

[54] YARN FRICTION FALSE TWIST DEVICE 3,287,890 11/1966 McIntosh et al. 57/77.4
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FOREIGN PATENTS OR APPLICATIONS
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[57] ABSTRACT
Strand friction false twist device comprises three equi-
angularly spaced parallel shafts carrying respective
sets of friction discs, the discs of each set being over-
lapped with those of other sets to provide a zig-zag
spiralling strand path through the centre of the device.
A threading up mechanism has guide arms which lead
a strand laterally into the device without the strand
contacting those discs rotating in outward direction.

4 Claims, 3 Drawing Figures

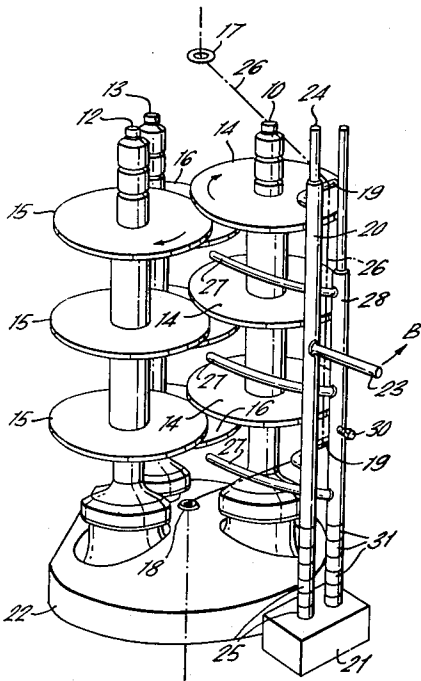
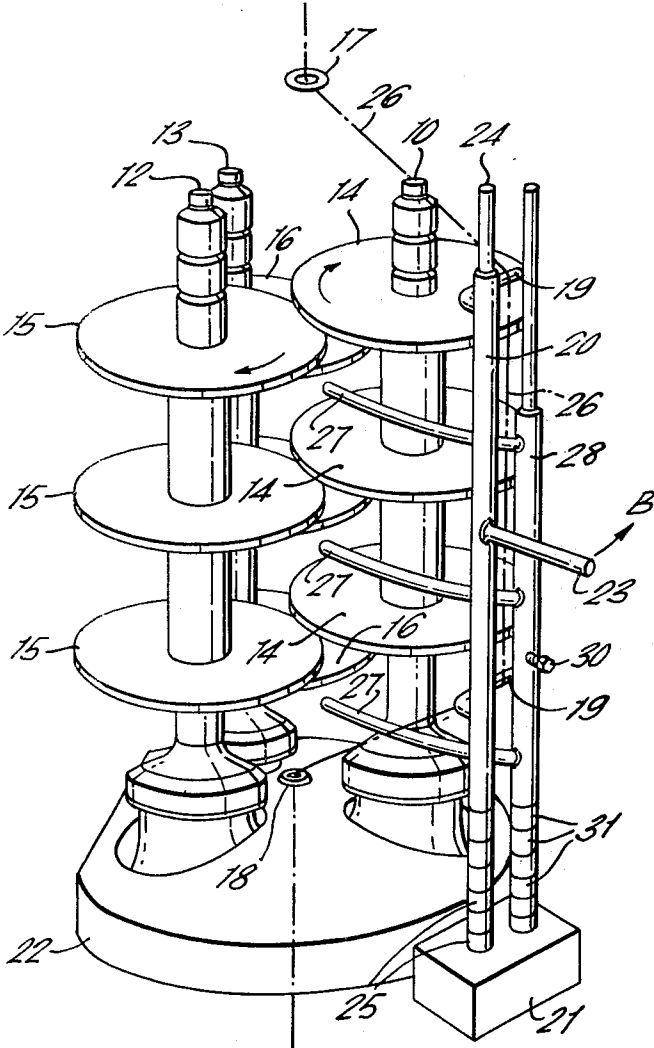
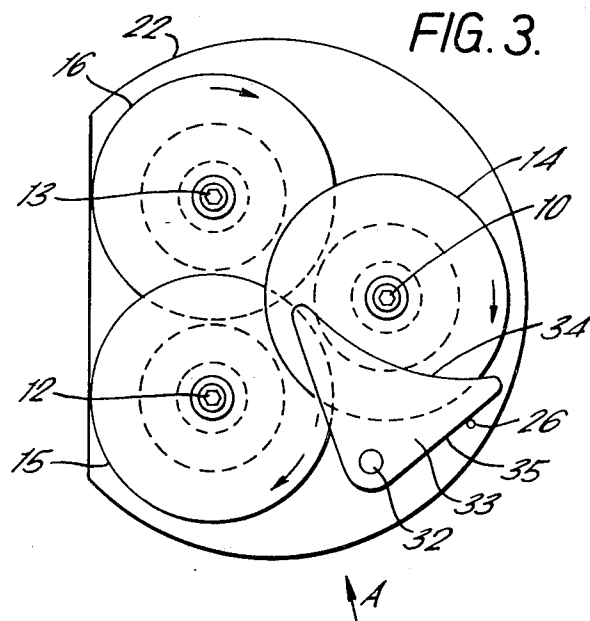
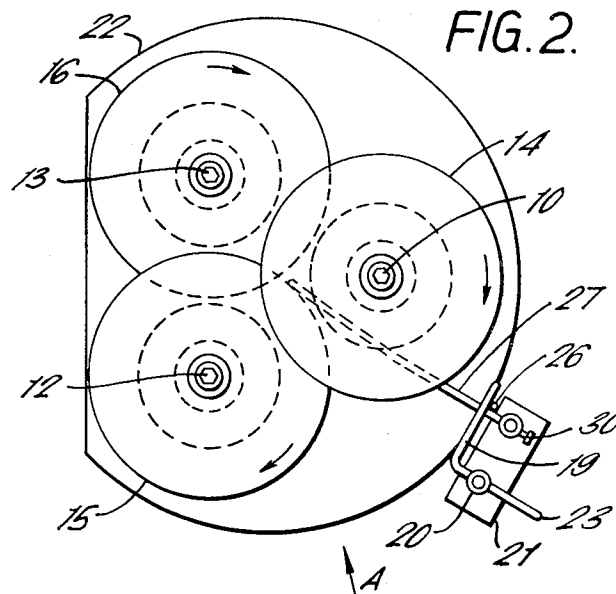


