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(54) **Twisting device for giving a false twisting to a textile fibre sliver.**

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## Description

The present invention relates to a twisting device for giving a false twist to a textile fibre sliver between the outlet calender of a drawing frame and a winding unit having a bobbin winding carriage, which is reciprocating parallel to the axis of the bobbin being formed and which supports an active false twisting unit with a revolving funnel.

In the following disclosure, and in the appended claims, the term "sliver" will be uniformly used in order to indicate both a roving of textile fibres, or a sliver of textile fibres, or, anyway, an aggregate of textile fibres.

On a drawing frame on which the sliver is collected on bobbins of a traditional type, the bobbin is produced by winding the sliver around an idle roll, driven to revolve by one or more slotted rolls, by means of an active false twisting unit which gives the sliver roundness and mechanical strength and maintains the individuality thereof during the subsequent unwinding process. In order to allow a cross-wound sliver bobbin to be formed, the active false twisting unit is supported by a bobbin winding carriage to which a reciprocating movement along a transversal stroke is given, which is substantially equal to the length of the desired bobbin.

It is known that the conveyance of the sliver between the outlet unit of the drawing frame, the "outlet calender", and the winding system, must be as constant as possible, not only for a regular winding to be formed, but also in order to take into due account the fact that the sliver is often fragile, in that the fibres by which it is constituted, are short, or are kept together with a reduced twisting degree. The winding should be hence carried out in a very regular way, and must take place with the fibres being kept as condensed as possible, in order that the mutual cohesion between the fibres does not cause false drawings to occur in the length of sliver running from the drawing frame outlet to the inlet of the revolving funnel of the active false twisting unit.

The sliver must be subjected to the due winding tension prerequisite for a compact bobbin to form, but said tension should be kept sufficiently constant, in order not to reach such values as to modify the dimensional and size characteristics of the sliver between the point of outlet from the outlet calender, and the point wherein the winding operation takes place. Relatively high changes in tension could even cause the sliver to break. One can easily understand how such a breakage would interrupt the production process, obliging the attending operator to take action. The labour cost for these emergency operations represents a considerable factor when the production costs are com-

puted.

In order to solve this winding problem, several solutions have been proposed in the past.

US-A-3,670,978 proposes, e.g., to make the sliver run inside a ring constituting an intermediate guide, installed, in a movable way, between the point of outlet from the outlet calender of the drawing frame and the bobbin winding system, in such a way that the total of the respective distances of said ring relatively to the outlet from the outlet calender and to the sliver guide remains always constant. On the same principle, moreover, several systems have already been proposed and realized which envisage, e.g. articulated toggle-levers, or the like, capable of realizing the desired kinetic system. However, these solutions suffer all from drawbacks, in that they require that relatively high masses be reciprocated, which cannot be applied to the present machines, operating at high speeds, not only due to large energy amount to be supplied and to the fast wear occurring in the various parts, but also owing to the fact that vibrations, and consequently fatigue breakages, occur.

Also EP-A-0 070 814 discloses a device, the main task of which is that of compensating the variable distance between the fixed sliver outlet point from the drawing frame and the movable point wherein the winding of the sliver on the bobbin takes place. In one embodiment this known device comprises a flexible support in the form of a spiral element with entry guide ring, positioned upstream the active false twisting unit with revolving funnel. Said spiral element, at its end provided with the entry guide ring, is secured by means of a support to the drawing frame, whereas its outlet end is secured to the inlet of the revolving funnel. Hence, the sliver is guided by the spiral element along its whole length between the outlet calender of the drawing frame and the revolving funnel and is subjected to fast wear due to the frictional contact with the spiral element.

Also this known device suffers from the same drawbacks as above explained.

The purpose of the present invention is to provide a twisting device, which avoids the mentioned drawbacks affecting the devices known from the prior art and which is capable of supplying the textile fibre sliver leaving the outlet calender of the drawing frame with an effective bond and compactness between the fibres, already before it enters the active false twisting unit, so as to render the sliver totally elastic and capable of supporting the necessary tension due to the differences in length during the winding operation.

These and still other purposes are all achieved by means of the twisting device of the present invention as defined in the characterising portion of claim 1.

