March 10, 1959 E. K. AUSTIN, JR., ET AL 2,876,616

VARIABLE TWIST YARN FORMING APPARATUS

Filed Jan. 9, 1956

FIG. 1.



FIG. 3.

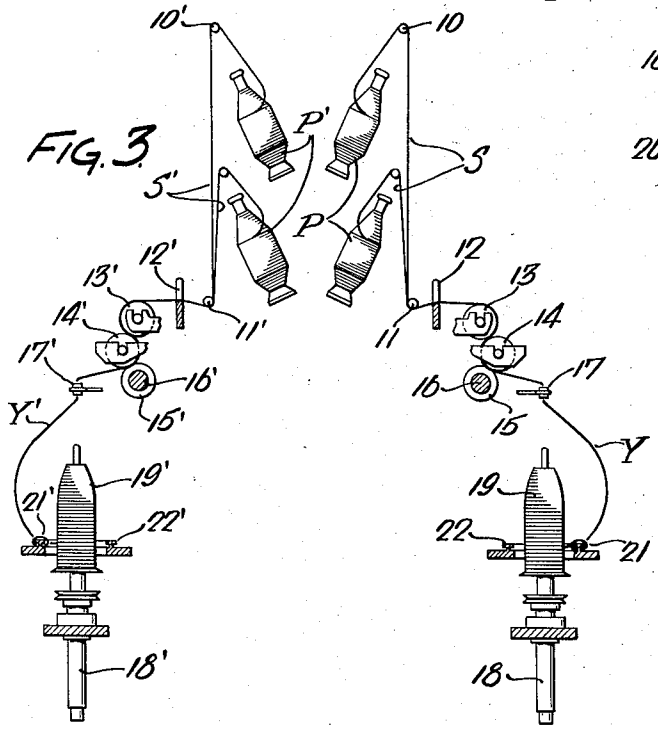


FIG. 4.

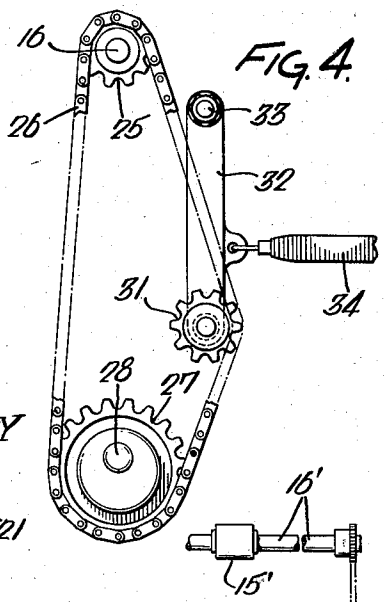


FIG. 5.

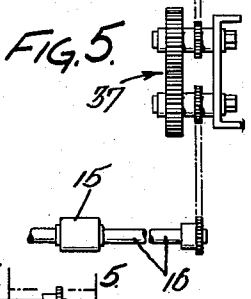
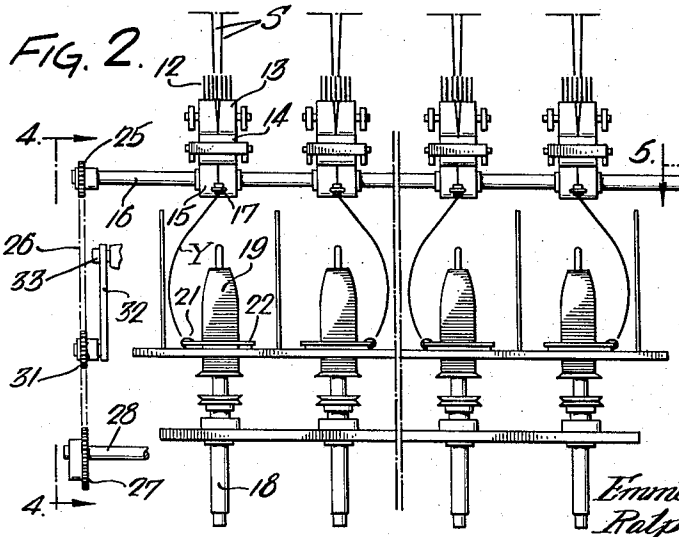


FIG. 2.



