(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 253 099 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
07.12.2005 Bulletin 2005/49

(51) Int Cl.[7]: **B65H 59/40**

(21) Application number: **02007814.3**

(22) Date of filing: **08.04.2002**

(54) **Improved device for measuring the mechanical tension of the yarn in weaving systems and the like**

Verbesserte Vorrichtung zum Messen der mechanischen Fadenspannung in Webeanlagen und dergleichen

Dispositif amélioré pour mesurer la tension mécanique de fil dans des systèmes de tissage et similaires

(84) Designated Contracting States:
BE CH DE IT LI SE

(30) Priority: **27.04.2001 IT TO010060**

(43) Date of publication of application:
30.10.2002 Bulletin 2002/44

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Description

[0001] "Improved device for measuring the mechanical tension of the yarn in weaving systems and the like"

[0002] This invention is concerned with an improved device for measuring the mechanical tension of the yarn in weaving systems and the like, and more particularly a measuring device capable of generating an analog signal proportional to the mechanical tension acting on the yarn being monitored. The analog signal is typically used as a feedback in the control circuit of a yarn braking device, in order to keep constant the mechanical tension in the yarn.

[0003] In order to measure the mechanical tension of the yarn, it is known to use devices comprising a sensor, generally consisting of a strain gauge or a piezoelectric sensor, and pressed by the yarn, which is tensioned between two thread guide eyelets that are suitably spaced on a rectilinear support, and between which the sensor is arranged (EP-A-0 574 062).

[0004] As it appears on Fig. 1 of the attached drawings, which shows a known measuring device, a sensor **S** is placed outside the plane of rectilinear support **X** on which two thread guide eyelets **O1-O2** are borne, so that yarn **F** leans on said sensor, deviating from a straight path and defining a broken line path whose vertex lies on sensor **S,** where the adjacent path segments join in such a way as to form an angle α.

[0005] In order to accurately measure the mechanical tension in the yarn, said angle α at the vertex of the yarn path must have a predetermined value resulting from the tangential contact of the yarn with points **a** and **b** of eyelets **O1-O2.** Moreover, that value must not change during the operation of the device, e. g. in consequence of an undesired displacement or an faulty arrangement, causing the contact between the yarn and the thread guide eyelets to move towards points **A** and **B,** and thereby changing angle α.

[0006] It is the main object of the present invention to improve the known device of Fig. 1 in such a way as to prevent any change of the angle α with which the yarn leans on the sensor, and to provide an accurate and reliable measure of the mechanical tension in the yarn, independently of any accidental or intentional cause which may produce undesired changes or faulty inclinations of angle α.

[0007] This object is achieved, according to the present invention, by means of an improved device having the features defined in the following claims.

[0008] Substantially, this invention is based on the innovative concept of inclining the two thread guide eyelets in opposite directions -with respect to the rectilinear support- so that the yarn passes diagonally through the eye of each thread guide eyelet, while maintaining contact with two diametrically opposite points of the eyelet which are symmetrical with respect to the centre of the eyelet. The inclination of the path segments preferably equals the inclination of the diagonal of the eye of the corresponding thread guide eyelet, which joins said yarn contact points.

[0009] The features, aims and advantages of the improved device according to the present invention will appear from the following detailed description, with reference to the attached drawings, wherein:

Fig. 1 is a schematic view of said known device,

Fig. 2 is a schematic view the like to Fig. 1 showing the improved device that is object of the present invention,

Fig. 3 is a detail to an enlarged scale of Fig. 2.

[0010] As shown in Fig. 1, a yarn **F,** passing through two thread guide eyelets **O1-O2** of a known device **D,** leans on sensor **S** placed between said eyelets in such a way as to define a broken line path comprising two inclined path segments **T1-T2,** which are tangent to the respective eyelets in points **a** and **b** and join at sensor **S,** in such a way as to form an angle α.

[0011] From inspection of the drawing of Fig. 1, it will be evident that, if the contact zones of the path segments with the respective thread guide eyelets during operation of the device move towards points **A** and **B** of the eyelets, whether accidentally or not, said path segments will become aligned along corresponding dashed segments **T'1-T'2,** with a corresponding change of the angle α and, consequently, of the measure signal se generated by sensor **S**.

[0012] In order to avoid that drawback, the present invention provides the improved device **D'** shown in Fig. 2, comprising two thread guide eyelets **O'1-O'2** that are inclined, in opposite directions, with respect to rectilinear support **X,** so that the yarn passes diagonally through the eye of each thread guide eyelet while mantaining contact with two diametrically opposite points **C1-C2** of the eyelets, which are symmetrical with respect to the centre of the eyelet itself (Fig. 3). The inclination of the eyelets with respect to support **X** is preferably adjustable by means of respective hinged linkages **CE1-CE2** which are lockable in position, and is chosen so that the yarn comes into contact with said points **C1-C2** of the eyelets. That condition keeps constant the inclination of yarn path segments **T1-T2,** in the spans between each of the eyelets and sensor **S'**. Moreover, the inclination of said path segments **T1-T2** preferably equals the inclination of the diagonal **d** of the eye of the corresponding thread guide eyelet (Fig. 3) which joins said contact points **C1-C2.**

[0013] By this arrangement, a predetermined, constant inclination α between path segments **T1-T2** is obtained, according to the stated aim, in the spans between sensor **S'** and the two thread guide eyelets, independently of the incoming and outgoing directions of the yarn, respectively upstream and downstream the eyelets with reference to the sliding motion of the yarn.