Inasmuch as the twisting device of the present invention is simply constituted by a spiral element connected only to the bobbin winding carriage, it has a very small inertia as necessary in order not to substantially apply a burden to the active false twisting unit supported by the bobbin winding carriage during its reciprocating motion. Thus, vibrations are avoided and the sliver does not undergo wear and damages.

The spiral element gives false twists to the sliver already before it enters the active false twisting unit, supplying it with such a bond and such a compactness between the fibres, as to render it totally elastic and capable of supporting the necessary tension to be applied for performing the cross-winding operation. More specifically, the spiral element performs the task of guiding the tape to the inlet of the revolving funnel, with simultaneously supplying the same sliver a false twist in a predetermined direction running towards the outlet calender and furthermore carries out the first step of sliver compacting and rounding before said sliver enters the active false twisting unit. The twist given to the sliver when this latter leaves the outlet calender by means of the spiral element keeps advantageously mutually bound the fibres which compose the same sliver, making it possible it to be put under tension, in order to elastically extend it, realizing a perfect compensation for the change in distance, with no risk of formation of false drafts. Thanks to this combination, and to this particular arrangement, the compensation and the false sliver twisting are realized by means of simple means, and, thanks to the low weight of the spiral element, the winding speed can be substantially increased on the machine. The whole assembly constituted by the combination of the spiral element and of the revolving funnel is light enough, so that it can be applied to the various machine types, and is also considerably cheap. Said combination makes it possible very fragile slivers to be processed without any difficulties, such as, e.g., slivers constituted by short, low-cohesion fibres and makes it possible breakages and interruptions in the continuity of the fibre aggregate, as well as a mutual slipping of the fibres, and therefore changes in cross-section surface area - which endanger the quality of the same sliver - to be avoided in these cases.

According to a form of practical embodiment, the spiral element has a substantially cylindrical shape and an inner diameter of positive value.

In the following a preferred form of practical embodiment of the device of the present invention is described for solely exemplifying and non-limitative purposes, with the aid of the only one hereto attached drawing table.

Said figure is a diagram schematically showing a side view of the twisting device according to the

present invention, in upstream cooperation with the outlet calender through which the sliver leaves the drawing frame, and in downstream cooperation with the system of cross winding for the formation of the bobbin on which the sliver is collected.

In the only one hereto attached drawing table: 2 is a schematic outline of the drawing frame; 3 is the outlet calender unit, which acts as the means for feeding the sliver leaving the drawing frame 2; 4 is the pressure roll of the outlet calender unit, which, together with the roll 5, continuously extract from the drawing area the fibre sliver 6; 6 is the sliver of textile fibres substantially constituted by an aggregate of a more or less large number of textile fibres of various length; 8 is a ring with a side slot, advantageously provided in order to make it possible the sliver 6 to be entered inside the ring 8. Said ring is given an inner ring surface with a spherical outline converging in the direction of feed of the sliver 6, which results to be guided into the interior of the spiral element 10; 10 is a spiral element having a helical-spring shape, with an inner diameter of positive value, and with a pitch and a number of turns which depend on the spinning frame and on the material being processed. Said spiral element 10 has two ends, one of which is destined to be fastened to the guide ring 8, and the other one is destined to be fastened to the bracket 12; 12 is a bracket which makes it possible the spiral element 10 to be rigidly connected to the active false twisting unit; 14 is the body of the false twisting unit; 16 is the revolving funnel of the body 14, for giving the sliver 6 false twists necessary for supplying said sliver with roundness and mechanical strength before it is collected on the periphery of the bobbin 30 under way of formation; 18 is the connection and support plate for supporting the body 14, and connecting it to the reciprocating carriage 20, driven to move parallelly to the axis of the bobbin 30 under way of formation; 24 is the sleeve sliding along the cylindrical guide bar 22 positioned parallel to the axis 34 of the roll 32 which drives the bobbin under way of formation 30; 26 is the flat structural shape which supports the whole carriage 20 provided with reciprocating motion with a transversal stroke substantially equal to the axial length of the desired bobbin 30.

