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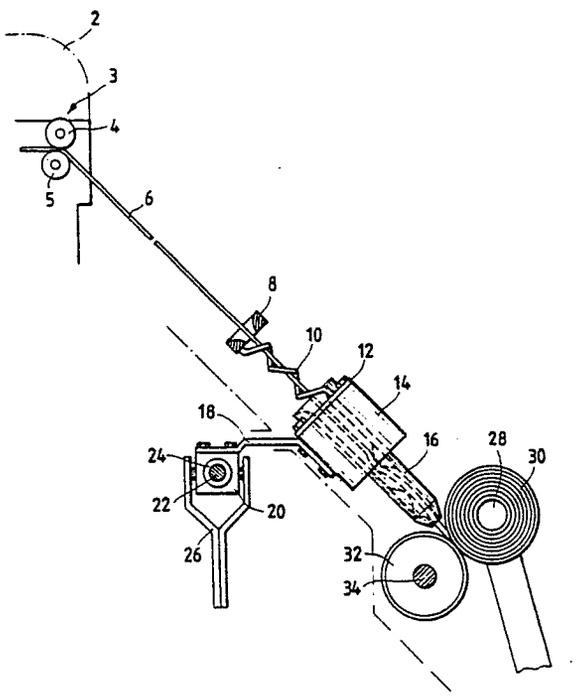
(54) Twisting device for bobbin winding car.

(57) Twisting device for bobbin winding car, so prearranged as to give a false twist to the sliver (6) leaving the drawing frame (2) - or from a derived machine - for cross-wound bobbin winding, constituted by a twisting element consisting of a spiral (10) rigidly anchored to a movable active-twisting unit of revolving-funnel type (16), causing, in this relationship of cooperation, said sliver to be compactly and firmly wound on the collecting bobbin and to be always subject to a same tension value both in the intermediate winding points, and in the winding points positioned at the ends of the above said bobbin under way of formation.



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"TWISTING DEVICE FOR BOBBIN WINDING CAR"

The present invention relates to a twisting device for a bobbin-winding car, suitable for giving a false twist to a sliver leaving a drawer frame, or from a derived machine, by means of a twisting element consisting of a spiral rigidly anchored to an active-twisting unit, reciprocating parallelly to the axis of the bobbin under way of formation.

In the following disclosure, and in the appended claims, the term "sliver" will be uniformly used in oder 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 a false twisting device 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 false twisting device is given a reciprocating movement, along a transversal stroke 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 drawer frame, the "outlet calenders", 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 to the revolving funnel of the active 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 computed.

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

US patent 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 kinematic 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 the 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 consequent fatigue breakages, occur.

The purpose of the present invention is to provide a twisting device for a bobbin winding car, capable of compensating the change in distance between a fixed feed outlet, and a movable winding sliver guide driven to reciprocate along a fixed-position bobbin under way of formation, which does not show the above-mentioned drawbacks affecting the devices known from the prior art. For this purpose, the present Applicant has studied, tested and developed a compensation for the above said change in distance by means of a spiral constituted by a wire made from spring-steel, or another wear-resistant material, wound in a substantially cylindrical shape with a pitch and with a diameter which depend on the material to be processed.

Inasmuch as it is simply constituted by a steel wire, the spiral element, according to the invention, has the very small inertia as necessary in order not to substantially apply a burden to the whole twisting element of the bobbing-winding car during its reciprocating motion. Thus, the spiral essentially acts as a means for compensating for the differences in length, and is provided, at its inlet end, with a suitable shape for guiding the sliver, and at its outlet end is rigidly anchored to the revolving-funnel twisting funnel. The spiral gives twists to the sliver, 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 performs the task of guiding the tape to the inlet of the

rotary 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 true active-twisting revolving-funnel device. The twist given to the sliver when this latter leaves the outlet calender by means of the spiral 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, the winding speed can be substantially increased on the machine The whole assembly constituted by the combination of the spiral 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 crosssection surface area - which endanger the quality of the same sliver - to be avoided in these cases. Incidentally, at the spiral outlet, from the sliver the twists are removed, which the sliver may have received upstream the spiral, so that it is ready to receive from the revolving funnel the necessary twist, which it must be given before being wound on the bobbin.