Claims

1. A device for measuring the mechanical tension of a yarn in a weaving system, comprising a pair of thread guide eyelets spaced on a rectilinear support (X) and a sensor (S) interposed between said eyelets, externally to the rectilinear support, bearing the pressure of the yarn as it runs from one eyelet to the other and defining two path segments mutually inclined at a predetermined angle (α), **characterized in that** said thread guide eyelets (O'1-O'2) are inclined in opposite directions with respect to the rectilinear support (X) so that the yarn (F) passes diagonally through the eye of each thread guide eyelet; and **in that** the inclination of eyelets with respect to the support (X) is chosen so that the yarn comes into contact with two diametrically opposite points (C1-C2) of each eyelet, which are symmetrical with respect to the centre of the eyelet itself, whereby the inclination of path segments (T1-T2) of the yarn in the spans between each eyelet and sensor (S') is kept constant and, correspondingly, the angle (α) between said path segments is also kept unchanged, independently of the incoming and outgoing directions of the yarn upstream and downstream of said thread guide eyelets (O1-O2).

2. The device of claim 1, **characterized in that** the inclination of each path segment (T1-T2) equals the inclination of the diagonal (d) of the eye of the corresponding thread guide eyelet which joins said two contact points (C1-C2) of the yarn with the eyelet.

3. The device of claim 1 or 2, **characterized in that** said thread guide eyelets (O1-O2) are linked to said rectilinear support (X) by means of respective hinged linkages (CE1-CE2) that are lockable in position, thereby allowing the relative inclination of said eyelets with respect to said support (X) to be adjusted.

Patentansprüche

1. Vorrichtung zum Messen der mechanischen Spannung eines Garns in einer Webanlage, mit einem Paar auf einer geradlinigen Abstützung (X) voneinander beabstandeten Fadenführungsösen und einem außerhalb der geradlinigen Abstützung zwischen den Ösen angeordneten Sensor (S), der den Druck des Garns aufnimmt, während es von einer Öse zu der anderen läuft, und zwei gegenseitig unter einem vorgegebenen Winkel (α) geneigte Wegssegmente festlegt,
dadurch gekennzeichnet, dass die Fadenführungsösen (O'1-O'2) bezüglich der geradlinigen Abstützung (X) in entgegengesetzte Richtungen geneigt sind, so dass das Garn (F) diagonal durch das Auge jeder Fadenführungsöse verläuft, und dass die Neigung der Ösen bezüglich der Abstützung (X) so gewählt ist, dass das Garn in Kontakt mit zwei diametral gegenüberliegenden Punkten (C1-C2) jeder Öse kommt, die bezüglich des Zentrums der Öse selbst symmetrisch sind, wodurch die Neigung der Wegsegmente (T1-T2) des Garns in der Spannweite zwischen jeder Öse und dem Sensor (S') konstant gehalten und dementsprechend der Winkel (α) zwischen den Wegsegmenten ebenfalls unverändert gehalten wird, unabhängig von der einlaufenden und abgehenden Richtung des Garns stromaufwärts und stromabwärts der Fadenführungsösen (O1-O2).

2. Vorrichtung nach Anspruch 1,
dadurch gekennzeichnet, dass die Neigung jedes Wegsegmentes (T1-T2) der Neigung der Diagonalen (d) des Auges der entsprechenden Fadenführungsöse entspricht, welche die zwei Kontaktpunkte (C1-C2) des Garns mit der Öse verbindet.

3. Vorrichtung nach Anspruch 1 oder 2,
dadurch gekennzeichnet, dass die Fadenführungsösen (O1-O2) mit der geradlinigen Abstützung (X) durch zugehörige schwenkbare Anlenkungen (CE1-CE2) verbunden sind, die in Stellung arretierbar sind, wodurch sie es gestatten, die relative Neigung der Ösen bezüglich der Abstützung (X) einzustellen.

Revendications

1. Dispositif de mesure de la tension mécanique d'un fil dans un système de tissage, qui comprend deux oeillets de guidage de fil disposés à distance sur un support rectiligne (X) et un détecteur (S) qui est intercalé entre lesdits oeillets, qui est situé à l'extérieur dudit support rectiligne, qui reprend la pression du fil à mesure qu'il se déplace d'un oeillet à l'autre et qui définit deux segments de parcours inclinés l'un par rapport à l'autre sous un angle prédéterminé (α), **caractérisé en ce que** lesdits oeillets de guidage de fil (O'1-O'2) sont inclinés dans des directions opposées par rapport au support rectiligne (X) de telle sorte que le fil (F) traverse en diagonale l'oeil de chaque oeillet de guidage de fil et **en ce que** l'inclinaison des oeillets par rapport au support (X) est sélectionnée de telle sorte que le fil entre en contact avec deux points diamétralement opposés (C1-C2) de chaque oeillet, qui sont symétriques par rapport au centre de l'oeillet proprement dit, l'inclinaison des segments de parcours (T1-T2) du fil situés dans l'étendue entre chaque oeillet et le détecteur (S') étant maintenue constante et, de manière correspondante, l'angle (α) formé entre lesdits segments de parcours étant égale-

ment maintenu inchangé quelles que soient la direction d'entrée et de la direction de sortie du fil en amont et en aval desdits oeillets de guidage de fil (O1-O2).

