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Nyfeler

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[54] **APPARATUS FOR PREVENTION OF CRINKLING IN TEXTILE YARNS**

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[52] **U.S. Cl.** **57/106**

[51] **Int. Cl.** **D01h 13/04**, B65h 57/00

[58] **Field of Search** 57/106; 242/157

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[57] **ABSTRACT**

Crinkle-preventer for textile yarns comprising a support and three bars arranged on the support so that one bar passes at a given angle between the other two which two are parallel, the bars being formed of a straight part and an S-shaped end part.

13 Claims, 6 Drawing Figures

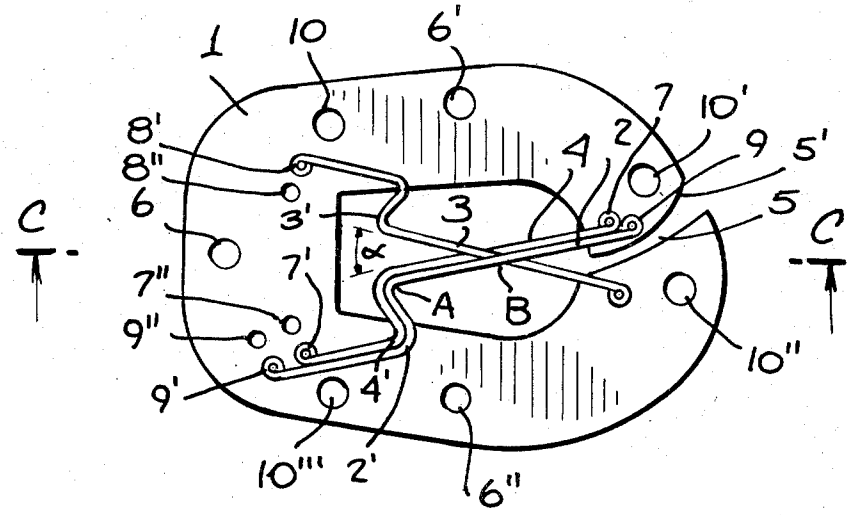


Fig. 1.

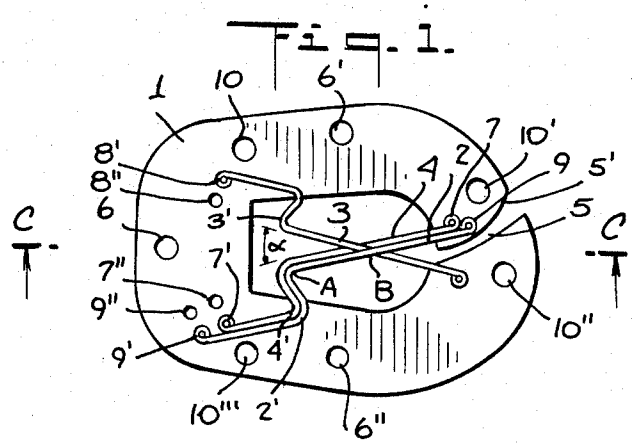


Fig. 2.

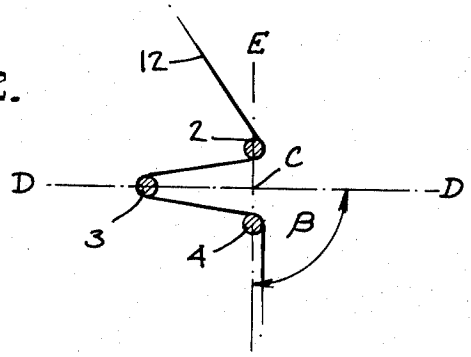


Fig. 3.

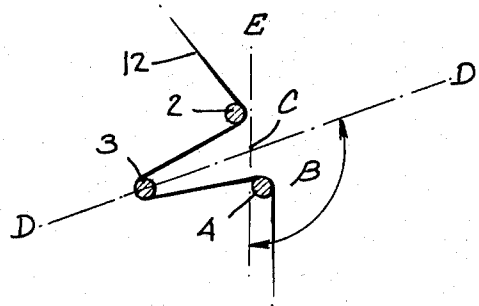


Fig. 4.

