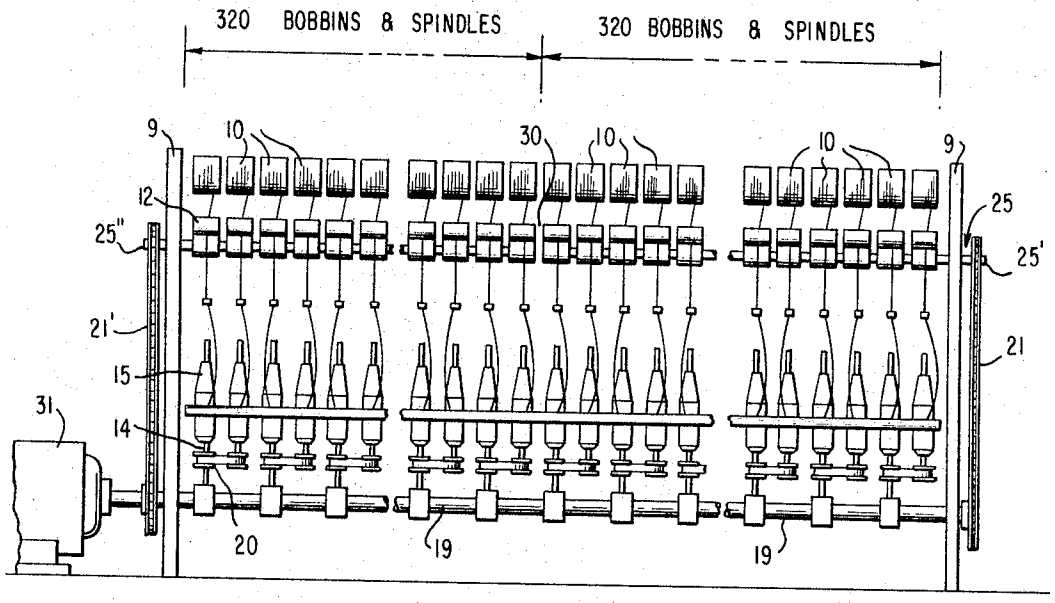
Sept. 5, 1967 M. M. BRYAN, JR 3,339,361

LONG SPINNING FRAME

Filed Nov. 22, 1965

FIG. 1



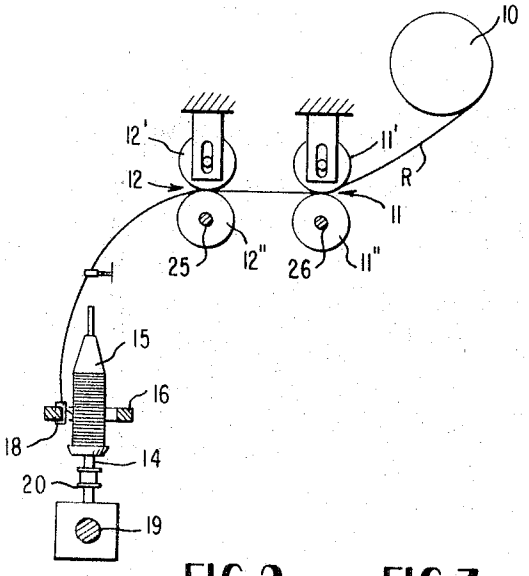


FIG. 2

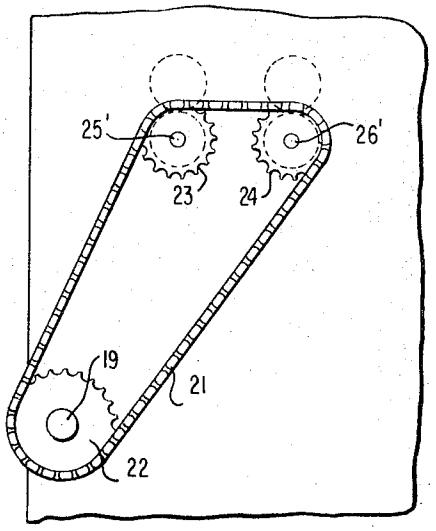


FIG. 3

INVENTOR

MORRIS M. BRYAN, JR.

