



(11) **EP 1 595 983 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
10.03.2010 Bulletin 2010/10

(21) Application number: **04704244.5**

(22) Date of filing: **22.01.2004**

(51) Int Cl.:
D01H 7/92 (2006.01)

(86) International application number:
PCT/ES2004/000028

(87) International publication number:
WO 2004/065673 (05.08.2004 Gazette 2004/32)

(54) **MULTI-DEVICE MACHINE FOR TREATING THREAD BEFORE WEAVING, APPLYING A PROVISIONAL MECHANICAL TREATMENT**

MULTIGERÄT-MASCHINE ZUR BEHANDLUNG VON FÄDEN VOR DEM WEBEN UNTER ANWENDUNG EINER PROVISORISCHEN MECHANISCHEN BEARBEITUNG

MACHINE MULTIDISPOSITIFS POUR LE TRAITEMENT DE FILS AVANT LEUR TISSAGE PAR L'APPLICATION D'UN TRAITEMENT MECANIQUE PROVISOIRE

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PT RO SE SI SK TR

(30) Priority: **22.01.2003 ES 200300164**

(43) Date of publication of application:
16.11.2005 Bulletin 2005/46

(73) Proprietor: **Frimal Trading S.L.**
08227 Terrassa, Barcelona (ES)

(72) Inventor: **GALAN I LLONGUERAS, Albert**
E-08228 Terrassa (ES)

(74) Representative: **Isern-Jara, Nuria**
J. Isern Patentes y Marcas
Avda. Diagonal 463 Bis 2°
08036 Barcelona (ES)

(56) References cited:
DE-B- 1 278 903 GB-A- 1 212 059
GB-A- 1 357 325 GB-A- 1 496 654
US-A- 3 837 155

EP 1 595 983 B1

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

Description**OBJECT OF THE INVENTION**

[0001] The object of the present invention is related to a multi-device false-twist machine, especially designed for on-line preparation of thread (by false-twisting), just before entering the need1e/s of all types of loops, knitting machines, etc. of technical and textile threads.

[0002] Said machine is especially designed in order to house several false-twister devices, where each device makes the thread or threads that pass through said device twist provisionally because of the effect of the false-twisting of a set number of rotations/meter on its path to the needle of what may be a loom, a knitting machine, etc.

[0003] By thus effecting the false-twist in this way the regularity of the thread is increased, avoiding many problems later in the final destination (loom, knitting 20 machine, etc.), since loosenings are not formed, which cause breakage problems in the thread/s and the needle/s, as well as a lack of quality in the final product.

BACKGROUND OF THE INVENTION

[0004] At present, the warp threads that feed need1e knitting machines and looms present a number of limitations when sending through each thread or group of threads joined by the hole of its respective need1e. Said thread or joined group of threads may be twisted or not depending on the effect desired in the final fabric, and upon passing through the respective need1e there is a high probability that the thread/s and/or corresponding need1e should break due to the friction among the thread/s and need1e due to the existence in said thread/s of a knot caused by the difference in unitary tensions in the case of groups of joined threads, or also due to the existence of certain irregularities in the thread/s itself/ themselves such as loosenings, loops, etc.

[0005] This phenomenon makes the production efficiency of said machines very low due to the operator's stopping the loom and provoked by said phenomenon, the application of previous corrective measures being habitual in order to present said problems as far as possible, centred in checking that the prime materials that are fed into said machines are produced with previous twisting operations and in good conditions of regularity, without knots, loosenings, etc.

[0006] The multi-device false-twisting machine restructures the present carpet or fabric production process, since the operation of creating false-twisting is added "on-line" to the general fabric production process, inserted before the needles of the need1e machine, whether the latter is a loom or a needle knitting machine, which does not lengthen the carpet or fabric production process in spite of being an additional operation.

