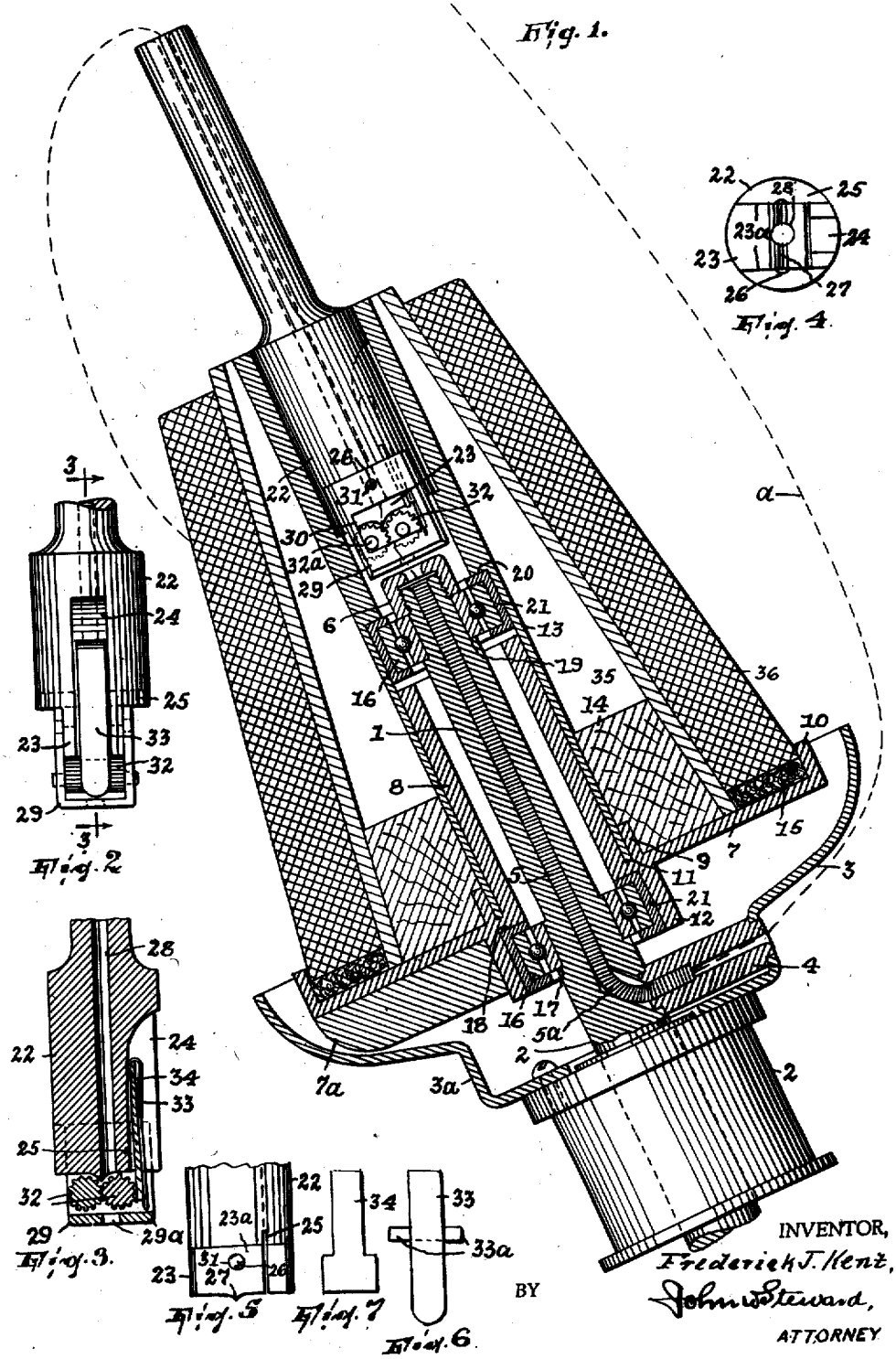
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DOUBLE TWIST TWISTER

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DOUBLE TWIST TWISTER

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2 Claims. (Cl. 57—58)

A known type of yarn twister for double twisting yarn comprises a carrier for the yarn package and a spindle structure axial of the structure formed by the carrier and package, the twister having an axial yarn passage through which the yarn, in passing from the package in over-end relation to the spindle, travels, thereupon, having passed clear through the passage, to proceed to some take-up medium (as a rotated spool) beyond the free end of the spindle and which winds up the yarn, the spindle structure being meanwhile rotated but the other structure in some way held stationary, as by the twister being tilted and the latter structure eccentrically weighted; on each revolution of the spindle a primary twist or turn is developed in the yarn between the package and the yarn-delivery point of the spindle and the other or secondary twist between such point and the take-up medium.