The sliver, or roving, or aggregate of fibres leaving the outlet calender 3 is entered into the guide ring 8 through the side slot and is conveyed, through the spiral, element 10, into the revolving funnel 16 in order to be collected on the periphery of the bobbin under way of formation 30 revolving on the winding spindle 28.

In the present disclosure, a preferred form of practical embodiment of the present invention has been disclosed, but other different forms of practical embodiment are possible as well; the shape,

the ratios and the size of the parts may be changed; the wire which constitutes the spiral element may be of a different suitable material; the anchoring elements 12 and 18 may be given a different shape, or may be mounted in a different way, without thereby departing from the scope of the solution as proposed by the present invention, as claimed in the hereto appended claim.

## Claims

1. Twisting device for giving a false twist to a textile fibre sliver (6) between the outlet calender (3) of a drawing frame (2) and a winding unit for cross-wound bobbin winding having a carriage (20), which is reciprocating parallel to the axis of the bobbin (30) being formed and which supports an active false twisting unit with a revolving funnel (16), comprising a spiral element (10) with entry guide ring (8), positioned upstream said active false twisting unit, wherein said spiral element (10) and said active false twisting unit cooperate to keep the sliver (6) always subject to an elastic compensation for the periodic changes in length of the distance between the intermediate winding points and the end winding points of the bobbin (30) under way of formation, characterised in that said spiral element (10) is connected only to said carriage (20), it being rigidly anchored to the body (14) of said active false twisting unit, which bears said revolving funnel (16) and in that said spiral element (10) has substantially cylindrical shape and an inner diameter of positive value.

## Patentansprüche

1. Vorrichtung zur Erteilung eines Falschdralles für ein Textilfaserband (6) zwischen der Abzugskalandrwalze (3) eines Streckwerkes (2) und einer Wicklungseinheit zum Kreuzspulenvickeln mit einem Wagen (20), der sich parallel zu der Achse der Spule (30), die bearbeitet wird, hin- und herbewegt und der die Aktivfalschzwirneinheit mit einem Drehtrichter (16) hält, umfassend ein Spiralelement (10) mit einem Einlaßführungsring (8), der vor (stromaufwärts) der Aktivfalschzwirneinheit angeordnet ist, wobei das Spiralelement (10) und die Aktivfalschzwirneinheit zusammenwirken, um das Band (6) immer einem elastischen Ausgleich zu unterwerfen, um die periodischen Längenänderungen des Abstandes zwischen den Zwischenwicklungspunkten und den Endwicklungspunkten der Spule (30) während der Bearbeitung auszugleichen, dadurch gekennzeichnet,

daß das Spiralelement (10) nur mit dem Wagen (20) verbunden ist, wobei es fest an den Körper (14) der Aktivfalschzwirneinheit angebracht ist, die den Drehtrichter (16) trägt, und daß das Spiralelement (10) im wesentlichen eine zylindrische Form und einen inneren Durchmesser mit positivem Wert hat.

## Revendications

1. Dispositif de torsion pour appliquer une fausse torsion à un ruban (6) de fibres textiles entre le rouleau de calandre de sortie (3) d'une étireuse (2) et un dispositif d'enroulement destiné à former un enroulement sur une bobine croisée et comportant un chariot (20) qui est animé d'un mouvement de va-et-vient parallèlement à l'axe de la bobine (30) en cours de formation et qui supporte un dispositif de fausse torsion actif, muni d'un entonnoir tournant (16), comprenant un élément hélicoïdal (10) pourvu d'une bague de guidage (8) d'entrée disposée en amont du dispositif de fausse torsion actif, l'élément hélicoïdal (10) et le dispositif de fausse torsion actif coopérant de manière à maintenir le ruban (6) soumis en permanence à une compensation élastique pour les variations périodiques en longueur de la distance entre les points d'enroulement intermédiaire et les points d'enroulement d'extrémité de la bobine (30) en cours de formation, caractérisé en ce que l'élément hélicoïdal précité (10) est relié uniquement au chariot (20) en étant fixé rigidement au corps (14) du dispositif de fausse torsion actif qui porte l'entonnoir tournant (16) et en ce que l'élément hélicoïdal (10) a une forme sensiblement cylindrique et un diamètre intérieur de valeur positive.

