March 20, 1951 J. A. TRUITT 2,545,534

WINDING MACHINE

Filed April 5, 1948 7 Sheets-Sheet 1

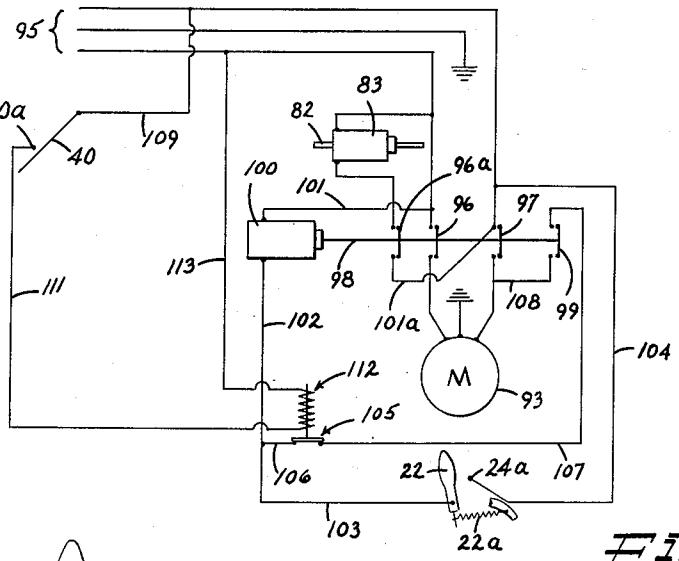


Fig. 4

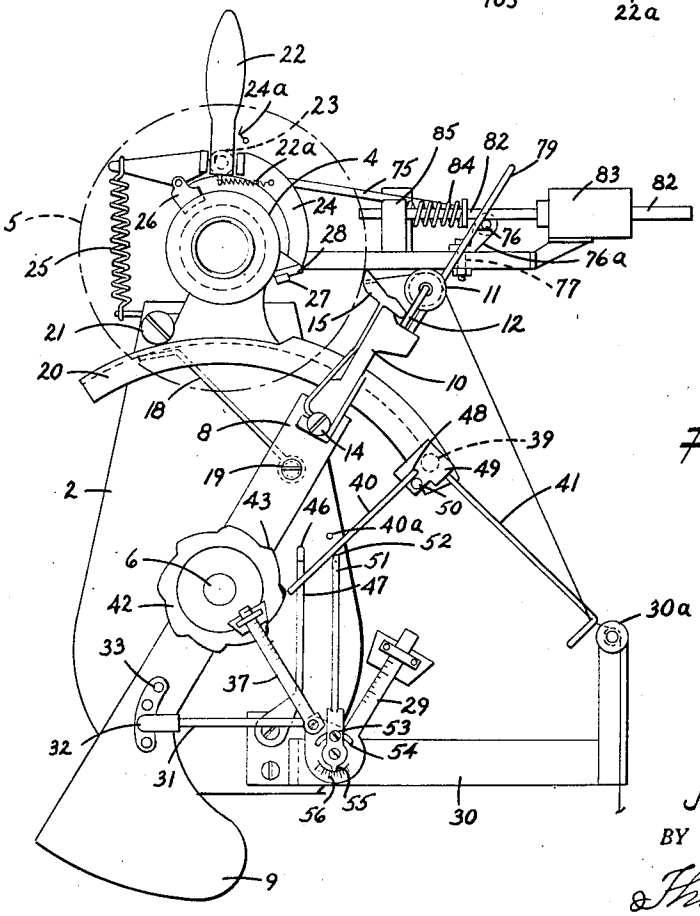


Fig. 1

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WINDING MACHINE

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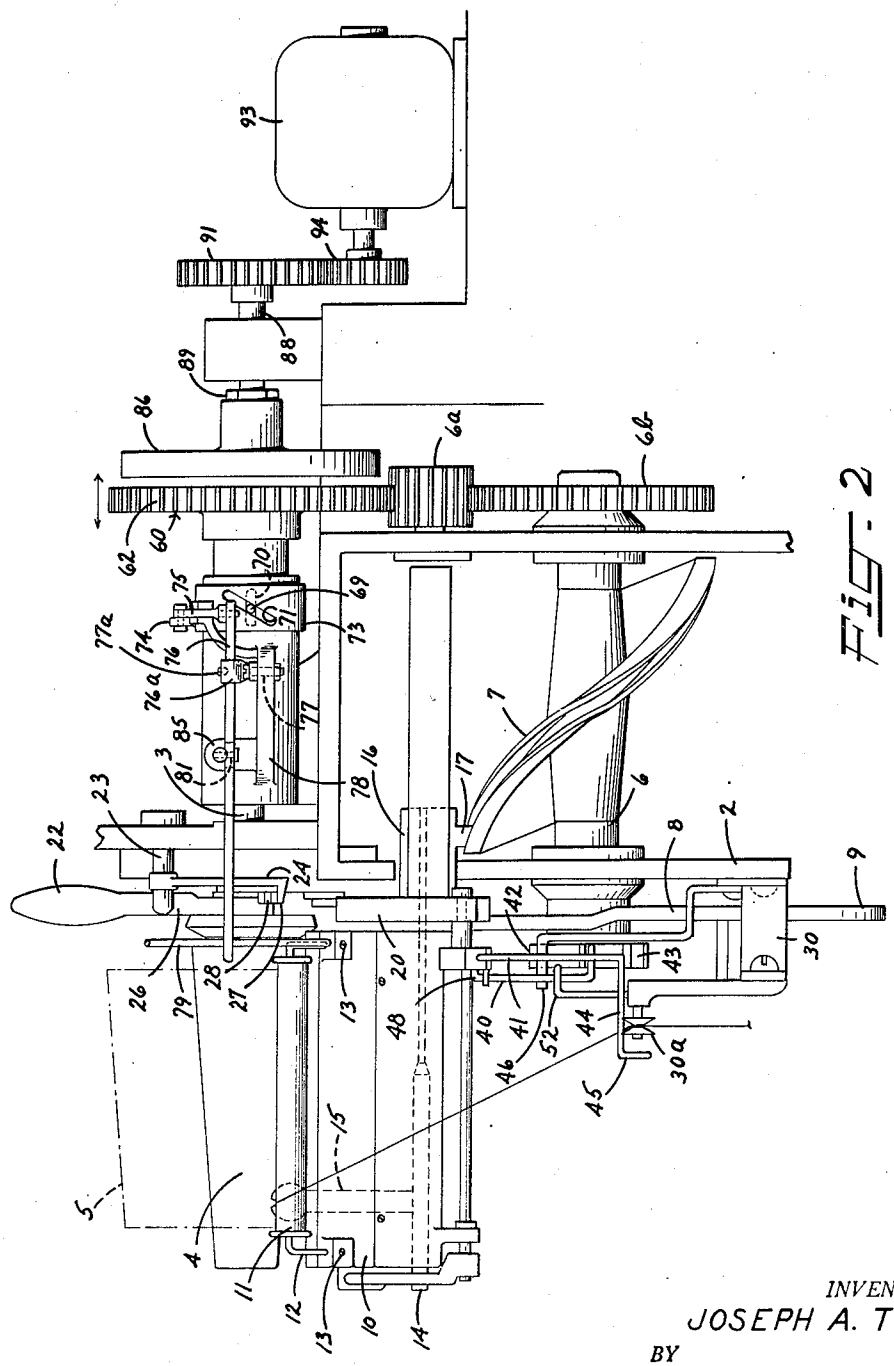


