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Yarn Twister for Spinning Frames

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Sept. 20, 1955 H. M. BROWN 2,718,111

YARN TWISTER FOR SPINNING FRAMES

Filed June 25, 1951 2 Sheets-Sheet 1

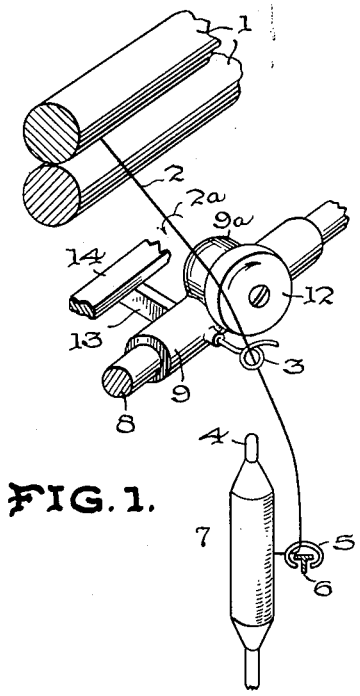

FIG. 1.

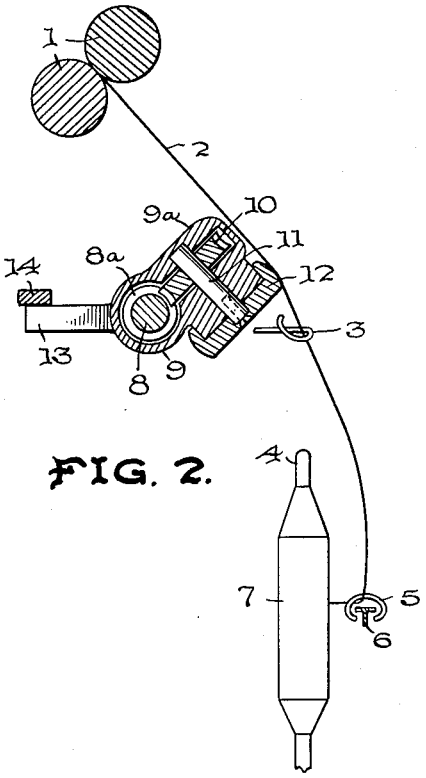

FIG. 2.

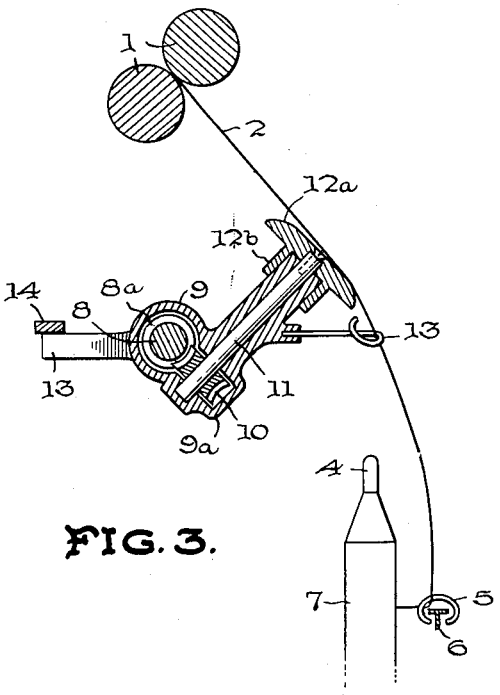

FIG. 3.

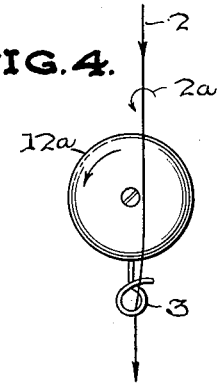

FIG. 4.

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YARN TWISTER FOR SPINNING FRAMES

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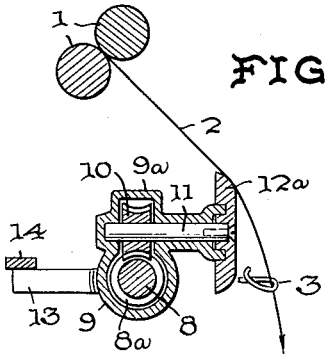


FIG. 5.

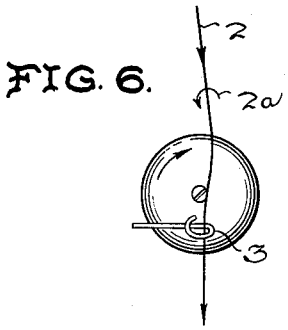


FIG. 6.

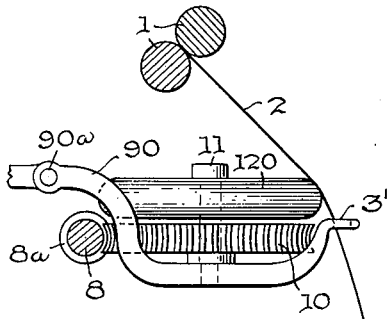


FIG. 7.