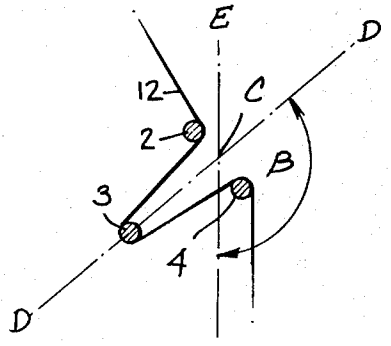
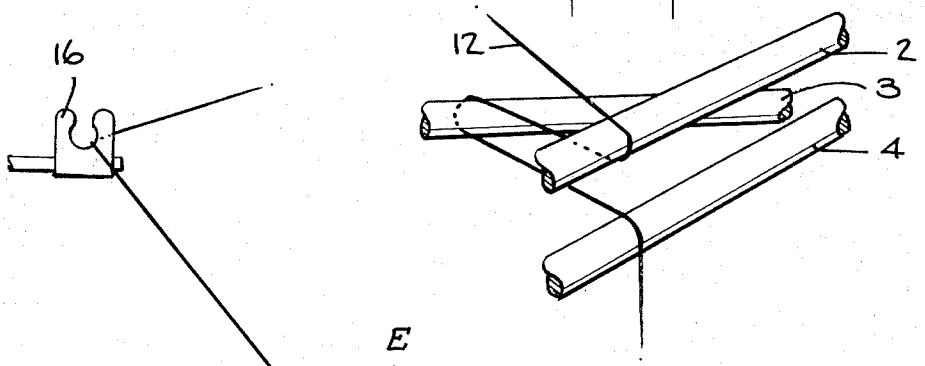


Fig. 2A.



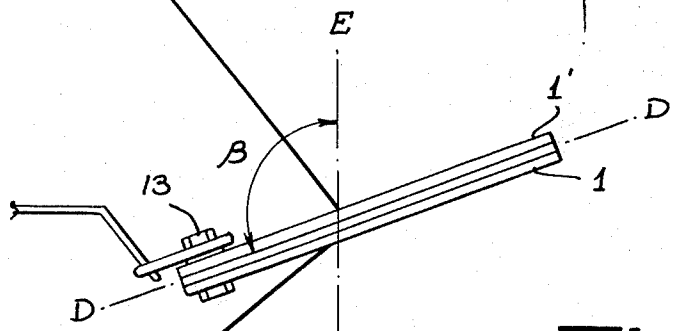
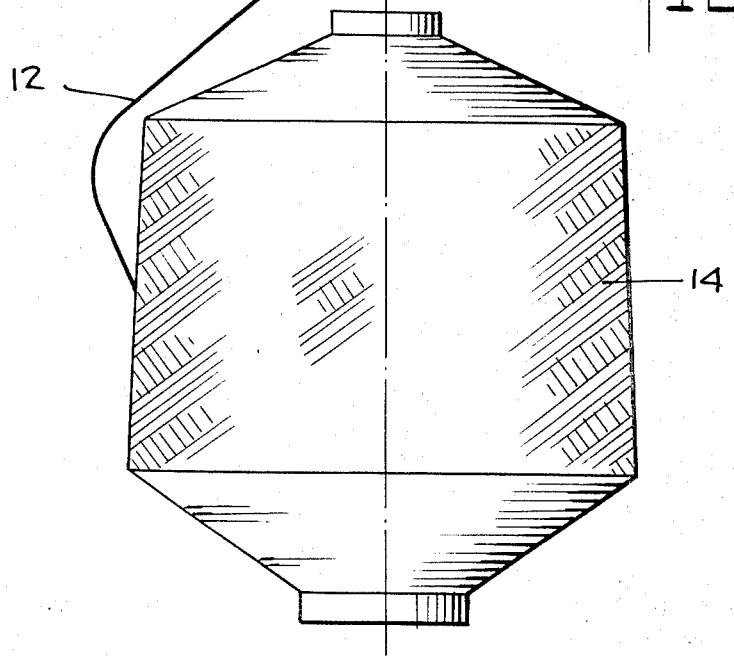


Fig. 5.



APPARATUS FOR PREVENTION OF CRINKLING IN TEXTILE YARNS

The present invention relates to apparatus for the prevention of crinkling in textile yarns in which a torque has been imparted, and more particularly in those yarns textured by temporary twisting and in crepe yarns.

The production of elastic textured textile yarns by temporary high-twisting synthetic thermoplastic yarns or yarn bundles by means of a false-twisting device, for example, and heat-setting the yarns while in the high-twisted condition is known. In certain textured yarns produced according to this process, however, their internal stress is not entirely compensated, as a consequence of which crinkling of the yarns occurs when they are drawn off a bobbin before being fed to a processing machine. Such crinkling may thus cause sudden increases in yarn tension, yarn breakages and undesirable down time of the machines while rethreading takes place.

For this reason, as a rule, the yarns drawn off a bobbin are fed to the processing machine through a so-called crinkle-preventer. Such a crinkle-preventer may consist, for example, of a support with a cylindrical pin which may be fixed coaxially with the bobbin axis on its head, on the free end of which a ring is mounted freely movable between two limiting collars. The yarn is fed at a certain angle, passed between the support and the ring and again drawn off at a certain angle. This crinkle-preventer, however, suffers from the disadvantage that it must be removed from the old bobbin and fixed on the new bobbin on every bobbin changing operation. Furthermore, where such crinkle-preventers are used, knotting of the yarn end of the emptying bobbin with the yarn end of the new bobbin is not possible since, as long as the crinkle-preventer is not fixed on the new bobbin, the yarn end of the new bobbin cannot rotate and would be torn off.

