June 13, 1950 E. KOELLA 2,511,638

TWISTER SPINDLE

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Fig. 1.

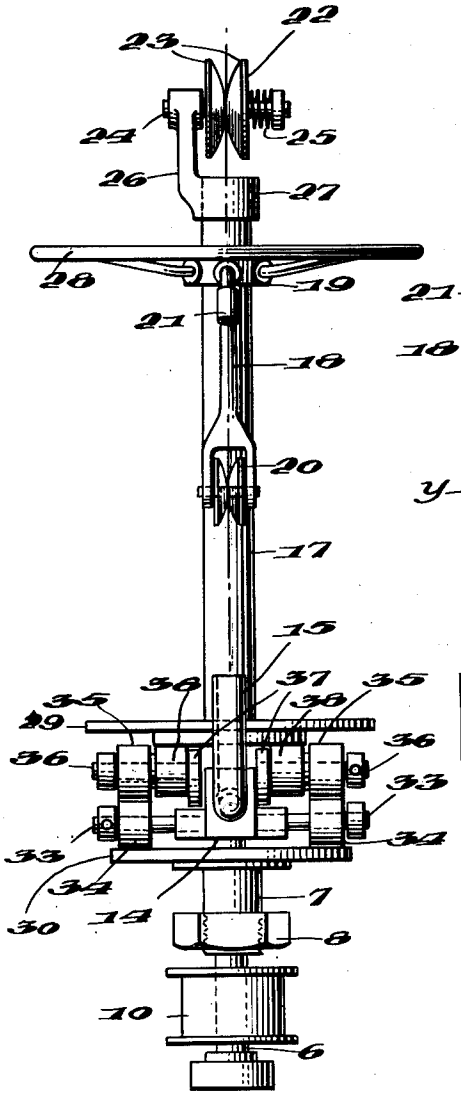
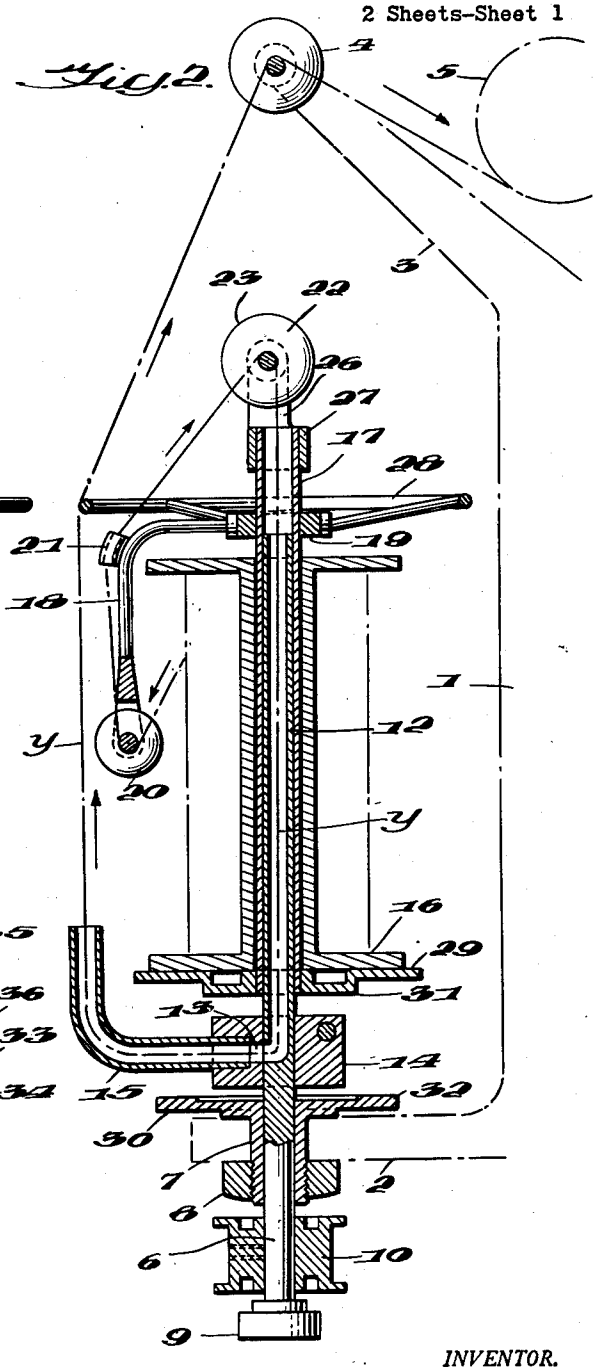


Fig. 2.



