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Yarn Twister for Spinning Frames

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March 25, 1952 H. M. BROWN 2,590,374

YARN TWISTER FOR SPINNING FRAMES

Filed Oct. 7, 1949 2 SHEETS--SHEET 1

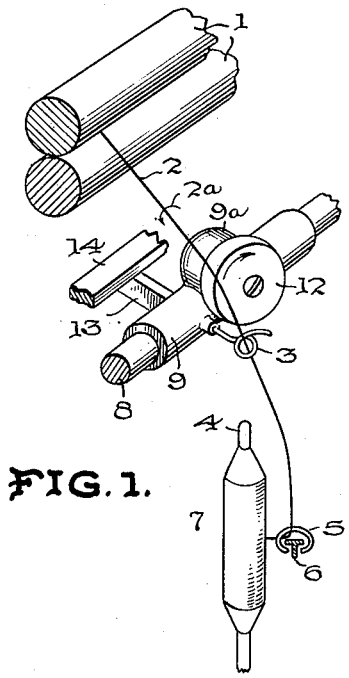

FIG. 1.

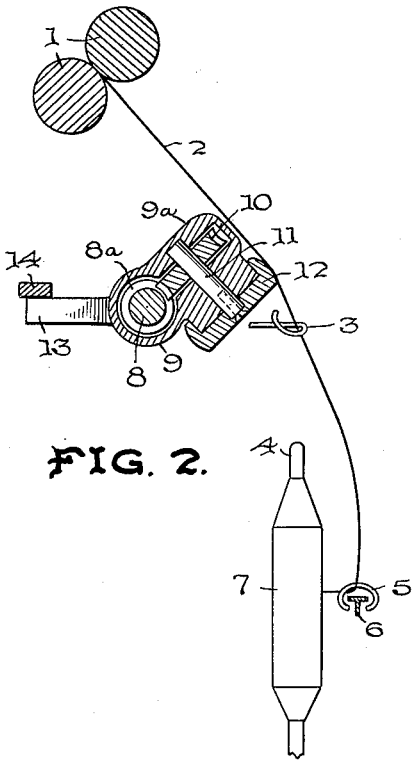

FIG. 2.

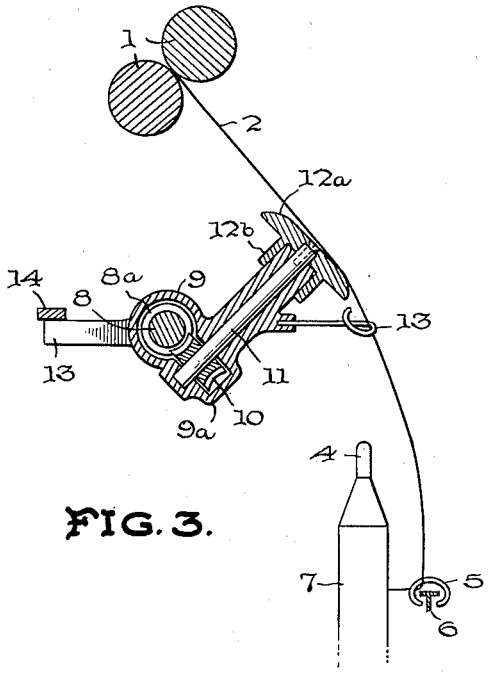

FIG. 3.

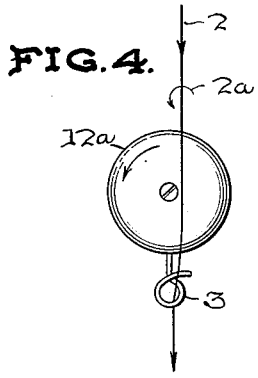

FIG. 4.

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YARN TWISTER FOR SPINNING FRAMES

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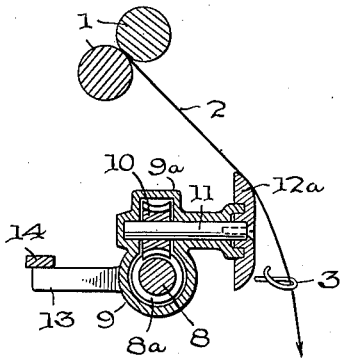

FIG. 5.

