United States Patent

[11] **3,595,003**

[72] Inventor **Hans Gassner**
Schweinfurt, Germany

[21] Appl. No. **843,961**
[22] Filed **July 23, 1969**
[45] Patented **July 27, 1971**
[73] Assignee **Kugelfischer Georg Schafer & Co.**
Schweinfurt, Germany
[32] Priority **Oct. 4, 1968**
[33] **Germany**
[31] **P 18 01 329.1**

[54] **FALSE TWISTING DEVICE**
9 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **57/77.45**
[51] **Int. Cl.** **D01h 7/92,**
D01h 7/46
[50] **Field of Search** 57/77.3,
77.45, 93, 103

[56] **References Cited**

UNITED STATES PATENTS

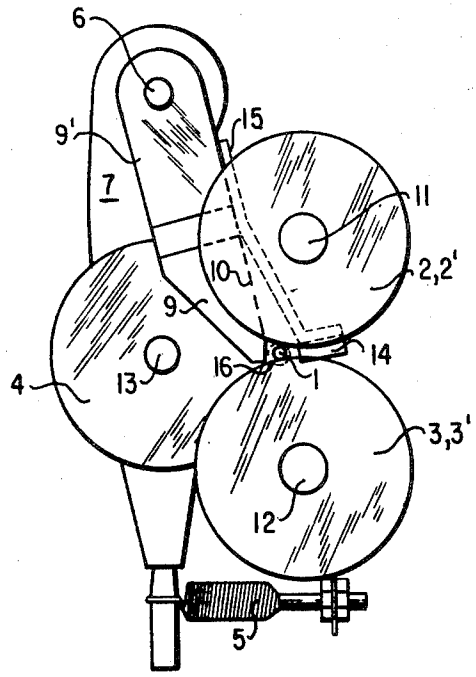
2,855,750	10/1958	Schrenk et al.	57/77.45 X
3,115,743	12/1963	Brodtmann	57/77.45
3,233,398	2/1966	Gilcrist	57/77.45 X
3,313,096	4/1967	Marciniak	57/77.45
3,392,518	7/1968	Forward	57/77.45
3,488,937	1/1970	Duquette	57/77.45

FOREIGN PATENTS

1,023,445	3/1966	Great Britain	57/77.45
1,079,298	8/1967	Great Britain	57/77.45
1,107,377	3/1968	Great Britain	57/77.45

Primary Examiner—Donald E. Watkins
Attorney—Stevens, Davis, Miller & Mosher

ABSTRACT: An elongate false twisting member extending axially along the outer periphery of a plurality of axially spaced-apart parallel rollers which rotatably bear in opposite radial directions against said member so as to determine a fixed radial position for same while simultaneously rotating same.



