Aug. 20, 1968 A. ZERMATI 3,397,528

MANUFACTURING A TWO-PLY TWIST YARN

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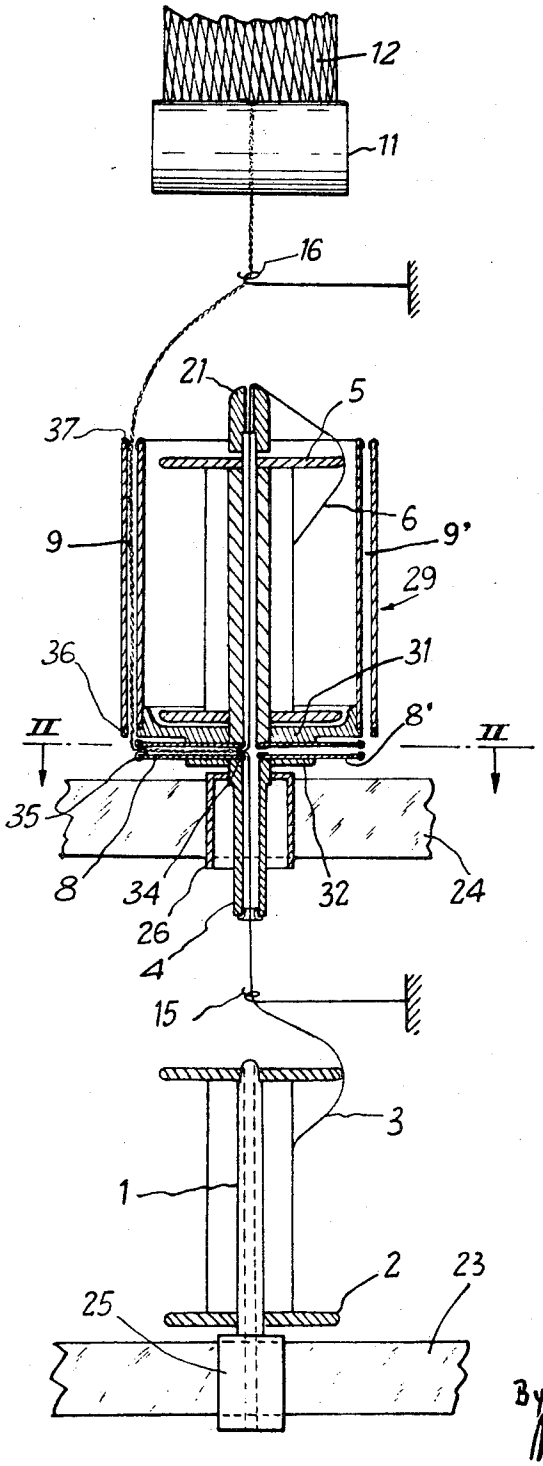


Fig. 1

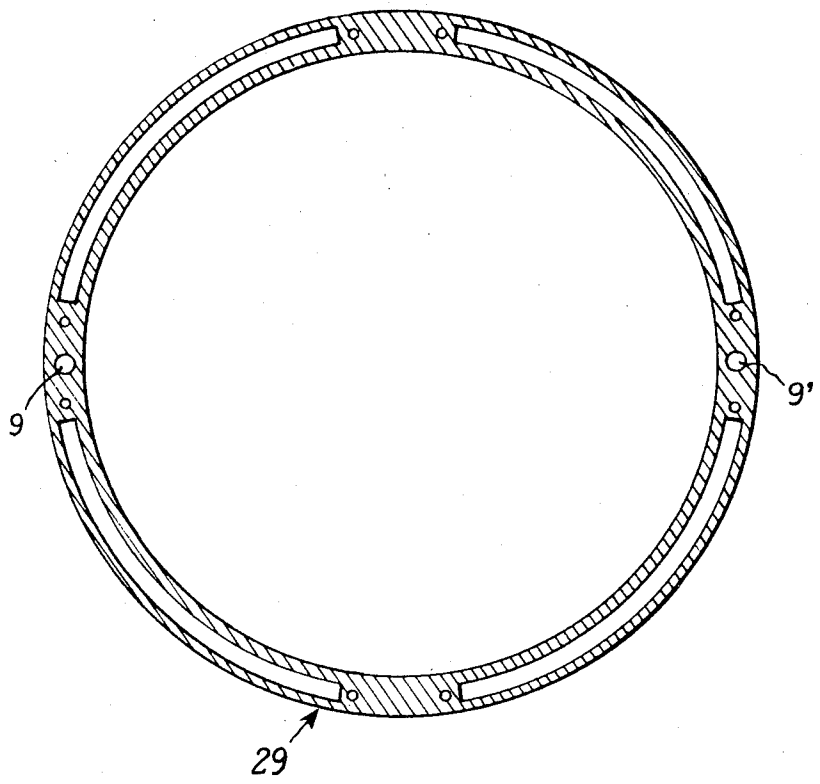
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Fig. 2



