April 15, 1941. J. R. WYLDE ET AL 2,238,203

TEXTILE MACHINERY

Filed April 18, 1940

FIG. 1

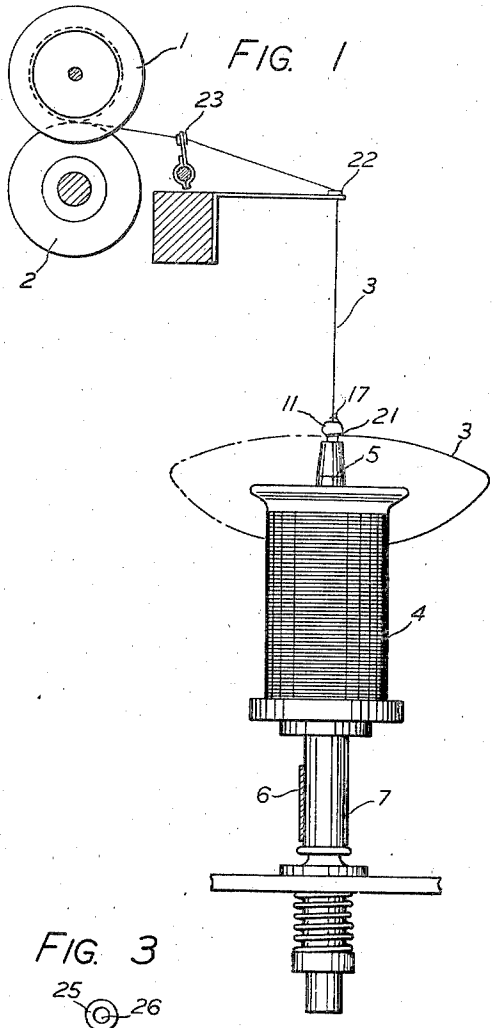


FIG. 2

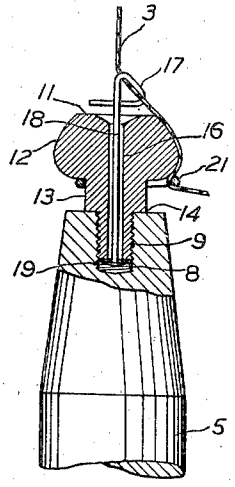


FIG. 4

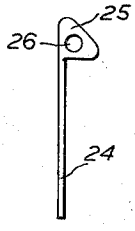
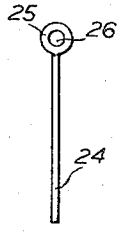


FIG. 3



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TEXTILE MACHINERY

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9 Claims. (Cl. 57—59)

This invention relates to textile machinery and more particularly to spindles suitable for use in yarn twisting apparatus.

The invention is particularly applicable to the production of yarns or threads of high twist, especially crêpe threads such as are used in the manufacture of natural or artificial silk crêpe fabrics.

An apparatus for the production of such threads is described in U. S. Patent No. 1,784,581. According to that specification, yarns are drawn from a rotating supply package by a take-up package supported on and frictionally driven by a drum, the yarn passing through a floating ring, disposed about the package supporting spindle below an annular flange secured to the spindle, and thence through suitable thread guides to the take-up package. The degree of twist imparted to the yarn is governed by the rate of rotation of the supply package and the rate at which the yarn is drawn off by the take-up package, the higher the rate of rotation of the supply package for a given rate of take-up of the yarn, the higher the degree of twist imparted to the yarn.

An object of the present invention is to improve the twist controlling elements of apparatus of the type described above, so as to produce yarns having more uniform twist.

According to the present invention a spindle adapted to support the yarn package to be rotated and protrude through the bore of the package, comprises a flange formed on the protruding end of the spindle, a ring disposed loosely about the spindle between the end of the package and the flange, between which ring and the flange the yarn passes during operation of the spindle, said ring having an inside diameter that is less than the diameter of the flange so as to be capable of being urged towards the flange under the pull of the yarn, and a thread guide disposed substantially centrally near the end face of the flange on the side remote from the ring and capable of rotating independently of the spindle.