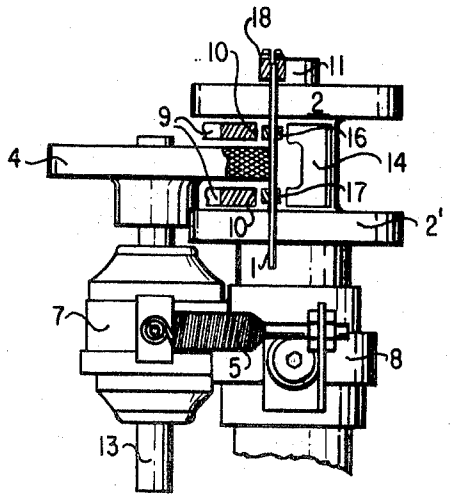


FIG. 1

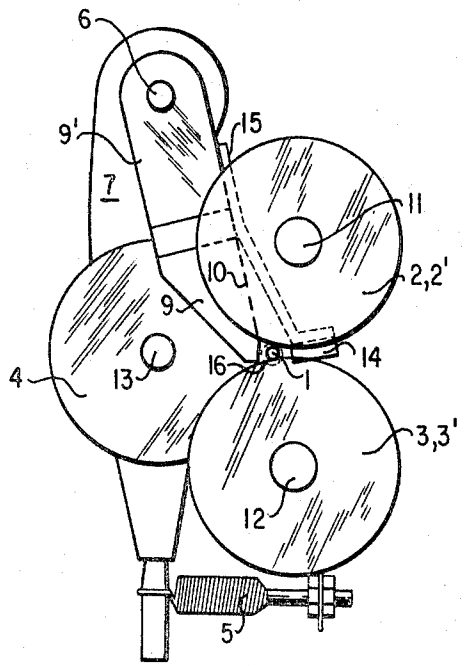


FIG. 2

INVENTOR
HANS GASSNER

BY
Stevens, Davis, Miller & Mosher
ATTORNEYS

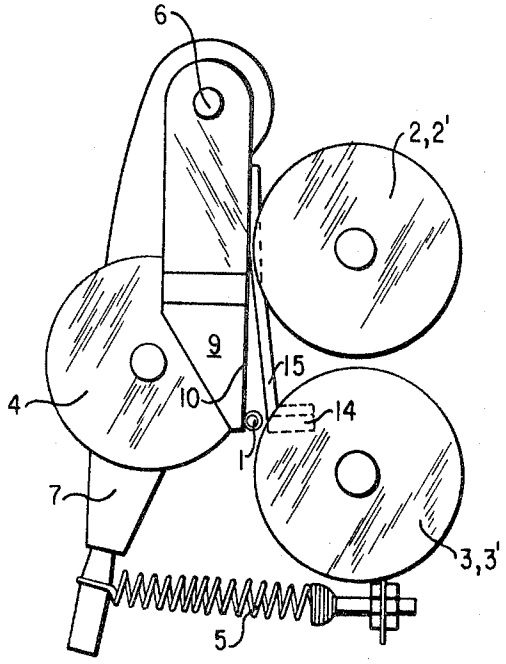


FIG.3

FALSE TWISTING DEVICE

The present invention relates to a false twisting device for the continuous crimping of synthetic threads and it comprises at least one rotatable elongate member, such as a tube, which constitutes the thread guide and which is rotatably supported by virtue of its extending axially along the peripheral surfaces of a plurality of axially spaced apart rollers at least one of which is radially opposed and axially between two others whereby in combination said rollers provide a three-point stable support for said member. Such an arrangement provides a high degree of stable support for the twisting member which is essential in instances in which it is to be rotated in the order of 500,000 r.p.m. and faster. Moreover, the arrangement according to this application is such that the aforementioned rollers may be separated from each other, when access to the twisting member is desired as during rethreading or during other operational interruption, without any other support being required for the twisting member during such periods. Specifically, the herein disclosed arrangement includes a magnetic means for holding the twisting member while it is no longer supported by said rollers, said magnetic means holding the member while it is being displaced between its normal operational position and a position enabling access thereto for rethreading, etc.

An object of the present invention is the realization of a rotary support means for a twisting member which provides an accurate and stable orientation of same for very high speed operation.

Another object of this invention is the realization of a support means which provides rotary support while simultaneously providing a rotary driving means for the twisting member.

Another object of the invention is the realization of a rotary support and driving means which provides easy access to the twisting member during intervals when such is required.

Another object of the invention is the realization of a support and driving means which permits separation of the driving means from the twisting member without an additional support means being required therefore and without disturbing the axial orientation of the twisting member relative to the driving means.

Another object of the invention is the realization of the foregoing objects through an arrangement which is simple in construction and operation and therefore reliable and not costly.

Other objects are those which are inherent in the disclosed arrangement, a preferred embodiment of which is specifically described with reference to the accompanying drawings in which:

FIG. 1 is a side elevation view of a device according to the invention, omitting rollers 3 and 3' so as to expose to view certain parts, and showing some parts in section;

FIGS. 2 and 3 are respective top plan views of the device of FIG. 1 respectively illustrating the swung in and swung out positions of the twisting member.

With reference to FIGS. 1 and 2, the twisting member comprises an elongate tube 1 extending axially between the nip formed by each of two pairs of rollers 2, 3 and 2', 3', it being understood that rollers 2, 2' are coaxial with each other and rollers 3, 3' are coaxial with each other and that FIG. 1 omits rollers 3, 3' for purposes of clarity.

As is seen in FIG. 1, therefore, the coaxial rollers 2, 2' bear upon axially spaced-apart points of a cylindrical twisting member such as tube 1 while another roller 4 bears against said tube at a point intermediate the rollers 2, 2', in this instance, exactly halfway between said rollers 2, 2'. The rollers 3, 3' are respectively in the same planes as rollers 2, 2'. The axis 11 of rollers 2, 2' is parallel to that 12 of rollers 3, 3' and to that 13 of roller 4.

Analyzing the arrangement shown in FIGS. 1 and 2, it is seen that a three point axial contact is provided to the tube 1 by the pairs of rollers 2, 3 and 2', 3' and the intermediate roller 4. Furthermore, the respective rollers in each pair, such as 2 and 3, together with roller 4 bear in different and somewhat opposed radial directions upon tube 1 whereby the tube is stabilized radially as well as axially between the respective rollers. It is, of course, clear that the rollers 2, 3 and 2', 3' in each pair are of such a diameter relative to that of tube 1 whereby said tube contacts both rollers in each pair in the condition depicted in FIG. 2.

The device includes a supporting frame 8 in which the rollers 2, 3 and 2', 3' are rotatably mounted. One end of a pivot arm 7 is also pivotally mounted at 6 to said frame 8 while the other end of said arm is held in position by a spring means 5 connected to said arm and to said frame. Rotatably mounted on arm 7 is the roller 4 so that said roller in fact resiliently urges the tube 1, in the condition depicted in FIG. 2, against the rollers in each said pair, the resilient urging being provided by spring 5.

