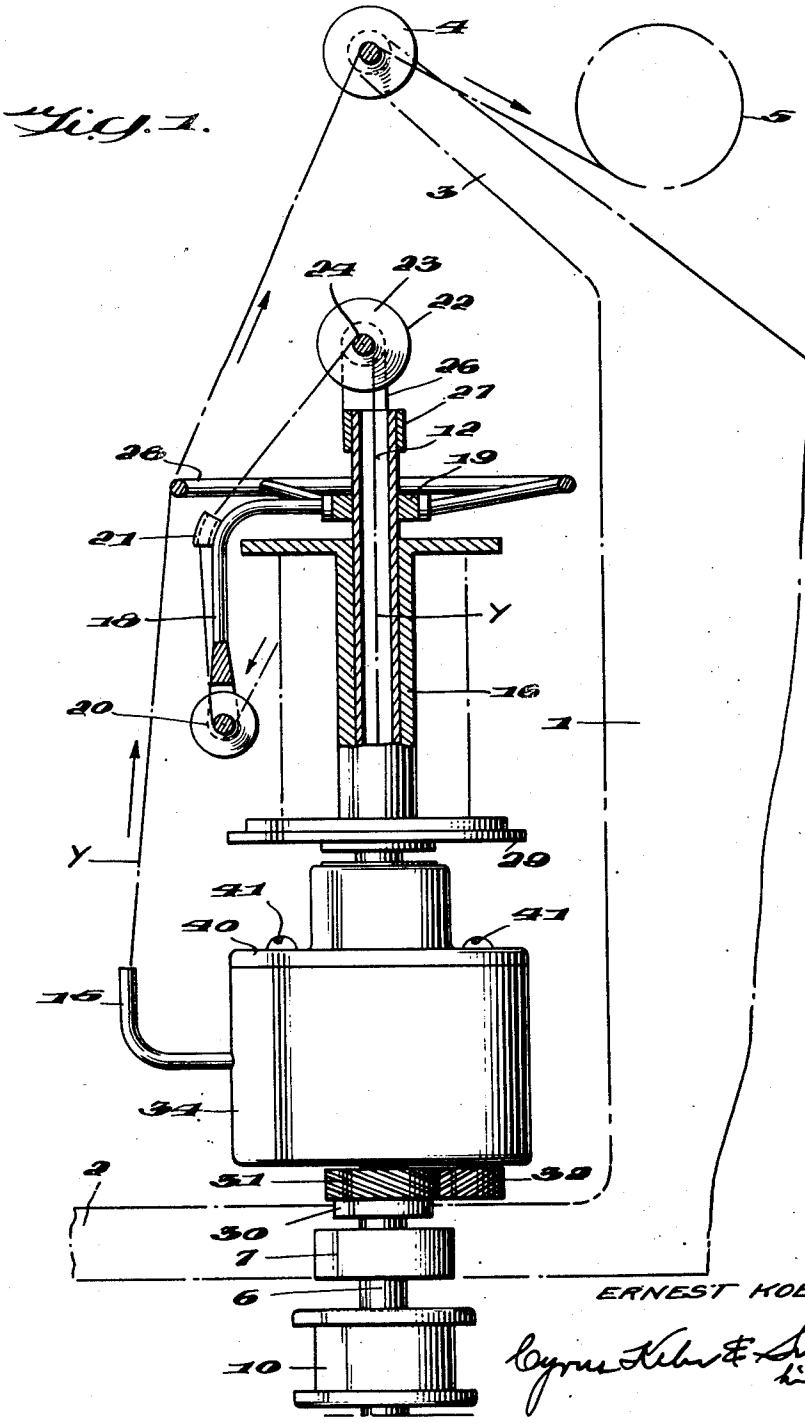
June 13, 1950 E. KOELLA 2,511,639

TWISTER SPINDLE

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Fig. 1.