Fig. 2

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WINDING MACHINE

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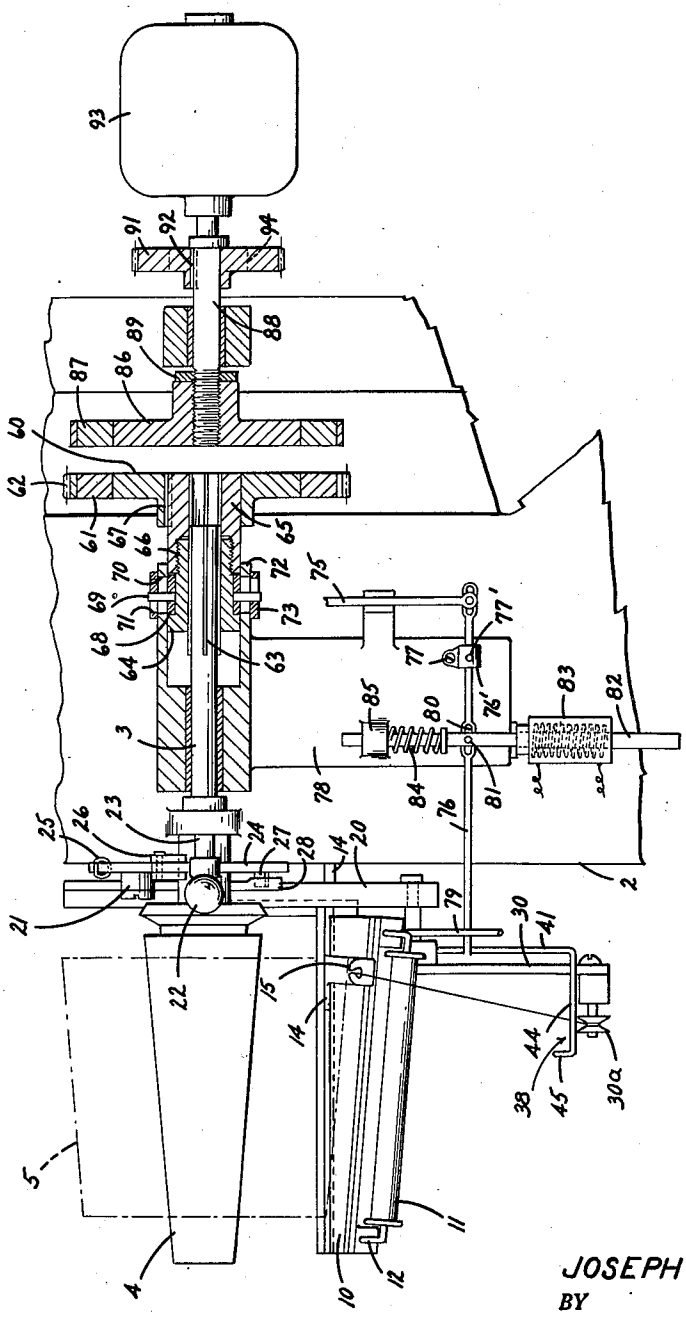


FIG. 3

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WINDING MACHINE

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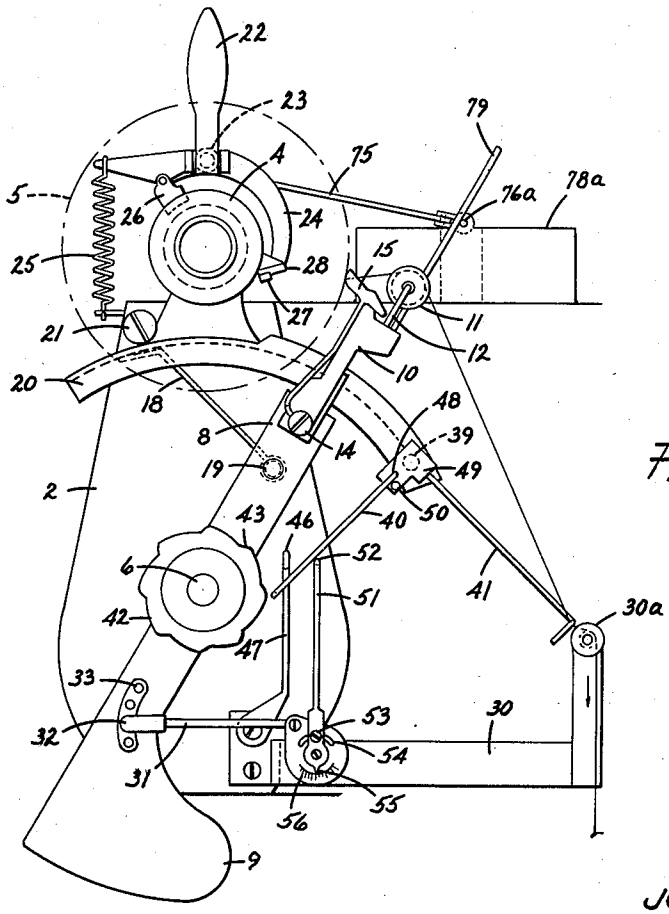