Two flat magnets 9 are attached to a support 9' which is also pivotally supported at 6. One of said magnets is positioned in each side of roller 4 so that its flank 10 faces the tube 1 at a one of two axially spaced locations thereof. Also attached to support 9' is an arm 15 of nonmagnetic material and secured at one end thereof is a head 14 of magnetically conductive material such as soft iron, said head 14 facing the side of tube 1 opposite to the side faced by the magnet flanks 10 and providing a return path for the magnetic flux between the two magnets 9.

In the operating position of FIG. 2, there exists an air gap between tube 1 and the magnet flanks 10 on one side and the head 14 on the other side so that said tube may rotate without contacting either the magnets 9 or the head 14, this avoiding any friction between the tube and the respective surfaces of elements 9 and 14. Also, in the position of FIG. 2, either spindle 11 or 12 may be driven by a known means, such as a belt drive, to correspondingly rotate the two rollers 2, 2' or 3, 3' which are rigid with said spindle, the rotation of these rollers being in turn transmitted to tube 1 through the surface-to-surface contact which exists between the rollers 2, 2' and 3, 3' with the tube 1. A high-speed ratio is obtained by having the diameter of tube 1 small relative to that of the other rollers.

When access to tube 1 is desired, as when it is necessary to rethread the tube or during other instances of interruption, the arm 7 is swung about pivot 6 to the swung-out position of FIG. 3 against the bias of spring 5, this movement causing arm 7 to carry roller 4 away from rollers 2, 3 so that tube 1 is no longer held by roller 4 against said pairs of rollers. Tube 1, however, is prevented from falling free by the magnetic attraction of the magnets 9 against which said tube is now free to move by virtue of having been released by roller 4. The tube 1, therefore, is magnetically held by magnets 9 which carry it to the position of FIG. 3 together with the roller 4 since magnet support 9' is rigid with the roller support arm 7.

In order to permit the tube 1 to be attracted against the magnets 9 while also maintaining a small enough diameter of said tube relative to the rollers 2, 3, magnetic material collars 16, 17 may be fixedly mounted on tube 1 at spaced-apart locations corresponding to the axial spacing between the magnets 9. Further, the use of such collars makes it possible to employ a tube 1 of nonmagnetic material.

The position depicted in FIG. 3 provides easy access to tube 1 for whatever operations thereon may be necessary. When such operations are completed the tube 1 may be carried back into the operative position of FIG. 2 simply by releasing arm 7 and permitting it to swing under the urging of spring 5. The tube 1 is thereby accurately relocated in the operative position of FIG. 2.

The magnetic means according to this application are inexpensive and yet reliable in operation. The use of the head 14 helps to ensure accurate positioning of the tube 1 in its swung-in and swung-out positions.

In addition to collars 16, 17 tube 1 is provided with a head 18 having an axially extending bore of the same diameter as

and in alignment with the axial bore of tube **1**, said head **18** having arranged in its bore a transversally extending pin around which the thread to be twisted is wound at least once.

What I claim is:

1. A false twisting device for thread, comprising: a rotatable elongate false twister member, a plurality of rollers rotatably mounted along respective axes paralleled to each other and to said member, said rollers bearing against said member at at least three axially spaced-apart locations therealong, a first said roller mounted along one of said axes being axially intermediate two said rollers mounted along another of said axes, said rollers bearing against said member in respective different radial directions whereby said member is axially and radially supported between said rollers, said first roller being radially displaceable relative to said two rollers, a magnet means integrally displaceable with said first roller and being positioned radially adjacent to said twister member.

2. The device of claim **1**, including two pairs of coplanar rollers, each pair being in a respective plane axially spaced apart from the other plane along the length of said member, the rollers in each pair being coaxial with respective rollers in the other pair, said member extending axially between said pairs of coplanar rollers, said first roller being axially intermediate said pairs of coplanar rollers.

3. The device of claim **1**, said magnet means comprising a pair of flat magnets axially spaced apart along the length of said member on one radial side thereof.

4. The device of claim **3**, said first roller having an operative position relative to said two rollers whereby said first roller urges said member against said two rollers and whereby magnets are radially separated from said member by an air gap.

5. The device of claim **3**, said magnet means including a head of magnetically conductive material bridging the axial distance between said flat magnets along a radial side of said member opposite to said one radial side, said head being integrally displaceable with said flat magnets.

6. The device of claim **1**, said first roller and said magnet means being mounted on a pivot arm, a resilient means urging said arm to a swung-in position which corresponds to said first roller bearing upon said twister member and urging same against said two rollers, said arm being pivotable against said urging to a swung-out position which corresponds to said first roller being radially displaced away from the aforementioned swung-in position whereby said twister member is free to displace radially away from said two rollers, said magnet means being adapted to hold said twister member in a fixed position relative to said first roller in the aforementioned swung-out position thereof.

7. The device of claim **1**, at least one of said rollers being driven and thereby being adapted to drivingly rotate said member through surface-to-surface contact therewith.

8. The device of claim **3**, including a pair of collars of magnetic material mounted on said member at an axial distance apart from each other in correspondence with the axial positions of said magnets, said collars being of larger diameter than said member.

9. The device of claim **8**, said member being of nonmagnetic material.