These, and still other purposes are all achieved by means of the improvement in the twisting device for the bobbin-winding car of the present invention, in particular in the collection of the sliver leaving the drawing frame, or derived machines, for cross-wound bobbin winding, characterized in that it comprises at least a spiral twisting element,per-se known, which is mounted immediately upstream an active-twisting unit, of revolving-funnel type, causing, in this relationship of cooperation, said sliver to be compactly and firmly wound on the collection bobbin, and to always result subject to an elastic compensation for the periodic changes in length between the intermediate winding points, and the end winding points during the formation of the above said cross-wound bobbin winding.

According to a form of practical embodiment, the twisting device is provided with a twisting element consisting of a spiral performing the primary task of giving the sliver a false twist, as necessary for the compensation for the periodic changes in distance during the winding between the stationary point of outlet from the outlet calender of the drawing frame, and the movable sliver-guide member, which is continuously reciprocated.

According to another form of practical embodiment, the twisting device is provided with a twisting element consisting of a spiral which is realized in a substantially cylindrical shape, with an inner diameter of positive value.

According to a further form of practical embodiment, the twisting device is provided with a twisting element consisting of a spiral with two ends, with one of said ends being rigidly anchored to the revolving-funnel twisting unit, and the other end having such a geometry as to realize the movable guide of the sliver coming from the outlet calender of the drawing frame.

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 a compensator and twisting sliver guide 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, or of a derived machine; 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 10; 10 is a spiral 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 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 false-twisting device; 14 is the body of the false-twisting device; 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 device 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 device, 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 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 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 claims.

