Oct. 20, 1953 G. HEBERLEIN ET AL 2,655,781

APPARATUS FOR IMPARTING FALSE TWIST TO YARN

Original Filed Sept. 12, 1944 2 Sheets-Sheet 1

Fig. 2.

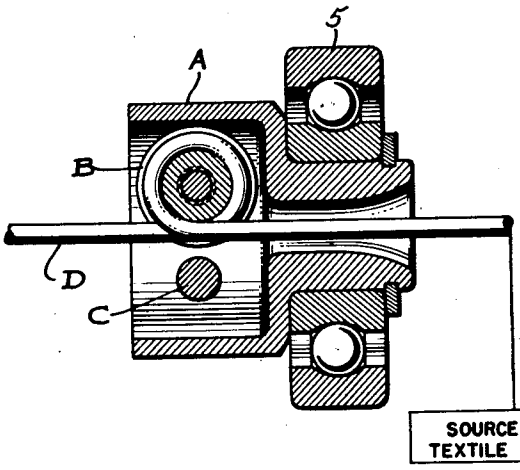



Fig. 1.

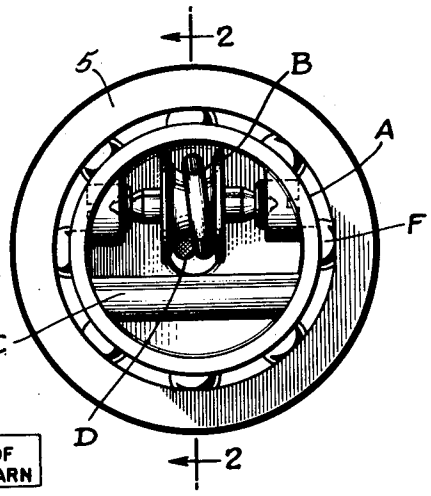



Fig. 3.

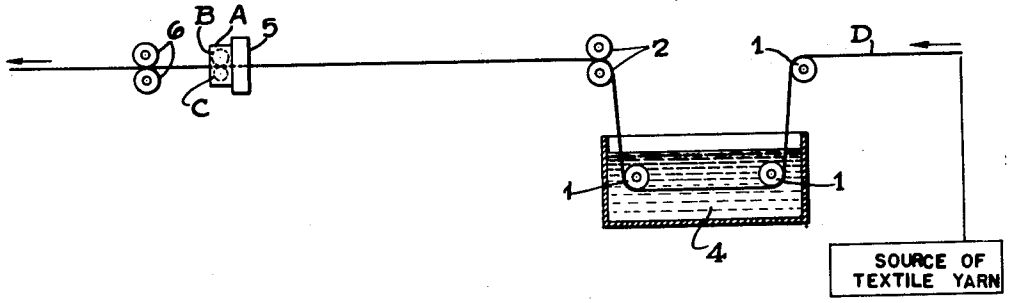
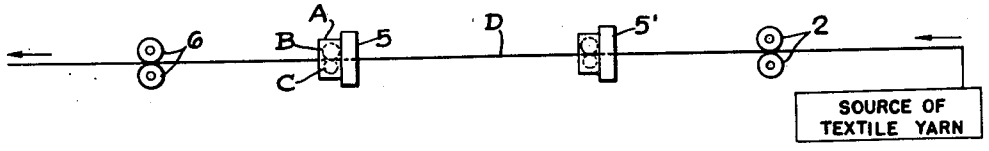



Fig. 4.




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Fig. 7.

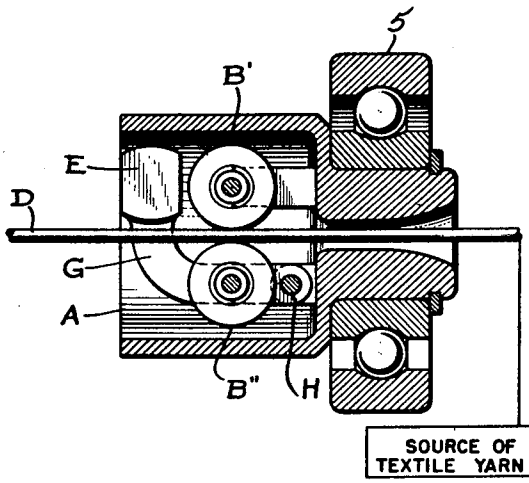



Fig. 6.

