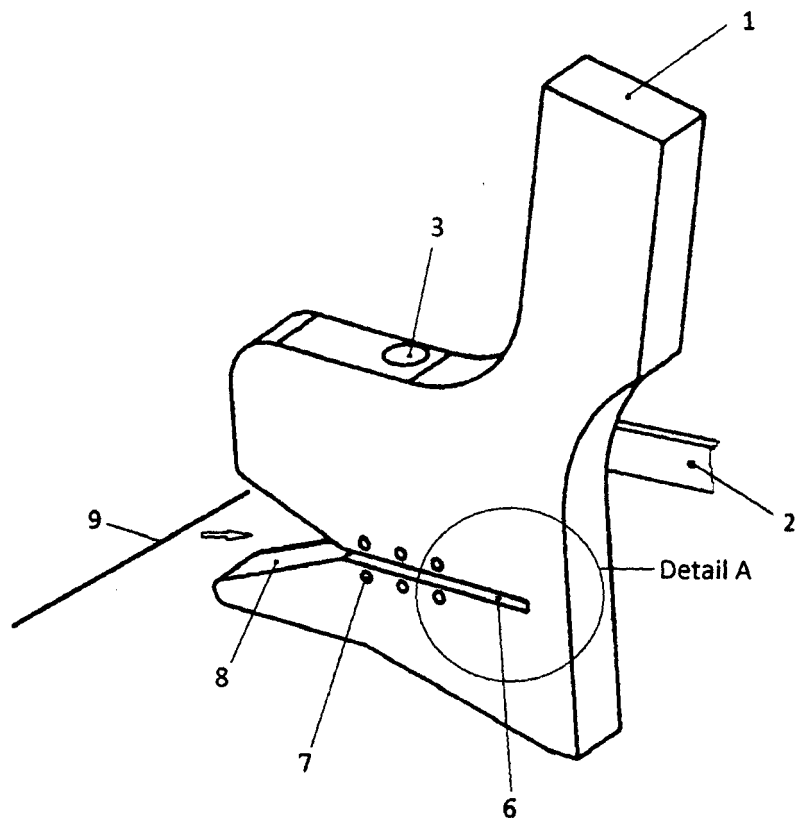


Fig. 1

Detail A

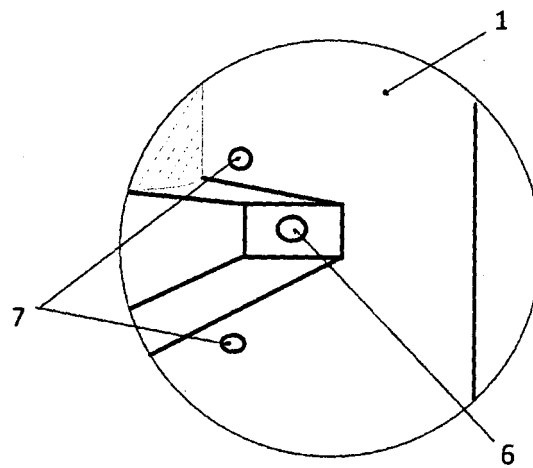


Fig. 1a

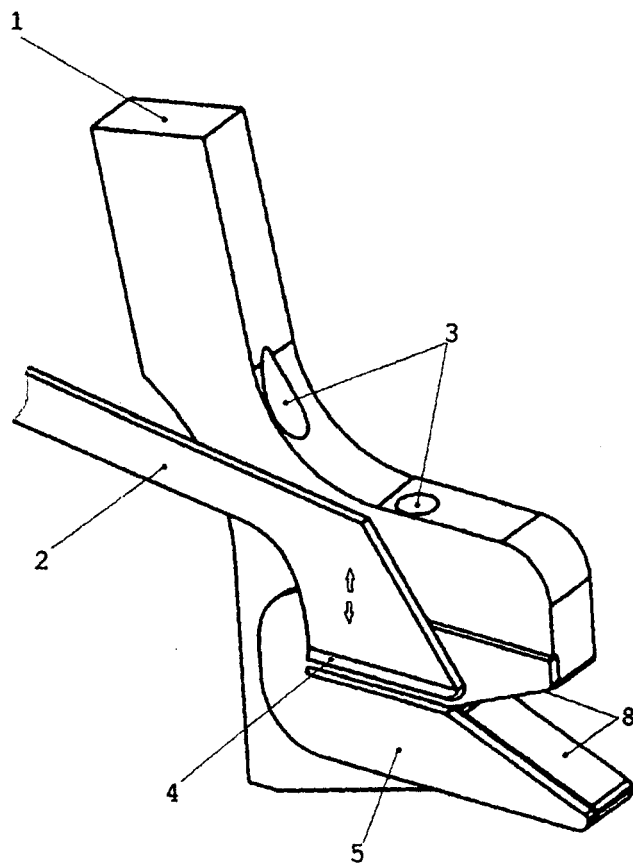


Fig. 2

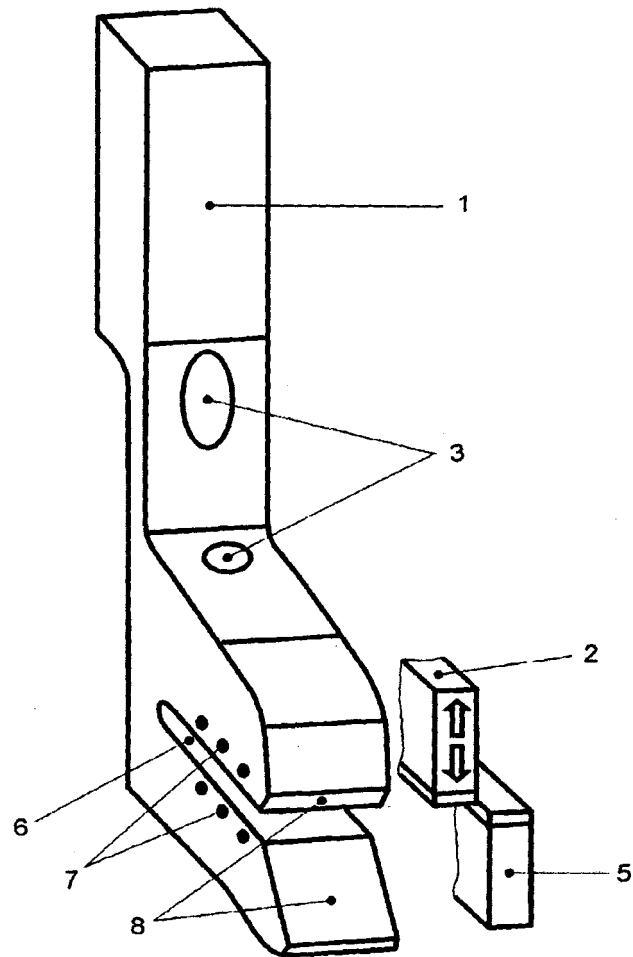


Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 2176455 B1 [0006]
- EP 2176455 A [0006]
- EP 1280950 B1 [0007]