Claims

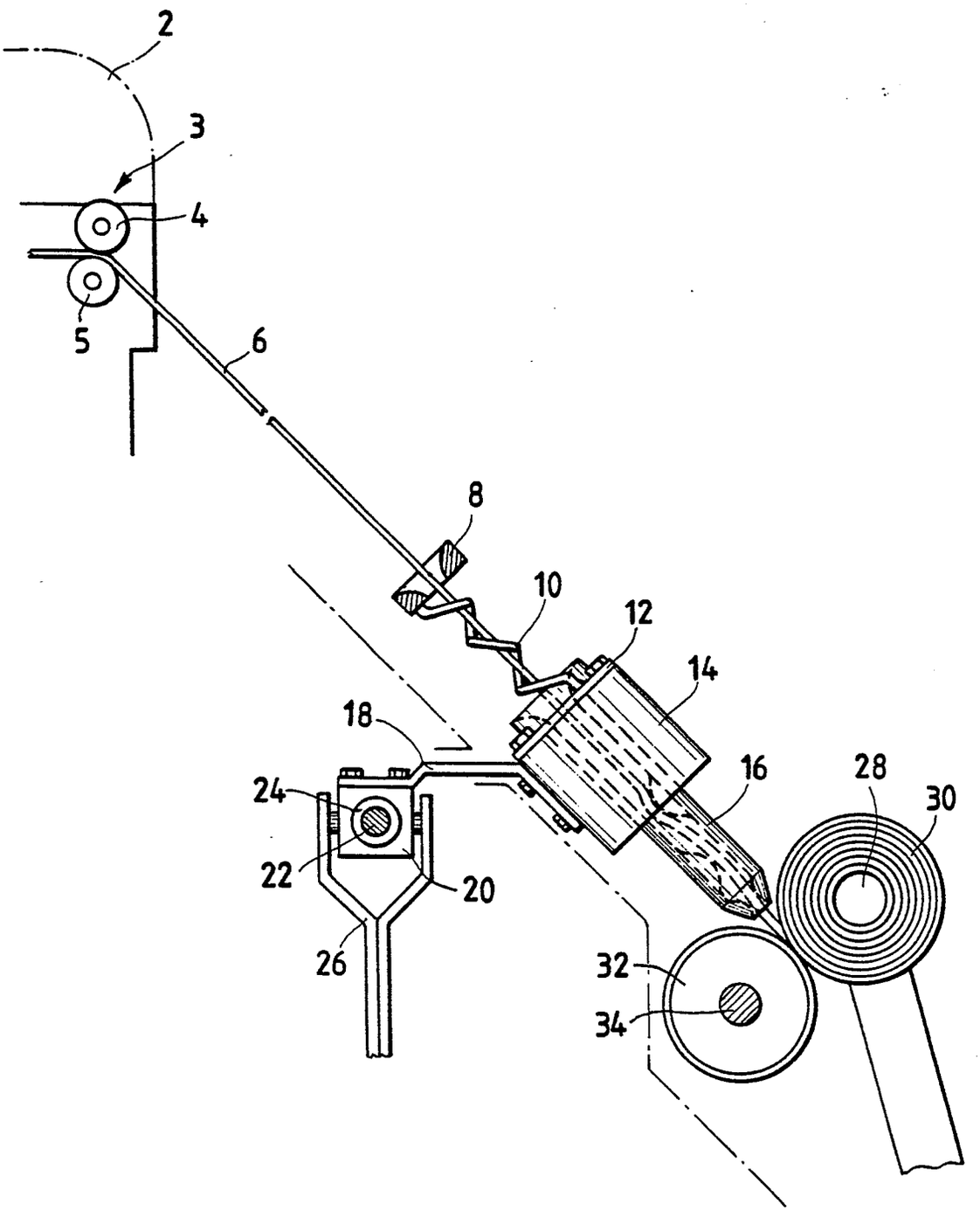
1. Twisting device for the bobbin-winding car in the collection of the sliver leaving the drawing frame for cross-wound bobbin winding, characterized in that it comprises at least a twisting spiral element, and an active-twisting element constituted by a revolving funnel, with the first element being positioned upstream the second one, with both said elements cooperating in order to wind the compact, rounded sliver on the collecting bobbin and to keep said sliver 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 above-said bobbin under way of formation.

2. Twisting device for bobbin-winding car according to claim 1, characterized in that it is provided with a twisting element constituted by a spiral, which performs the primary task of supplying the sliver with a false twist necessary for compensating for the periodic changes in distance during the winding, between the fixed point of outlet from the outlet calender of the drawing frame, and the movable thread guide member, which is continuously reciprocating.

3. Twisting device for bobbin-winding car according to claim 2, characterized in that the spiral twisting element is given a substantially cylindrical shape.

4. Twisting device for bobbin-winding car according to claims 2 and 3, characterized in that the spiral twisting element is given an inner diameter of positive value, and that said value is a function of the size and of the type of fibre of the sliver to be processed.

5. Twisting device for bobbin-winding car according to claims 2, 3 and 4, characterized in that the spiral twisting element has two ends, one of which is rigidly anchored to the revolving-funnel twisting unit, and the other one has such a geometry as to realize the movable guide of the sliver coming from the outlet calender of the drawing frame.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EUROPEAN SEARCH REPORT

Application Number

EP 88 20 0983

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	EP-A-0 070 814 (SAVIO) * Page 6, line 32 - page 7, line 20; page 8, lines 9-14; figures 3-6 *	1-5	B 65 H 59/00 D 01 H 13/04
A,D	US-A-3 670 978 (DRAGISICH) * Figures *	1	
A	BE-A- 659 089 (SAUVAGE) * Figure 3 *	1	
A	FR-A-1 502 636 (SCHLUMBERGER)		
A	GB-A-1 063 181 (REITER)		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)
B 65 H D 01 H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	06-09-1988	RAYBOULD B.D.J.

CATEGORY OF CITED DOCUMENTS

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