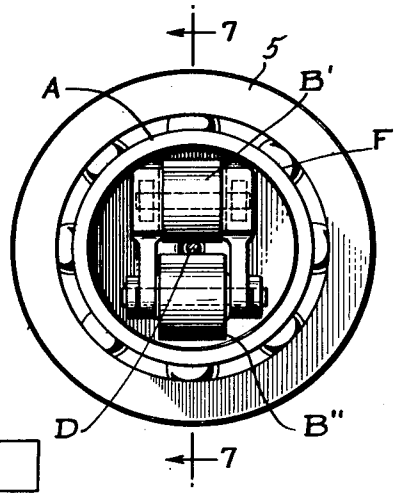
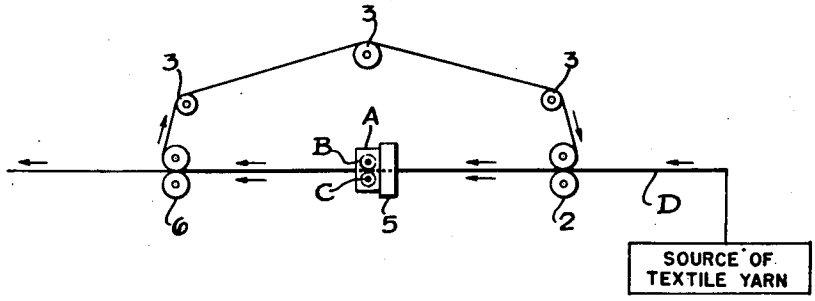



Fig. 5.




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# UNITED STATES PATENT OFFICE

2,655,781

## APPARATUS FOR IMPARTING FALSE TWIST TO YARN

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Original application September 12, 1944, Serial No. 553,694, now Patent No. 2,463,618, dated March 8, 1949. Divided and this application February 19, 1948, Serial No. 9,484. In Switzerland October 18, 1943

5 Claims. (Cl. 57—77.3)

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This invention relates to novel apparatus for imparting a temporary or so-called false twist to yarn.

Our invention is applicable to those yarns which are susceptible of improvement by the imparting of false twists thereto, and in this aspect the present invention has particular relation to artificial fibers, natural and regenerated cellulosic yarns, certain natural nitrogenous fibers such as silk, and especially in connection with the production of wool-like fibers therefrom.

We are aware that means for imparting false twist to yarns are already known. In accordance therewith a transitory over-twist of a running yarn is applied, followed by untwisting. Examples of known devices of the type under consideration may be found in British Patents 424,880, 442,073, and 464,981, and in French Patent 884,965.

The known devices all have the disadvantage, however, that the running yarn is subjected therein to such centrifugal force during the high rotating speeds desirably employed in order to impart false twist that operating difficulties result. As a consequence, in practice such known devices can only be employed at comparatively low rotating speeds, resulting in technically inferior products and lower output, i. e., production, both being disadvantageous factors of importance.

Among the difficulties encountered when attempting to operate at desirably high rotating or twisting speeds with known devices, we might mention the formation of "baloons" and the safety hazards involved. By "baloons" we mean the patterns formed by the yarns after leaving the false twist device and before they are wound on take-up rolls. The presence of these "baloons" is an indication that breakage of the yarn is quite possible. Furthermore, as aforesaid, when operating at the high speeds most desirable for false twisting purposes, known devices cause vibration, which, considering the high speeds involved, is a potential danger hazard.

By our present invention we have succeed in

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providing a false twist device capable of being operated at high-rotating speeds, and therefore capable of high productivity. Our apparatus is characterized by the fact that its use permits the yarn undergoing treatment to be twisted and untwisted while it travels a path which is substantially and effectively a straight line between the two fixed points between which the device is operatively disposed. No evidence of "baloons" and/or vibration occurs when operating with our novel apparatus.

