Sept. 23, 1952 J. J. GANNON ET AL 2,611,229

APPARATUS FOR SPINNING, TWISTING, AND WINDING YARN

Filed March 11, 1949 2 SHEETS—SHEET 1

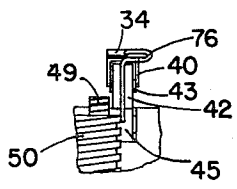


FIG. 6

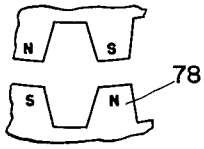


FIG. 7

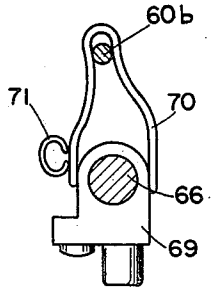


FIG. 4

FIG. 1

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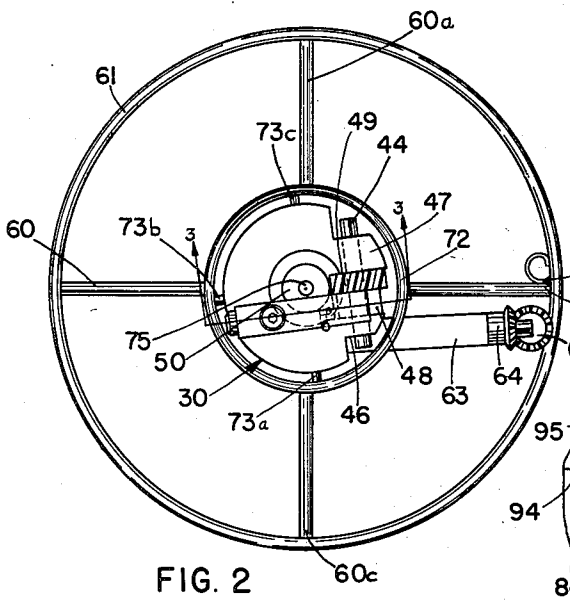


