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(54) **Pneumatic weft end tension device for air looms.**

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Description

The present invention relates to a pneumatic weft end tension device for air looms, apt to keep the weft yarn tensioned after it has been inserted into the shed and until the end of reed beat-up.

It is known that, in air looms, the weft yarn is inserted into the shed by a plurality of nozzles fed with compressed air. More precisely, the weft yarn is launched into the shed by a main nozzle, positioned at the inlet side of the loom, and it is guided and sustained along the shed by a plurality of secondary nozzles, provided in correspondence of a shaped launching channel formed by the reed blades.

Upstream of the main nozzle there is a measuring weft feeder, which feeds the weft yarn, measuring the exact length required. The weft yarn thus unwinds from the weft feeder, thanks to the air jets blown by the aforespecified nozzles, and fully stretches along the shed. Seen the high speed at which this operation takes place, the weft yarn - firmly held at one end by the stopping means provided on the weft feeder - undergoes, after it has been stretched along the shed, a kind of rebound which imparts thereon a succession of longitudinal oscillations, varying in amplitude according to the elasticity of the yarn.

It is quite evident that, in these conditions, reed beat-up has to be postponed until the aforementioned weft yarn oscillations have dampened, so as to avoid weaving a fabric with weft yarns which are either too loose or too tense. This delay - which, as said, becomes particularly evident when weaving highly elastic yarns - besides obviously slowing down the weaving operation, also determines an increase of compressed air consumption, since the secondary nozzles - or at least those positioned towards the end of the shed - have to keep operative up to complete damping of the yarn oscillations.

To overcome these drawbacks, it has been proposed to adopt the so-called weft "end" tension devices, which are positioned on the loom side opposite to that of the main nozzle, and which catch the free end of the weft yarn and keep it under tension until reed beat-up has taken place. Said known devices generally comprise a closed duct, including at least one sharp bend and having its inlet positioned beside or behind the reed, in correspondence of the weft yarn launching channel, as well as pneumatic means apt to create an air stream inside said duct.

The direction of said air stream inside the duct and the positioning of this latter are such that the weft yarn is sucked therein, and is braked against the walls of said duct in correspondence of said bend; this prevents its longitudinal oscillations, or

anyhow causes the damping thereof in a very short lapse of time.

These known type devices, though having solved on one hand the problem of a safe and reliable weft end tension, require on the other hand an additional member (the above duct) which, besides an extra cost, also involves other inconveniences. In fact, as well as creating problems of space, said duct also needs to be precisely positioned in order to correctly perform its function, thereby requiring toilsome adjustments each time it has to be adapted to the weaving of different fabric widths or of different yarn counts. It should also be noted that, in the known weft tension devices, the weft yarn has to cross the whole duct in order to be efficiently braked therein, whereby it is often necessary for the measuring weft feeder to feed an additional yarn length, with a consequent waste of yarn.

Document EP-A-0 133 153 discloses a weft yarn tensioning device in which a pneumatic duct is provided fixable at different positions across the width of the reed.

The object of the present invention is to therefore supply a weft end tension device having a far simpler structure than those of known technique and, in particular, requiring no special duct members to efficiently brake the free weft yarn end.

Another object of the present invention is to supply a weft end tension device which needs no special positioning adjustments, and which can thus be promptly shifted and adapted to different positions of the free weft yarn end, when weaving fabrics of different widths.

A further object of the present invention is to prevent any yarn waste, since no additional yarn length is required for an efficient braking thereof.

According to the present invention, said objects are reached by means of a pneumatic weft end tension device for air looms - of the type in which the free weft yarn end, close to the outlet of the shed, is pneumatically deviated into a duct providing for at least one change of direction in respect of the direction taken up by the weft yarn in the shed - characterized in that said duct is formed by two adjacent blades of the reed, suitably spread apart, through which is blown an air stream apt to deviate therein the free end of the weft yarn.

Further characteristics and advantages of the device according to the present invention will anyhow result more evident from the following detailed description of a preferred embodiment thereof, illustrated by way of example on the accompanying drawings, in which:

Fig. 1 is a front view of the device of the present invention; and

Fig. 2 is a cross section view, along the line II-II of fig. 1, of the same device.

The weft end tension device of the present invention comprises a blower 1, consisting of a tube with circular section flattened at its free end, so that its outlet orifice is practically straight. The flattened end part 1a of the blower is moreover oblique in respect of the longitudinal axis of the tube, so that its outlet orifice faces the reed and is inclined in respect of a vertical line by an angle of less than 45°.

The other end of the blower 1 is fixed to a block 2 slidable along a guide 3 of the sley 4. The length of the blower 1 is calculated so that its free end 1a may be positioned between two adjacent reed blades 6 - to the side of the fabric being woven and thus beyond the split selvage zone - and may spread them apart, so as to form a duct 5. The block 2 is connected - in known manner - to a pneumatic pipe 7, fed with compressed air by operating a solenoid valve 8.