Accordingly, our invention comprises a false twist apparatus hereinafter described, capable of being operated at high rotating speeds without forming "balloons" or inducing vibration, said apparatus being characterized by means permitting substantially straight-line or central guiding of the yarn between the two fixed points within which the false twist device is operatively disposed.

Our invention will be more fully understood by reference to the following description, taken in connection with the drawings, which form a part hereof.

In the drawings:

Fig. 1 is an embodiment of our false twisting device in open rear view;

Fig. 2 is a longitudinal section on the line 2—2 of Fig. 1;

Fig. 3 shows diagrammatically the arrangement of the false twisting device between two fixed points or rollers;

Fig. 4 shows an arrangement of two false twisting devices between two fixed points;

Fig. 5 is a diagrammatic representation showing a false twisting device being used in conjunction with a so-called gray backing material;

Fig. 6 is another embodiment of our novel false twisting device, in open rear view; and

Fig. 7 is a longitudinal section on the line 7—7 of Fig. 6.

The yarn to be false twisted is arranged as in Fig. 3. The thread or normally twisted yarn passes over the guide rollers 1, through impreg-

nating trough 4 and is temporarily high-twisted between the fixed points 2 and 6, which are, for instance, a pair of rollers, by means of the false twisting device 5. By means of this device the yarn can be high twisted in the usual manner in its original twist-direction and detwisted again. But it can also be high twisted opposite to its original twist direction beyond the zero point, and then again be untwisted. This operation has the advantage, when producing wool-like yarns, that a more pronounced crepe effect is obtained. As shown in Fig. 4, two false twisting devices, 5 and 5', may be employed, if desired, the yarn in such case retaining its twist between 5 and 5'. Fig. 5 is an arrangement used when employing a so-called gray backing material. Here 2 and 6 are the fixed points, 3 the guide rollers for the endless backing material, and 5 the false twisting device.

The embodiment of the false twisting device shown in Figs. 1 and 2, has a tube A which is operatively attached (not shown) to suitable power-actuated means to impart high rotating speeds to the tube. The latter is shown as running on ball bearings F. A small roller B with a guide groove is disposed within tube A arranged to rotate on a shaft perpendicular with respect to the axis of tube A and in such a manner that the periphery of roller B is tangent, or substantially so, to the axis of tube A. C is a counterweight attached to the tube, for instance, a bracket for the balancing of the small roller B supported eccentrically with respect to thread passing along the axis of tube A. Counterweight C is parallel to the shaft of roller B and its mass and position are such that it counter-balances the mass of the roller B and its associated members. The yarn D enters the tube A approximately centrally in the direction and along the line of the axis of the tube; it is wound around roller B and leaves the tube in the same direction, approximately centrally. As may be seen from Fig. 1, the yarn D leaves the roller B substantially in the center of the tube A, the deviation from dead center being of the order of about one-half the thickness or diameter of the yarn. The yarn passing through the false twisting device is twisted to at least 500 turns per meter and is thereafter untwisted as set forth in the parent application hereinafter referred to.

Another embodiment of our novel false twisting device is apparent from Figs. 6 and 7. In these figures, A shows a tube as before. Small grooveless rollers B' and B'' are arranged in tube A so that they can come into operative contact with each other at the axis of the tube, being mounted eccentric to said axis. B' and B'' are supported parallel with respect to each other and perpendicular with respect to the axis of the tube. Roll B' is mounted on a fixed axis while B'' is supported by swinging arm G in the tube, G being swingably disposed on its axis H which is parallel to the axis of rolls B' and B''. Arm G has at its free end the centrifugal weight E.

In the latter embodiment, the yarn D is led between rollers B' and B''. When tube A is rapidly rotated, weight E acts as a fly-wheel and swings G clockwise around axis H, whereby the parts attain equilibrium as shown in Figs. 6 and 7, wherein roller B'' comes into contact with yarn D as a result of the centrifugal force and presses the yarn against roller B'. The position and diameter of the latter roller are so chosen that the path of travel of yarn D deviates at rolls B' and B'' from straight line travel between the fixed points by a distance of the order of one-half the diameter of the yarn.



