Sept. 15, 1931. T. E. ANDREW ET AL 1,823,638

MACHINE FOR SPINNING, DOUBLING, TWISTING, AND THE LIKE, YARNS, FIBERS, AND THE LIKE

Filed Nov. 18, 1927 2 Sheets-Sheet 1

Fig. 1.

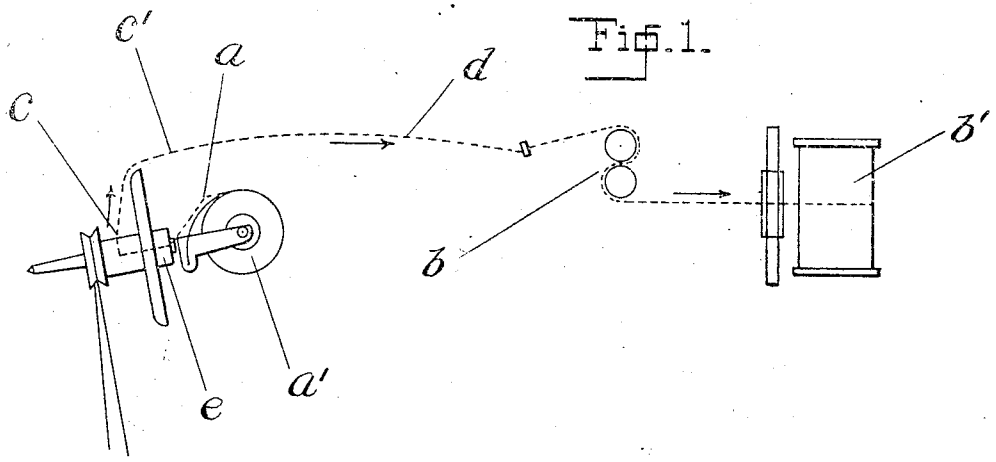
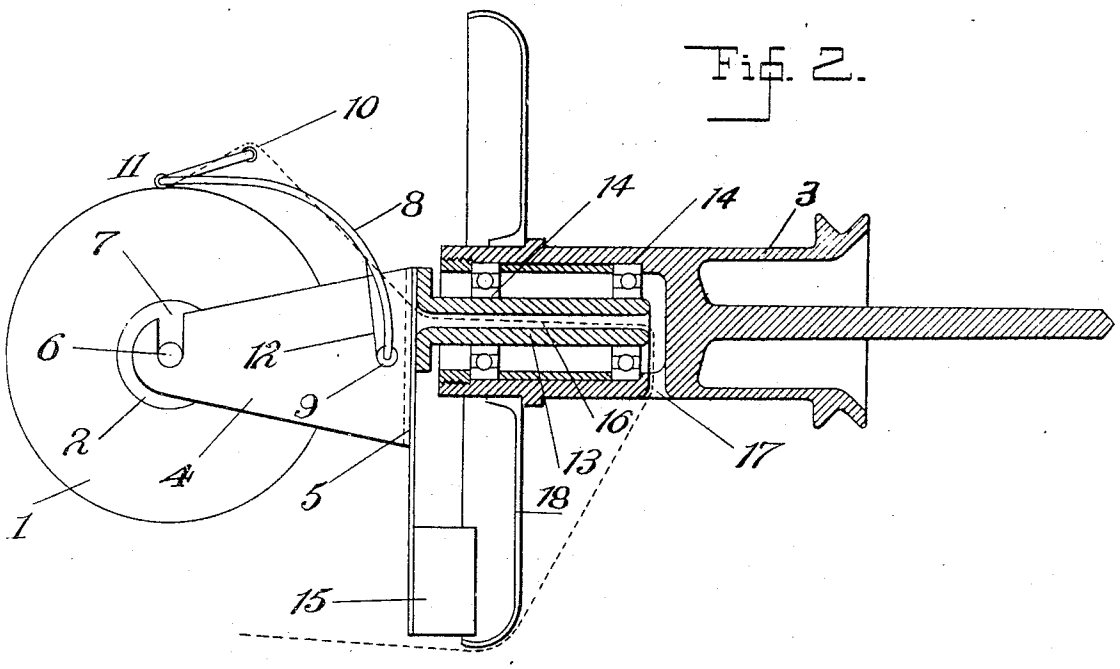


Fig. 2.