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MANUFACTURING A TWO-PLY TWIST YARN

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ABSTRACT OF THE DISCLOSURE

A device for manufacturing a two-ply twist yarn, the said device being constituted by a hollow vertical spindle which carries a bobbin of one of the components and located above a vertical spindle which can also be of hollow construction and which carries a bobbin of the other component, both spindles being driven in rotation in the same direction and at the same speed, the upper spindle being additionally adapted to carry a radial guide, a longitudinal guide, and a yarn-guide disposed above the upper spindle, one of the components being adapted to travel upwards from the lower bobbin into the bore of the upper spindle in which the said component encounters at the level of the radial guide the other component which is travelling downwards from the upper bobbin into the bore of the upper spindle, these two components being then directed together into the radial guide and into the longitudinal guide.

The present invention relates to the manufacture of two-ply twist yarn. In known twisting processes which are intended to produce substantial wound lengths without any knots in the twist yarn, one of the two components, or even both components, are either untwisted or overtwisted separately prior to twisting one over the other, or else said components are subjected to excessive tensions, which results in a fairly large number of breaks.

The object of the invention is to provide a device for manufacturing two-ply twist yarns which is not subject to the above-mentioned disadvantages of devices based on conventional principles.

To this end, the complete device according to the invention is constituted by a hollow vertical spindle which carries a bobbin of one of the components and located above a vertical spindle which can also be of hollow construction and which carries a bobbin of the other component, both spindles being driven in rotation in the same direction and at the same speed. The upper spindle is additionally adapted to carry a radial guide, one end of which opens in the interior of said upper spindle and the other end of which has its opening in a longitudinal guide which is rigidly fixed to the radial guide. A take-up device is disposed above the upper spindle. One of the components is adapted to travel upwards from the lower bobbin into the bore of the upper spindle in which said component encounters, at the level of the radial guide, the other component which is travelling downwards from the upper bobbin into the bore of the upper spindle. These two components are then directed together into the radial guide and into the longitudinal guide in order to pass subsequently through a stationary guide ring located on the geometrical axis of the upper spindle, then upwards from said guide ring into the take-up device.

By virtue of this particular constructional arrangement, and in view of the fact that the two bobbins and the upper spindle rotate at the same speed, the unwinding of the two components is carried out with ease and their individual twists are not modified to any substantial extent up to the moment when they are assembled and re-twisted together. There is therefore obtained a wholly uniform twist with a minimum number of breaks at the time of manufacture of the twist yarn.

The invention is also directed to modes of construction comprising at least one of the following features:

(a) A stationary guide ring is provided between the lower end of the upper spindle and the lower bobbin and is traversed by the component which is derived from said lower bobbin.

(b) The radial guide is constituted by a radial duct formed in a pulley which is rigidly fixed to the hollow spindle.

(c) The longitudinal guide is constituted by a longitudinal duct formed in the thickness of the lateral wall of a cylindrical can which is fixed on said pulley.

(d) The pulley is provided with a second radial duct located on the same diameter as the first.

The invention will be more readily understood by consideration of the following description and by a study of the accompanying drawings which show by way of nonlimitative example one exemplified embodiment of a device for the manufacture of a two-ply twist yarn according to the invention.

In these drawings:

FIG. 1 is a vertical sectional view of the complete device; and

FIG. 2 is a horizontal sectional view on a larger scale and taken along the line II—II of FIG. 1.

The device for manufacturing two-ply twist yarn as shown in the drawings essentially comprises a rotary vertical spindle **1** which can be of hollow construction, a bobbin **2** mounted on said spindle and filled with a first yarn component **3**, vertical rotary spindle **4** of hollow construction located above the spindle **1** in coaxial relation with this latter and adapted to carry a bobbin **5** filled with a second yarn component **6**, a horizontal radial guide **8** which is rigidly fixed to the hollow spindle **4** and which terminates inside this latter, a longitudinal guide **9** which is also rigidly fiixed to the hollow spindle **4** and the lower end of which terminates in the vicinity of the outer end of the radial guide **8**, and a take-up device which is generally designated by the reference numeral **11**, said take-up device being of any suitable and conventional type such as, for example, a cylinder which effects the frictional drive of the bobbin **12** formed by the twist yarn. In addition, a first guide ring **15** is disposed in front of the inlet of the hollow spindle **4** and a second guide ring **16** is disposed in front of the inlet of the take-up device, **11**.

In the example which is illustrated, the hollow spindle **4** is surmounted by a pierced cap **21**, the rounded top face of which serves as a guide for the component **6** which is unwound from the spool and passes downwardly into the hollow spindle **4**.

The two spindles **1** and **4** are driven in rotation at the same speed by any conventional means of suitable design such as, for example, by two licker-belts **23**, **24** respectively in contact with pulleys **25**, **26** which are coupled to said spindles.