Fig. 5

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WINDING MACHINE

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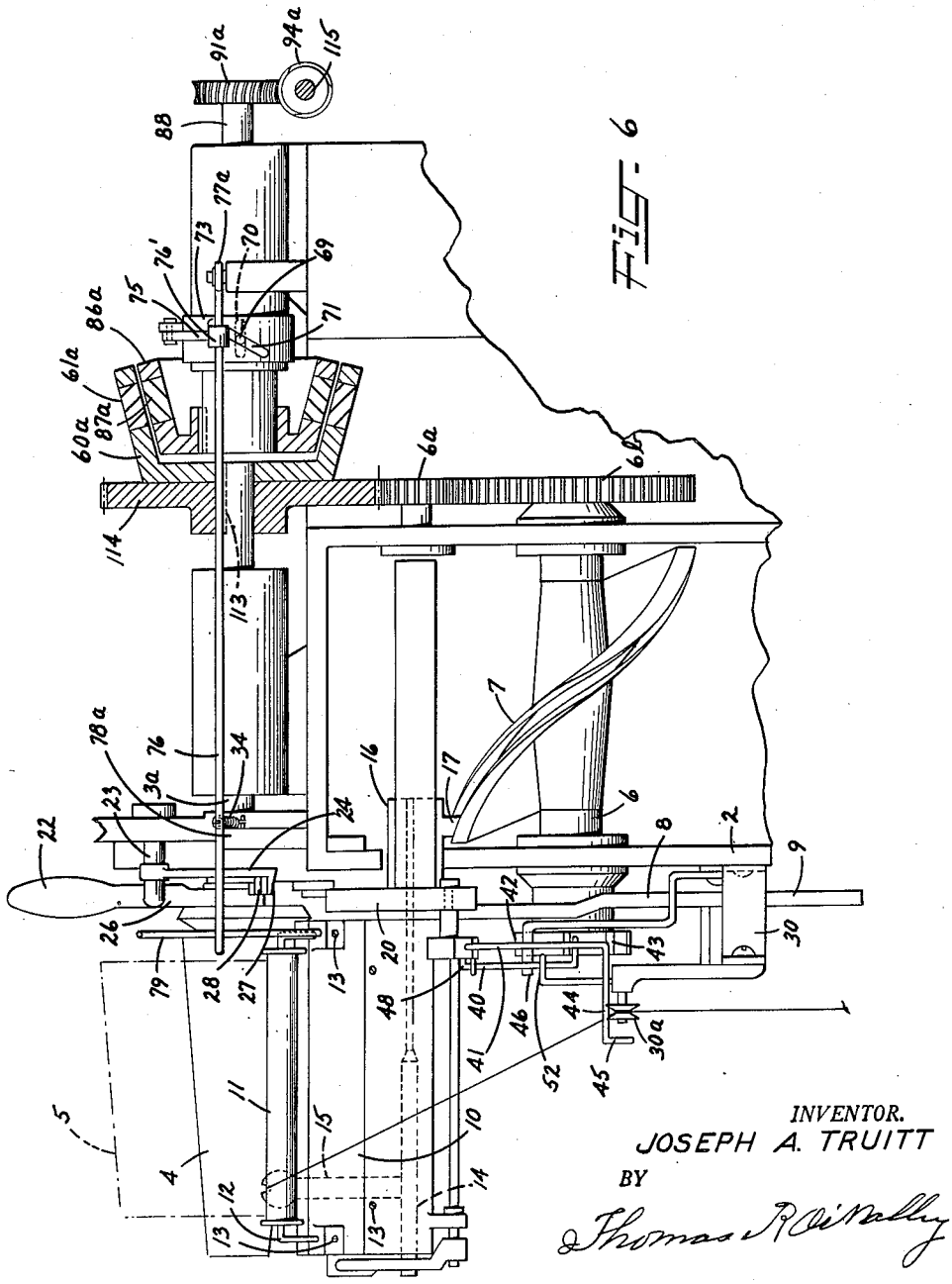


FIG. 6

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March 20, 1951 J. A. TRUITT 2,545,534

WINDING MACHINE

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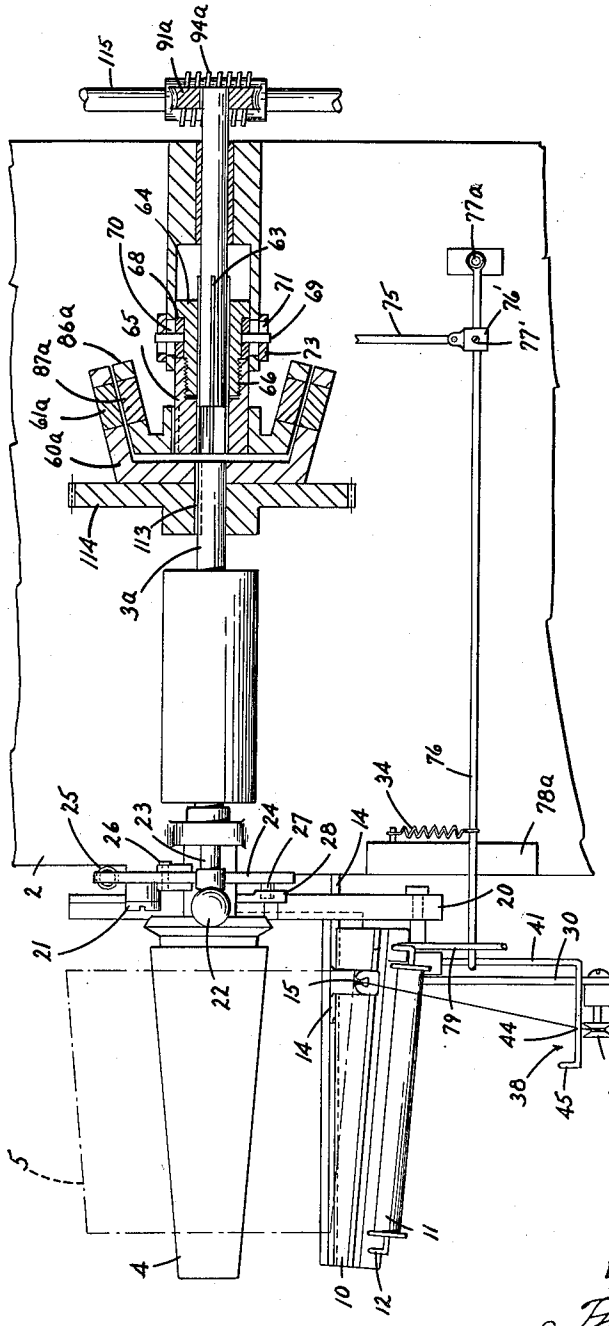