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Fig. 3.

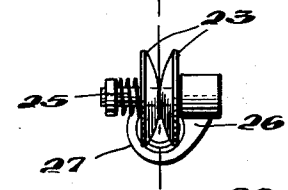


Fig. 4.

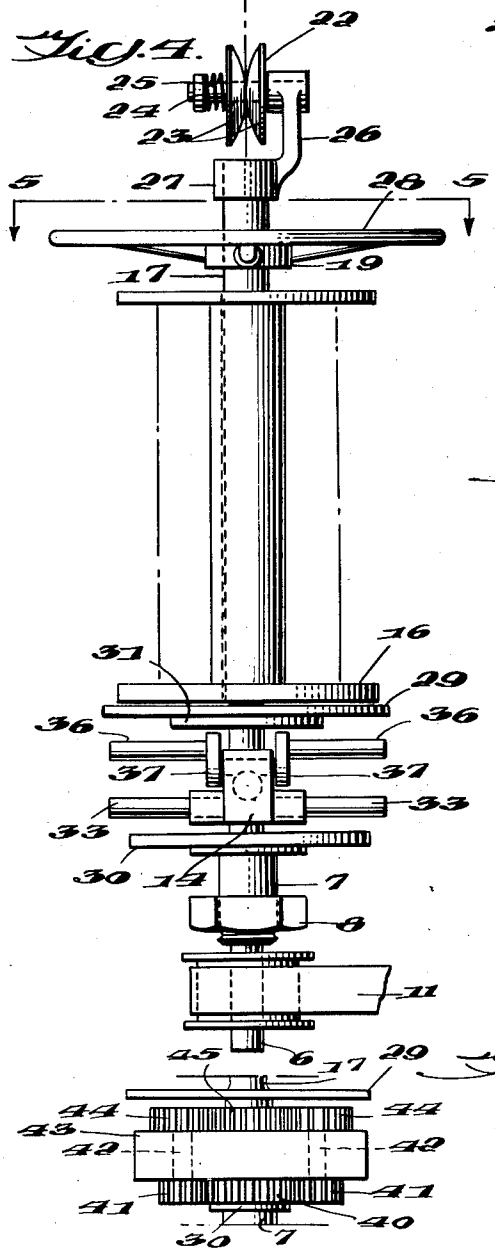


Fig. 5.

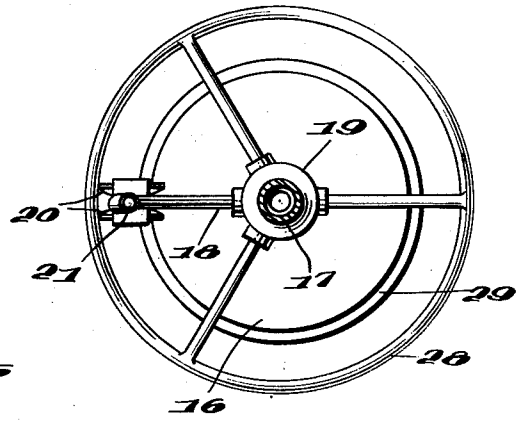


Fig. 6.