[0007] In cases such as the production of fabrics in which, at present, pre-twisting of the thread is only carried out as a preventive measure in order to increase the reg-

ularity of the thread/s, and as a consequence the efficiency in the need1e loom, needle knitting machine or need1e braiding machine, in an improved acceptance of the thread/s passing through its respective holes, the process of pre-twisting can be eliminated by installing the multi-device false-twisting machine on-line before the thread enters the needles or the need1e knitting machine.

DESCRIPTION OF THE INVENTION

[0008] The multi-device false-twisting machine is composed of a fixed frame that may include adjustable parts, on which the false-twisting devices are mounted (as is already known in the market), in a varying number depending on the number of threads that the loom or knitting machine has

[0009] On knitting machines with one hole, the machine has one device, and up to 1.500 devices on needle looms. Said machine is disposed so that the devices may be located at a distance and with the appropriate orientation in relation to the needles of the loom or knitting machine, with the objective that the threads proceeding from the spools of the input creel, before arriving at the needles, should pass through the devices and the false-twisting effect produced by the devices should reach the needles of the loom or knitting machine.

[0010] In the multi-device machine of the invention, each false-twisting device is provided with an activation system, whether pneumatic by electrovalves, electro-mechanical, with an electric motor and mechanical transmission, or others, depending on the type of device applied among those known in the market. In any case, said devices generate a false-twist on each of the thread/s that pass through said respective false-twisting device.

[0011] A false-twisting device is an apparatus that, essentially, has a point at which the thread is sent into the device and a point at which the thread comes out of said device, as well as an intermediate zone between the two aforementioned points at which the thread is rotated with respect to its own lengthwise axis in one or another rotation direction depending how it is activated. The multi-device machine of the invention allows the installation of false-twisting devices of any of the types known in the state of the art, and in it, the number of rotations per unit of time generated on the thread, the direction of rotation of said thread and the duration of rotation movement generated are the parameters whose values are set before starting the warp production operation. The combination of the values of said parameters is controlled and directed by a central unit by a working program and said combination of values is specific depending on the calibre and type of thread or threads to be processed.

[0012] The distance from the set point, within the zone in which the thread is rotated, that is, where the false-twist is generated before the thread enters the loom, up to the respective need1e of the loom or knitting machine can also be adjusted and the direction of the thread ori-

ented depending on each different product to be processed, with the purpose of the threads having, just before entering the needle, the necessary number of twists to present loosenings or loops and so that they may pass through said needles without any trouble. Although generally, once said distance and orientation is set it may be maintained as in the majority of threads it is already correct.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] In order to provide an improved understanding of the present invention a practical preferred embodiment of the object of the present invention is included below, based on the attached figures.

Figure 1: View of the multi-device false-twisting machine mounted on a "TUFTING" needle loom

Figure 2: Front view of the multi-device false-twisting machine mounted on a "TUFTING" needle loom.

PREFERRED EMBODIMENT OF THE INVENTION

[0014] The preferred embodiment disclosed below should be understood as just one of the many which, as an application of the present invention, may be put into practice, taking into account that the type of false-twisting device is not an essential part of the invention and any type of said device known in the art may be used in any practical embodiment of the machine of the invention. The essential object of the invention being to generate twists in the thread or threads, whether one or several and already twisted or not, proceeding from an input creel of the loom, at an intermediate point between said creel and the needle (8) of the loom or knitting machine so that as soon as said thread/s make contact with said needle (8) it is provided with a set number of twists per meter, thus by such an effect providing the thread with greater regularity and roundness, therefore preventing breakage problems due to the formation of loosenings, loops or other causes derived from insufficient twisting.

[0015] The thread (1) proceeding from the input creel are sent to the frame (3) on which the false-twisting devices (4) being used are mounted, from among the different types known in the art, activated by their activation system. In this embodiment, the devices are mechanical rollers that are activated simultaneously by a belt (6) proceeding from an electrical, mechanical, pneumatic, etc. motor, among those known can be used to put the invention in practice. Similarly, it may or may not be necessary to use one or more thread direction change rollers (2) depending on the distance and orientation chosen for each product.