Inventors:
Emmett Kyle Austin Jr.
Ralph T. Reid
by Hyde & Ballard Atty.

United States Patent Office 2,876,616
Patented Mar. 10, 1959

2,876,616

VARIABLE TWIST YARN FORMING APPARATUS

Emmett Kyle Austin, Jr., Buchanan, and Ralph T. Reid, Lexington, Va., assignors to James Lees and Sons Company, Bridgeport, Pa., a corporation of Pennsylvania

Application January 9, 1956, Serial No. 558,118

3 Claims. (Cl. 57—91)

The present invention relates to yarn twisting apparatus, and more particularly to apparatus for producing yarn having varying twist.

In the manufacture of carpets, it has been found highly desirable to employ yarns for the pile surface which vary in twist along their length. When yarns of uniform twist are woven into carpets, the pile loops or tufts have a tendency to assume positions in parallel alignment and the resultant fabric has definite visible directional effects, and not infrequently, exhibit warpwise streaks. When weaving moresque or multi-colored yarns, streaks and color runs are even more likely to appear in the fabric. These disadvantages are eliminated by using a yarn which has varying twist along its length.

Prior to the present invention, in order to produce yarn having a varying twist, it was necessary to purchase a special twisting machine, or in the alternative, to dismantle an existing machine and rebuild the same to include a variable drive mechanism or other mechanism for producing the varying twist. The present invention provides a simple and effective mechanism which may be applied to a conventional twisting machine without substantial modification thereof to produce a yarn having varying twist along its length.

With the foregoing in mind, a primary object of the present invention is to provide mechanism converting a conventional twisting machine into a machine for producing varying twist yarn.

All of the objects and the various features and details of the construction and operation of the invention are more fully set forth hereinafter with reference to the accompanying drawing in which:

Fig. 1 is a view of a yarn embodying varying twist and made on apparatus modified in accordance with the present invention;

Fig. 2 is a fragmentary front elevation of apparatus embodying the present invention;

Fig. 3 is a diagrammatic side elevation showing the operation of the apparatus illustrated in Fig. 2;

Fig. 4 is a section taken on the line 4—4 of Fig. 2; and,

Fig. 5 is a section taken on the line 5—5 of Fig. 2.

Referring now to the drawing, the apparatus of the present invention utilizes the working elements of a conventional downtwister. As shown in Fig. 3, the singles yarns or other fibrous strands S to be twisted, are supplied from supply packages P mounted at the top of the machine. The strands S are guided by guide means indicated at **10**, **11**, and **12** over a train of feed rollers **13**, **14**, and **15**. The feed roller **15** is positively driven by a shaft **16**, and the rollers **13** and **14** are rotated at the corresponding surface speed by reason of the frictional contact of the roller **14** with the roller **15**, and of the roller **13** with the roller **14**. The two strands S are guided by a guide eye **17** disposed coaxially above the spindle **18** mounting the bobbin **19**, receiving the twisted yarn. To effect twisting of the strands S into a yarn Y, the strands are passed through a traveler **21**

mounted for sliding movement on the ring **22** of the twisting machine and is wound on the bobbin **19**. The spindle **18** rotates at high speed and is displaced axially within the ring **22** to provide a level wind of the yarn on the bobbin **19**. By reason of the differential in speed between the traveler **21** and the surface of the bobbin **19** (due to friction), the strands S are twisted to form the yarn Y. The opposite side of the twisting machine is identical to the first side and the same reference numerals have been used, identified with a prime superscript (′). The conventional ring twister provides a constant speed drive for the shafts **16** and **16′** to feed the yarn to the bobbin at a constant rate, but the present invention provides a varying speed drive for the shafts.

In accordance with the invention, the drive for the shaft **16** is disconnected and a special drive is substituted which drives the shaft **16** at varying speed, and thereby advances the strands to the bobbin at a similarly varying rate. The variation in the rate of advance of the strands to the bobbin produces a varying twist in the final yarn, as shown in Fig. 1. The yarn therefore has a high twist portion, for example ten turns per inch, indicated at Y′, and a low twist portion, for example three turns per inch, indicated at Y″. In the present instance, the variation from the high twist portion to the low twist portion is gradual, as indicated in Fig. 1.