2. Dispositif selon la revendication 1, **caractérisé en ce que** l'inclinaison de chaque segment de parcours (T1-T2) est égale à l'inclinaison de la diagonale (d) de l'oeil de l'oeillet de guidage de fil correspondant qui relie lesdits deux points de contact (C1-C2) du fil avec l'oeillet.

3. Dispositif selon les revendications 1 ou 2, **caractérisé en ce que** lesdits oeillets de guidage de fil (O1-O2) sont reliés audit support rectiligne (X) au moyen de liaisons articulées respectives (CE1-CE2) dont la position peut être verrouillée, ce qui permet d'ajuster l'inclinaison desdits oeillets par rapport audit support (X).

Fig. 1

PRIOR ART

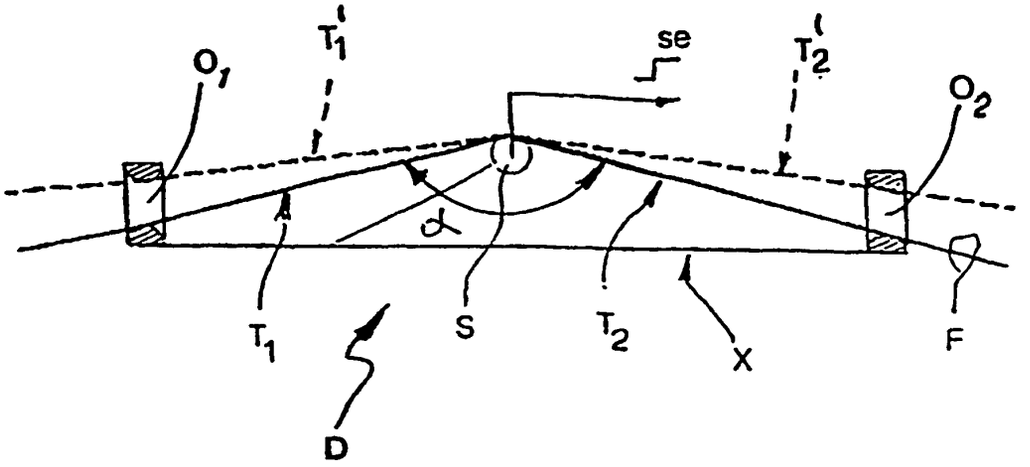

Fig. 2

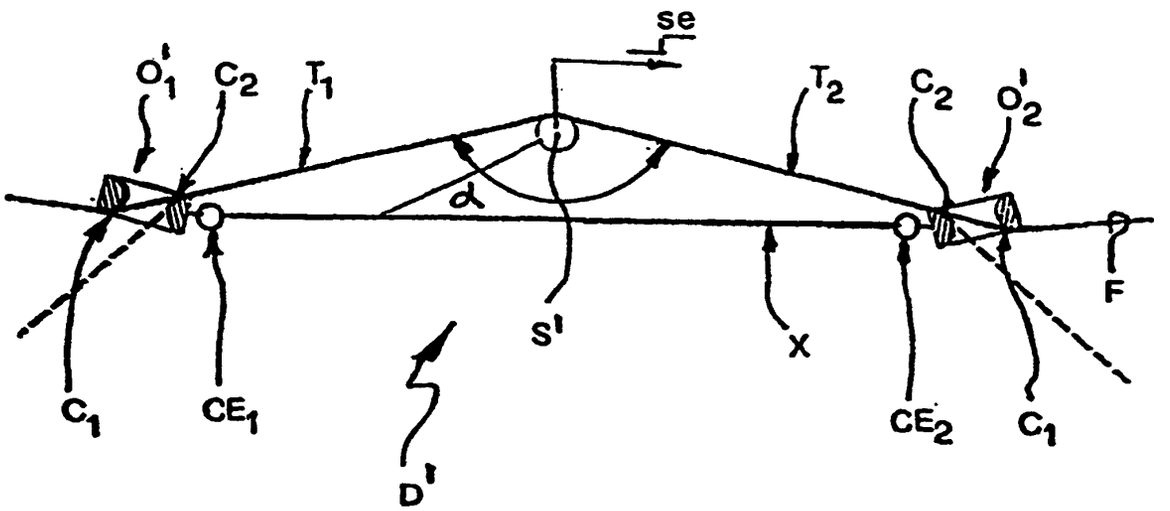

Fig. 3