[0016] The threads enter and cross through the respective devices, which produces the twists in the thread/s, said twists being made in a set direction and

on the portion of thread between the device (4) and the roller (2) (or between the device (4) and the input creel when rollers are not being used) and in the opposite direction on the portion of thread between the device (4) and the needle (8). The number of twists per unit of length that the thread carries at the time it enters into the needle (8) depends on: the relative position of the devices (4) with respect to the roller (2) positions and the needle (8), the quantity and calibre of the threads to be sent through a single needle and whether said threads are twisted amongst themselves, the degree of false-twist generated by the device (4), the input speed of the warp thread generated by the loom, the cycle of rotation movements generated by the device (4) and the sequence of rotation movements and stops, if set, of each cycle, all of which is determined and programmed depending on the characteristics and needs of the thread to be processed.

[0017] The activation motor (5) is provided with a conventional thread control system with regards to the degree and direction of the false-twist. A general program sets the variables of speed and thread rotation, including the specific movement sequence and the work cycle for each specific type of thread to be processed.

[0018] It is important to note that the essential characteristic of the multi-device false twisting machine is that it is mounted on-line within the main machine, that the operation of the devices is carried out as just one of the series of operations of said main machine, and that the operation of the devices does not in any way condition the thread processing speed in the needle loom, the needle knitting machine, etc., although it does increase the efficiency of the functioning of said weaver, knitting machine, etc.

Claims

1. Multi-device false-twisting machine, specially for treating yarns before they are woven in all kinds of weaving looms and knitting machines for needles, providing said weaving looms and knitting machines with round yarns without lumps, loops or irregularities, whereby

a) it is formed by a frame (3) in which there are mounted false-twister devices (4), wherein these devices can be of all kinds of those known in the art, wherein said frame (3) has a variable number between 1 and 1.500 of said devices (4) in function of the number of needles that the weaving loom or knitting machine has, and by means of programming and controlling the adjustments of the variables of the operation of false-twisting such as the degree of false-twisting generated by the device (4), the direction of the rotational movement generated by the device (4) and the sequence of rotational move-

ments and stoppages, if determined, of each cycle, all of which is determined and programmed in function of the characteristics including that one where the yarn is previously twisted, and requirements of the yarn to be processed.

b) It is situated in the weaving loom or knitting machine in an intermediate point between the feeder rack and needles (8) of the weaving loom or knitting machine, that means as a process aligned with the posterior process of weaving, whereas the operation of the devices (4) develops as being one more of the operations of said weaving loom or knitting machine, such that the devices (4) are in a distance and at an adequate orientation with respect to the respective needles (8) of the weaving loom or knitting machine, with the aim that the yarn (one or several for each needle, being previously twisted or not) coming from the roller (2) or from the spools of the feeder rack, pass previously to their arrival to the needles through the devices of false-twisting (4) and the effect of false-twisting produced by the devices arrives to the needles, of the weaving loom or knitting machine so that the previous twisting of the yarn can be eliminated, in those cases in which it is used as a preventative measure to increase the regularity of the same, and consequently for the weaving loom, knitting and needle stranding machine accepts better the passing through of the yarn/s through their respective orifices.

2. Multi-device false-twisting machine, especially for treating threads before they are woven in all types of looms and needle knitting machines, according to the first claim, **characterised in that** said machine is combinable with any type of needle loom, needle knitting machine, needle braiding machine, etc