Additionally, in the known type of crinkle-preventer, intense fluttering of the ring occurs, whereby sudden increases of yarn tension are caused which may, in turn, cause irregularities of the quality of the goods knitted therefrom and may even cause breakage of very thin yarns. Furthermore, the known crinkle-preventer is relatively expensive.

Thus, I have conceived an apparatus which eliminates the foregoing difficulties and disadvantages, and by which I am able to provide a relatively inexpensive crinkle-preventer, the operation of which is quite satisfactory even where the yarn is very thin and has a strong tendency to crinkle.

Essentially, I contribute by my invention, a crinkle-preventer for textile yarns, particularly of textured yarns, which is characterized in that, in an annular support with a slot therein, three bars of circular cross-section are fixed, two of which are arranged in parallel at a certain vertical distance from each other and the third passing between the two former bars without any contact and crosses them at an acute angle, and in that each of the three bars, in addition to a straight part, is formed with an S-shaped bent end part.

The support may be of oval or any other form. It may consist of metal or of synthetic material and be formed by a base plate and a cover plate. The bars may consist, for example, of polished spring steel, of a sintered ceramic material or of other alloys; and the diametrally arranged bars may cross at an angle of between 5° and 30°.

There has thus been outlined rather broadly the more important features of the invention in order that the detailed description thereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject of the claims appended hereto. Those skilled in the art will appreciate that the conception upon which this disclosure is based may readily be utilized as a basis for the designing of other structures for carrying out the several purposes of the invention. It is important, therefore, that the claims be regarded as including such equivalent construction as do not depart from the spirit and scope of the invention.

A specific embodiment of the invention has been chosen for purposes of illustration and description, and is shown in the accompanying drawings, forming a part of the specification, wherein:

FIG. 1 is a top plan view of the base plate of an example of the crinkle-preventer of the present invention;

FIG. 2 illustrates an arrangement of the crinkle-preventer above a yarn cop in lateral view;

FIG. 2A is a detail perspective view of part of the structure of FIG. 2 and is used to illustrate a yarn path; and

FIGS. 3–5 are cross-sectional views taken along line C—C of FIG. 1 illustrating details of the crinkle-preventer in different oblique positions.

Referring now to the drawing and particularly to FIG. 1, the bottom plate 1 of the support is shown as having an oval shape, the base plate consisting of aluminum and being of a thickness of the order of 2 mm. In the base plate 1, three bars 2, 3 and 4 of circular cross-section of polished spring steel, are fixed. All three bars have diameters of 0.5 mm, and each has an S-shaped bent end part (2′, 3′, 4′) serving as a stop member for the yarn, and is of spiral shape at both ends. The spirals are removably fixed in recesses 7, 7′; 8, 8′;, 9, 9′ of the base plate, so that the bars may easily be removed and replaced. The bars 2 and 4 are arranged in the support diametrally and in parallel with one another, but are separated by a vertical distance which corresponds to the bar diameter and cross the bar 3 which is passed diametrally between them at an angle α here shown to be of about 10°. The angle α may be varied if necessary between 5° and 30° by displacing one spiral-shaped end of each of the bars 2, 3, 4, into corresponding recesses 7″, 8″, 9″ of the base plate 1. After fixing the spiral-shaped ends of the bars, 2, 3, 4 in the appropriate recesses, a cover plate 1′ (FIG. 2) of equal shape, size and thickness as the base plate 1 is fixed on the same by screws passed through the bores 10, 10′, 10″ and 10‴. Between the base plate and the cover plate, an intermediate layer may be placed to provide the necessary spacing of the bars where they cross each other. The support 1, 1′ is formed with a lateral slot 5 for inserting the yarn, executed as a self-threader, one edge 5′ of the slot being rounded to facilitate insertion of the yarn. Furthermore, the support 1 has three bores 6, 6′, 6″ serving to fix the crinkle-preventer on the bobbin frame of the processing machine by means of screws 13.

FIG. 2 illustrates the arrangement of the crinkle-preventer in oblique position above the yarn bobbin 14, its connection to the bobbin frame being not shown. The oblique position of support 1, 1' is chosen so that the yarn 12 can be positioned on the bars 2, 3, 4 along the distance A – B, according to its tension. The middle plane of support 1, 1', accordingly, forms an angle β with the central axis E of the bobbin support 15. Furthermore, the crinkle-preventer can be arranged so that the central axis of the support 1, 1' is slightly displaced with respect to the central axis E of the bobbin support 15. The amount of this displacement depends on the behavior of the yarn 12 while passing through the crinkle-preventer, and positioning of the yarn along the distance A – B.