FIG. 7

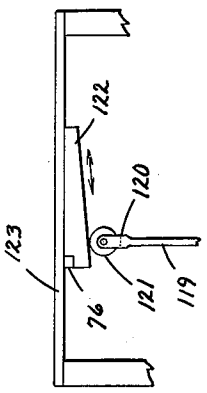


FIG. 9

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March 20, 1951 J. A. TRUITT 2,545,534

WINDING MACHINE

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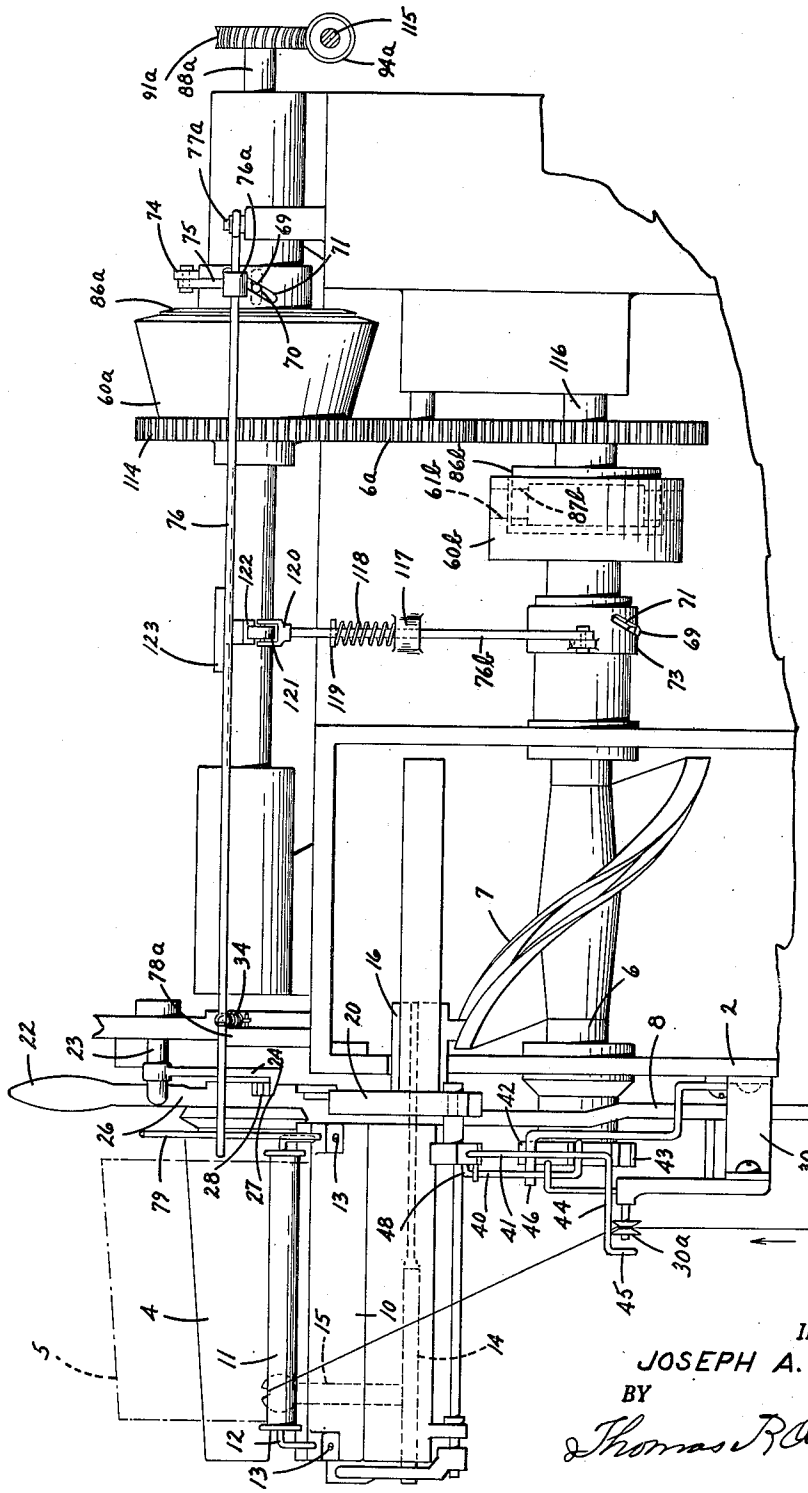


FIG. 8

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Patented Mar. 20, 1951 2,545,534

UNITED STATES PATENT OFFICE

2,545,534

WINDING MACHINE

Joseph A. Truitt, West Chester, Pa., assignor to American Viscose Corporation, Wilmington, Del., a corporation of Delaware

Application April 5, 1948, Serial No. 19,013

12 Claims. (Cl. 242—18)

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This invention relates to winding machines. It is particularly concerned with a new driving mechanism for rotating the winding spindle for receiving yarn thereon at a preselected linear speed, constant or varying, and at a yarn tension which is maintained constant or is varied in a predetermined manner to protect the yarn from undesirable strains and to assist in producing a package of any desired density.

A more specific objective of the invention is to provide a mechanism for driving a winding spindle at constant linear winding speed, so that such a spindle may serve as a take-up for yarn which is normally delivered from a supply at a constant rate or which should be withdrawn from the supply at a constant rate. As an example of the first situation, the take-up may be of yarn discharged, in wet or dry condition, from a machine for producing artificial filaments in a continuous manner. As an example of the latter, the constant withdrawal by the take-up may be of yarn from an up-twister in order to introduce uniform twist. In all of these various situations, the winding system employed is preferably of the "precise wind" type in which there is a constant relationship between the angular speed of rotation of the spindle and the frequency of traverse of the yarn as it is taken up in the package.

A further specific object of the invention is to provide a new mechanism for driving the traverse guide at a frequency which is controlled in relation to the angular speed of rotation of the spindle, to be constant or varied in a predetermined manner throughout the diameter of the package. The variation, in a preferred instance, can be controlled to provide a constant helix angle between adjacent superimposed convolutions to provide improved flow of liquor through the package in liquid treatments thereof, such as washing, dyeing, bleaching, etc., and improved filtering action.