The present invention affords simple conversion of a standard twisting machine to a machine for producing varying twist yarn. As shown in Fig. 2, the conventional drive for the shaft **16** is disconnected, and a sprocket **25** is attached to the shaft. The sprocket **25** is driven by a chain **26** which, in turn, is driven by a sprocket **27**. The sprocket **27** is mounted eccentrically on a shaft **28** which in the preferred form of the invention is coupled directly to the twisting machine motor, but separate drive means for the shaft **28** may be employed.

Means is provided to take up the slack in the chain **26** caused by the eccentric mounting of the sprocket **27**. To this end, an idler sprocket **31** is mounted in engagement with the chain **26** on an arm **32** which is pivoted to the frame as indicated at **33**. The arm **32** is biased outwardly by a spring **34** to properly tension the chain on the sprockets **25** and **27**. In the preferred embodiment of the invention, the shaft **16** at one side of the twisting machine, is driven by the sprocket **25**, and the shaft **16′** at the other side of the twisting machine is driven from the shaft **16** through gearing indicated generally at **37** in Figs. 2 and 5.

Thus, to convert the conventional twisting machine to produce varying twist yarn, the drive to the shafts **16** and **16′** is disconnected, and the sprocket **25** is mounted on one of the shafts. The arm **32** is pivotally mounted on the frame of the machine with the sprocket **31** rotatably mounted thereon. The eccentric sprocket **27** is mounted on the shaft **28** which is connected to the drive of the twisting machine. Thus, the machine may be converted without dismantling it or disturbing the adjustments of the settings of the working parts.

While a particular embodiment of the present invention has been herein illustrated and described, it is not intended to limit the invention to such a disclosure, but changes and modifications may be made therein and thereto within the scope of the following claims.

We claim:

1. In a twisting machine having a non-rotating supply package of strand material, a take-up twisting spindle, a pair of nip rolls for advancing strand material from the supply package to the take-up spindle, a shaft for driving said rolls, driving connections for said shaft comprising a driven sprocket mounted on said shaft to drive the same, a drive shaft, a driver sprocket mounted on said drive shaft, one of said sprockets being mounted eccentrically

on its shaft, a chain trained around said sprockets, an idler sprocket engaging said chain, and means mounting said idler sprocket for displacement to take up the slack in said chain caused by the eccentric mounting of said one sprocket.

2. In a twisting machine having a non-rotating supply package of strand material, a take-up twisting spindle, a pair of nip rolls for advancing strand material from the supply package to the take-up spindle, a shaft for driving said rolls, driving connections for said shaft comprising a driven sprocket mounted on said shaft to drive the same, a drive shaft, a driver sprocket mounted on said drive shaft, one of said sprockets being mounted eccentrically on its shaft, a chain trained around said sprockets, an idler sprocket engaging said chain, means mounting said idler sprocket for displacement to take up the slack in said chain caused by the eccentric mounting of said one sprocket, and means to bias said idler sprocket against said chain to provide uniform tension thereon.

3. In a twisting machine having a non-rotating supply package of strand material, a take-up twisting spindle,

a pair of nip rolls for advancing strand material from the supply package to the take-up spindle, a shaft for driving said rolls, driving connections for said shaft comprising a driven member mounted on said shaft to drive the same, a drive shaft, a driver member mounted on said drive shaft, one of said members being mounted eccentrically on its shaft, flexible endless element trained around said members, an idler engaging said flexible endless element, and means mounting said idler for displacement to take up the slack in said flexible endless element caused by the eccentric mounting of said sprocket.

References Cited in the file of this patent

UNITED STATES PATENTS

1,898,085	Dreyfus	Feb. 21, 1933
2,061,614	Dickie et al.	Nov. 24, 1936
2,089,193	Dreyfus	Aug. 10, 1937

FOREIGN PATENTS

775,423	France	Oct. 8, 1934