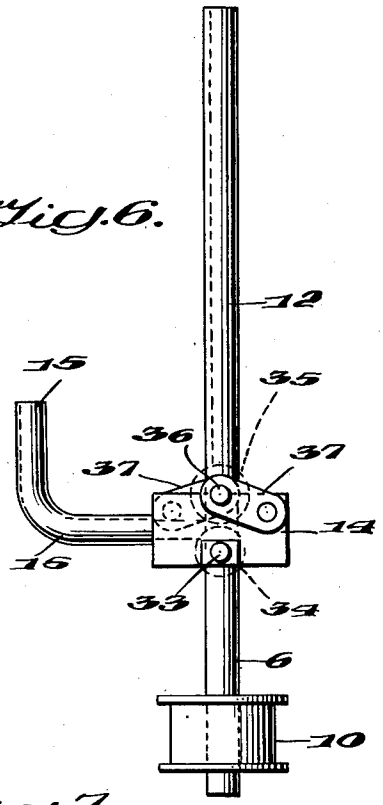


Fig. 7.

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UNITED STATES PATENT OFFICE

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TWISTER SPINDLE

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3 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 Such a twisting action is applied by a twister spindle as the yarn is withdrawn from a spool.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 more than two twists to the yarn for each turn of the spindle, materially increasing the speed of production and improving the character of the cord, while eliminating the conventional spooling operation, which is, therefore, one object of this invention.

A further 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.

These objects may be accomplished, according to one embodiment of the invention by providing means for imparting simultaneously two twists of the same kind to the portion of yarn traveling between the tension device fastened to the upper part of the spindle and the lateral outlet or the junction of the lower end of the upper part of the spindle and the innermost end of the lateral opening at the lower part of the spindle, and an additional twist thereto as the yarn is directed out of the lateral opening at the lower part of the spindle while being directed over the guide roll. The two twists mentioned above are produced by separately turning in single or multiple directions the opposite ends of the portion of yarn in the spindle.

The yarn is directed from a spool or bobbin over the tension device, down the upper part of the spindle and laterally through a tube in the lower part of the spindle. The tension device at the mouth of the upper part rotates bodily in a direction opposite from the direction of rotation of the lower part of the spindle. This causes the opposite ends of the portion of the yarn in the spindle to be twisted separately, while the lateral discharge of the yarn through the tube and over the guide roll imparts the final twist thereto. This makes it possible to increase materially the speed of the yarn, and the output of the machine.

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

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Fig. 1 is a side elevation of the twister spindle, detached from the machine;

Fig. 2 is a vertical section therethrough at right angles to Fig. 1, and showing the mounting on the spindle back;

Fig. 3 is a top plan view of the tension device and top of the spindle sleeve;

Fig. 4 is a side elevation of the spindle and spool assembly, with parts omitted for clearness of illustration;

Fig. 5 is a horizontal section therethrough substantially on the line 5—5 in Fig. 4;

Fig. 6 is a side elevation of the spindle detached; and

Fig. 7 is a similar view showing a modification.

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. 2. 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 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 a bearing sleeve 7 in the bracket 2, which sleeve is shown as secured to the bracket by a nut 8. A step bearing 9 (Fig. 2) 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 11 (Fig. 4) for rotating the spindle.

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

A supply spool or bobbin is shown at 16 containing the yarn or yarns to be twisted. The spool 16 is carried by a sleeve 17 detachably tele-

scoped over and journaled on the tubular portion 12 of the spindle 6.

The yarn is withdrawn from the package on the spool 16 by a flyer 18 attached by a ring 19 to the sleeve 17 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 25. The tension device 22 is supported by an arm 26 carried by a ring 27 mounted on the upper end of the sleeve 17. 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.

An upper flange 29 is secured to the sleeve 17 for removal therefrom to replace the spool 16, and normally holds the spool resting thereon and rotatable with the flange by friction fit. This upper flange 29 is in opposed relation to a lower flange 30, fixed to the upper end of the bearing sleeve 7. The flanges 29 and 30 may be provided with opposed tracks formed by ribs 31 and 32 on the surfaces thereof.

Provision is made for rotating the upper flange 29 relative to the flange 30 and also with respect to the spindle 6. One form of drive connection therebetween is shown, although other desired means may be substituted therefor if desired. Shafts 33 extend in opposite directions from the block 14 and have journalled thereon friction rolls 34. The friction rolls 34 are in bearing relation with superposed friction rolls 35 journalled on shafts 36 carried by links 37 pivoted to the block 14 to rest by gravity on the rolls 34. Fixed to rolls 35 and also journalled on the shafts 36 are driven rolls 38 bearing against the rib 31 on the upper flange 29.