The yarn 12 drawn off from the bobbin 14 is inserted into the support 1, 1' through the slot 5 and thus passed around the bars 2, 3 and 4, as shown in FIGS. 3–5. The yarn is fixed on the support 1, 1' during drawing-off in the knee A of bars 2, 4 and, depending on the tension, oscillates between the knee A and the crosspoint B of the bars, crinkles being thereby eliminated. As shown in FIG. 2, after passage through the crinkle-preventer, the yarn 12 is fed to the processing machine over the deviation member 16. The extent of dissolution of crinkles may be adjusted by choosing the oblique position of the crinkle-preventer to obtain the most advantageous results.

According to FIG. 3, the central plane D—D of support 1, 1' is declined around its central axis C with respect to the central axis E of the bobbin support 15, the angle β being 90°. The bars 2, 3 and 4 thereby apply a relatively low tension to the yarn. According to FIG. 4, the central plane D—D of support 1, 1' is inclined, with respect to the central axis E of the bobbin support 15, by an angle β of 120° to the right or to the left, wherefrom a large deviation of the path of the yarn 12 results. The larger the tendency of the yarn to crinkle, the greater its deviation by the bars 2 and 4 with respect to bar 3 must be. In FIG. 5, the central plane D—D of support 1, 1' is inclined by an angle β of the order of 130° in respect of the central axis E of the bobbin. The inclination of the middle plane D—D with respect to the axis E by the angle β may in any case occur to the right or the left, depending on whether the yarn is S or Z twisted. The crinkle-preventer of the present invention may, in certain cases, also be used as a yarn-brake when the yarn runs off a bobbin irregularly.

From the foregoing description, it will be seen that I contribute a crinkle-preventer which need not be removed from the expiring bobbin and fixed to a new one at each bobbin change. My crinkle-preventer, being devoid of the ring associated with the known device, is also free of its associated flutter and consequent ill effects. My device is useful in connection with yarns of the class described and most particularly with such yarns as have been textured by temporary twisting and with crepe yarns.

I believe that the construction and operation of my novel crinkle-preventer will now be understood and that its advantages will be fully appreciated by those persons skilled in the art.

I claim:

1. A crinkle-preventer for textile yarns having a torque, characterized by support means provided with a slot, three bars (2, 3, 4) fixed to said support, two of said bars (2, 4) being spaced from each other, the third bar (3) passing between the two first-mentioned bars without contact with same and crossing them at an acute angle, each of the three bars being formed with a straight shank and a curved end part (2', 3', 4').

2. A crinkle-preventer according to claim 1, characterized in that the support is of oval shape.

3. A crinkle-preventer according to claim 1, characterized in that the support consists of a base plate (1) and of a cover plate (1') of equal shape and size.

4. A crinkle-preventer according to claim 3, characterized in that the ends of the bars (2, 3, 4) are of spiral shape and are fixed in corresponding recesses (7, 7'; 8, 8' 9, 9') of the base plate (1).

5. A crinkle-preventer according to claim 4, characterized in that the spiral shaped bar ends may be fixed in different recesses in said support means in order to change the angle at which the third bar crosses the first two bars.

6. A crinkle-preventer according to claim 1, characterized in that the bars consist of polished spring steel.

7. A crinkle-preventer according to claim 1, characterized in that the acute crossing angle of the diametrally arranged bars is between 5° and 30°.

8. A crinkle-preventer according to claim 1, characterized in that said slot in the support means is in the shape of a self-threader for the yarn and has a rounded edge (5') to facilitate insertion of the yarn.

9. A crinkle-preventer according to claim 1, characterized in that said two bars (2, 4) are parallel to one another.

10. A crinkle-preventer according to claim 1, characterized in that said bars are of circular cross-section.

11. A crinkle-preventer according to claim 1, characterized in that said curved part of said bars is S-shaped.

12. A crinkle-preventer for textile yarns having a torque, characterized by support means provided with a slot, three bars (2, 3, 4) fixed to said support, two of said bars (2, 4) being spaced from each other, the third bar (3) passing between the two first-mentioned bars without contact with same and crossing them at an acute angle, each of the three bars being formed with a straight shank and a curved end part (2', 3', 4'), and means mounting said crinkle-preventer relatively to a yarn supply package whereby the horizontal plane of said support is inclined with respect to the central axis of the supply package.

13. A crinkle-preventer according to claim 12, characterized in that the horizontal plane of said support is inclined with respect to the central axis of the supply package by an angle of the order of between 90° and 130°.

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