Patentansprüche

1. Mehrfachfaden-Falschdrallmaschine, insbesondere zur Bearbeitung von Fäden vor deren Verarbeitung in Webstühlen und Strickmaschinen aller Art, wobei diesen Webstühlen und Strickmaschinen runde Fäden ohne Knoten, Schlaufen oder Unregelmäßigkeiten zugeführt werden, wobei diese

a) einen Rahmen (3), auf dem Falschdrallvorrichtungen (4) angebracht sind, welche Vorrichtungen jeglicher aus der Technik bekannten Art sein können, so dass dieser Rahmen (3) je nach Anzahl der Nadeln, die ein Webstuhl oder eine Strickmaschine aufweist, eine zwischen 1 und 1.500 veränderliche Anzahl dieser Vorrichtungen (4) aufweisen kann, sowie Mittel zur Programmierung und Steuerung der Einstellungen

der Betriebsvariablen für das Falschdrallen umfasst, wie etwa der von der Falschdrallvorrichtung (4) erzeugte Grad der Falschdrallung (4), die Richtung der von der Falschdrallvorrichtung erzeugten Drehbewegung und die Abfolge von Drehbewegungen und Stopps, sofern vorhanden, in jedem Zyklus, wobei all dies in Abhängigkeit von den Merkmalen, einschließlich jenem, wo der Faden zuvor gezwirnt wurde, und von den Erfordernissen des zu verarbeitenden Fadens festgelegt und programmiert wird;

b) sich auf einem Webstuhl oder einer Strickmaschine an einer zwischen dem Zuführrahmen und den Nadeln (8) des Webstuhls oder der Strickmaschine gelegenen Stelle befindet, das heißt, als auf den darauffolgenden Web- oder Strickvorgang ausgerichteter Vorgang, während der Arbeitsvorgang der Falschdrallvorrichtungen (4) als ein Arbeitsgang des genannten Webstuhls oder der Strickmaschine abläuft, so dass die Falschdrallvorrichtungen (4) sich in einer angemessenen Entfernung und Ausrichtung gegenüber den jeweiligen Nadeln (8) des Webstuhls oder der Strickmaschine befinden, mit dem Ziel, dass der von der Walze (2) oder von den Spulen des Zuführrahmens kommende Faden (einer oder mehrere für jede Nadel, egal ob sie zuvor gezwirnt wurden oder nicht) bevor er zu den Nadeln gelangt durch die Falschdrallvorrichtungen (4) geführt wird, und dass der Faden mit dem von diesen Vorrichtungen erzeugten Falschdralleffekt bei den Nadeln des Webstuhls oder der Strickmaschine ankommt, so dass die vorherige Drallung des Fadens eliminiert werden kann, für jene Fälle, in denen dies als vorbeugende Maßnahme zur Erhöhung der Regelmäßigkeit desselben verwendet wird, und infolgedessen der Webstuhl, die Strick- oder Knüpfmaschine den oder die Fäden besser durch die entsprechenden Öffnungen durchlaufen lässt.

2. Mehrfachfaden-Falschdrallmaschine, insbesondere für die Bearbeitung von Fäden vor deren Verarbeitung in Webstühlen oder Strickmaschinen aller Art nach Anspruch 1, **dadurch gekennzeichnet, dass** diese Maschine mit jeder Art Nadelwebstuhl, Strickmaschine, Knüpfmaschine usw. kombinierbar ist.