BY Newton, Hopkins, Jones & Ormsby

ATTORNEYS

United States Patent Office

3,339,361

Patented Sept. 5, 1967

3,339,361

LONG SPINNING FRAME

Morris M. Bryan, Jr., Jefferson, Ga., assignor to The Jefferson Mills, Inc., Jefferson, Ga., a corporation of Georgia

Filed Nov. 22, 1965, Ser. No. 508,990
8 Claims. (Cl. 57—92)

ABSTRACT OF THE DISCLOSURE

What is disclosed is a spinning frame which is generally conventional in the positioning of a plurality of spindles and a plurality of drafting rolls relative to each other but in which the driven drafting rolls are provided by a plurality of separate shaft segments that are independently driven from a drive shaft drivingly connected to all of the plurality of spindles. The spinning frame disclosed provides a long spinning frame which may be of substantially any length since the plurality of separate and independently driven shaft segments substantially eliminate the thin and thick spots in the rovings caused by motion of the drafting rolls upon starting and stopping of the spinning frame that have been a problem with prior art spinning frames exceeding certain lengths.

This invention relates to spinning frames, and more particularly to a long spinning frame.

In the past, spinning frames have been limited in length even though it has been generally recognized in the art that a long spinning frame would provide the same number of bobbins as two or more short spinning frames at less initial cost, with fewer maintenance problems, and at lower operating expense. The reason that spinning frames have been limited in length in the past is that when prior art spinning frames have exceeded certain maximum lengths, undesirable thin spots and thick spots have been caused in the rovings upon the starting and stopping of the spinning frames.

These undesirable thin spots and thick spots in the rovings are caused in prior art spinning frames which exceed certain maximum lengths because it is characteristic of a prior art spinning frame to drive the drafting rolls with shafts which also carry the drafting rolls and which extend the length of the spinning frame. Since the drafting rolls are preferably of small diameter, these shafts must also be of small diameter. As a result, these shafts tend to twist along their lengths when initially rotated from one end of the spinning frame because of the inertia of the drafting rolls distributed along their lengths.

This twisting of these shafts becomes progressively greater in magnitude along the lengths of the shafts and is greatest at those ends of the shafts most remote from that end of the spinning frame at which the shafts are driven. Moreover, if the shafts are sufficiently long, the twisting is sufficiently great in magnitude for the shafts to have significant back rotations when the spinning frame is stopped and the twisting disappears. This back rotation of the shafts after the spindles have stopped and the resulting reverse rotation of the drafting rolls causes a thin spot in a roving on the spinning side of the drafting rolls and a thick spot in the roving on the opposite side of the drafting rolls and it is to avoid this back rotation that prior art spinning frames have been limited to those certain maximum lengths which would not result in significant twisting of the shafts carrying and driving the drafting rolls.

This prior art limitation on the length of a spinning frame cannot be avoided by simply driving these shafts from both ends of a spinning frame since the slightest lack of coordination between the driving means at one end

of a spinning frame and the driving means at the other end of the spinning frame would introduce twisting of the shaft equal to or greater than that caused by shafts which were too long. However, the invention disclosed herein overcomes this prior art limitation on the length of a spinning frame in a practical and efficient manner.

This is because the invention permits a spinning frame to be of substantially any desired length without encountering that back rotation of the shafts carrying the drafting rolls which causes thin spots and thick spots in the rovings. Thus, it provides the same number of bobbins as two or more prior art spinning frames at substantially less initial cost, with less maintenance, and at lower operating cost.