Inventors
Thomas Edwin Andrew
Melon Langstreth
James Bancroft
By their Attorney
D. Anthony Lisina

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Fig. 3.

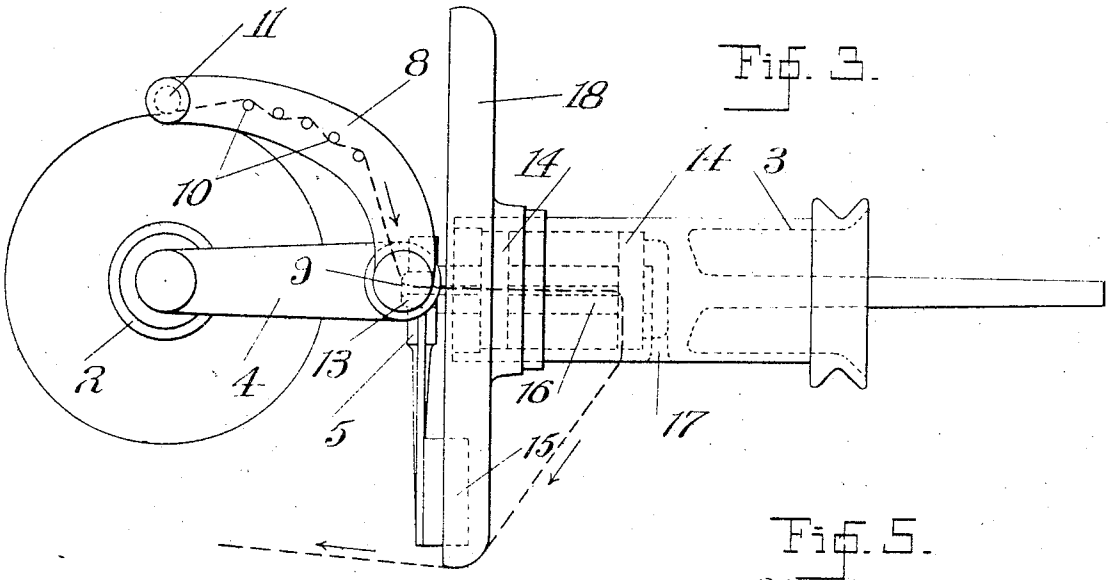


Fig. 5.

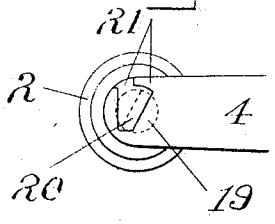


Fig. 4.

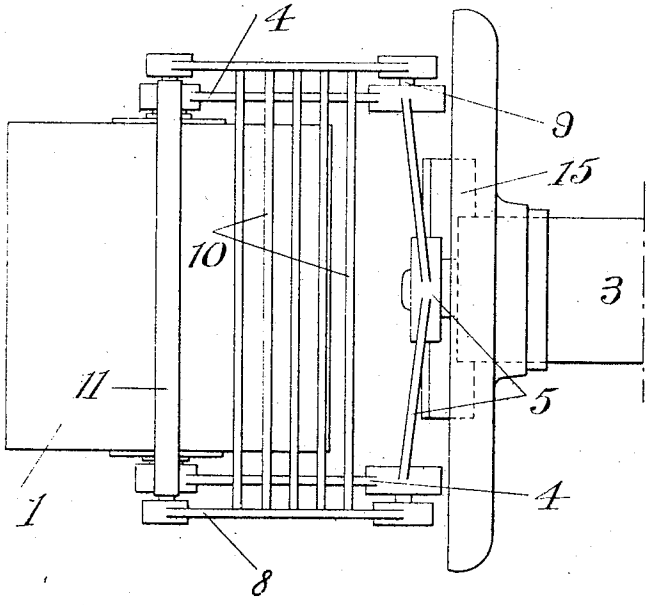
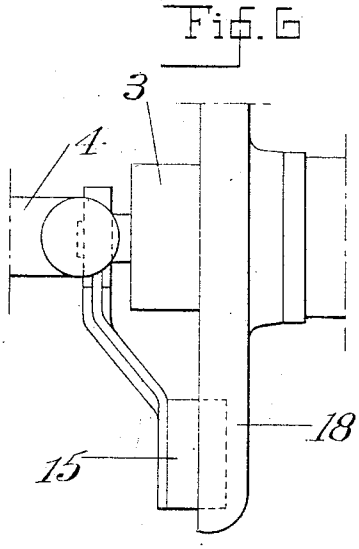