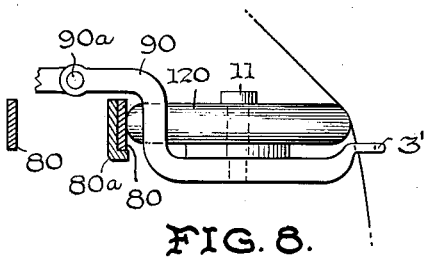
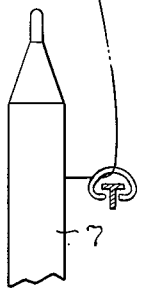


FIG. 8.



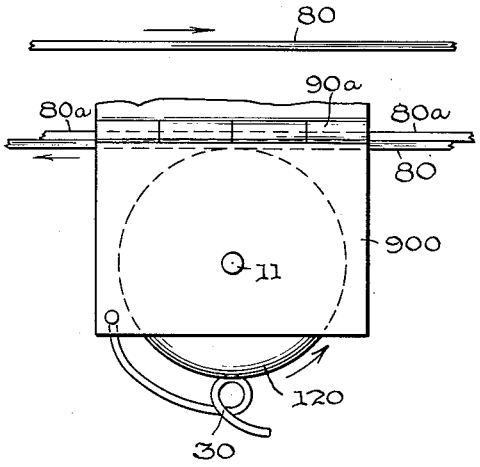


FIG. 10.

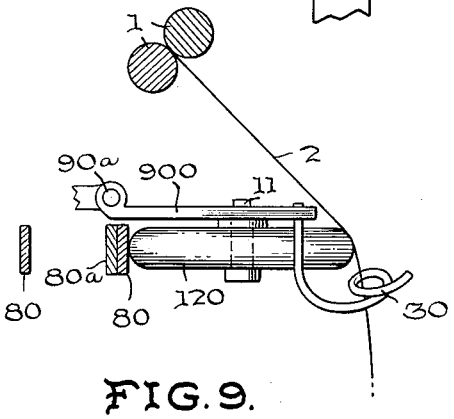


FIG. 9.

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YARN TWISTER FOR SPINNING FRAMES

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Application June 25, 1951, Serial No. 233,336

3 Claims. (Cl. 57—77.4)

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 desired to apply a twist to the yarn or thread passing through the machine.

It is a primary object of the invention to provide such devices in which the twister element of each twister unit is mounted for rotation on an individual movable frame and has its external surface normally in operative frictional twisting engagement with the thread or yarn, the arrangement being such that movement of the frame may disengage the twister element from or reengage it with the thread without requiring the thread to be manipulated or handled in any manner.

A further important object attained by certain embodiments of the invention is to so associate the twister element of each unit and its driving element that movement of the unit to operative or inoperative position will automatically establish or break the driving connection between the driving element and the twister element. This has the added advantage, when used in spinning frames, of permitting doffing of the various bobbins associated with the respective twister units while permitting manipulation of the thread or yarn as desired without danger of the thread being wound around rotating twister elements.

The present application is a continuation-in-part of my application, Serial No. 120,148, filed October 7, 1949, now Patent No. 2,590,374, dated March 25, 1952.

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 desk having a horizontal axis;

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

Figure 7 is a sectional view similar to Figure 5 showing another twisting device arranged so that tilting movement of the twister frame may disconnect the rotary twister element from its driving element.

Figure 8 is a sectional view similar to Figure 7 showing another form of twisting device in which the rotary twisting element is movable out of driving engagement with a driving element in the form of an endless belt.

Figure 9 is a sectional view similar to Figure 8 showing still another form of twisting device generally similar to that of Figure 8, except that the twisting element is disposed beneath its individual supporting frame.

Figure 10 is a plan view of the embodiment illustrated in Figure 9.

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 distributed 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 or driving element **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 suitable 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 the frame of each twister unit is formed of a sleeve housing **9** surrounding a portion of the shaft **8** which carries a worm **8***a*. A lateral extension **9***a* of the sleeve **9** encloses a gear **10** which meshes with and is driven by the worm **8***a* on the shaft **8**. The gear **10** is mounted upon shaft **11** which is journaled in the housing extension **9***a*, and a twister element in the form of a friction roller, wheel or disk **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 **9***a* 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 **2***a* in Fig. 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 Figures 1 and 2, is formed of a disk **12***a* 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 **12***a* 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 **2***a*. The twister disk **12***a* is provided with a cylindrical flange **12***b* on the back face thereof, and this flange surrounds the cylindrical portion of the casing extension **9***a* 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 **12***a* is arranged on a horizontal axis, and the disk **12***a* 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 **12***a* must be rotated in a clockwise direction to impart an anti-clockwise twisting to the thread **2** as shown in Figure 6.

In Figure 7 I have illustrated a form of twisting unit which is pivotally supported in such a manner that it will normally be retained by gravity in operative position, as in the preceding forms, and in which upward tilting, in addition to disengaging the twisting element from the thread **2** and permitting doffing of the bobbin associated with said unit, will also break the driving connection between the twister element and its associated driving element.