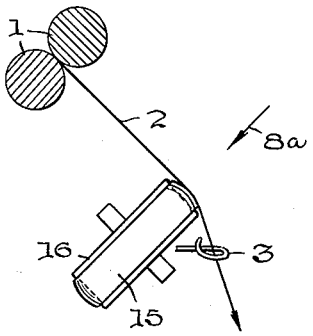

FIG. 7.

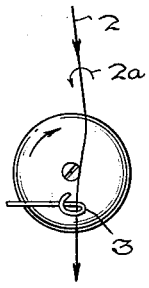

FIG. 6.

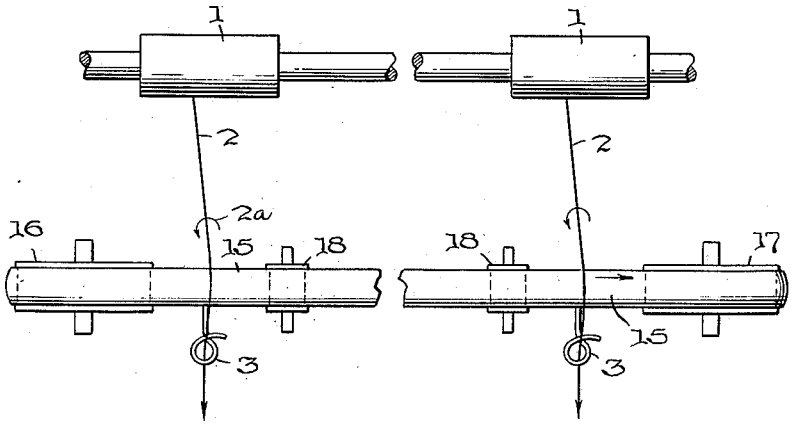

FIG. 8.

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YARN TWISTER FOR SPINNING FRAMES

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2 Claims. (Cl. 57—51)

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This invention relates to devices for applying false twist to yarn or thread. While the twisting devices of my invention are especially adapted for use on spinning frames, they may be used in other machines where it is desirable to apply a real twist to the yarn or thread passing through the machine.

A broad object of the invention is to devise a twisting device to be inserted between the front or delivery rolls of a spinning frame and the thread guides which are located directly above the spindles carrying the bobbins or quills. By such an arrangement, the necessary false twist is applied to the yarn or thread before it reaches the thread guide, and very little twist is applied by the traveler.

Another object of the invention is to devise a yarn twisting device in which the yarn is twisted by having frictional engagement with the surface of a single moving twister element, the frictional surface of the twister element being arranged to travel continuously in a closed path which runs substantially at right angles to the yarn at the point of contact of the yarn with the surface. In all forms of my invention, the frictional surface of the twister element is freely exposed and is not confined or surrounded by any other parts which would necessitate the threading of the yarn or thread through an aperture or small space in the twisting element.

In the use of my twister devices, the yarn is twisted near the front rolls by rolling of the yarn from the action of the frictional surface of the twister element, and the traveler is left free to perform its winding function. Since the yarn so made is completely finished after it passes the twisting device, a heavier traveler may be used, thereby permitting winding of the bobbin with greater tension and giving a greater bobbin capacity. Another advantage of the twister of my invention is that the balloon of the yarn under this additional tension is so small that larger traveler rings may be placed on a given frame, or the spindles may be placed closer together. The spindles may be run at higher speeds than usual, or finer counts may be made of shorter stable lengths than when spun at usual tensions. Also, better quality yarn results from the false twisting immediately at the front rolls which precludes false draft which often takes place in this region with present machines.

In the present invention, where the twisting is done by rolling, more twist can be placed in the yarn between the front rolls and the twisting device than is finally required in the yarn.

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This is especially advantageous when making low twist yarns that heretofore have tended to break near the front rolls.

A number of embodiments of my invention are illustrated somewhat diagrammatically in the accompanying drawing in which

Figure 1 is a perspective view of one form of twisting device in which each yarn delivered from the front rolls is twisted by engagement with the peripheral edge of a roller;

Figure 2 is a sectional view of Figure 1 taken in a vertical plane passing through the axis of the twisting roller;

Figure 3 is a sectional view similar to Figure 2 of a modified form of twisting device in which the twisting element is a rotary disk;

Figure 4 is a front view of the twisting element of Figure 3;

Figure 5 is a sectional view similar to Figure 2 showing another twisting device in which the twisting element is formed of a rotary disk having a horizontal axis;

Figure 6 is a front view of the twisting element of Figure 5;

Figure 7 is an end view of another form of twisting device in which the twisting element is formed of an endless belt extending throughout the length of the spinning frame; and

Figure 8 is a view of Figure 7 taken in the direction of the arrow 8a.