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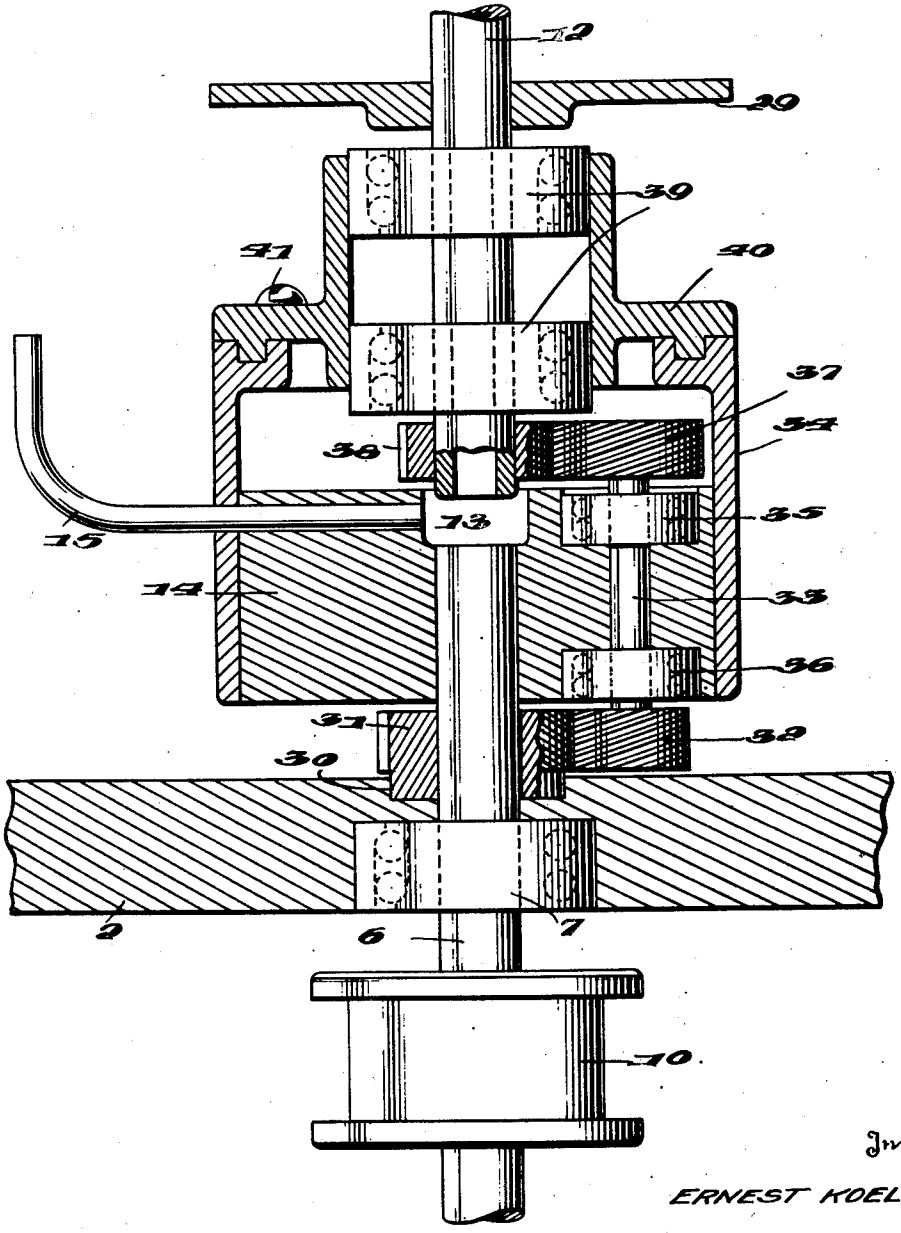
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Fig. 2.



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TWISTER SPINDLE

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Application February 9, 1948, Serial No. 7,105

4 Claims. (Cl. 57—58)

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This invention relates to improvements in twister spindles of the character used for applying twists to one or more yarns or strands.

It has been customary heretofore to apply a twist to one or more yarns, usually several, to form a cable or cord of greater strength than the individual yarns. Such a twisting action is applied by a twister spindle as the yarn is withdrawn from a spool. Such twister spindles as have been used heretofore have provided only one or two twists to the yarn for each turn of the spindle, which limits the speed of operation of the twister machine.

I have discovered that it is possible to apply a triple twist to the yarn for each turn of the spindle, materially increasing the speed of production and improving the character of the cord.

One form of twister spindle is set forth in my application, Serial No. 791,180, filed December 12, 1947.