With this construction, the disposition of the rotatable thread guide near to the end face of the flange causes the thread guide to constrain the yarn to make contact with a substantial portion of the surface of the flange while at the same time allowing the yarn to move circumferentially round the flange as the package rotates for the purpose of inserting twist. Also, the pull of the yarn during the twisting operation urges that length of yarn in contact with the flange to press against the flange. It is found that this arrangement tends to smooth out any kinks or spirals that may be formed as the yarn is twisted, with the result that a yarn with greater uniformity of twist is obtained.

The flange should be free from sharp edges and is preferably of approximately spheroidal shape, that is to say, the diameter of the flange diminishes towards its lengthwise extremities so as to produce a curved surface meeting the spindle substantially at right angles to its axis at one extremity and terminating at the other extremity in a plane at right angles to the axis of the spindle.

Conveniently, the flange is formed on a separate member provided with means for securing the member to the spindle; for example, the member may be provided with a screwed shank for engagement with a tapped hole provided in the end of the spindle, the screwed shank terminating in a shoulder adapted to abut the end of the spindle so as to form an annular space between the spindle end and the flange for accommodation of the loosely disposed ring. With the flange formed on a separate member the member is conveniently bored axially throughout its length to form a bearing in which a cylindrical extension of the thread guide is free to rotate, the tip of the extension protruding through the screwed shank and a washer being riveted to the extension to prevent the guide from coming out of the bore. Such unit construction lends itself to the application of the present invention to existing twisting apparatus at very small cost.

The maximum diameter of the flange is preferably sufficiently less than that of the spindle to allow the package to be accommodated to be easily slipped over the flange into position on the spindle.

By way of example a form of spindle according to the invention will now be described in greater detail with reference to the accompanying drawing in connection with a twisting apparatus of the type described above.

In the drawing:

Figure 1 is a diagrammatic side elevation of a twisting apparatus employing a spindle according to the invention;

Figure 2 is an enlarged view of the tip of the spindle shown in Fig. 1; and

Figures 3 and 4 are alternative constructions of a thread guide.

Referring to Figs. 1 and 2, a take-up package 1 supported on and frictionally driven by a drum 2 draws yarn 3 from a rotating bobbin 4 supported on and driven by a spindle 5, the spindle 5 being driven by a belt 6 passing over a whorl 7 on the base of the spindle.

The tip of the spindle 5 is drilled axially to form a hole 8 which is tapped for the reception of the screwed shank 9 of a member 11 having a flange 12 of approximately spheroidal shape and a cylindrical portion 13 terminating in a shoulder 14 abutting the end of the spindle 5. The member 11 is provided with an axial bore

16 which accommodates a freely rotatable thread guide 17 of wire twisted to form a pigtail guide eye for easy threading and having a length 18 passing freely through the bore 16, a washer 19 being riveted to the end of the length 18 to prevent the guide 17 from coming out of the bore. The maximum diameter of the flange 12 is sufficiently less than that of the spindle 5 to allow the bobbin 4 to be slipped easily over the flange 12 into position on the spindle.

During twisting, the yarn 3 follows a balloon shaped path from the rotating bobbin 4 to a ring 21 loosely disposed about the cylindrical portion 13 of the member 11, and then passes between the ring 21 and the flange 12, over the flange 12 to the rotatable guide 17, which allows the yarn to travel circumferentially round the flange as it unwinds from the rotating package 4, and thence over a substantially vertical path to a fixed guide eye 22 from which it passes through a traversing guide 23 to the take-up package 1.