The operation of the false twisting device per se and in conjunction with known procedures normally applied to textile yarns of the type indicated is believed to be apparent from the foregoing description and no further elucidation is deemed necessary as those skilled in the art will now understand how the false twisting device operates. It will also be understood by those skilled in the art that modifications may be made in the device herein described without departing from the spirit of this invention and accordingly all such modifications coming within the scope of the appended claims are intended to be secured hereby.

This application is a division of our copending application Serial No. 553,694, filed September 12, 1944, now Patent No. 2,463,618.

We claim:

1. An apparatus for imparting a false twist to textile yarn which comprises, in combination, a source of supply of twisted textile yarn, a rapidly rotatable tube having its axis corresponding to the path of straight line travel of the yarn passing therethrough between two fixed points outside of said tube, and guide roller means mounted in said tube, said roller means rotating on an axis perpendicular to that of said tube and eccentric with respect to said line of travel, and said roller means being disposed so that the yarn leaves it at a point substantially along the path of said axis of said tube, and means to rotate said tube rapidly to high twist the textile yarn to at least 500 turns per meter and thereafter detwist the highly twisted yarn.

2. An apparatus for imparting a false twist to textile yarn which comprises, in combination, a source of supply of twisted textile yarn, a rapidly rotatable tube having its axis corresponding to the path of straight line travel of the yarn passing therethrough, two pulleys swingably mounted in said tube eccentric with respect to the longitudinal axis of the tube, said pulleys being swingable toward one another into contact adjacent the longitudinal axis of the tube, said pulleys having their axes parallel to one another and each axis being perpendicular to the longitudinal tube axis, the peripheries of the pulleys being arranged to lie substantially tangent to the longitudinal axis of the tube when the pulleys are swung into contacting position, and means to rotate said tube rapidly to high twist the textile yarn to at least 500 turns per meter and thereafter detwist the highly twisted yarn.

3. An apparatus for imparting a false twist to textile yarn which comprises, in combination, a source of supply of twisted textile yarn, a rapidly rotatable tube having its axis corresponding to the path of straight line travel of the yarn passing therethrough between two fixed points outside of said tube, a guide roller mounted in said tube, said roller on an axis perpendicular to that of said tube and eccentric with respect to said line of travel, and said roller being disposed so that the yarn leaves it at a point substantially along the path of said axis of said tube, a counterweight for said guide roller and its associated parts attached to said tube, and means to rotate said tube rapidly to high twist the textile yarn to at least 500 turns per meter and thereafter detwist the highly twisted yarn.

4. An apparatus for imparting a false twist to textile yarn which comprises, in combination, a source of supply of twisted textile yarn, a rapid-

ly rotatable tube having its axis corresponding to the path of straight line travel of the yarn passing therethrough between two fixed points outside of said tube, a guide roller mounted in said tube, said roller rotating on an axis perpendicular to that of said tube and eccentric with respect to said line of travel, and said roller being disposed so that the yarn leaves it at a point substantially along the path of said axis of said tube, a counterweight for said guide roller disposed diametrically opposite thereto and attached to said tube, said counterweight having its longitudinal axis parallel to that of said guide roller, and means to rotate said tube rapidly to high twist the textile yarn to at least 500 turns per meter and thereafter detwist the highly twisted yarn.

5. An apparatus for imparting a false twist to textile yarn which comprises, in combination, a source of supply of twisted textile yarn, a rapidly rotatable tube running on ball bearings having its longitudinal axis corresponding to the path of straight line travel of the yarn passing therethrough between two fixed points outside of said tube, a guide roller mounted in said tube having a groove for holding a loop of yarn, said roller rotating on an axis perpendicular to said tube and eccentric with respect to said line of travel, and said roller being disposed so that the yarn leaves it at a point substantially along the axis of said tube, and means to rotate said tube rapidly to highly twist the textile yarn in the opposite direction to the original twist beyond the zero point and thereafter untwist the yarn.



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