In general, the present invention utilizes a magnetic drive for rotating the winding spindle at the desired speed. It comprises a rotatable member carrying one or more magnetizable elements and a second rotatable member carrying one or more magnetic elements opposite the magnetizable element or elements; one member is secured to the winding spindle and the other is arranged to be driven by an outside power source, so that when the latter member is rotated, such as by an electric motor, the other member and the spindle are rotated at a predetermined speed and a predetermined torque which may be maintained constant throughout

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the winding or may be varied in a predetermined manner by varying the air gap between the magnetizable elements and the magnetic elements. Alternately, the first rotatable member may carry magnetic elements and the second may carry magnetizable elements. Again, each rotatable member may carry both magnetic and magnetizable elements. The air gap may be varied by axially shifting one or both of the rotatable members, which may take the form of coaxially mounted adjacent discs, or concentrically related rings, cylindrical or conical, one surrounding the other.

In the drawing, illustrative of the invention,

Figure 1 is a front elevation of a winding machine embodying the present invention,

Figure 2 is a side elevation of the winding machine shown in Figure 1,

Figure 3 is a plan view of the embodiment of Figure 1,

Figure 4 is a wiring diagram for the embodiment of Figure 1,

Figure 5 is a front elevation of a second embodiment,

Figure 6 is a side elevation of the second embodiment,

Figure 7 is a plan view of the second embodiment,

Figure 8 is a side elevation of a third embodiment, and

Figure 9 is a detailed view of part of the third embodiment.

While the invention will be described hereinafter in relation to a winding machine for producing cone-shaped packages, it is to be understood that it is not limited thereto.

Referring to the embodiment of Figures 1 to 4 of the drawing, reference numeral 2 designates the fixed main frame of the machine. At the top of frame 2, a rotating spindle 3 is journaled in suitable bearings and is adapted to be driven by means hereinafter described. The spindle is adapted to receive a cone or cop tube 4 upon which the package 5 is to be wound.

A shaft 6 is journaled in the frame 2 and extends in a direction parallel to the winding spindle 3. This shaft 6 is connected to the spindle and is driven therefrom by suitable means, such as gears 62, 6a and 6b. The shaft 6 also carries a helical grooved cam 7 for rotation therewith.

A traverse frame 8 is pivotally mounted upon the shaft 6 upon which it is suitably balanced such as by the counterweight 9. This traverse frame 8 is provided with a backing plate 10

and a porcelain bail 11 may be rotatably supported on a wire 12 whose depending legs adjacent the ends of the bail are suitably fastened within recesses in the plate 10 by means of set screws 13. The traverse frame 8 is constructed to provide a horizontal groove through which a traverse bar 14 may reciprocate. A thread guide 15, whose upper end is adapted to press lightly against the package being wound is fastened to one end of the traverse bar 14 for reciprocation therewith. The other end of the traverse bar 14 is provided with a head 16 having a depending pin or roller 17 adapted to engage the groove in the helical cam 7. As the package builds up, it gradually swings the traverse frame 8 away from the spindle 3 and the traverse frame is prevented from swinging back toward the spindle by means of a lever 18 having one end fastened thereto at 19 and the other end engaging within a groove formed underneath a segment 20 which is pivotally fastened to the main frame 2 at 21.

The operation of the winding machine is initiated by a starting lever or handle 22, mounted on one end of a stud 23 pivotally mounted near the top of the main frame 2. A lever 24 adjacent the starting lever 22 is mounted fixedly on the rod 23 so that it rocks therewith but there is some play between lever 22 and the lever 24, which play is taken up by a spring 22*a* which normally urges lever 22 in a counterclockwise direction relative to lever 24. One end of lever 24 is normally biassed in a counterclockwise direction by a spring 25 fastened to the frame 2 and is provided with a braking means 26 which is adapted to press against the spindle 3 and to stop the rotation thereof when the lever 22 is in the stop position. The other end of the lever 24 is formed as a curved arm having a hook 27 at its end. When the starting lever 22 is swung into operating position, brake 26 is lifted from the spindle (as shown in Figure 1), lever 22 makes electric contact with a spring terminal 24*a* (closing a starting circuit for the driving motor), and the hook 27 engages another hook 28 secured to or constituting part of the pivoted segment 20. The machine may be maintained in running position by setting these hooks 27 and 28 in opposition to the spring 25 which otherwise would tend to set the brake and to swing the starting lever 22 into the stop position.

The pressure exerted by the guide 15 against the exterior winding of the package is controlled by a counterweighted arm 29 pivotally mounted on a bracket 30 fastened to the frame 2 of the machine. The link 31 is connected to arm 29 a short distance from its pivotal axis and is connected to the traverse frame 8 at 32. For adjustment, the end of link 31 may be inserted into any one of a series of sockets 33 provided. It will be seen that as winding proceeds arm 29 swings in a counterclockwise direction and that this swinging of the counterweight causes a gradual decrease of the force exerted by link 31 in opposition to the turning of the traverse frame 8 in a clockwise direction.

In operation of the machine, the yarn coming from a stationary package, from an up-twister, from the last stage of a continuous spinning machine, or from any other source passes first over the guide 30*a*, under a break or exhaustion detector 38, over the porcelain bail 11 and through the traverse guide 15 to the package. The break detector 38 comprises a device pivotally mounted at 39 upon segment 20. The device is composed of two arms 40 and 41, one of which 40 extends toward a wheel 42 having numerous projections or ridges 43 thereon mounted upon the cam shaft 6 for rotation thereby. The other arm 41 is bent to form a horizontal extension 44 adapted to ride upon the yarn and along which the yarn may traverse to a certain extent. The extension 44 may be bent at the end to form a hook 45 to prevent the yarn from accidentally slipping out of engagement therewith. The first arm 40 is of such length and the entire detector device 38 is so balanced that upon breakage of the yarn, the device swings in a clockwise direction to bring arm 40 into the path of the projections 43 upon the rotating wheel 42 which in turn forces the segment 20 in a counterclockwise direction sufficiently to release the two hooks 27 and 28 and thereby permit the spring 25 to throw the starting lever 22 into the stop position to apply the brake. Also, when arm 40 swings into the way of projections 43, it makes electric contact with a terminal 40*a*, which energizes a relay for opening the electric circuit to the driving motor, as will be explained hereinafter.

The arm 40 of the breakage detector is independently pivotally supported at 48 on the pivotal mounting 49 upon which the other arm 41 is fixedly secured. A screw 50 secured to the pivotal mounting 49 of the end breakage detector serves as a rest for the arm 40 to limit its counterclockwise motion with respect to the pivotal mounting 49 of the end breakage detector.