Revendications

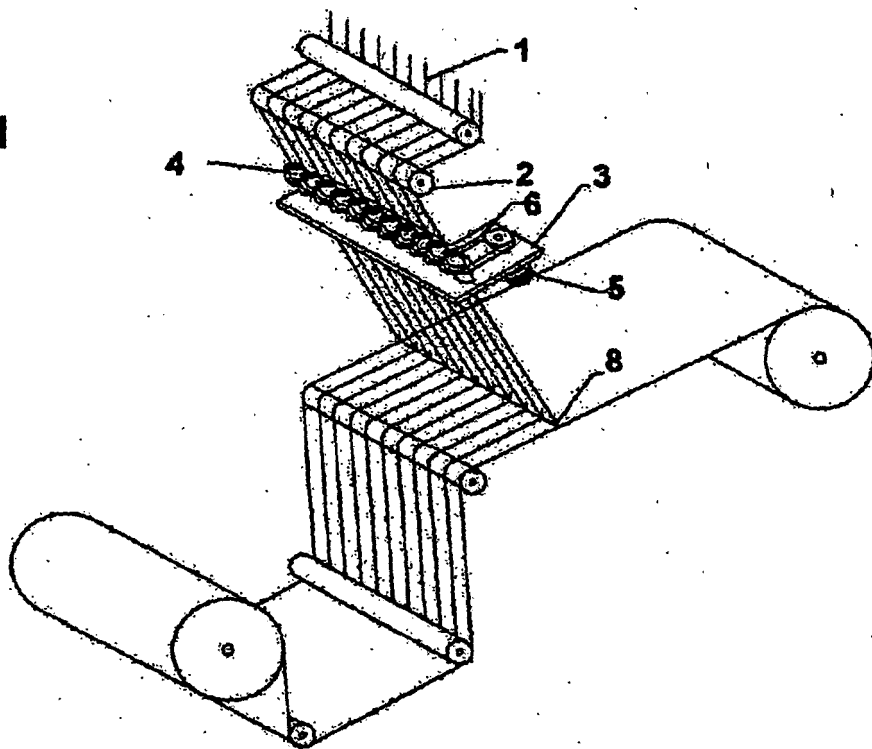
1. Machine multidispositif, à fausse torsion, spécialement conçue pour le traitement de fils avant leur tissage sur toutes sortes de métiers à tisser et de machines à tricoter, fournissant auxdits métiers à tisser et machines à tricoter des fils ronds sans noeuds, boucles ou irrégularités. Ladite machine :

a) est composée d'une armature (3) sur laquelle sont montés les dispositifs à fausse torsion (4), lesdits dispositifs pouvant être de l'un quelconque des types connus dans le domaine, de sorte que ladite armature (3) est constituée d'un nombre variable desdits dispositifs (4) allant de 1 à 1.500 selon le nombre d'aiguilles que possède le métier à tisser ou la machine à tricoter, ainsi que de moyens de programmation et de contrôle des réglages des variables de fonctionnement en fausse torsion, tels que le degré de fausse torsion généré par le dispositif (4), le sens du mouvement de rotation généré par le dispositif (4) et la séquence de mouvements de rotation et d'arrêts, s'il en existe, de chaque cycle ; tout ceci étant déterminé et programmé selon les caractéristiques du dispositif, y compris celle selon laquelle le fil a été préalablement soumis à une torsion et les exigences du fil à traiter ;

b) est située sur le métier à tisser ou la machine à tricoter à un point intermédiaire entre le châssis d'alimentation et les aiguilles (8) du métier à tisser ou de la machine à tricoter, c'est-à-dire comme un processus relié linéairement au processus postérieur de tissage, tandis que le fonctionnement des dispositifs (4) se fait comme une opération de plus parmi celles dudit métier à tisser ou machine à tricoter. De la sorte, les dispositifs (4) se trouvent à une distance appropriée et ont une orientation correcte par rapport aux aiguilles respectives (8) du métier à tisser ou de la machine à tricoter, l'objectif étant que le fil (un ou plusieurs par aiguille, préalablement soumis à torsion ou pas) issu du rouleau (2) ou des bobines du châssis d'alimentation passe, avant son entrée dans les aiguilles, à travers les dispositifs à fausse torsion (4) et que l'effet de fausse torsion produit par les dispositifs soit transmis aux aiguilles du métier à tisser ou de la machine à tricoter, de manière que le tordage préalable du fil puisse être éliminé, dans les cas où il est utilisé comme mesure préventive pour augmenter la régularité de celui-ci. Il en résulte que le métier à tisser, la machine à tricoter et la machine à tresser à aiguilles acceptent mieux le passage du ou des fil(s) par leurs orifices respectifs.

2. Machine multidispositifs à fausse torsion, spécialement conçue pour le traitement de fils avant leur tissage sur toutes sortes de métiers à tisser et de machines à tricoter à aiguilles, selon la première revendication, **caractérisée en ce que** ladite machine peut être combinée à n'importe quel type de métier à tisser à aiguilles, de machine à tricoter à aiguilles, de machine à tresser à aiguilles, etc.