FIG. 2

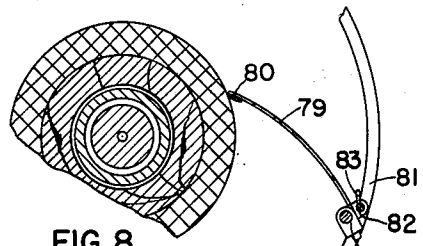


FIG. 8

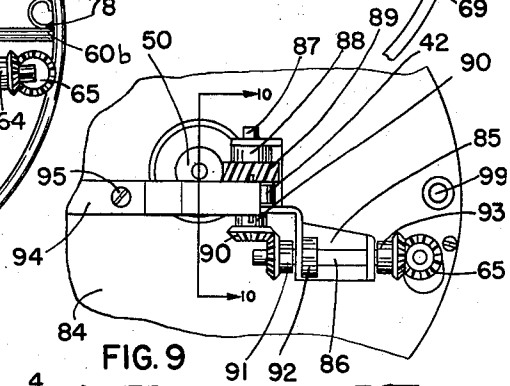


FIG. 9

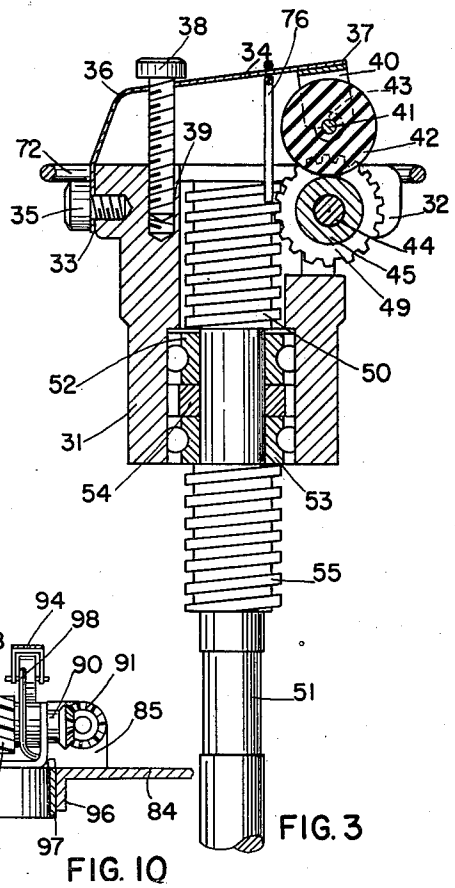


FIG. 3

FIG. 10

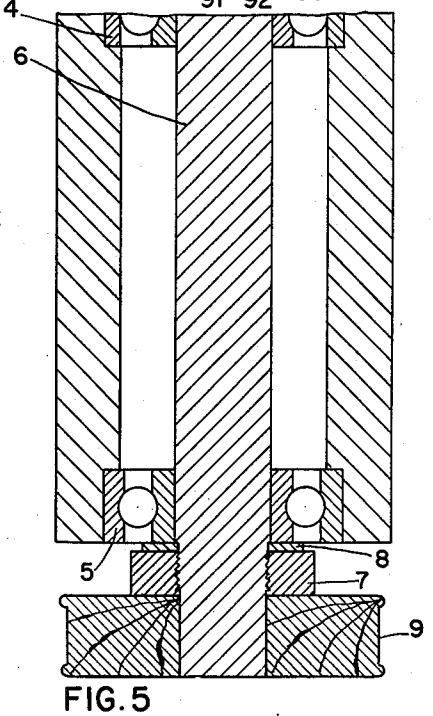


FIG. 5

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2,611,229

APPARATUS FOR SPINNING, TWISTING, AND WINDING YARN

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Application March 11, 1949, Serial No. 80,994

7 Claims. (Cl. 57—58)

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This invention relates to an improved apparatus for spinning, twisting and winding a yarn, roving or bundle of textile fibers to form a package, and the twisting and winding may be included selectively in the same or a different handling operation as the drawing of staple fibers. For convenience, the term "yarn" as used herein is intended to include not only textile yarns but also rovings, slivers, or any bundles of textile fibers, threads or filaments.

An object of the invention is to improve and simplify apparatus for twisting and winding yarns on a bobbin to form a package; which enables the winding efficiently of either large or small packages; with which the yarn may be wound with a desired degree of tautness; and with which the winding may take place for relatively long periods with a minimum of attention from an operator.

Another object of the invention is to provide an improved apparatus for imparting approximately a two for one twist to the yarn in a rapid, continuous operation, and in the same operation and handling also wind the twisted yarn on a bobbin to form a package; with which breakage of the yarn will be a minimum; which will handle the yarn at least as rapidly as by previous methods and apparatus for twisting and winding; with which the yarn may be wound on a bobbin in helical form with superposed layers, with squared ends or relatively sharp corners at the top and bottom of the package; and which will have a minimum breakage and a maximum capacity of yarn.

Another object of the invention is to provide improved means to twist and wind the yarn on a package at maximum speed without undue stretching or breaking of the yarn and to generally speed up the winding and twisting operation; in which the winding unit may be brought close to the drawing rolls to decrease air and centrifugal forces on the yarn and thus minimize the tension required on the thread passing through the delivery rolls, with resulting minimum danger of undue stretching and breaking of the yarn.

Another object of the invention is to improve the winding mechanism which delivers the yarn to the package; and cause delivery of the yarn to the package evenly and squarely at the top and bottom of the package.

Another object of the invention is to provide improved apparatus for accomplishing each of these objects which will be relatively simple, compact, durable, convenient, inexpensive, and of relatively large capacity.

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Other objects and advantages will be apparent from the following description of one embodiment of the invention, and the novel features thereof will be particularly pointed out hereinafter in the appended claims.

In the accompanying drawings:

Fig. 1 is a side elevation partly in section and partly schematic, of apparatus constructed in accordance with this invention, and useful in practicing the method;

Fig. 2 is a top plan of the winding unit;

Fig. 3 is a sectional elevation of the winding unit, with the section taken approximately along the line 3—3 of Fig. 2;

Fig. 4 is a partial top plan, partly in section, of the guide and follower, the section being taken approximately along the line 4—4 of Fig. 1;

Fig. 5 is a sectional elevation of a part of the lower end of the apparatus shown in Fig. 1 showing the pulley which is a positive drive for the apparatus;

Fig. 6 is a partial section and plan of certain details, the section being taken approximately along the line 6—6 of Fig. 1;

Fig. 7 is an elevation of a portion of the permanent magnets which hold the bobbin from rotation;

Fig. 8 is a partial top plan, partly in section, of a slightly modified construction of follower and a finger, the section being taken transversely through the bobbin and spindle intermediate of the ends of the bobbin;

Fig. 9 is a plan of a modification somewhat like Fig. 2 but illustrating a modification of certain details which may be part of the modification shown in Fig. 8; and

Fig. 10 is a sectional elevation through a portion of the same, section being taken approximately along line 10—10, Fig. 9, but with worm and spindle removed to avoid obscuring the details.