In such arrangement, the driving shaft **8** and worm **8***a* are similar to those described in preceding embodiments, but the twister frame **90** is pivotally mounted, as at **90***a*, for movement about an axis located above and to the rear of the axis of the shaft **8**, so that the action of gravity will normally maintain the twister element **120** in operative engagement with the thread while also maintaining the worm gear **10** in mesh with the worm **8***a* to thereby establish an operative connection between the driving element **8***a* and the twister element **120** which is in the form of a wheel or disc connected to the worm gear **10** which is journaled upon spindle **11**. The frame **90** may be formed of a base portion which supports spindle **11** and a pair of spaced arms for pivoting the frame at the axis **90***a*. The rear portion of gear **10** extends between the two arms.

In this embodiment, the twister element **120** is mounted above the twister frame **90** and the thread guide **3'** may conveniently be mounted on the forward edge of the twister frame and positioned just forwardly of and below the twister element **120**.

It will be seen that upward tilting of the twister frame **90** will move the element or disc **120** away from the upper end of its respective bobbin to permit doffing thereof, and will disengage the worm gear **10** from the element **8***a* while also moving the twister element or disc **120** out of engagement with the thread **2**.

In the embodiment of the invention illustrated in Figure 8, the twister frame **90** is pivotally mounted at **90***a*, as in Figure 7, and the twister element or friction wheel **120** is rotatably supported above the frame on spindle **11** with its forward peripheral edge normally in frictional engagement with the thread **2**, all in similar manner to that described in connection with Figure 7.

However the rear peripheral edge of the twister element or wheel **120** is normally in direct driven engagement with the driven element **80** which, in this case, constitutes the front reach of an endless belt driven through any suitable

means. Preferably a backing plate or guide **80***a* will be fixed behind the front reach of belt **80** to limit the rearward flexing or yielding thereof under pressure of the wheel **120**. Belt **80** preferably extends completely across the front of the spinning frame to function as the common driving element for a plurality of twister units.

It will be seen that upward tilting of the twister unit of Figure 8 about its pivotal axis **90***a* will simultaneously disengage the friction wheel **120** from both the thread **2** and its driving element **80**.

The form of the invention illustrated in Figures 9 and 10 is substantially like that shown in Figure 8, except that the twister element or wheel **120** is rotatably mounted beneath the pivotally supported twister frame **900**, which may comprise a flat metal plate, and the thread guide **30** is substantially like that shown in Figure 8, except that below and slightly in front of the wheel **120**.

In this arrangement, as best seen in Figure 10, only the forward peripheral edge portion of the twister element or wheel **120** projects from beneath the frame plate **900**, which acts as a guard to prevent winding of the thread about the wheel **120**.

In operation, the twister frame **900** may be swung upwardly to disengage the twister element **120** from both its driving element or belt **80** and from the thread **2**.

In the operation of each of the forms of the invention illustrated in Figures 7 to 10, inclusive, it will be apparent that the twister element must be rotated in a clockwise direction to cause a counterclockwise twisting of the thread **2**; and in each case it will be further apparent that upward swinging of the twister unit to an inoperative position will permit unobstructed access to the associated bobbin for doffing, while also discontinuing the driving connection between the twister element and its respective driving element. Lowering of the unit however will automatically re-establish such driving connection.

In all of the embodiments, it will be apparent that upward tilting of the pivotally mounted twister units will remove them from positions in which they might interfere with doffing of their respective bobbins, and will at the same time automatically disconnect their twister elements from engagement with their respective threads **2**.

I claim:

1. In a textile machine in which a plurality of threads are delivered from the machine at fixed locations spaced along the length of the machine and pass through a like plurality of second fixed locations at points below and forward of said first locations, the combination of an endless belt extending throughout the length of said machine and having one reach thereof arranged below said threads and between said first and second fixed locations, a fixed backing for said reach arranged on the opposite side thereof from said threads, a twisting element for each thread for applying a false twist to the thread comprising a friction wheel, an individual frame mounting each friction wheel for rotation about a substantially vertical axis and in a position where its peripheral surface is in contact with the face of said reach on the opposite side thereof from said fixed backing and another portion of its peripheral surface is in frictional twisting engagement with its assigned thread, and means pivotally supporting each of said frames about an axis located so the weight of the frame maintains said wheel in contact with said reach, and swinging of the frame about said axis moves said wheel away from said reach.

2. A textile machine according to claim 1 and including a thread guide carried by each individual frame for maintaining said assigned thread in frictional contact with the periphery of said wheel when said frame is in its normal position.

3. A textile machine as set forth in claim 1 wherein each individual frame comprises a plate arranged above said friction wheel and protecting the assigned thread from being wound around said wheel, the extreme front

peripheral edge portion of said wheel projecting from beneath said plate into operative engagement with the thread.

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