Fig. 6.



Inventors

Thomas Edwin Andrew
Melon Langstreth
James Bancroft

By their Attorney

D. Anthony Usina

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UNITED STATES PATENT OFFICE

THOMAS EDWIN ANDREW AND MELON LANGSTRETH, OF ROCHDALE, AND JAMES BANCROFT, OF ACCRINGTON, ENGLAND, ASSIGNORS TO DUNLOP COTTON MILLS LIMITED, OF ROCHDALE, ENGLAND

MACHINE FOR SPINNING, DOUBLING, TWISTING, AND THE LIKE, YARNS, FIBERS, AND THE LIKE

Application filed November 18, 1927, Serial No. 234,234, and in Great Britain April 13, 1927.

This invention relates to spinning, twisting, doubling and the like machines of the kind hereinafter called double twist machines adapted to impart two or more twists to the roving, yarn, thread or the like, hereinafter called the yarn, at every single revolution of the spindle.

In this class of machine the yarn in transit during treatment is formed into a loop held relatively fast at points adjacent the wind off spool and the take up spool respectively and the loop is rotated at its closed end so that one leg of the said loop rotates about the other. Thus, two twists are imparted to the yarn, one between each respective relatively fast point and the rotary point.

Hereinafter we have used the terms "bobbin" and "reel" and in order that the significance thereof may be appreciated, the use of the said terms is explained in the following paragraph.

In ring and traveller- and also in flier machines, the twisted yarn is invariably wound onto the spool associated with those devices. Now in this respect there are two main classes of double twist machines. The same being (*a*) those wherein the twisted yarn is wound onto the spool associated with the twisting devices—the same sequence as in ring and traveller machines, and (*b*) those wherein the said sequence is reversed, the twisting devices being associated with the spool of the untwisted yarn. This invention has particular reference to the latter class and hereinafter, in general, the term "bobbin" is used in connection with the spool carrying the untwisted yarn, and the term "reel" with the spool whereon the twisted yarn is wound.

There are several types of this latter class of double twist machines: our invention refers mainly to improvements in that type of such machines wherein firstly; the yarn is led from the bobbin, through a rotary part relative to which it is stationarily mounted, out at the side thereof and thence to the reel, and wherein, secondly, rotation of the bobbin is occasioned by unwinding. Of the points referred to in the second paragraph hereof the rotary point occurs where the yarn leaves the spindle while the two relatively fast points occur, one between the said rotary point and the bobbin and the other between the said rotary point and the reel.

It will be apparent that to ensure a constant degree of twist an even tension in the yarn at all points is essential and it is an object of this invention to provide means whereby the tension in the yarn is occasioned to the required degree and caused to be constant irrespective of extraneous conditions militating against such evenness of tension; such for instance as the tendency for the bobbin to rotate faster by its momentum than it would by the normal pull of the yarn—thus to decrease the tension in the said yarn.

While the opposing friction at the bearings of the bush or spool—hereinafter called the spool—of the bobbin occasioned by the weight of the yarn thereon—tends to retard the rotation of the said bobbin—thereby tensioning the yarn—we have found that such friction, particularly at normal i. e., plain concentric bearings is insufficient to provide the degree of tension required.