Referring first particularly to Fig. 1, the invention is illustrated by way of example as part of a mechanism for drawing rovings of staple fibers, twisting them to form a twisted yarn, and winding the twisted yarn on a bobbin. Any suitable drawing mechanism which will combine rovings to form a yarn and deliver this to the rollers 1 may be used.

Disposed immediately below and aligned with feeding rollers 1, which may be the delivery rollers of a drawing device, is the improved twisting and winding device. This device designated generally at 2, is mounted in a bearing housing 3 that is carried on any suitable support or platform.

The bearing housing 3 carries vertically spaced and aligned radial and end thrust ball bearings 4 and 5, Figs. 1 and 5, which rotatably support a spindle 6. A lock nut 7, Fig. 5, is threaded on the spindle 6 against the ball bearing 5 and a washer 8 is preferably interposed between the bearing 5 and the lock nut 7. A grooved pulley 9 is fixed upon the lower end of the spindle 6 and is driven by a belt (not shown) so that the spindle will be continuously rotated. Any suitable means may be used to positively drive this pulley.

Immediately above the bearing 3, Fig. 1, the spindle 6 is provided with a shoulder or external peripheral flange 10 on which rests a circular flier 11. The flier is provided with a passage 12 which extends through the body of the flier from the outer periphery to the center bore of this flier. The top of the flier 11 is slotted in step-like fashion as indicated at 13, to receive a tube 14 whose elbow 15 extends into an opening 16 cut into the spindle 6. The passage in the tube 14 opens into a passage 17 of similar size in the spindle. This passage 17 with which the spindle 6 is provided, extends from the upper free end of the spindle to the opening 16 in the lower part of the spindle. A circular ring 18 which telescopes over the spindle 6, keeps the tube 14 in place, and screws (not shown) fasten the ring 18 and the flier 11 to the flange 10 of the spindle 6, thus forming a rotatable unit.

A pair of combined thrust and radial ball bearings 19 and 20, Fig. 1, are secured in endwise, spaced relationship upon the upper end of the spindle 6 and they rotatably support a sleeve 21. The lower end of the sleeve 21 is externally threaded to receive a ring 22 upon whose lower periphery is a peripheral lip 23 which acts as a support for the upper permanent magnet to be later herein described. Against the top face of bearing 19 is a washer 24 secured by a lock nut 25 which confines bearings 19 and 20 and spacer 26 to the spindle 6. Above the shoulder 27 of the sleeve 21, the sleeve is slightly upwardly tapered and convergent as at 28, which serves to receive and support a removable bobbin 29 on which the yarn is to be wound.

Rotatably mounted on the upper end of the spindle 6 is a tension and winding unit generally designated at 30, Figs. 1, 2 and 3. The upper end of the body 31, Fig. 3, is provided with a head or flange 32 and this flange has a flat spot 33 against which the lower part of the tension spring 34 is placed and securely fastened by a screw 35. The spring 34 has the form somewhat like a distorted L above the top surface of the body 31. Angle 36 is lower than point 37, and just beyond the angle 36, the spring is adjusted for tension by a screw 38 which passes through a hole in the spring and is threaded into a recess 39 at the top of the body 31. At the upper end of the spring, at the point 37, there is fastened a U-shaped bracket 40, the wings of which extend downward. The lower edge of each wing is notched to fit over a pin 41 on which is mounted a rubber roll 42. Washers 43 on pin 41 at opposite sides of the roll separate the rubber roll from the sides of the wings of the bracket.

Immediately below the roll 42 and rotatably mounted on the pin 44 is a commercial type worm gear 49 with a hub 45 which contacts the rubber roll 42. The flange 32, Fig. 2, is notched somewhat equidistantly from the horizontal center line and on the periphery of the flange to provide flat faces 46 and 47 that facilitate insertion of pin 44. An opening 48 is cut into the body 31 and the flange 32 from the outer periphery to the center bore of the body and to a depth to clear the diameter of the worm gear 49. The gear 49 meshes with a worm screw 50 which is fixedly secured to the upper end of shaft 51. This shaft 51 fits snugly into an enlarged opening in the upper part of the passage 17 in the spindle 6, so that they rotate together as a unit. Within the bore of the body 31 are two radial ball bearings 52 and 53 which are vertically aligned and rotatably mounted on the shaft 51 with a spacer 54 between them. Somewhat below worm screw 50 and fixedly secured on the same shaft 51 is another worm screw 55. Worm screw 55 meshes with worm gear 56, Fig. 1, which is secured to rotatable shaft 57.