Referring to Figures 1 and 2 of the drawing, one section of the front or delivery rolls of a spinning frame are shown at 1. These rolls normally supply the yarn or thread 2 to a thread guide 3 located immediately above rotating spindle 4. The thread 2 passes through the guide 3 and then through the usual traveler 5 mounted upon a ring track 6 surrounding the spindle 4, and is wound upon the bobbin carried by the spindle 4 to form the yarn package 7. It will be understood that relative vertical motion between the spindle 4 and the track 6 is provided to properly distribute the yarn in forming the package 7.

According to my invention, a twisting device is inserted between the front rolls 1 and the thread guide 3 to impart the necessary twist to the thread 2 before it reaches the guide 3. In the arrangement shown in Figures 1 and 2, the twisting device is formed of a rotary shaft 8 arranged parallel with the front rolls 1 and mounted in stationary bearings arranged at intervals along the frame. This shaft extends throughout the length of the frame and is driven from the head end of the frame through suit-

able change-speed gearing to secure different speeds of the twister units for yarns of different twist. Individual twister units are provided for each yarn or thread as shown in Figures 1 and 2, and each twister unit is formed of a sleeve housing 9 surrounding a portion of the shaft 8 which carries a worm 8a. A lateral extension 9a of the sleeve 9 encloses a gear 10 which meshes with and is driven by the worm 8a on the shaft 8. The gear 10 is mounted upon shaft 11 which is journaled in the housing extension 9a, and a friction roller 12 is mounted on the lower end of the shaft 11. The thread guide 3 is also supported from the sleeve housing 9, and the entire twister unit, including the thread guide, may be tipped upwardly individually, or all together, for doffing the bobbins. Each unit is normally maintained in its proper operative position by means of a rearwardly extending lug 13 on the sleeve 9 which engages the lower face of a stationary stop bar 14 extending throughout the length of the frame. The unit housing sleeves 9 together with the supporting bearings for the shaft 8 cover the entire shaft to prevent yarn from winding on the shaft when ends come down. Also, the friction roller 12 has a circular recess in one face thereof which receives the cylindrical portion of the casing extension 9a surrounding the shaft 11 to prevent the shaft 11 from winding yarn or lint.

As shown in Figure 2, the friction roller 12 is mounted to rotate on an axis inclined to the horizontal by substantially 45°. The outer peripheral edge of this roller is formed of a smooth friction surface which engages the thread 2 as it passes from the rolls 1 to the guide 3. The roller 12 is so positioned with respect to the guide 3 that the thread 2 engages the roller at some point on the top portion of the peripheral edge, and the arrangement should be such that the thread 2 is deflected from its normal path by the roller 12, so that the tension of the thread will hold the thread in contact with the roller.

In the operation of the arrangement shown in Figures 1 and 2, the shaft 8 will be rotated continuously in one direction to cause clockwise rotation of the rollers 12 as shown in Figure 1, and this will cause anti-clockwise twisting of the thread 2 as shown by the arrow 2a in Figure 1, and twisting of the thread in this particular location will result in the various advantages enumerated above.

In the twisting arrangement shown in Figures 3 and 4, the construction is generally the same as that shown in Figures 1 and 2, and elements serving the same function have been indicated by like reference numerals. In this arrangement the twister element, instead of being formed as a roller as in Figure 1 and 2, is formed of a disk 12a mounted on the outer end of shaft 11 and having a rounded outer face positioned so that it engages the thread 2 at a point near the lower peripheral portion thereof and deflects the thread upwardly from its normal path between the rolls 1 and the thread guide 3. Except for the fact that the shaft 11 is inclined at right angles to the position shown in Figure 2, the arrangement for mounting and driving the twister element in Figures 3 and 4 is substantially the same as that shown in Figures 1 and 2. In this arrangement, however, the disk 12a must be rotated in an anti-clockwise direction, as shown in Figure 4, to impart an anti-clockwise twist to the thread 2 as shown by the arrow 2a. The twister disk 12a is provided with a cylindrical flange 12b on the back face thereof, and this flange surrounds the cylindrical portion of the casing extension 9a in which the shaft 11 is journaled to prevent the shaft from winding yarn or lint.