The operation of the weft end tension device of the present invention is simple and efficient. In fact, when the weft yarn travelling along the launching channel 9 of the reed reaches the blower 1, the solenoid valve 8 is opened so as to feed compressed air into said blower 1. This produces an air stream between the reed blades 6 - spread apart by the blower 1 - thus deviating therein the free weft yarn end.

The canalization effect determined by the spreading apart of the blades 6, together with the particular shape and positioning of the free end 1a of the blower 1, are such as to guarantee that the air blown by said blower creates no turbulences, and that a regular air stream is sent through the duct 5 - i.e. from the front to the rear of the reed - into which the free weft yarn end is thus safely and unfailingly guided, independently from its count and elasticity.

The sharp deviation imparted on the yarn and the friction produced by its rubbing against the walls of the blades 6, between which said yarn has been deviated, form - of course, as long as the blower 1 is fed with compressed air through the solenoid valve 8 - a perfect weft yarn braking system. The yarn can thus be tensioned to the desired extent - which is also adjustable by varying the air pressure into the blower 1 - thereby promptly damping any longitudinal yarn oscillations.

Since the weft end tension device of the present invention is mounted beyond the split selvage zone, it can continue to let out air also during closing of the shed, namely when the last secondary nozzles must have already stopped blowing (and thus keeping the weft yarn tensioned) to avoid disturbing or even breaking the warp yarns, especially when these consist of fine yarns or are formed with delicate fibres. The perfect and regular tensioning of the weft yarn is thus guar-

anteed through the whole weaving operation, namely until the weft yarn has been fully woven into the fabric.

To prevent dust from reaching the warp yarns, on account of the air jets blown by the blower 1, a deviating screen 10 can usefully be added to the weft end tension device of the present invention. Said screen 10 is positioned over the rear surface of the reed and is slidable along the top part 11 thereof, being fixed thereto in the wanted position by two screws 12. The air stream is so deviated in a direction parallel to the reed, preventing dust from being undesirably conveyed towards the warp yarns.

From the previous description, it is quite evident how the weft end tension device of the present invention has fully reached the intended objects. Said weft end tension device is in fact essentially simple - it practically consists of a blower and the respective control valve - and thus of minimum cost. Furthermore, it requires no specific additional duct member - since it makes use of the reed blades suitably spread apart to form a duct - thus being practically all positioned below the fabric weaving plane with no waste of space in the weaving area. Finally, thanks to the slidable fixing system of the block 2 carrying the blower 1, this latter can be shifted with greatest rapidity and precision in any new required position, when changing over from one weaving operation to another with a fabric of different width. Said block 2 can be firmly fixed into the required position by simply tightening the socket head screw 13 mounted thereon.

The invention has been described with reference to a preferred embodiment thereof, but it is evident that it should not be limited to the same. The protection scope of the invention hence covers any possible modifications and improvements within reach of a technician skilled in the art, falling within the definition of the invention given in the following claims.

Claims

1. Pneumatic weft end tension device for air looms - of the type in which the free weft yarn end, close to the outlet of the shed, is pneumatically deviated into a duct providing for at least one change of direction in respect of the direction taken up by the weft yarn in the shed - characterized in that said duct (5) is formed by two adjacent blades (6) of the reed, suitably spread apart, through which is blown an air stream apt to deviate therein the free end of the weft yarn.

2. Pneumatic weft end tension device as in claim 1), wherein said air stream is blown by a blower (1) interposed between said blades (6) and apt to simultaneously spread them apart.
3. Pneumatic weft end tension device as in claim 2), wherein said blower (1) consists of a tube with circular section flattened at its free end (1a), the outlet orifice of which is substantially straight and oblique in respect of the longitudinal axis of the tube and ends in proximity of the lower part of the weft launching channel (9) of the reed.
4. Pneumatic weft end tension device as in claim 3), wherein said straight outlet orifice of the blower (1) faces the reed and forms with a vertical line an angle below 45°.
5. Pneumatic weft end tension device as in claim 2), wherein said blower (1) is fixed to a block (2) slidable along the sley (4) by guide means (3) and apt to be fixed thereto, in a position at will, by screw means (13).
6. Pneumatic weft end tension device as in claim 1), comprising also a screen (10) positioned over the rear surface of the reed and apt to deviate said air stream in a direction substantially parallel to the reed.
7. Pneumatic weft end tension device as in claim 6), wherein said screen (10) is slidable along the top part (11) of the reed and can be fixed thereto by screws (12).