Fixedly secured to the lower periphery of the body 31 is a ring 58 to which is fixed a cage-like structure generally designated at 59. To this ring 58 are fixed four shaped wires 60, 60*a*, 60*b*, and 60*c*, which form the cage. Two rings 61 and 62 are fixed at the top and bottom of these wires, to create a more rigid structure. The tension and winding unit 30 and the cage 59 form a single rotatable unit. A bracket 63 is rigidly secured at one end to the lower part of the ring 58 and this bracket rotatably mounts the shaft 57. The opposite end of the shaft 57 rotatably mounts a miter gear 64, which meshes with another miter gear 65. Miter gear 65 is rotatably fixed to the upper end of the reversing helical cam spindle 66. Cam spindle 66 is rotatably held by two bearings 67 and 68 which are fixed to the upper ring 61 and lower ring 62. A follower 69 is movably mounted on the return spindle 66. This follower is restrained from rotation about the reversing helical cam spindle 66 by a guide wire 70 which has one end fixed to one side of the guide, bent around the cage wire 60*b*, and the other end of the guide wire 70 fixed to the opposite side of the follower 69. Fixed to the guide wire 70 is an eye 71.

Around the periphery of the flange 32, Fig. 2, is a ring 72 which is held equidistantly about the periphery of the flange by three supporters 73*a*, 73*b*, and 73*c* about 90° apart and carried on the flange 32. This ring 72 prevents the yarn from being entangled in the tension and winding unit.

The bobbin 29 is mounted on the sleeve 21 and the rovings which have been passed through the drawing rolls 1 and combined into a single yarn 74 is passed downwardly to the rotating flier 11, then into and along the passage 12, through the elbow 15 and upward through the passage 17 in the spindle 6, then through a passage in the tension and winding unit where it comes out of the opening 75, Fig. 2, of the worm screw 50 at the upper end of the shaft 51. The yarn 74, is deflected sidewise by a guide wire 76, Fig. 6, depending from spring 34. This guide wire is bent in a U shape about the edge of the tension spring 34, and then vertically to a position somewhat in line with the vertical center line of the rubber roll 42 and somewhat away from the periphery of the roll. The yarn thus deflected away from the worm gear 49, enters between and is propelled linearly by the rubber roll 42 and the hub 45 of the worm 49. The roll 42 is rotated on the pin 41 by the friction of the hub 45 which receives its motion from the worm screw 50 with which it meshes.

As the yarn leaves the rolls of the winding and tension unit, it passes through an eye 78, Fig. 2, on the upper ring 61 of the cage 59, then downwardly to and through the eye 71 of the follower

69 and guide 70. The horizontal center line of winding unit 30, Fig. 2, is offset from the center lines of the shaped wires 60 and 60b, thereby forming an angle with the center line of said shaped wires so that as the yarn 74 leaves the rolls 42 and 45, the yarn travels in a straight line to the eye 78, then downwardly to and through the eye 71, and after passing through the eye 71, it is connected to the bobbin.

The bobbin 29 is removably mounted on the sleeve 21 and is not rotatably driven by the spindle while the latter is rotating. The sleeve 21 would be free to rotate on the spindle axis, except that its rotation is restricted by the magnetic attraction between the two permanent magnets 76 and 77 which are arranged in superposed relation along the sleeve 21, but with the flier 11 between them to carry yarn 74 into the lower end of the spindle passage 17. The permanent magnets 76 and 77, as magnetized, have their poles on the faces nearest each other, consequently, the magnets exert a strong magnetic pull on each other across the gap in which the flier 11 moves.

Each magnet is an endless ring of magnetized material and has on its face toward the other magnet a circular row of an even number of spaced pole projections 78, Fig. 7. The poles of each row are alternately of opposite polarity, the north poles of one row being opposite, across the gap, from the south poles. With this arrangement there is a magnetic flux across the air gaps between these aligned pole projections of opposite polarity, and this magnetic flux prevents the sleeve on which the bobbin is mounted from turning with the spindle and the sleeve which mounts the flier. If the bobbin should be turned slightly on the sleeve, it will again be stopped as soon as the pole projections of opposing polarity of the two magnets again become aligned across the air gap.