As the spindle 6 is rotated, this turns the block 14, thus moving the rolls 34, 35 and 38 in orbits about the axis of the spindle 6. At the same time, these rolls turn on the axes of the shafts 33 and 36. This is caused by the engagement of the rolls 34 and 35 together and of the rolls 34 with the lower flange 30, while the rolls 38 are in bearing relation with the upper flange 29.

Thus, the block 14 is rotated with the spindle 6 to impart an opposite direction of rotation to the upper flange 29. The latter rotates the sleeve 17 and the tension device 22 to twist the upper end of the portion of the yarn Y in the sleeve portion 12 in a direction opposite to the direction of the twist of the lower end thereof by the rotation of the spindle 6. Then the third twist is imparted to the yarn as it is discharged radially through the tube 15 and passes over the guide roll 4.

The relative speeds of turning movement may be varied by changing the relative sizes of the rolls 34, 35 and 38, or replacing these with gears or other suitable driving means. The links 37 are pivoted to the block 14 to swing so as to accommodate for such variations. The number of sets of rolls between the upper and lower flanges may also be varied, as desired.

Fig. 7 shows a modification, as mentioned, in

which spur gears are substituted for the rolls 34—38. A gear 40 is fixed to the bottom flange 30, coaxial with the spindle 6. Meshing with the gear 40 are planetary gears 41, secured on shafts 42, journalled in a block 43, similar to the block 14. Also secured to the shafts 42 are planetary gears 44 meshing with a gear 45 fixed to the sleeve 17 and the top flange 29. The block 43 is fixed to the spindle 6.

As the spindle 6 is rotated in the manner described above, the block 43 will be rotated therewith. This block 43 will move the shafts 42 through an orbit, with the planetary gears 41 and 44 in mesh respectively with the gears 40 and 45. Since the gear 40 is stationary, the gears 41, 45, will be rotated during this planetary movement, and will impart rotation to the sleeve 17 and the top flange 29. This will result in a twisting action being imparted to the yarn, substantially as described above.

The application of simultaneous right and left hand twists to the yarn increases materially the speed of movement of the yarn, and, therefore, the output or production of the machine. It serves also to produce a better rope or cord because the twist is applied in three stages, producing an evener lay. The application of the twist slowly and in three stages overcomes the full contraction of the yarn when the process of twisting is in motion.

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 tubular spindle having an inlet at one end thereof and a lateral outlet for continuous movement of yarn therethrough, means for rotating the spindle to apply a twist to the yarn adjacent the outlet, a tension device adjacent the inlet and constructed to receive and grip the yarn during passage thereto, a sleeve telescoped over the tubular spindle and supporting the tension device thereon, and means for rotating the sleeve and tension device relative to the tubular spindle in the opposite direction therefrom, said sleeve rotating means including a flange connected with the sleeve, and means for applying rotating movement to said flange.

2. In a twister spindle, the combination of a tubular spindle having an inlet at one end thereof and a lateral outlet for continuous movement of yarn therethrough, means for rotating the spindle to apply a twist to the yarn adjacent the outlet, a tension device adjacent the inlet and constructed to receive and grip the yarn during passage thereto, a sleeve telescoped over the tubular spindle and supporting the tension device thereon, means for rotating the sleeve and tension device relative to the tubular spindle in the opposite direction therefrom, said sleeve rotating means including a flange connected with the sleeve, a second flange fixed relative thereto, rolls interposed between the flanges in bearing relation thereto, and means for turning the rolls.

3. In a twister spindle, the combination of a tubular spindle having an inlet at one end thereof and a lateral outlet for continuous movement of sage thereto, a sleeve telescoped over the tubular spindle and supporting the tension device thereon, means for rotating the sleeve and tension device relative to the tubular spindle in the opposite direction therefrom, said sleeve turning means in-

cluding a flange connected with the sleeve, a second flange fixed relative thereto, a set of rolls interposed between the flanges in bearing relation thereto and between a pair of said rolls, and means connected with the tubular spindle for bodily moving said set of rolls.

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