This invention relates to twisters of the above class and its subject is to provide the twister with a tension means which is characterized and functions in the following advantageous ways, to wit, so as to avoid disrupting the yarn or its filaments and the stripping-back of the latter, though the same be quite frail and the twister is operated at a quite high speed; so as to permit to pass it irregularities in the yarn and also the usual flexible implement by which the yarn is initially threaded through the twister; so as to avoid the necessity of adjusting said tension means once, as in its manufacture and the assembling of its parts, said tension means has been adapted to certain yarns; and so that, when said tension means has been mounted in the twister, it shall effectively serve to prevent the twist that is developed as an incident of rotation of the spindle structure from working backward to an undue extent, thus to cause snarls and interfere with the free delivery of the yarn from the package.

In the drawing,

Fig. 1 is a view, mainly in vertical section but partly in elevation, of the improved twisting unit;

Fig. 2 is a side elevation of the tension assembly, viewed from the right in Fig. 1;

Fig. 3 is a vertical central sectional view of said assembly on line 3—3, Fig. 2;

Fig. 4 is an underneath view of the body or holder thereof;

Fig. 5 shows a fragment of the body or holder of said assembly in side elevation, viewed from the left in Fig. 2; and

Figs. 6 and 7 show the spring of said assembly and its gib or retainer.

What I term the spindle structure here includes the spindle proper or spindle 1, the pulley 2, the bowl-shaped yarn guide 3, and a sleeve 4, these parts being in fixed relation to each other, with parts 1, 2 and 3 concentrically related and part 4 in radial relation to parts 1 and 3. The spindle has an axial bore diverted at its lower end at about 45° to merge into the bore of sleeve 4, and in these bores is a coiled lining member 5, as a helical spring, whose uppermost convolution is enlarged and clamped between the upper end of the spindle and a nut 6 screwed on the spindle and having its bore coaxial with the bore of the spindle. Whereas the passage formed by the bores of the spindle and sleeve has angular bends, the lining member is bent in a curve, at 5a, so that the true bore it provides is similarly bent, which avoids undue abrasion of the yarn travelling through such bore and facilitates the operation of threading the yarn therethrough, as by a flexible threading implement.

The carrier in the example is formed in two sections. The lower section comprises a centrally apertured disk 7 having a central upstanding tube 8; concentric upstanding flanges 9 and 10, the flange 9 being of but slightly greater diameter than the tube so as to form therewith an annular groove or socket 11, and the flange 10 being at the rim of the disk; and a depending concentric flange 12 of slightly greater diameter than the tube. The upper section includes, with a holder 22 to be referred to, a tube 13 which from its lower end upwardly is internally reduced in thickness so that it may be slipped over the upper one of the bearings (to be referred to) and, snugly fitting the tube 8, have its lower end entered to the socket 11, thus to form with tube 8 a tubular post. The disk carries a centering plug 14 for the package, penetrated and centered by flange 9, it being of appreciably less diameter than flange 10 so as to form an annular channel to receive the package and, since the package core is conical, being itself also conical. In said channel may be placed a cushion 15, as of felt, on which the package is supported. The carrier is weighted at 7a so that it remains stationary while the spindle structure rotates. Between the spindle structure and the carrier are upper and lower ball-bearings 16, the lower such bearing being between shoulders 17 and 18 of the spindle and lower carrier section and having its inner race tightly fitting the spindle and the upper bearing being interposed between shoulders 19 and 20 of the spindle and upper carrier section, its inner race being opposed against upward displacement by the nut 6. Between the outer race of each bearing and the

corresponding carrier section is preferably a resilient bushing 21 for damping vibration incident to unbalance or whipping of the spindle structure. The construction is such that the upper carrier section, while snugly fitting the tube 8 of the lower section, may be upwardly withdrawn from the lower section and the upper bearing.

Contained in the tube is an assembly constructed as follows:

22 is a holder, which is generally cylindrical so as snugly to fit the somewhat enlarged upper end portion of the bore of tube 13, preferably projecting above the tube and here having such projecting portion somewhat reduced. It has a depending projection 23 whose opposite upright faces 23a are flat and parallel, and extending from above this projection to the lower end thereof it has a channel 24; it also has, in crossing relation to the channel and splitting the projection in a plane perpendicular to said faces and extending upwardly somewhat above the projection, a slit 25. Extending from each of said faces the projection has a rounded protuberance 26. Further, the under side of the projection preferably has a rib 27 formed by concave converging surfaces. Said holder has a bore 28 extending therethrough from its upper to its lower end and which, when the holder is fitted to the bore of the tube 13, is approximately alined with the aforesaid true bore of the spindle structure.