The twist arrangement shown in Figures 5 and 6 is the same as that illustrated in Figures 3 and 4 except that the shaft 11 for the twisting disk 12a is arranged on a horizontal axis, and the disk 12a is positioned so that the thread 2 engages the front face of the disk at the upper peripheral portion thereof. With this arrangement, the disk 12a must be rotated in a clockwise direction to impart an anti-clockwise twisting to the thread 2 as shown in Figure 6.

In Figures 7 and 8 I have illustrated a form of twisting device in which a single twisting element serves to twist all of the threads on one side of a spinning frame. In this arrangement the twisting element is formed of an endless belt 15. This belt is mounted upon two main flanged pulleys 16 and 17 which are suitably journaled at opposite ends of the spinning frame, the belt 15 being arranged so that its upper reach is located somewhat above the thread guides 3 and in a position to deflect the threads 2 out of their normal path between the rolls 1 and the guides 3. The upper reach of the belt 15 is supported at intervals by idler pulleys 18 which are provided with flanges to prevent shifting of the belt by the drag from the advancing threads. The lower reach of the belt 15 may be suitably housed within the frame space below the idler pulleys 18. In this arrangement, the thread guides 3 may be mounted to swing sidewise for doffing purposes instead of hinging upwardly as in the usual arrangement.

In the arrangement of Figures 7 and 8, the belt 15 is driven continuously in one direction through suitable change-speed gearing connected to one of the pulleys 16 or 17. The normal tension on the threads 2 will hold the threads in contact with the outer face of the upper reach of belt 15. With the belt moving from left to right as shown in Figure 8, the belt tends to pull the threads to the right, see Figure 8, but the tension on the threads tends to pull them back to the left thereby causing the threads to roll upon the belt and to impart twist to the threads.

As will be seen from the foregoing, each form of my twisting device includes a driven twisting element having a friction surface arranged to travel continuously in a closed path, and the friction element is arranged to engage the yarn on the underside thereof at a point where the friction surface runs substantially at right angles to the direction of the yarn, and the twisting element is positioned to deflect the yarn slightly upwardly from the path which it normally would follow in proceeding from the delivery rolls to the thread guide. In each case, the friction surface at the point of contact with the yarn is freely exposed, or is unconfined, so that the yarn may be arranged in operative relation with the friction surface by simply laying the yarn across the friction surface, and there is no necessity for threading the yarn through small apertures or spaces in the device. In Figures 1 to 6, inclusive, the twister element is in the form of an individual friction wheel for each strand of yarn, whereas in Figures 7 and 8, the driven twister element is in the form of an endless band or belt arranged to drive all of the strands or threads on one side of the spinning frame.

While all forms of my yarn twisting devices

illustrated and described herein are shown as applying a counter-clockwise twist to the yarn, it will be obvious that a twist in the reverse direction may be applied by any of the devices by simply reversing the direction of rotation of the twister element. Also, while I prefer to arrange the driven twister element to engage the yarn on the underside thereof, it will be obvious that the devices may be arranged to engage the yarn in other positions, such as on the side of the yarn, or even on the top of the yarn, but in all cases the driven twister element would engage the yarn and deflect it from its normal path of movement from the delivery rolls to the thread guide so that the normal tension of the yarn will maintain the yarn in contact with the driven twister element.

What I claim is:

1. In a textile machine in which a plurality of parallel strands of yarn are delivered each from a pair of delivery rolls to an individual thread guide spaced from said rolls, the combination of a twisting device for applying false twist to said strands at a point between said pairs of rolls and said thread guides, said twisting device including an endless belt arranged below said strands and extending transversely under each strand, said belt being positioned so that the outer surface of the upper reach thereof engages each strand on the underside thereof and deflects each strand upwardly from its normal path of movement between its pair of rolls and its individual thread guide, whereby each strand is held in frictional engagement with the surface of said belt by the

normal tension of the strand and false twist is applied to the strand by the rolling of said strand over the surface of said endless belt.

2. In a spinning frame in which a plurality of strands of yarn are supplied from delivery rolls to a plurality of thread guides spaced from said rolls and located above the respective spindles of said frame, the combination of a twisting device for applying twist to all of said strands at a point between said rolls and said thread guides, said device including an endless belt extending throughout the length of said frame and arranged below said strands and parallel with said rolls, said belt being arranged so that the upper reach thereof engages said strands on the underside thereof and deflects said strands upwardly from their normal paths of movement from said rolls to said thread guides, and means for driving said belt to impart twist to said strands.

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