FIG. 1.





YARN FRICTION FALSE TWIST DEVICE

This invention relates to friction false twist devices of the kind in which a plurality of overlapping rotary discs are arranged on axes disposed about a strand path in such manner that the running strand contacts the rim of each disc in turn and is false twisted by being rotated by frictional contact with the moving rims as the discs rotate all in the same direction. We have found that by suitably positioning the discs with respect to one another, the strand is caused to travel over each disc rim at an angle inclined to the plane of rotation of the disc so that it is rotated with a substantially pure rolling motion on the disc rim, substantially without slip. In this way, the twist impartation becomes independent of the variations of frictional effect usually associated with friction twisting, in which there has hitherto been substantial slip between strand and friction surface. Consequently, a very precise and positive control of the twisting operation results, giving a surprisingly regular texturing effect in false twist crimping strands such as yarns of synthetic polymeric materials.

A typical device of the kind to which this invention relates, comprises three parallel, equiangularly spaced shafts each having a set of three discs with rubber or polyurethane tyres or rims, all of equal radius and equally axially spaced, and arranged so that they overlap one another substantially when viewed axially. The discs are so axially spaced and overlapped that a strand passing through the centre of the device follows a zig-zag spiralling path and lies on the friction surface of each tyre at an angle to the direction of motion of the surface equal, or substantially equal, to the desired twist angle, and in this manner the pure rolling motion is achieved. The discs all rotate in the same direction, and considering the shafts to be numbered 1, 2 and 3 as viewed axially in plan view and in adjacent order progressing either clockwise or anticlockwise, discs on shaft 2 lie between those on shafts 1 and 3. Hereafter a friction false twist device as described above will be denoted as "of the kind referred to".

Since the degree of overlap of the discs is considerable, threading-up of the device with yarn, at start-up or after a breakage, becomes somewhat difficult when the discs are actually rotating and the yarn running, because it will be appreciated that when trying to introduce the yarn laterally between any two adjacent sets of wheels of overlapping discs into the centre of the device, the rims of one set of discs are moving inwardly but the rims of the other set are moving outwardly relative to the centre of the device.

Attempts to force the yarn in may cause breakage, and breakages are also likely to occur if the device is threaded up while the discs are stationary and is then started up.

According to the present invention a friction false twist device of the kind referred to is provided with a threading-up mechanism having members about which can be releasably supported a bight or loop of running yarn which passes around the exterior of the sets of discs from end to end of the device, the mechanism also being provided with guide arms which extend towards the centre of the device between the respective shafts of two adjacent sets of discs, and are so located as to guide the bight or loop of yarn, when released from the support members, laterally inwardly between the two

adjacent sets of discs without the yarn contacting that set having its disc rims moving outwardly.

Preferably the support members are mounted on a common pivotal support, and are movable together between an operative position, in which they support the bight or loop of yarn, and a release position in which the loop is freed to be guided into the device by the guide arms.

An embodiment of the invention will now be described with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of a friction false twist device and its threading-up mechanism, taken in the direction of the arrow A of FIG. 2.

FIG. 2 is a plan view of FIG. 1.

FIG. 3 is a similar view to FIG. 2 showing an alternative embodiment.

Referring to the drawings, the friction false twist device comprises three parallel equiangularly spaced shafts 10, 12 and 13 all driven to rotate in clockwise direction (as seen in plan view) by any suitable drive mechanism (not shown) such as belts and pulleys or wharves.

The respective shafts each carry a set of discs 14, 15, and 16 with rubber or polyurethane rims, all of equal radius and equally spaced, and arranged so that they overlap one another substantially, which can be seen most clearly when viewed axially as in FIG. 2. It will be seen that the discs 15 of shaft 12 lie between the discs 10 and 16 of shafts 10 and 13. The discs may be ceramic material or ceramic-coated.