FIG. 1



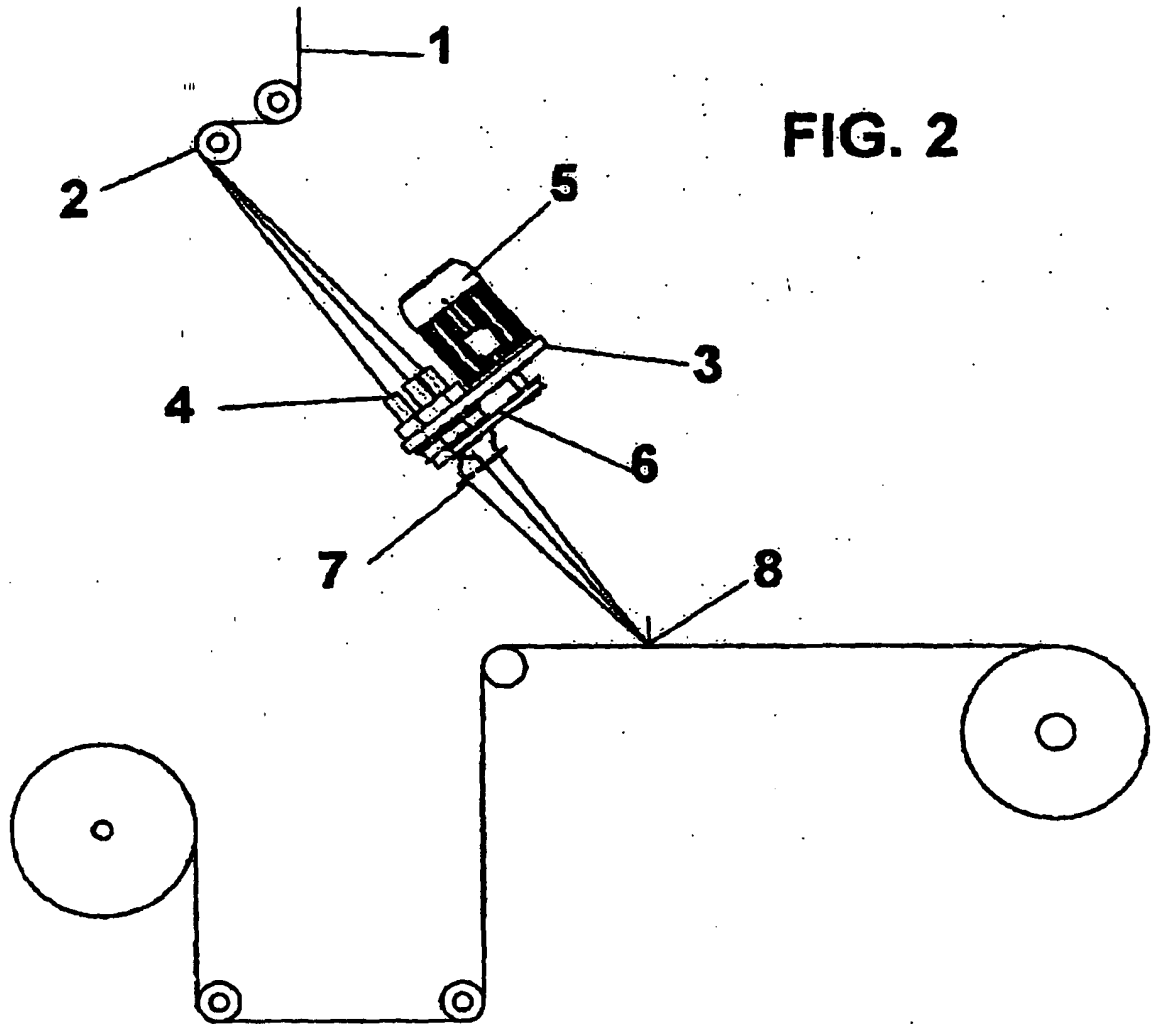


FIG. 2