In the form of the invention shown in Figures 1 to 4, an auxiliary arm 51 suitably secured to arm 29 for swinging motion therewith has a portion 52 arranged to engage arm 40 and to swing it into the path of the projections 43 when the predetermined size of package is attained, whereupon stoppage of the machine is effected. The arm 51 may be secured to arm 29 by means of a bolt 53, adjustability being provided for by a slot 54 in arm 29. The arm 51 also may be provided with an indicator comprising the pointer 55 adapted to cooperate with the scale 56 upon the arm 29. The scale may be graduated to correspond with the sizes of packages that would be attained upon setting the pointer to the several indicia thereon.

Reference to the drawing will show that the application of the auxiliary arm 51 to arm 29 may readily be compensated for merely by an adjustment of the counterweight on the arm 29.

The magnetic driving means which constitute the most important feature of the present invention comprises the rotatable member 60 carrying one or more magnetizable elements or magnetic elements 61 secured therein. Though member 60 can be made entirely of magnetizable material and magnetized with the proper number of poles, the main body of the rotatable member 60 is preferably of non-magnetic material, i. e., a material which is substantially uninfluenced by the relative movement of a magnetic field with respect thereto. When a plurality of elements 61 are provided, they are preferably provided in pairs or in even numbers—for example, 2, 4, 6, 8, 12, 16, 24 or more, in which event they are disposed with magnetic poles alternating symmetrically about the axis of the rotatable member 60. If a single magnetizable or magnetic element 61 is preferred, it may constitute a continuous annulus about the member. The external periphery of the member 60 may be provided with gear teeth as 62 which mesh with gear 6*a*.

The rotatable member 60 is connected to the

spindle 3 for rotation therewith and for axial sliding motion therealong and, for this purpose, the shaft 3 is provided with splines or ridges 63 which fit slidably within the sleeves 64 and 65 secured together by screw threads 66. A key 67 secures the member 60 to the sleeve 65.

Means is provided for axially moving the member 60 relative to the spindle 3. This means comprises a ring 68 (Figure 3) fitting within an annular recess provided in the outer periphery of the sleeves 64 and 65. The ring 68 is provided with two diametrically opposed pins 69 which project through slots 70 and 71 in the bearing 72 and annular yoke or cam 73 fitting slidably therearound. The slots 70 within the bearing 72 extend axially, whereas the cam slots 71 in the yoke 73 are each provided with a projecting lug 74 to which is pivotally secured a link 75 (Figures 2 and 3). The link 75 is pivotally connected to a lever 76 which carries an adjustable clamp 76' having a bore for pivotally receiving the pin 77 upstanding from 78 to provide a fulcrum for lever 76. One end of lever 76 projects into the path of a rod 79 (which may be described as a cam-rod because of its function) secured to the traverse frame just back of one end of the bail wire 12 (see particularly Figure 2). The lever 76 is also slotted at 80 to receive a pin 81 carried by a reciprocable core 82 operated by the solenoid coil 83. A spring 84 normally urges lever 76 toward the coil and a bore provided in an ear 85 projecting upwardly from the frame 78 serves to guide the rod 82. The core 82 has its magnetic center displaced on the side of the coil 83 away from lever 76 so that when coil 83 is energized, it imparts clockwise motion to lever 76 as viewed in Figure 3, overcoming spring 84, and pressing lever 76 against rod 79.

Opposite the rotatable member 60 is disposed the rotatable member 86 which may be similar in construction, being provided with one or more magnetic elements or magnetizable elements 87, corresponding in number and disposition to the elements 61 of the member 60. When elements 61 are of magnetic material, elements 87 are of magnetizable material, or vice versa. The element or elements 61 or 87 may be of any magnetizable material, such as soft iron, cobalt, nickel, or alloys thereof, but a preferred alloy is that known as Alnico one type of which consists of 8% aluminum, 14% nickel, 24% cobalt, 3% copper and the balance iron. The elements 87 or 61 may be of electromagnetic character provided with the necessary electric windings and circuits therefor, or of permanent magnetic material, such as magnetized steel, cobalt, nickel, or other alloys thereof such as those known as Alnico and Cunico. In the preferred instance, particularly when the Alnico alloy mentioned hereinabove is used in the other element or elements, the alloy known as Cunico consisting of 50% copper, 21% nickel and 29% cobalt may be used.

The member 86 is carried by a shaft 88 upon which it may be threaded and held by a lock nut 89. The shaft 88 is rotatably mounted in a fixed bearing 90 of the machine frame and is provided with a gear 91 keyed thereto as at 92. An electric motor 93 drives a pinion 94 which meshes with the gear 91 for driving the magnetic elements 87.

Figure 4 illustrates diagrammatically an electric circuit for interconnecting the various elements of this embodiment of the invention. It shows a source of current, such as a three-phase A. C. line 95 having two of the lead lines connectable to the motor 93 by means of the contacts 96 and 97 respectively, the third phase being grounded as shown. The core 98 carrying contacts 96, 96*a*, 97 and 99 which are normally open, extends into operative relationship with the holding coil 100 which is connected on one side by a lead line 101 to one of the power supply lines and on the other side by lead lines 102, 103 and 104 to another line of the power supply. Between 103 and 104 the starting lever 22 and contact 24*a* are disposed. The normally closed contact 105 is provided between branch lines 106 and 107. The line 107 is arranged to be connected in series with line 108 connected to one terminal of the motor by means of contact 99. The coil 83 is connected to one of the lines 95 and through contact 96*a* is adapted to be connected through lead line 101*a* to another of the lines 95.

The arm 40 which is responsive to thread exhaust, breakage and also to completion of the package, is connected by line 109 to one of the power supply lines, whereas the terminal 40*a* is connected by a line 111 to coil 112 of the relay which controls contact 105. Coil 112 is connected by line 113 to another line of the power supply.

The operation of this embodiment is as follows:

In starting the machine, the operator swings lever 22 in a clockwise direction causing it to make contact with terminal 24*a*, thereby closing the circuit to start the motor 93. After the operator has secured the lug 27 under the latch 28, he is free to release lever 22 which is caused to break contact with terminal 24*a* because of spring 22*a*. Contact 99 maintains the current in the holding coil 100 and contact 96*a* maintains current in coil 83, thereby holding lever 76 against rod 79. During operation of the motor, the rotatable member 60 is in close position to the rotatable member 86 by virtue of the coil 83 urging lever 76 into contact with rod 79 carried by the traverse frame. As the package builds up, however, the swinging of the rod 79 causes lever 76 to swing in a counter-clockwise direction as viewed in Figure 3 which causes the ring 73 to rotate about the bearing sleeve 72 and shift the member 60 away from member 86. The extent of this shift can be predetermined by pre-selecting the curvature of rod 79 (that is, by replacing a straight rod 79 with one having any desired curvature along its line of contact with the lever 76) and/or by the adjustment of the location of pivot 77 by the set screw 77'.