The pull exerted on the yarn 3 by the rotating take-up package 1, coupled with the drag on the yarn arising from the rotation of the bobbin 4, causes the ring 21 to have a partial trapping effect on the yarn at the point where the yarn passes between the ring 21 and the flange 12. The thread guide 17, being disposed centrally and near to the end of the flange 12, constrains the yarn to make contact with the surface of the flange 12 over a line extending from the point where the yarn passes between the ring 21 and the flange 12 to the end of the flange, and the pull of the take-up package 1 urges the yarn in contact with the flange to press against the flange to provide for smooth insertion of the twist.

The diameter of the spindle at the tip abutting the shoulder 14 is slightly greater than the inside diameter of the ring 21 to allow the ring when not in use to rest on the tip of the spindle where the ring can readily be lifted for the purpose of threading the yarn.

As mentioned above the guide 17 shown in Fig. 2, is made from wire bent into the form of a pigtail. Alternative forms of guide are shown in Figs. 3 and 4, these guides having wire stems 24 terminating in flattened pieces 25 pierced to form eyes 26 through which the thread is passed.

Having described our invention what we desire to secure by Letters Patent is:

1. A twisting spindle adapted to support a yarn package to be rotated and protrude through the bore of the package, comprising a flange formed on the protruding end of the spindle, a ring disposed loosely about the spindle between the end of the package and the flange between which ring and the flange the yarn passes during operation of the spindle, said ring having an inside diameter that is less than the diameter of the flange so as to be capable of being urged towards the flange under the pull of the yarn, and a thread guide carried by the spindle and disposed substantially centrally near the end face of the flange on the side remote from the ring, the guide being capable of rotating independently of the spindle.

2. A spindle according to claim 1, wherein the flange is of approximately spheroidal shape.

3. A twist controlling device adapted to be attached to the yarn package supporting spindle of a yarn twisting apparatus, comprising a flanged member having a cylindrical body of smaller diameter than the flange, a ring of smaller diameter than the flange loosely fitted around the cylindrical body, a thread guide rotatably mounted on the flanged member with its guide eye disposed substantially centrally near the end face of the flange on the side remote from the body, and means on the body for attaching the device to the spindle.

4. A twist controlling device according to claim 3, wherein the flange is of approximately spheroidal shape.

5. A twist controlling device according to claim 3, wherein the thread guide comprises a length of wire twisted to form a pigtail guide eye.

6. A twisting spindle adapted to support a yarn package to be rotated and protrude through the bore of the package, comprising a member separate from the spindle and provided with means for securing it to the end of the spindle, the member being formed with a flange, a ring disposed loosely about the spindle between the end of the package and the flange between which ring and the flange the yarn passes during operation of the spindle, said ring having an inside diameter that is less than the diameter of the flange so as to be capable of being urged towards the flange under the pull of the yarn, and a thread guide carried by the spindle and disposed substantially centrally near the end face of the flange on the side remote from the ring, the guide being capable of rotating independently of the spindle.

7. A twisting spindle adapted to support a yarn package to be rotated and protrude through the bore of the package, comprising an axially bored flange formed on the protruding end of the spindle, a ring disposed loosely about the spindle between the end of the package and the flange between which which ring and the flange the yarn passes during operation of the spindle, said ring having an inside diameter that is less than the diameter of the flange so as to be capable of being urged towards the flange under the pull of the yarn, and a thread guide having a cylindrical extension free to rotate in the bore of the flange, the guide being disposed substantially centrally near the end face of the flange on the side remote from the ring.

8. A spindle according to claim 7, wherein the thread guide comprises a length of wire twisted to form a pigtail guide eye.

9. A twisting spindle adapted to support a yarn package to be rotated and protrude through the bore of the package, comprising a flange formed on the protruding end of the spindle and having a diameter less than that of the spindle, a ring disposed loosely about the spindle between the end of the package and the flange between which ring and the flange the yarn passes during operation of the spindle, said ring having an inside diameter that is less than the diameter of the flange so as to be capable of being urged towards the flange under the pull of the yarn, and a thread guide carried by the spindle and disposed substantially centrally near the end face of the flange on the side remote from the ring, the guide being capable of rotating independently of the spindle.

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