The object of this invention is to improve the construction of the twister spindle to apply to the yarn multiple twists (more than two) simultaneously in a construction which is practical to manufacture and use.

This object may be accomplished, according to one embodiment of the invention by providing means for imparting a double twist to the yarn as it passes through the spindle, and a third twist thereto as the yarn is directed out of the spindle. The double twist is applied by separately twisting in opposite directions the opposite ends of the portion of yarn in the spindle. As this portion is directed laterally out of the spindle the third twist is applied thereto by this directing action.

Provision is made for driving the spindle to insure the twisting actions described, by operating means of relatively simple construction which improves the action and operation, which means is practical for manufacture and use.

This embodiment of the invention is illustrated in the accompanying drawings, in which:

Fig. 1 is a side elevation of the twister spindle; and

Fig. 2 is an enlarged vertical section therethrough.

The invention is adapted for twisting any size or character of yarn, as desired, of one or more threads or strands, in the formation of a cord, cable or rope. Usually several yarns are twisted together to form a cord, as the yarns are withdrawn from a package and delivered to a spool.

The twister spindle illustrated as an embodiment of this invention is adapted for use in a twister machine of any desired character, only a portion of which is shown in Fig. 1. A spindle back 1 has a bearing bracket 2 thereon for supporting the spindle, and an arm 3 on which is journaled a guide roll 4 for the formed cord as

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the latter is drawn onto the receiving spool 5 of the twister. The spool 5 is power driven to apply pulling action to the cord, in the usual manner of operating a twister. Ordinarily a twister includes many spindles assembled in side-by-side relation, only one of which is shown.

The spindle is indicated generally at 6, and may be mounted upright in the bearing bracket 2. The spindle 6 is journaled in an anti-friction bearing 7 in the bracket 2. A step bearing supports the lower end of the spindle 6. A pulley 10 is keyed to the spindle 6 and is adapted to receive the usual operating tape for rotating the spindle.

The upper end of the spindle 6 is aligned with a tubular section as indicated at 12, which tubular spindle portion 12 is open at the upper end to receive the yarn therethrough, and terminates at its lower end at an opening 13 within a block 14, with which opening 13 the tubular portion is in open communication. A tube 15 has one end connected with the opening 13, being secured rigidly to the block 14, and extends outwardly and upwardly therefrom, preferably of angular shape.

A supply spool is shown at 16 containing the yarn or yarns to be twisted. The spool 16 is journaled on the tubular spindle section 12.

The yarn is withdrawn from the package on the spool 16 by a flyer 18 attached by a ring 19 to the spindle section 12 and extending outwardly and downwardly therefrom to a position approximately midway of the length of the spool 16, in the form illustrated. The lower end of the flyer 18 carries a guide roll 20, over which the yarn or cable Y is drawn from the spool 16. The flyer 18 is shown also as provided with a guiding eye 21 thereon, through which the yarn Y extends to a tension device 22.

This tension device may be of any suitable type which will grip the yarn. It is shown as of the type in which a pair of discs 23 are relatively slidable on a pin 24 under the action of a compression spring. The tension device 22 is supported by an arm 26 carried by a ring 27 mounted on the upper end of the sleeve 12.

The ring 19 carries a guiding ring 28 of greater diameter than the path of the flyer 18. The yarn Y is drawn from the tube 15 over the rim of the guiding ring 28, thence to the guide roll 4 of the twister.

The supply spool 16 is supported on an upper flange 29 secured rigidly to the spindle portion 12, as by welding or otherwise, whereby the spool 16 will be rotated with the upper spindle 12 by frictional engagement with the flange 29.

A bottom flange 30 is fixed to the bearing bracket 2, free of the lower spindle 6 for rotation of the latter relative thereto, while the flange 30 remains stationary. Also fixed to the flange

30 is a gear 31, remaining stationary but meshing with a planetary gear 32 secured to the lower end of a shaft 33 that extends upward through the block 14, in the twister head designated generally at 34. The shaft 33 is mounted and supported in anti-friction bearings 35 and 36, which journal the shaft for rotation relative to the block 14, and also support the shaft against end thrust.