This improvement in spinning frames is provided by a spinning frame in which the drive shaft driving the spindles extends the length of the spinning frame and in which the shafts driving and carrying the drafting rolls are a plurality of axially aligned shaft segments extending along the length of the spinning frame. The drive shaft is of sufficient diameter to prevent significant twisting regardless of its length and the shaft segments carrying and driving the drafting rolls are driven from the drive shaft at a plurality of points along the length of the spinning frame. More importantly, even though the spinning frame disclosed herein may be of a any desired length, the lengths of the shaft segments which carry and drive the drafting rolls are never equal to or greater than that length which causes significant twisting of the shaft segments.

These and other features and advantages of the present invention will be more clearly understood from the following detailed description and accompanying drawing in which like characters of reference designate corresponding parts throughout and in which:

FIG. 1 is a front elevational view, partially broken away, showing a spinning frame embodying the invention and with most of its conventional structural features omitted for clarity;

FIG. 2 is a schematic view showing the path of a roving through the front and rear pairs of drafting rolls to a bobbin; and

FIG. 3 is an end elevational view showing a drive means for that embodiment of the invention shown in FIG. 1,

These figures and the following detailed description disclose a specific embodiment of the invention but the invention is not limited to the details disclosed since it may be embodied in other equivalent forms.

Referring now more particularly to the drawing and to that embodiment of the invention here shown by way of illustration, it will be seen that the spinning frame disclosed herein has a main frame **9** along the length of which are a plurality of spindles **14** and a plurality of pairs of drafting rolls **11** and **12**. Each spindle **14** has an associated spinning ring **16** with a traveler **18** and roving from a conventional supply of roving R as at **10** is twisted into thread and layed on a bobbin **15** carried by each spindle **14** by the action of the spinning ring **16** and the traveler **18** associated with the spindle **14**.

The pairs of drafting rolls **11** and **12** are arranged with respect to the spindles **14** in conventional manner in that there is a rear pair of drafting rolls **11** and a front pair of drafting rolls **12** associated with each spindle **14** and it will be understood that a roving R passes through a rear pair of drafting rolls **11**, a front pair of drafting rolls **12** to a bobbin **15** on a spindle **14**.

Moreover, the spindles **14** and their associated spinning rings **16** and travelers **18** are driven in conventional manner from a drive shaft **19** which extends the length of the spinning frame and from which drive mechanisms **20** drive the various spindles **14** to twist the roving and

wind the thread on the bobbins **15**. In addition, the pairs of drafting rolls **11** and **12** are conventional in that one drafting roll in each pair of drafting rolls **11** and **12** is an idler roll **11'** or **12'** and only one roll **11''** or **12''** in each pair of drafting rolls **11** and **12** is carried and driven by a shaft **25** or **26**.

However, unlike prior art spinning frames, in the spinning frame disclosed herein, the shafts **25** and **26** do not extend the length of the spinning frame. Rather, each shaft **25** or **26** comprises a plurality of axially aligned segments **25'** and **25''** or **26'** or **26''**, each of which is individually driven from the drive shaft **19**. In that embodiment of the invention disclosed herein, the shaft **25** comprises two segments **25'** and **25''** which together form the shaft **25** and the shaft **26** comprises two segments **26'** and **26''** which together form the shaft **26**. Thus, the shafts **25** and **26** extend the length of the spinning frame, but are discontinuous at **30**.

The shaft segments **25'** and **26'** of the shafts **25** and **26** are driven from the right end of the spinning frame as viewed in FIG. 1 and the shaft segments **25''** and **26''** of the shafts **25** and **26** are driven from the left end of the spinning frame as viewed in FIG. 1 by a drive means which is best shown in FIG. 3.