In the operation of this twisting and winding mechanism, the yarn passes from the feed rolls 1 downwardly to and through the flier, then upwardly through the spindle, then between the roll 42 and hub 45. Hub 45 and roll 42 serve to pull the yarn upwardly through the spindle and feed it to the eye 78 on the cage 59 and then downwardly to the eye 71 fixed to the guide 70. Worm screw 55, Fig. 3, meshes with the worm gear 56 and when the spindle 6 is in motion, the worm wheel 56 rotates the shaft 57 which in turn rotates miter gear 64 which is meshed with gear 65. The reversing helical cam spindle 66 is fixed to the miter gear 65, and when this gear 65 rotates, the reversing helical cam spindle also rotates.

When the rotating reversing helical cam spindle 66 is rotating about its own axis, the rotating action of this spindle causes the follower 69 to travel alternately up and down the spindle in a uniform traversing motion. Since the guide wire 70 carries the eye 71, the yarn is delivered to the bobbin in even helical layers as the cage 59 carrying the spindle revolves about the stationary bobbin. Follower 69 is prevented from completely turning around the reversing helical cam spindle by the restricting guide 70 upon which it slides. The length of spindle 66 determines the over-all height of the package, since the follower, as it traverses the length of the spindle, reaches either the upper or lower end of the cam path, rapidly reverses at a definite point, delivering the yarn at that point, and thus assures the desired squared ends of the package.

The friction in the bearings 52 and 53 which mount the head 31 on the member 51 provide a yielding torque tending to cause the head 31 to follow in rotation, the rotation of member 51. There is also some friction between the teeth of the worm screw 50 and the worm wheel 49, the screw 55 and the worm wheel 56, the friction of the bearings for the return spindle 66 and shaft 57 and between the teeth of mitergears 64 and 65, all of which supplement the frictional drag on the head 31 that tends to drag the head 31 in rotation with the member 51. The screws 50 and 55 are rotating at the same speed as the spindle and since the head is lagging behind, the worm wheel 49 will be driven at a rate of speed proportional to the difference in speed between the member 51 and the head 31. If the head 31 was rotating at the same speed as the spindle, there would be no rotation of the gear 49. The rotation of the worm wheel 49 causes corresponding rotation of the hub 45 and since the yarn is passing between this hub and the friction roller 45, the yarn will be pulled upwardly through the spindle and delivered to the winding arm. The peripheral speed of the hub 45 should be equal to or greater than that of the feed rolls 1, after allowance has been made for contraction of the yarn due to twist imparted thereto, in order that the yarn be taken away by the hub 45 at least as fast as it is delivered at rolls 1. The twist imparted to the yarn by its rotation about the bobbin also assists in keeping the yarn taut because of the contractions of the yarn due to the twisting. Hub 45 rotates at a speed which should deliver the yarn to the winding cage at the rate at which it is delivered by the rolls 1, but should the hub tend to deliver the yarn faster, due to speed variation, the yarn can slip slightly on the hub 45 and no breakage of the yarn will occur.

In a modification of this invention and referring first to Fig. 8, the follower 69 carries a finger 79, the tip of which is bent to form an eye 80. To a flat ring 81 of the cage 59 is fixed a small plate 82 which acts as a bearing for the lower end of the reversing helical cam spindle 66 and also holds the lower end of the wire 60b in place. The plate 82 is set at an angle for the most effective position of the reversing helical cam spindle and the guide. Intermediate of the ends of the wire 60b there is fixed a yarn guide eye 83.

A further modification replaces in the upper ring 61 of the cage 59 with a circular plate 84, Fig. 9. To this plate is secured a bracket 85 in which are rotatably mounted two shafts 86 and 87. Secured on and rotating with the shaft 87 is a collar 88, a worm gear 89, with a hub, which corresponds to the worm gear 49, and a miter gear 90. Secured on and rotating with the shaft 86, which is at right angles to shaft 87, and meshing with miter gear 90, is a mating miter gear 91. Secured on and rotating with the shaft 86 is a collar 92 and a miter gear 93. Miter gear 93 meshes with miter gear 65.