A bearing member 29 is provided which consists of an elastic U-shaped metal strip, its end portions having opposed openings 30 (Fig. 1) and above the openings orifices 31 to receive the protuberances 26 of the holder. It has a bottom hole 29a in line with bore 28. This member straddles the projection 23 of the holder so that its end portions are in face to face relation to the faces 23a of the projection; since the protuberances are rounded and said member is elastic the latter can be sprung free of the projection and thus removed.

32 designates the pair of intermeshing toothed rolls each of a length to lie between the end portions of member 29 but so as to be free to rotate and having trunnions 32a in the openings 30 of said end portions. They are confined to opposite sides of a plane cutting the holder lengthwise and passing between them by the under surface of projection 23 of the holder and by the lower margins of the openings 30 of the bearing member 29, with which their trunnions engage.

The rolls are urged to the left, Fig. 1, with the trunnions of the left-hand roll (which provides the aforesaid abutment) engaged with the left sides of openings 30, by an elastic strip or spring 33 rebent as shown in Fig. 3, one leg being longer than the other and its shorter leg having oppositely projecting ears 33a. Before the bearing member, with its contained rolls, is attached to the holder the spring is entered upwardly, with its bend leading, to the channel 24 and so that its ears 33a enter the slit 25 at both sides of the channel and abut the upper end of the slit. At 34 is a strip which extends into the slit and is interposed between the spring and the right-hand roll, it being of fiber so as to avoid undue wear of the teeth of the roll by the spring.

At 35 is the core and at 36 are the windings thereon of the package.

By a suitable flexible threading implement the yarn a is threaded down through the holder 22, between the rolls 32 and down through the spindle structure so as to emerge therefrom v th sleeve 4, from which it is extended upwar y to the spool or other core which, during the twisting, is rotated so as to wind the yarn and so draw it from the package.

During the twisting incident to the rotation of the spindle structure, with ballooning of the yarn as shown, the yarn is subjected to tension by the rolls. As an incident of the clamping effort which they impose on the yarn the twist thus effected is checked by the rolls in its effort to travel backwards or to the package, whereby snarling of the yarn is avoided; this is partly due to the compressing of the yarn by the rolls but is also materially augmented by the crimping of the yarn by the rolls. As considerable practice has shown, the twister may be operated at high speed and yet the operation proceeds without stripping of the yarn or such obstruction to its travel as to disrupt it or its fibers, and if irregularities in the yarn are present their effect to check the travel, with possible breakage of the yarn, is rendered impotent, the right-hand roll yielding to permit them to pass.

When in the claims I refer to the unit which is formed by the carrier, or the carrier and package, as non-rotative I of course mean that it is held by some force, as gravity, which prevents its rotation without obstructing ballooning of that part of the yarn which extends from the spindle structure to whatever expedient pulls the yarn from the package, as a rotated spool on which the yarn is wound. In the present example the twister is tilted, as shown, so that weight 7a is effective to hold the structure including the carrier and package against rotation.

Having thus fully described my invention, what I claim is:

1. A double-twist yarn-twister including an upright spindle-including structure rotative around the axis, and having an axial yarn-bore extending downwardly from the upper end of and discharging laterally, of the spindle, a non-rotative structure arranged on the first-named structure above the discharge end of said yarn-bore and including a carrier coaxial with, and journaled on and penetrated by said spindle of, said first-named structure and a yarn-package penetrated and carried by the carrier, the second-named structure extending above the spindle and having a yarn-bore substantially coaxial with the first-named yarn-bore, said first-named structure having, formed around its axis and below the carrier, a yarn-contact surface to which said discharge-end is open, and means carried by the second-named structure above the spindle to tension the yarn and limit backward travel of the primary twist incorporated therein on rotation of the first-named structure, said means including a pair of lengthwise circumferentially fluted intermeshing rolls freely rotative in said second-named structure with their axes crossing the first-named axis and one of which is normally urged into clamping relation to the yarn extending between them.

2. The yarn-twister set forth in claim 1 characterized by the portion of the second-named structure extending above the spindle and carrying said means being telescopically connected with and upwardly removable from the lower portion of such structure.

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