By this means, it is possible to vary the gap between the magnetizable element 61 and the magnetic element 87. By so varying the gap, the tension exerted upon the strand as it is drawn to the package over guide 15 can be controlled in a predetermined manner. This result is obtained by virtue of the slip or difference in speed of rotation between the driven member 60 and the driving member 86 which are coupled by the magnetic fields therebetween. Less slip is obtained when the gap is lessened so that, as the winding builds up and the diameter of the package requires a slower speed of rotation, if it is desired to maintain an approximately constant tension, it is necessary to widen the gap continuously during the winding operation. If it is desired to reduce the tension gradually during the winding, it is merely necessary to adjust

the pivot 77 of lever 76 to increase the rate of separation between members 86 and 60 over that which would give the constant tension. Conversely, if it is desired to increase the tension during winding the adjustment is set to reduce the rate of separation.

In case the threads should break or it should become exhausted from the package or other source supplying it during the winding of the package 5, or in case the package 5 becomes full, the arm 40 is swung in a clockwise direction into contact with terminal 40a and with the projections 43 of the wheel 42. The circuit in Figure 4 shows that upon closing the circuit at 40a the coil 112 is energized. Energization of coil 112 opens contact 105, thereby de-energizing the holding coil 100 and opening contacts 96, 96a, 97 and 99, and consequently interrupting the current supply to the motor and to the coil 83. De-energization of coil 83 allows core 82 to be urged by spring 84 in such a direction as to swing lever 76 in a counterclockwise direction, which in turn withdraws member 60 to its maximum displacement from member 86. This reduces the magnetic influence upon elements 61 to a negligible amount so they do not acquire a "set" magnetism upon stopping of the machine. In addition, the latch 28 is lifted to release lug 27 which allows spring 25 to apply the brake 26. These several functions all occur substantially simultaneously when the arm 40 is swung into stopping position. After the condition has been remedied, the machine may be started as indicated hereinbefore.

In the second embodiment shown in Figures 5 to 7, certain of the parts are the same as in the embodiment of Figures 1 to 4 and such parts are designated by the same reference characters. In this embodiment, however, the frusto-conical rotatable member 60a is secured to winding spindle 5a in a fixed manner, as by the key 113, and a gear 114 keyed to the shaft 3a meshes with the pinion 6a for driving the cam 7 through gear 6b. The other rotatable member 86a has a conical external surface complementary to the conical internal surface of the rotatable member 60a and each of the members is provided with magnetic or magnetizable inserts 61a and 87a. As in the previous embodiment, when 61a is of magnetic material, elements 87a are of magnetizable material and vice versa. In this embodiment, the member 86a is movable axially with respect to the member 60a and this may be accomplished by means of the lever 76a (corresponding to 76 of Figures 1 to 4, but being longer in order to reach further back from the winding head). The lever 76a for rotating the yoke 73 provided with the cam slots 71 for imparting axial movement to the member 86a is secured to the lever 76a by an adjustable clamp 76' as in the previous embodiment and the lever 76a is pivoted upon a stationary part of the frame at 77a beyond the clamp 76', thereby making lever 76a of the third class. A spring 34 normally urges lever 76a against cam rod 79. A frame member 78a having a horizontal upper surface supports and guide lever 76a during its swinging motion. The member 86a and the means for imparting axial adjustment thereto are carried upon the splined shaft 88a in a manner analogous to that in which member 6a is carried upon the splined shaft 3 in the embodiment of Figures 1 to 4. The shaft 88a may be provided with a worm wheel 91a which meshes with a worm 94a driven by a shaft 115. This shaft may carry a plurality of worms 94a at spaced intervals along its length for driving a number of such winding machines.

In this embodiment, the member 86a rotates at all times except when it is desired to shut down the entire machine including all of its winding units for extensive repairs. However, in case of yarn breakage or exhaustion of yarn from the supply or filling of the package, the arm 40 of the stop mechanism is swung into the path of the cogs on the wheel 42, thereby lifting the segment 20, disconnecting the latch 27 and 28 and applying the brake 26 to stop the winding spindle. Such stoppage, as stated, does not stop the rotatable member 86a and this system of stopping is of advantage when a number of machines are driven from a common power supply since it enables one machine to be stopped for replacement of a package, replacement of supply, or tying of broken ends without shutting down adjacent winding spindles. After the cause for the momentary stoppage is corrected, the operator merely releases the brake and sets the latch 27 and 28 to start the spindle again. As in the previous embodiment, one of the rotatable members, 86a in this instance, is shifted axially with respect to the other 60a throughout the winding of the package in order to control the tension during winding. As in the previous embodiment, this tension may remain constant or it may be varied in a predetermined manner. This embodiment also is adapted to take yarn from any source of supply, and particularly those mentioned hereinabove in connection with Figures 1 to 4, such as an up-twister for producing uniform twist by virtue of the constant speed of take-up, from a continuous spinning machine, or even from a stationary package. This embodiment has also the additional advantage over that of Figures 1 to 4 in that the rotatable member 86a shifted is not in engagement at its periphery with other driving elements as member 60 was engaged with pinion 6a of the embodiments of Figures 1 to 4.

In the embodiment of Figures 8 and 9, the construction of the embodiment in Figures 5 to 7 is further modified in that a magnetic clutch or interconnection is provided between the gear 6b and the cam 7. The magnetic coupling therebetween comprises concentric cylindrical members, one 60b surrounding the other 86b. Member 86b is fixedly secured to a shaft 116 upon which the gear 6b is mounted for rotation therewith. The member 60b is mounted for axial motion relative to 86b in a manner similar to the corresponding internal cone of the embodiment of Figures 5 to 7 and the disc 60 of Figures 1 to 4. The yoke 73 provided with the cam slots 71 in this instance is connected by an upwardly extending lever 76b reciprocably guided through a bore in a lug 117 secured to the frame and normally urged upwardly by a spring 118 bearing against the upper face of the lug 117 and a pin 119 secured to the lever 76b. At its upper end, lever 76b is provided with a yoke 120 supporting a rotatable follower roll 121 which bears against the under-surface of a cam 122 having the form of a wedge and secured, as more particularly shown in Figure 9, to the lever 76a which operates the means for moving the member 86a axially. A fixed plate 123 provided above the cam 122 serves to guide the lever 76a and the cam 122. In this embodiment, it will be seen that as the package builds up member 86a shifts axially relative to member 60a. This serves to control the tension and the speed of winding of the yarn upon the spindle. In addition, however,