A slightly modified tension spring 94, Fig. 9, which corresponds to tension spring 34, is secured to the circular plate 84 by a set screw (not shown). The tension spring 94 is adjusted by a screw 95. Plate 84, Fig. 10, is provided with a depending hub 96 which houses a bushing 97. The bushing 97 houses a ball bearing (not shown) which rotatably mounts the spindle 51 and worm screw 50. A guide wire 98, Fig. 10, which corresponds to 76, is fixed to the bracket 85 and bent to upstand from the base of the bracket somewhat near the center of the roll face. Near the pe-

riphery of the plate 84, Fig. 9, somewhat in line with the center line of the roll 42, is an opening 89 which acts as a yarn guide.

In the operation of this modification of the winding and twisting mechanism, the yarn 74 passes from the feed rolls 1 downwardly, ballooning about the cage 59, to and through the flier, then upwardly through the spindle where the yarn passes between the roll 42 and the hub of worm gear 89. The hub of the worm gear 89 and the roll 42 serve to pull the yarn upwardly through the spindle and feed it to and through the eye 89 and then downwardly to and through the eye 83 and thence towards the bobbin and through the eye 80 on the finger 79.

Worm screw 50 meshes with worm gear 89 which causes the shaft 87 to rotate and subsequently the rotation of the miter gear 90 which is meshed with a similar gear 91. Since miter gear 91 is fixed to the shaft 86, as is miter gear 93, both gears revolve and as gear 93 is meshed with gear 65 the result is the rotation of this gear 65. The reversing helical cam spindle 66 has fixed to its upper end the miter gear 93 and as that rotates, the reversing helical cam spindle also rotates causing the follower 69 to travel up and down the spindle in a uniform traversing motion. The yarn 74 is delivered through the eye 80 of the finger 79 to the bobbin in even helical layers as the cage 59 carrying the spindle rotates about the stationary bobbin. The length of the reversing helical cam spindle 66 determines the over all height of the package since the follower 69, as it traverses the length of the spindle, reaches either the upper or lower end of the cam path, rapidly reverses at a definite point, delivering the yarn at that point and thus assures the desirable squared ends of the package.

It will be understood that various changes in the details, materials, and arrangements of parts which have been herein conceived and illustrated in order to explain the nature of the invention, may be made by those skilled in the art within the principle and scope of the invention as expressed in the appended claims.

We claim:

1. In a winding and twisting apparatus, a tubular bobbin carrier, a rotatable element passing through said carrier and on which said carrier is rotatably mounted, said element having an axial passage extending downwardly from its upper end and a radially extending passage opening into the lower end of said axially extending passage, a member rotatably mounted on the upper end of said element above said carrier and having a depending skirt telescoping over and spaced from the carrier, a reversing cam screw rotatably carried by said skirt and having its axis of rotation generally lengthwise of but at one side of the carrier, a cam follower slidingly guided along the screw by said skirt and having camming engagement with said screw, a thread guide carried by said follower, and guiding to a bobbin on said carrier to be wound thereon, a thread descending past the skirt, inwardly along the radial passage, upwardly through said axial passage and then to the thread guide, means for holding the carrier from rotation with said element, and a driving connection from said element to said screw by which relative movement between the member and element causes rotation of said cam screw.

2. In a winding and twisting apparatus, a tubular bobbin carrier, rotatable element passing through said carrier and on which said carrier is rotatably mounted, said element having an axial passage extending downwardly from its upper end and a radially extending passage opening into the lower end of said axially extending passage, a member rotatably mounted on the upper end of said element above said carrier and having a depending skirt telescoping over and spaced from the carrier, a reversing cam screw rotatably carried by said skirt and having its axis of rotation generally lengthwise of but at one side of the carrier, a cam follower sliding and rotatably mounted on said screw and having a tongue engaging with the screw to cause the follower to move back and forth endwise along the screw, said skirt and follower having cooperating sliding engagement that confines the follower against rotation with the screw as it moves therealong, a thread guide carried by said follower, and guiding to a bobbin on said carrier to be wound thereon, a thread descending past the skirt, inwardly along the radial passage, upwardly through said axial passage and then to the thread guide, means for holding the carrier from rotation with said element, and a driving connection from said element to said screw by which relative movement between the member and element causes rotation of said cam screw.