The axially spacing and degree of overlap of the discs provide that yarn running through the centre of the device, between two aligned and centrally located top and bottom guide eyes 17 and 18, follows a zig-zag spiralling path and lies on the friction surface of each disc rim at an angle equally, or substantially equal, to the desired twist angle to be inserted in the yarn.

It can be seen from FIG. 2 that if an attempt is made to thread-up by thrusting a running yarn laterally into the centre of the device from the exterior, say between the sets of wheels 14 and 15 in the direction of arrow A, the wheels 14 would tend to carry the yarn inwardly but the wheels 15 would tend to force it outwardly, but if the yarn is prevented from making contact with the set of wheels 15, then wheels 14 will automatically carry the yarn in and thread-up the device.

For this purpose a thread up mechanism is provided which comprises two spaced support members 19, both projecting horizontally from a common upright mounting rod 20 which can be pivoted manually about its own axis on a base member 21, which base member could be secured to a machine frame (not shown) or be secured to or integral with the base plate 22 of the friction twist device itself. The mounting rod 20 has a handle 23, and in the particular construction shown the rod 20 is tubular and pivots on a fixed shaft 24, and is adjustable axially by providing spacer sleeves 25 between the bottom end of the tubular rod 20 and the base member 21.

The purpose of the support members 19 is to releasably support a bight or loop of running yarn 26, shown in chain-dot lines in FIG. 1, as it runs between the top and bottom guides 17 and 18, with the loop passing around the exterior of the sets of discs 14 and 15 from end to end of the device, but the loop can be released

from the supports by moving the handle 23 in the direction of the arrow B of FIG. 1.

The thread-up mechanism is also provided with three parallel guide arms 27 which extend towards the centre of the device between the respective shafts 10 and 12 of the two adjacent sets of discs 14 and 15, each arm being fixedly located to guide the loop of yarn 26 released from the support members 19 laterally inwardly between each of the three pairs of adjacent discs 14 and 15, without the yarn contacting any disc 15 on its way into the centre. This can be seen most clearly in FIG. 2, the yarn loop 26 being seen at the upper side of an arm 27 located outside the zone encompassed by the rim of disc 15.

All the arms 27 are conveniently carried by a mounting tube 28 sleeved over an upright shaft 29 fixed to the base member 21, the tube 28 being movable about the shaft, for correct setting of the positioning of the guide arms 27, and being then lockable to the shaft by a set screw 30. Between the bottom end of the mounting tube 28 and the base member 21 are spacing washers 31 which provide for axial adjustment of the position of the mounting tube and hence the guide arms 27.

A simple indexing mechanism such as a ball catch can be provided for holding the support members 19 in the loop-forming position shown in the drawings. The guide arms 27 and their mounting need not be of the exact construction described, for example the guide arms may be part of a comb-like member stamped from sheet metal.

Furthermore the guide arms and the support members need not be separate from one another, but may be integral with one another and afforded by two different edges of respective ones of several plates, one edge being a guide edge and the other a plain or notched support edge for the bight or loop, which is released manually from the support edges to engage the guide edges when threading up the device.

This arrangement is shown in FIG. 3 of the drawings, in which the base plate 22 supports an upright mounting rod 32 which preferably is rotatably adjustable for setting it and which carries a set of four aligned spaced plates 33 of generally triangular shape of which only the top plate is seen in FIG. 3. The edge 34 of each plate acts as a guide arm in exactly the same manner as

the guide arms 27 of FIGS. 1 and 2. Another edge 35 of the plate acts as a stationary support member for the yarn loop 26, and can be plain as shown or can have a small notch which locates the loop positively before it is manually released onto the guide edge 34.

What is claimed is:

1. In a strand friction false twist device comprising a plurality of rotary overlapping friction discs arranged in sets, a plurality of parallel equiangularly spaced shafts each mounting a respective set of discs to be rotated by the shafts all in the same direction of rotation, the discs being axially spaced on the shafts and from each other and overlapped to provide a zig-zag spiralling path for a strand running through the centre of the device and over the rims of the friction discs, the improvement which consists of providing a threading up mechanism comprising support members about which can be releasably supported a loop of running yarn extending about the exterior of the sets of discs from end to end of the device, guide arms, means mounting and positioning said guide arms for them to extend towards the centre of the device and between the shafts of two adjacent sets of discs so as to guide the loop of yarn when released from the support members laterally inwardly into the device between said two adjacent sets of discs without contacting that set having its rims moving outwardly relative to the centre of the device.

2. Strand friction false twist device as claimed in claim 1, and further comprising a common pivotal support which mounts said support members for movement together between an operative position, in which they support the loop of yarn, and a release position in which the loop is freed to be guided into the device by the guide arms.

3. Strand friction false twist device as claimed in claim 1, and further comprising means movably mounting said guide arms for correct setting of their positioning to guide the loop of yarn into the device.

4. Strand friction false twist device as claimed in claim 1, and further comprising mounting rod means for said guide arms, means for adjusting the arms axially of the mounting rod, and means providing for rotational adjustment of the arms about the axis of the mounting rod.

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