The drive means shown in FIG. 3 is on the right end of the spinning frame as viewed in FIG. 1, but there is a similar drive means on the left end of the spinning frame. From FIG. 3 it will be seen that the drive means includes a chain **21** passing around a sprocket **22** on the drive shaft **19** and over a sprocket **23** on the shaft segment **25'** and a sprocket **24** on the shaft segment **26'**. The drive means at the left end of the spinning frame includes a similar chain **21'** passing around a sprocket **22'** on the drive shaft **19** and around sprockets **23'** and **24'** on the shaft segments **25''** and **26''**. Thus, it will be understood that the shaft segments **25'**, **25''**, **26'** and **26''** are individually driven from the drive shaft **19** and that similar drive means may be provivded to drive additional shaft segments so that the length of no shaft segment **25'**, **25''**, **26'** or **26''** need be so long as to experience substantial twisting when its rotation is initiated.

It will also be understood that only one drive motor **31** is required to drive the entire spinning frame, and that this drive motor **31** drives the drive shaft **19** which in turn drives the various spindles **14**, the shaft segments **25'** and **26'**, and the shaft segments **25''** and **26''**. It is the shaft segments **25'**, **25''**, **26'** and **26''** which carry the driven rolls **11''** or **12''** of the pairs of drafting rolls **11** and **12** and these pairs of drafting rolls **11** and **12** draft the rovings R in conventional manner.

It will thus be seen that the invention disclosed herein provides a long spinning frame which is not limited in length by the necessity of avoiding the back rotation of the shafts **25** and **26**. For example, the spinning frame disclosed in FIG. 1 has 640 spindles **14** rather than the 320 spindles characteristic of prior art spinning frames. Thus, its initial cost, its maintenance, and its operating expense are all less than that of a prior art spinning frame.

It will therefore be understood by those skilled in the art that the particular embodiment of the invention here shown is by way of illustration only, and is meant in no way to be restrictive; therefore, numerous changes

and modifications may be made, and the full use of equivalents resorted to, without departing from the spirit or scope of the invention as defined by the appended claims.

What is claimed as invention is:

1. In a spinning frame having a plurality of spindles and a plurality of drafting rolls operatively related to said plurality of spindles, a continuous drive shaft operatively connected to said plurality of spindles so as to simultaneously drive all of said plurality of spindles, a plurality of separate shaft segments each of which is drivingly connected to only some of said plurality of drafting rolls and each of which is operatively connected to said continuous drive shaft so that said plurality of shaft segments are driven independently of each other by said continuous drive shaft.

2. The spinning frame of claim **1** in which said plurality of shaft segments are horizontally and axially aligned parallel to said continuous drive shaft.

3. The spinning frame of claim **2** in which at least some of said plurality of drafting rolls are positioned on said plurality of shaft segments.

4. The spinning frame of claim **1** in which said spinning frame has a frame length along which said plurality of spindles are positioned and in which said continuous drive shaft has a shaft length substantially equal to said frame length of said spinning frame.

5. The spinning frame of claim **4** including a drive means positioned at one end of said continuous drive shaft for rotating said continuous drive shaft.

6. The spinning frame of claim **5** including means spaced along said shaft length for rotating each of said plurality of shaft segments by rotation of said continuous drive shaft.

7. The spinning frame of claim **4** in which the number of said plurality of spindles positioned along said frame length is at least six hundred and forty.

8. The spinning frame of claim **1** including a second plurality of drafting rolls related to said plurality of spindles, and a second plurality of shaft segments each of which is drivingly connected to only some of said second plurality of drafting rolls and each of which is operatively connected to said continuous drive shaft so that said second plurality of shaft segments are driven independently of each other by said continuous drive shaft.

References Cited

UNITED STATES PATENTS

316,008	4/1885	Carroll	57—102
617,511	1/1889	Peirce	57—102 X
1,263,055	4/1918	Goldsmith	57—92
1,963,135	6/1934	Keyser	57—102 X
2,168,449	8/1939	Reich	57—97
2,875,645	3/1959	Keyser	57—102 X

FOREIGN PATENTS

346,703	4/1931	Great Britain.
505,419	5/1939	Great Britain.
760,512	10/1956	Great Britain.

FRANK J. COHEN, *Primary Examiner.*

D. E. WATKINS, *Assistant Examiner.*