The upper end of the shaft 33 carries a gear 37 in mesh with a gear 38, attached to the lower end portion of the upper spindle portion 12. This spindle portion 12 is journaled and supported by anti-friction bearings 39 mounted within a cover 40 of the twister head 34.

The lower spindle 6 extends only into the twister head 34 where the block 14 is securely shrunk on the spindle 6, or otherwise rigidly attached thereto, and is supported in the anti-friction bearing 7, besides the step-bearing at the lower end thereof. The planetary gears 32 and 37 are also supported in anti-friction bearings 35 and 36. Only one train of gears is shown and usually will be sufficient, although additional sets of gears may be used, if desired.

As stated, the gear 31 is stationary, while the gear 32 moves in an orbit therearound while revolving on the axis of the shaft 33. The twister head 14, 34, will be rotated by the lower spindle 6, which will impart rotation to the shaft 33 and thereby rotate the gear 38 and the upper spindle 12 in the opposite direction to the lower spindle 6. In the arrangement of gears shown, the same speed of rotation will be imparted to the upper spindle 12, although any desired ratio can be secured by varying the relative sizes or the character of the gearing.

This will impart rotation to the upper spindle 12 and the flange 29 which will turn the tension device 22, carried by the upper end of the spindle 12. This will impart rotation to the flyer 18, substantially as described in connection with my prior application, Serial No. 791,180, filed December 12, 1947. The rotation of the tension device 22 by the spindle 12 imparts one twist to the yarn Y, as the yarn leaves the tension device adjacent the upper end of the spindle 12 in a direction opposite to the twist imparted in the lower end portion of the spindle 12 as the yarn enters the tube 15. Then the third twist is imparted to the yarn as it is discharged from the tube 15. Thereby three twists are imparted to the yarn to increase materially the speed of movement of the yarn and, therefore, the output or production of the machine.

This construction improves the form of the device over that set forth in my prior application, tends to reduce friction between the parts and provides a firm and rigid structure which may be operated at high speed.

The parts may be disassembled by removing the cover 40 from the twister head 44, which cover is secured in place by one or more screws 41, in the form shown. This cover also cooperates to enclose the operating parts of the head and to exclude dust therefrom. Suitable gears may be used which will accommodate the operation thereof at high speed and preferably having spiral teeth, although any suitable and desired form of gears may be utilized for the purpose.

While the invention has been illustrated and described in certain embodiments, it is recognized that variations and changes may be made therein without departing from the invention, except as specified in the claims.

I claim:

1. In a twister spindle, the combination of a spindle member, a tubular spindle arranged in axial alignment with the spindle member for continuous movement of yarn therethrough and having an outlet for the yarn, inter-engaged gearing operatively connecting the spindle member and tubular spindle together for uniform rotation in opposite directions, a twister head including means fixed to the spindle member and supporting at least a portion of the gearing, and means connected with said supporting means and enclosing a portion of the gearing.

2. In a twister spindle, the combination of a spindle member, a tubular spindle arranged in axial alignment with the spindle member for continuous movement of yarn therethrough and having an outlet for the yarn, a support fixed to the spindle member, a shaft journaled in the support and extending substantially parallel to the spindle member, gearing connections between the opposite end portions of said shaft and the spindle member and tubular spindle, respectively, a twister head including a housing fixed to the support and enclosing at least a portion of the gear connections, and anti-friction bearings carried by the housing and journaling the tubular spindle.

3. In a twister spindle, the combination of a tubular spindle having an inlet at one end thereof and an outlet for continuous movement of yarn therethrough, a tension device adjacent the inlet and constructed to grip the yarn during passage therethrough, a yarn support fixed to the tubular spindle, means for rotating the spindle including gearing operatively connected therewith, means for rotating the tension device in the same direction as the tubular spindle, and a housing enclosing the gearing and having means carried thereby for journaling the tubular spindle thereon.

4. In a twister spindle, the combination of a spindle member, a tubular spindle arranged in axial alignment with the spindle member for continuous movement of yarn therethrough and having an outlet for the yarn, a support fixed to the spindle member, a shaft journaled in the support and extending substantially parallel to the spindle member, gearing connections between the opposite end portions of said shaft and the spindle member and tubular spindle, respectively, and a twister head including a housing fixed to the support and enclosing at least a portion of the gear connections.

ERNEST KOELLA.

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