Patentansprüche

1. Pneumatische Vorrichtung zum Spannen des Schußfadenendes in Luftdüsenwebmaschinen - des Typs, bei dem das freie Schußfadenende, nahe dem Auslaß des Faches, pneumatisch in eine Durchführung (5) abgelenkt wird, so daß für wenigstens eine Richtungsänderung in bezug auf die Richtung, die von dem Schußfaden in dem Fach genommen wird, gesorgt wird -, dadurch gekennzeichnet, daß die Durchführung (5) durch zwei benachbarte Lamellen (6) des Rietes gebildet wird, in geeigneter Weise voneinander beabstandet, durch die ein Luftstrom geblasen wird, der dazu geeignet ist, darin das freie Ende des Schußfadens abzulenken.
2. Pneumatische Vorrichtung zum Spannen des Schußfadenendes nach Anspruch 1, bei der der Luftstrom von einem Gebläse (1) geblasen wird, das zwischen den Lamellen (6) angeordnet ist, und dazu ausgelegt ist, sie gleichzeitig

beabstandet zu halten.

3. Pneumatische Vorrichtung zum Spannen des Schußfadenendes nach Anspruch 2, bei dem das Gebläse (1) aus einem Rohr mit einem kreisförmigen Querschnitt besteht, das an seinem freien Ende (1a) abgeflacht ist, wobei dessen Auslaßöffnung im wesentlichen gerade und abgeschrägt in bezug auf die Längsachse des Rohres ist und in der Nähe des unteren Teiles des Schußfadenkopplungskanals (9) des Rietes endet.
4. Pneumatische Vorrichtung zum Spannen des Schußfadenendes nach Anspruch 3, bei der die gerade Auslaßöffnung des Gebläses (1) dem Riet zugewandt ist und mit einer vertikalen Linie einen Winkel unter 45° bildet.
5. Pneumatische Vorrichtung zum Spannen des Schußfadenendes nach Anspruch 2, bei der das Gebläse (1) an einem Block (2) befestigt ist, der durch eine Führungseinrichtung (3) entlang der Lade (4) gleitbar und dazu ausgelegt, daran befestigt zu sein, ist, in einer beliebigen Position, durch Schraubeinrichtungen (13).
6. Pneumatische Vorrichtung zum Spannen des Schußfadenendes nach Anspruch 1, die auch eine Blende (10) aufweist, die über der rückwärtigen Fläche des Rietes angeordnet und dazu ausgelegt ist, den Luftstrom in eine Richtung abzulenken, die im wesentlichen parallel zu dem Riet ist.
7. Pneumatische Vorrichtung zum Spannen des Schußfadenendes nach Anspruch 6, bei der die Blende (10) entlang des oberen Teiles (11) des Rietes gleitbar ist und daran mit Schrauben (12) befestigt werden kann.

Revendications

1. Dispositif pneumatique de tension d'extrémité de trame pour métiers à jets d'air - du type dans lequel l'extrémité libre du fil de trame, près de la sortie de la foule, est déviée pneumatiquement dans un conduit prévoyant au moins un changement de direction par rapport à la direction prise par le fil de trame dans la foule - caractérisé en ce que ledit conduit (5) est formé par deux lames (6) adjacentes du peigne, écartées de manière appropriée, dans lequel est soufflé un flux d'air apte à dévier en son sein l'extrémité libre du fil de trame.
2. Dispositif pneumatique de tension d'extrémité de trame selon la revendication 1, dans lequel

ledit flux d'air est soufflé par un organe de soufflage (1) disposé entre lesdites lames (6) et apte à écarter les lames simultanément.

3. Dispositif pneumatique de tension d'extrémité de trame selon la revendication 2, dans lequel ledit organe de soufflage (1) consiste en un tube de section circulaire aplati à son extrémité libre (1a), dont l'orifice de sortie est sensiblement rectiligne et oblique par rapport à l'axe longitudinal du tube et se termine à proximité de la partie inférieure du canal de projection de trame (9) du peigne. 5
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4. Dispositif pneumatique de tension d'extrémité de trame selon la revendication 3, dans lequel ledit orifice de sortie rectiligne de l'organe de soufflage (1) donne sur le peigne et forme avec une ligne verticale un angle inférieur à 45°. 15
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5. Dispositif pneumatique de tension d'extrémité de trame selon la revendication 2, dans lequel ledit organe de soufflage (1) est fixé à un bloc (2) pouvant coulisser le long du battant (4) au moyen d'un guide (3) et apte à être fixé à ce dernier, dans la position voulue, par une vis 13. 25
6. Dispositif pneumatique de tension d'extrémité de trame selon la revendication 1, comprenant un écran (10) positionné sur la surface arrière du peigne et apte à dévier ledit flux d'air dans une direction parallèle au peigne. 30
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7. Dispositif pneumatique de tension d'extrémité de trame selon la revendication 6, dans lequel ledit écran (10) peut coulisser le long de la partie supérieure (11) du peigne et peut être fixé à celui-ci par des vis (12). 40

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