In the example which is illustrated in the drawings, the longitudinal guide is constituted by a duct which is formed in the thickness of a cylindrical cam **29**, the base **31** of which is fixed on the hollow spindle **4**. The radial guide **8** is constituted by a tube fitted in a radial bore formed in a pulley **32** which is rigidly fixed to the base **31** of the cam **29**. The inner end of the tube **8** penetrates through the thickness of the hollow spindle **4** and terminates in the bore of this latter. Said inner end of the tube **8** is fitted with a ceramic eye **34** and the outer end of the tube is fitted with a similar eye **35**. Similarly, the lower and upper ends of the longitudinal guide **9** are fitted with ceramic eyes **36** and **37** respectively.

For reasons of balance, and also in order to facilitate the introduction of threads through the tube **8**, provision

is made for another tube 8' which is inserted in the hollow spindle and which is symmetrical with the tube 8 relatively to the geometrical axis of said spindle. Also for reasons of balance, the can 29 is provided with a duct 9' which is diametrically opposite to the duct 9.

When the two spindles are driven in rotation at the same speed, the two components 3 and 6 unwind without difficulty from their spools without being subjected either to twisting or untwisting and meet at that point of the passageway of the hollow spindle 4 which is surrounded by the ceramic eye 34, said eye being located at the inner end of the radial guide 8. These two components are therefore not subjected to any modifications in their individual twists up to the point of junction; then, taking into account the movement of rotation of the guides, the assembly of both components forms a twist 12, the twist being applied, from the take-up device 11 and especially from the guide ring 16, within the ducts 9 and 8 up to the point of assembly.

As will be apparent, the invention is not limited to the forms of embodiment which have been described and illustrated and a number of different modifications can be contemplated without thereby departing either from the scope or the spirit of the invention.

What I claim is:

1. A device for forming a two-ply twist yarn, constituted by two yarn components twisted together, said device comprising, in combination, a lower vertical rotary spindle; a first bobbin, carrying one of said yarn components, mounted on said lower spindle for coaxial rotation with the latter; an upper vertical hollow rotary spindle positioned above said lower spindle in vertically spaced coaxial relation with said lower spindle; a second bobbin, carrying the other of said yarn components, mounted on said upper spindle for coaxial rotation with the latter; means secured to said upper spindle below said second bobbin and defining a radially extending hollow guide having one end opening into said upper spindle; means secured to said upper spindle and defining a longitudinal hollow guide extending upwardly, parallel to the axis of said upper spindle, from a point adjacent the other end of said radially extending hollow guide to a point above the upper end of said second bobbin; a take-up device positioned above said upper spindle; a first stationary guide ring positioned between said take-up device and said upper spindle and coaxial with the latter; and means rotating said lower and upper spindles in synchronism at the same angular velocity and in the same angular direction; said one yarn component being guided directly from said first bobbin upwardly into the lower end of said upper spindle; said other yarn component being guided directly from said second bobbin into the upper end of said upper spindle and downwardly through said upper spindle; said

two yarn components meeting in said upper spindle at the level of said radially extending hollow guide for conjoint guiding of said two yarn components upwardly through said radially extending hollow guide, upwardly through said longitudinal hollow guide and through said first guide ring to said take-up device, while two said yarn components are twisted together to form said two-ply twist yarn.

2. A device for forming a two-ply twist yarn, as claimed in claim 1, including a second stationary guide ring positioned between the upper end of said lower spindle and the lower end of said upper spindle and coaxial with said spindles for guiding of said one yarn component directly from said first bobbin into the lower end of said upper spindle.

3. A device for forming a two-ply twist yarn, as claimed in claim 2, in which said means secured to said upper spindle below said second bobbin comprises a pulley fixed to said upper spindle; said radially extending hollow guide comprising a radially extending bore formed through said pulley.

4. A device for forming a two-ply twist yarn, as claimed in claim 1, in which said means defining said longitudinal hollow guide comprises a cylindrical can fixed to said upper spindle to rotate with the latter; said longitudinal hollow guide comprising a duct extending longitudinally through the wall of said cylindrical can.

5. A device for forming a two-ply twist yarn, as claimed in claim 3, in which said pulley is formed with a second radial bore extending along the same diameter as the first mentioned radial bore.

6. A device for forming a two-ply twist yarn, as claimed in claim 5, in which said means defining said longitudinal hollow guide comprises a cylindrical can coaxial with said pulley and fixed to rotate with the latter; said longitudinal guide comprising a bore extending longitudinally through the wall of said cylindrical can.

7. A device for forming a two-ply twist yarn, as claimed in claim 6, in which the wall of said cylindrical can is formed with a second bore extending longitudinally therethrough and extending upwardly from a point adjacent the radially outer end of said second radial duct.

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