3. In a winding and twisting apparatus, a tubular bobbin carrier, rotatable element passing through said carrier and on which said carrier is rotatably mounted, said element having an axial passage extending downwardly from its upper end and a radially extending passage opening into the lower end of said axially extending passage, a member rotatably mounted on the upper end of said element above said carrier and having a depending skirt telescoping over and spaced from the carrier, a reversing cam screw rotatably carried by said skirt and having its axis of rotation generally lengthwise of but at one side of the carrier, a cam follower engaging the screw and propelled by it endwise back and forth, a thread guide carried by said follower, and guiding to a bobbin on said carrier to be wound thereon, a thread descending past the skirt, inwardly along the radial passage, upwardly through said axial passage and then to the thread guide, means for holding the carrier from rotation with said element, and a driving connection from said element to said screw by which relative movement between the member and element causes rotation of said cam screw.

4. In a winding and twisting apparatus, a tubular bobbin carrier, rotatable element passing through said carrier and on which said carrier is rotatably mounted, said element having an axial passage extending downwardly from its upper end and a radially extending passage opening into the lower end of said axially extending passage, a member rotatably mounted on the upper end of said element above said carrier and having a depending skirt telescoping over and spaced from the carrier, a reversing cam screw rotatably carried by said skirt and having its axis of rotation generally lengthwise of but at one side of the carrier, a cam follower slidingly and rotatably mounted on said screw and propelled by it back and forth endwise of the screw, a thread guide carried by said follower, and guiding to a bobbin on said carrier to be wound thereon, a thread descending past the skirt, inwardly along the radial passage, upwardly through said axial passage and then to the thread guide, means for

holding the carrier from rotation with said element, and a driving connection from said element to said screw by which relative movement between the member and element causes rotation of said cam screw.

5. In a winding apparatus, a spindle, means mounting said spindle for rotation, a bobbin carrier telescoping over said spindle and relatively stationary, a member rotatably mounted on an end of said spindle and having an extension alongside of but spaced from said carrier, a reversing screw cam rotatably carried by said extension, a cam follower propelled back and forth along said cam by its engagement with the cam, a yarn guide connected to and moving with said follower, a worm screw on said end of said spindle, a worm wheel on said member and meshing with said worm screw, a driving connection on said member from said worm wheel to said screw cam whereby relative rotation of said spindle and member will cause operation of said screw cam, means for holding said carrier from rotation, and a yarn guide carried by said member, whereby when a yarn is passed continuously through said last named guide, then through the follower guide and to a bobbin on said carrier, said member will be frictionally driven from said spindle and will wind said yarn on said bobbin as rapidly as it is delivered thereto.

6. In a winding apparatus, a spindle, means mounting said spindle for rotation, a bobbin carrier telescoping over said spindle and relatively stationary, a member rotatably mounted on an end of said spindle and having an extension alongside of but spaced from said carrier, a reversing screw cam rotatably carried by said extension, a cam follower propelled back and forth along said cam by its engagement with the cam, a yarn guide connected to and moving with said follower, a worm screw on said end of said spindle, a worm wheel on said member and meshing with said worm screw, a driving connection on said member from said worm wheel to said screw cam whereby relative rotation of said spindle and member will cause operation of said screw cam, means for holding said carrier from rotation, a pair of engaging feed rolls on said member adjacent said spindle end, means yieldingly pressing said rolls with peripheral rolling contact, one of said rolls being driven by said connection, and a yarn guide carried by said member adjacent said connection

and one end of said screw cam, whereby when a yarn is fed continuously between said feed rolls then to said last mentioned yarn guide, then to said follower guide, and to a bobbin on said carrier, said member will be frictionally driven from said spindle and will wind the yarn on said bobbin at a rate dependent upon the relative movement between said spindle and member.

7. In a winding apparatus, a spindle, means mounting said spindle for rotation, a bobbin carrier telescoping over said spindle and relatively stationary, a member rotatably mounted on an end of said spindle and having an extension alongside of but spaced from said carrier, a reversing screw cam rotatably carried by said extension, a cam follower propelled back and forth along said cam by its engagment with the cam, an arm carried by said follower for travel therewith, extending generally tangentially to a bobbin mounted on said carrier, and having an eye on its free end, a worm screw on said end of said spindle, a worm wheel on said member and meshing with said worm screw, a driving connection on said member from said worm wheel to said screw cam, whereby relative movement between said spindle and member will cause operation of said screw cam, means holding said carrier from rotation, and a yarn guide carried by said member adjacent said connection and one end of said screw cam, whereby when a yarn is passed continuously through said guide, then said eye and is then connected to said bobbin, said member will be frictionally driven from said spindle and will wind said yarn on said bobbin at a rate dependent upon the relative movement between said spindle and member.

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