the member 60b is moved axially, preferably in such a manner as to reduce the overlap between the elements 61b (magnetic or magnetizable) with respect to the elements 87b (magnetizable or magnetic). As the overlap decreases, the slip between the members 86b and 60b gradually increases so that the frequency of the traverse guide per revolution of spindle rotation is changed during the build-up of the package. The lower surface of cam 122 can be preselected to give any desired change in frequency. In one preferred instance, it is shaped in such a manner that the frequency of the traverse guide decreases at the proper rate to maintain a constant helix angle between the guidings in adjacent superimposed layers for the purpose of improving fluid flow through the package in cases where it is desired to subject the final wound package to liquid treatments, such as dyeing, bleaching, washing, lubricating, sizing and the like. Without the provision of the couplings 60b, and 86b between gear 6b and cam 7, the helix angle would be gradually reduced as the diameter of the package increases because of the constant relationship between the frequency of traverse to the angular speed of rotation of the winding spindle. The provision of the magnetic clutch of the present invention makes it possible to vary the angle in any predetermined manner or to maintain it constant throughout such winding.

As in the other embodiments, that of Figures 8 and 9 is adapted to serve as the take-up for yarns proceeding from a continuous spinning machine, from an up-twister, or from any other source of supply, and especially those which necessarily deliver the yarn at a constant rate of speed, or in which it is desirable that the take-up withdraw the yarn at a constant rate of speed.

Although the various specific forms of magnetic clutch members are shown in specific relationships, it is to be understood that any one of the forms, that is, concentric cylinders, concentric cones, and coaxial discs, can be used in any relationship desired. In general, the amount of axial movement between the members of the magnetic clutch during the building of the package may be as low as 0.02 inch, or as high as ¼ to ½ inch, the lower figures being commonly employed with the plate type or cone type members as in the embodiments of Figures 1 to 7, whereas somewhat greater axial disolacement may be found necessary with the cylindrical relationship shown in the embodiment of Figures 8 and 9. When serving as a take-up for yarn fed to the device at constant speed, as from a continuous spinning machine, the relative movement between the members whereby the air gap is varied serves to regulate the yarn tension in any desired manner, either maintaining it constant or gradually increasing or decreasing it as desired in spite of the fact that the yarn speed is constant. When the device serves as a drawing off as well as a take-up device, the variation in the air gap between the members of the magnetic clutch serves to regulate both the yarn speed and tension. In the case of drawing yarn from an up-twister, it serves to maintain the speed of withdrawal constant so as to produce a uniformly twisted yarn. This invention thus provides a winding system which makes it possible to control the tension in any desired manner throughout the winding of the package in spite of the fact that the package diameter is increasing.

It is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined in the appended claims.

I claim:

1. A winding machine comprising a rotatable spindle for receiving a carrier upon which a strand is to be wound, a rotatable member carrying a magnetizable element, a second independently rotatable coaxial member carrying a magnetic element opposite the first member, said rotatable members being relatively movable in an axial direction, one of the members being connected to the spindle for rotating it upon rotation of the member, stopping means for the machine, and means responsive to actuation of the stopping means for separating the rotatable members into positions of minimum magnetic interaction.

2. A machine in accordance with claim 1 comprising a part movable in response to the change in diameter of the package, and means connecting one of the rotatable members to the movable part to axially move one of said members gradually relative to the other member throughout the winding.

3. A winding machine comprising a rotatable spindle, a rotatable member carrying a magnetizable element, a second coaxially related independently rotatable member carrying a magnetic element opposite the first member, said members being relatively movable axially, one of the members being connected to the spindle for rotating it therewith, means for rotating the other member, means for stopping the rotating means, resilient means for urging one of the members away from the other, means for urging said one member toward the other in opposition to the resilient means, means for initiating the rotating means, and means for rendering the last-named urging means ineffective upon operation of the stopping means.

4. A machine in accordance with claim 3 which comprises means for predeterminedly varying the relative axial separation between the members during winding.

5. A machine in accordance with claim 3 comprising a part movable in response to the diameter of the package, and means operated by said movable part for predeterminedly varying the axial distance between the members during winding.

6. A winding machine comprising a rotatable spindle for receiving a carrier upon which a strand is to be wound, a guide for leading the strand to the package, means for traversing the guide from end to end of the carrier to distribute the strand thereon during winding, driving means interconnecting the spindle and the traversing means for maintaining a predetermined frequency relationship between the traverse of the guide and the angular speed of the spindle, a rotatable member carrying a magnetizable element, a second independently rotatable coaxial member carrying a magnetic element opposite the first member, one of the members being connected to the spindle for rotating it upon rotation of the member, means for rotating the other member, stopping means for the machine, and means responsive to actuation of the stopping means for separating the rotatable members into positions of minimum magnetic interaction.

7. A machine in accordance with claim 6 comprising means automatically operable during the winding for varying the distance between the members in a predetermined relation to the diameter of the package.

8. A machine in accordance with claim 7 in which the frequency of traverse per spindle revolution remains constant throughout the winding.

9. A machine in accordance with claim 8 in which the interconnecting driving means comprises a second pair of independently rotatable coaxial members, one comprising a magnetic element and the other a magnetizable element.

10. A machine in accordance with claim 9 comprising means automatically operable during the winding for varying the axial distance between the members of each pair in a predetermined relation to the diameter of the package.

11. A winding machine comprising a rotatable spindle for receiving a carrier upon which a strand is to be wound, a guide for leading the strand to the package, a traverse frame for supporting the guide, means for reciprocating the guide relative to the traverse frame, the traverse frame being swingably mounted to allow the guide to move away from the spindle as the package builds up, a rotatable member secured to the spindle for rotation therewith and carrying a magnetizable element, a second substantially coaxially mounted and independently rotatable member carrying a magnetic element opposite the first member, means for rotating the second member, the first rotatable member being axially movable relative to the second rotatable member, said machine comprising a rotatable cam for

imparting axial motion to the first member, a member secured to the traverse frame for motion therewith, and a linkage comprising a lever engaging the last-named member for rotating the cam member in response to a change in the package diameter.

12. A machine in accordance with claim 11 which comprises resilient means for urging said lever against the member carried by the traverse frame.

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