According to this invention, therefore, we do not rely wholly upon the friction normal at ordinary bearings but preferably provide means whereby the same may be increased and/or augmented in the required degree and manner; the said means preferably being actuated by or associated with improved guiding and/or tensioning means which are a particular feature of our said invention. Provision is made whereby the spindle may support the bobbin without transmitting rotation to it; and various other features of our invention will hereinafter become apparent.

In order that our invention may be more clearly understood and readily carried into practical effect, the same will now be described with reference to the accompanying drawings, in which:—Figure 1 illustrates more or less diagrammatically the general principle of double twist machines as manifest in apparatus according to one embodiment of our invention;

Figure 2 is a side view, partly in cross-section, of one embodiment of our invention;

Figure 3 is a side view of a modificational construction;

Figure 4 is a part plan view of Figure 3;

Figure 5 shows a constructional detail while Figure 6 shows a further detailed modification.

Referring particularly to Figure 1, the yarn in transit during treatment—the travel direction of the said yarn being indicated by the arrows in the drawings—is formed into a loop, held relatively fast at points *a* adjacent to the wind off spool *a'* and *b* to the take up spool *b'* respectively and the loop is rotated at a point *c* upon its closed end *c'* so that one leg *d* of the said loop rotates about the other leg *e* thereof. Thus, two twists are imparted to the yarn, one between each respective relatively fast point—*a* and *b*—and the rotary point *c*.

In the embodiment of our invention illustrated in Figure 2, the package or bobbin of yarn 1 to be twisted is carried on a parallel spool 2 whereof the axis is at right angles to the axis of the spindle 3—the latter being disposed horizontally or slightly inclined.

The said bobbin 1 is mounted between the horizontally extending extremities 4 of a bracket 5 stationarily supported as hereinafter described upon the driving spindle 3.

In the mounting of the said bobbin provision is preferably made to facilitate the operations of doffing and loading; as exemplified in Figure 2, the spool 2 has axially extending bearing pins 6 whereby it is supported in complementary slots 7 vertically disposed in the said extremities 4.

The tensioning arrangement as exemplified in Figure 2 includes a pivotal structure 8 fulcrumed at 9 upon the bracket 8, and—extending transversely across the bobbin between the arms of the said structure 8—a guide bar 10 and a brake skid 11.

The guide bar 10 serves several useful purposes. For instance, while acting as a guide for the yarn to the bore of the spindle it constitutes the first relatively fast point and obviates the possibility of the twisting yarn breaking by entangling loose fibers upon the yarn on the bobbin. Further, particularly in association with the pivotal bracket, it also functions to tension the yarn: the said yarn in passing over the bar causes the brake skid 11 to be pressed against the surface of the bobbin of yarn and thus we create friction at that point and also increase the friction at the bearings of the spool of the bobbin.

While the effect of such an arrangement may be such as to occasion the required tension—advisably provision is made whereby the said effect may be accentuated.

As exemplified in the drawings such provision may, for instance, be embodied in means whereby (*a*) the retardation of the bobbin is increased to increase the tension in the yarn or alternatively whereby (*b*) the tension in the yarn is increased to increase the retardation of the bobbin.

To exemplify, the pressure between the brake skid and the bobbin may be increased (*a*) as in Figure 2 by virtue of the spring 12 or (*b*) as in Figures 3 and 4 by virtue of the additional tension occasioned in the yarn by its deviation around the several bars 10 wherein that arrangement is characterized.

The deviation of the yarn about the bars 10 creates in the yarn the desired tension—and in the construction illustrated in Figures 3 and 4 is exemplified this advantageous feature of our invention; namely, that the tension in the yarn may be readily varied—for the purpose for instance, without altering the spindle speed, of occasioning differences of characteristics between yarns of the same count or folding or to accommodate yarns of different counts or foldings—merely by varying the number of bars whereabout the said yarn is caused to pass.

A further advantageous feature of our invention exemplified particularly in Figure 3, lies in this:—that facility is provided to maintain the path or disposition of the yarn, as seen in end elevation, substantially constant throughout the period of unwinding—the nature of the said angle or disposition of the yarn of course affecting to a certain degree the tension created in the said yarn.

We will now proceed to describe the means whereby the bobbin is mounted stationarily upon the rapidly rotating driving spindle 3.

Referring again to Figure 2, in the preferred arrangement the bracket 5 has a cylindrical extension 13 whereby it is supported upon ball bearings 14, whereof the inner races are fast upon the said extension and whereof the outer races are fast within the spindle.

The means provided completely to obviate the possibility of rotation of the bobbin with the spindle comprises, as shown in Figure 2, a weight 15 perpendicularly dependent from the cylindrical extension 13.

To accommodate the yarn in transit from the bobbin to the reel, the said extension 13 is bored along its axis as shown at 16 and the driving spindle has a hole 17 communicating with the said bore.

It now remains to describe the path of the yarn. The said yarn passes from the bobbin over the bar or bars 10, through the bore 16 of the cylindrical extension 13 of the bracket 5, out through the hole 17 in the spindle 3, and from thence to the reel.

The yarn between the spindle and the reel catenates around the bobbin of the yarn and, mainly to keep the said catenary clear of the same, we preferably provide a disc guide 18 over the edge of which the yarn passes in transit between the said spindle and reel.

It is not to be construed that we are limited to the precise details described either of the application of our invention or the particular means for carrying it into effect.

To exemplify: In general, the pivotal structure does not essentially comprise a wire or similar framework. As shown in Figures 3 and 4 for instance, the arms 8 may be rather in the form of plate-like members or flat brackets.

Again, as further exemplified in those figures, instead of a brake skid rigid between the said arms we may prefer to utilize a roller 11 rotatable therebetween. And it will be apparent that the said skid—rigid or rotary—may have or be provided with any convenient surface or covering.

Or again, as exemplified in Figure 5, instead of the spool having axially extending pins 6 for its bearings, it may rotate upon an axle 19, said axle being stationarily supported in the extremities 4 by the coacting of its spigot 20 with the recesses 21 formed in the said extremities.

The mounting means may be arranged in any convenient manner, such for instance as is indicated in our copending application Serial No. 234,233, filed November 18, 1928.

And we may, further, provide facility to balance or partly to balance the overhanging weight of the bobbin and associated parts, for instance as is exemplified in Figure 6 the weight 15 may function also to that end.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. An apparatus of the type described which comprises a rotating spindle, a non-rotating bobbin carrier mounted on said spindle and having a yarn passage coaxial with said spindle, a bobbin mounted transversely to the axis of said spindle, tensioning means on said bobbin carrier serving to deflect said yarn between said bobbin and said passage and braking means continuously actuated by said deflecting means.

2. An apparatus of the type described which comprises a rotating spindle, a non-rotating bobbin carrier mounted on said spindle and having a yarn passage coaxial with the axis of said spindle, a bobbin mounted transversely to the axis of said spindle, an arm pivoted at a fixed point on said bobbin carrier and having its free end resting on said bobbin and tensioning means on said arm to deflect yarn outwardly of its direct path passing from said bobbin to said yarn passage.

3. An apparatus of the type described which comprises a rotating spindle, a non-rotating bobbin carrier having a yarn passage coaxial with the axis of said spindle and a bobbin mounted on said carrier transversely to the axis of said spindle, an arm pivoted on said carrier and having its free end bearing against said bobbin and tensioning means on said arm to deflect yarn in passing from said bobbin to said yarn passage and to create a reaction pressure of said arm against said bobbin.

4. An apparatus of the type described which comprises a bobbin carrier having a yarn passage, a bobbin mounted with its axis transverse to said yarn passage, means on said carrier to rotatably support said bobbin, an arm pivoted on said carrier at a fixed point eccentrically to the axis of said bobbin and tiltable to frictionally engage said bobbin, and a tensioning rod on said arm serving to deflect said yarn outwardly from its direct path from said bobbin to said passage.

In witness whereof, we have hereunto signed our names.

THOMAS EDWIN ANDREW.
MELON LANGSTRETH.
JAMES BANCROFT.