Feb. 14, 1928.

M. B. GROUT

1,659,259

TENSION DEVICE

Filed Nov. 14, 1923

3 Sheets-Sheet 1

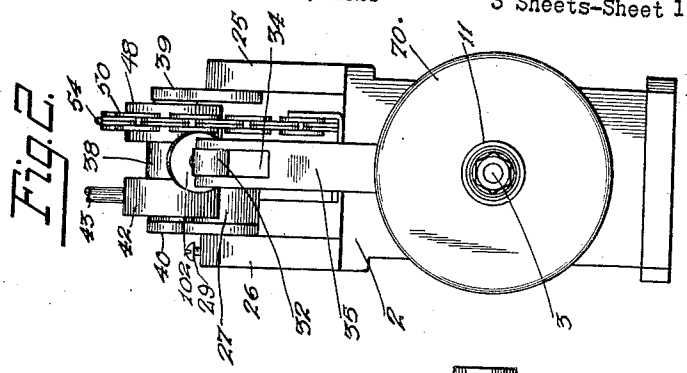


Fig. 2.

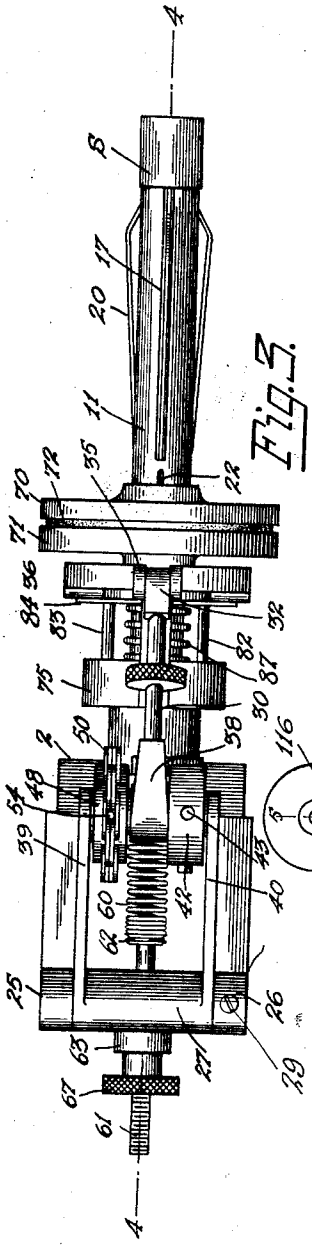


Fig. 3.

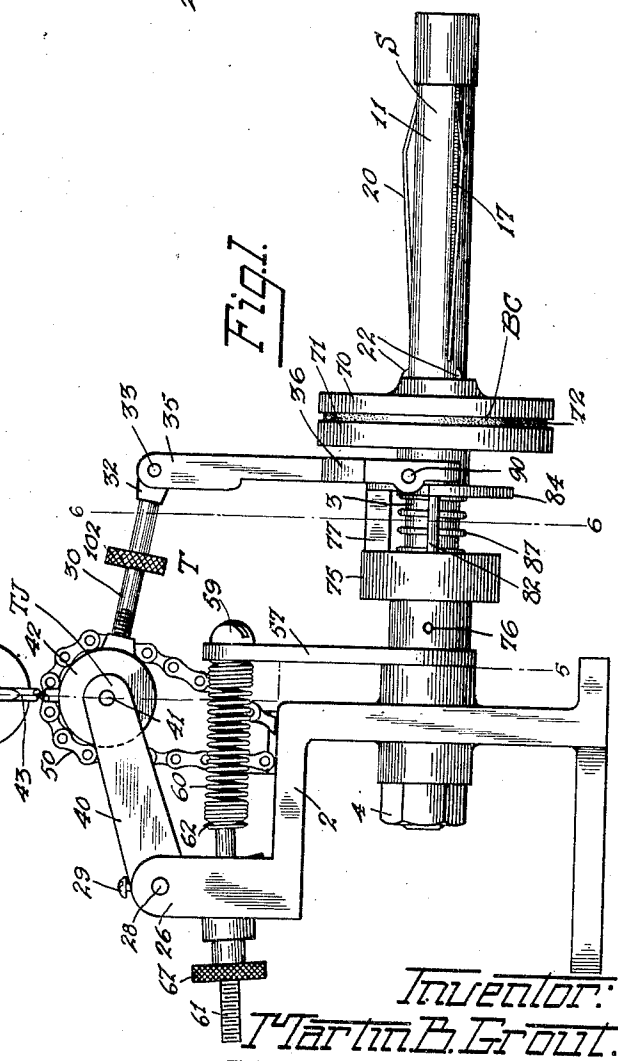


Fig. 1.

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3 Sheets-Sheet 2

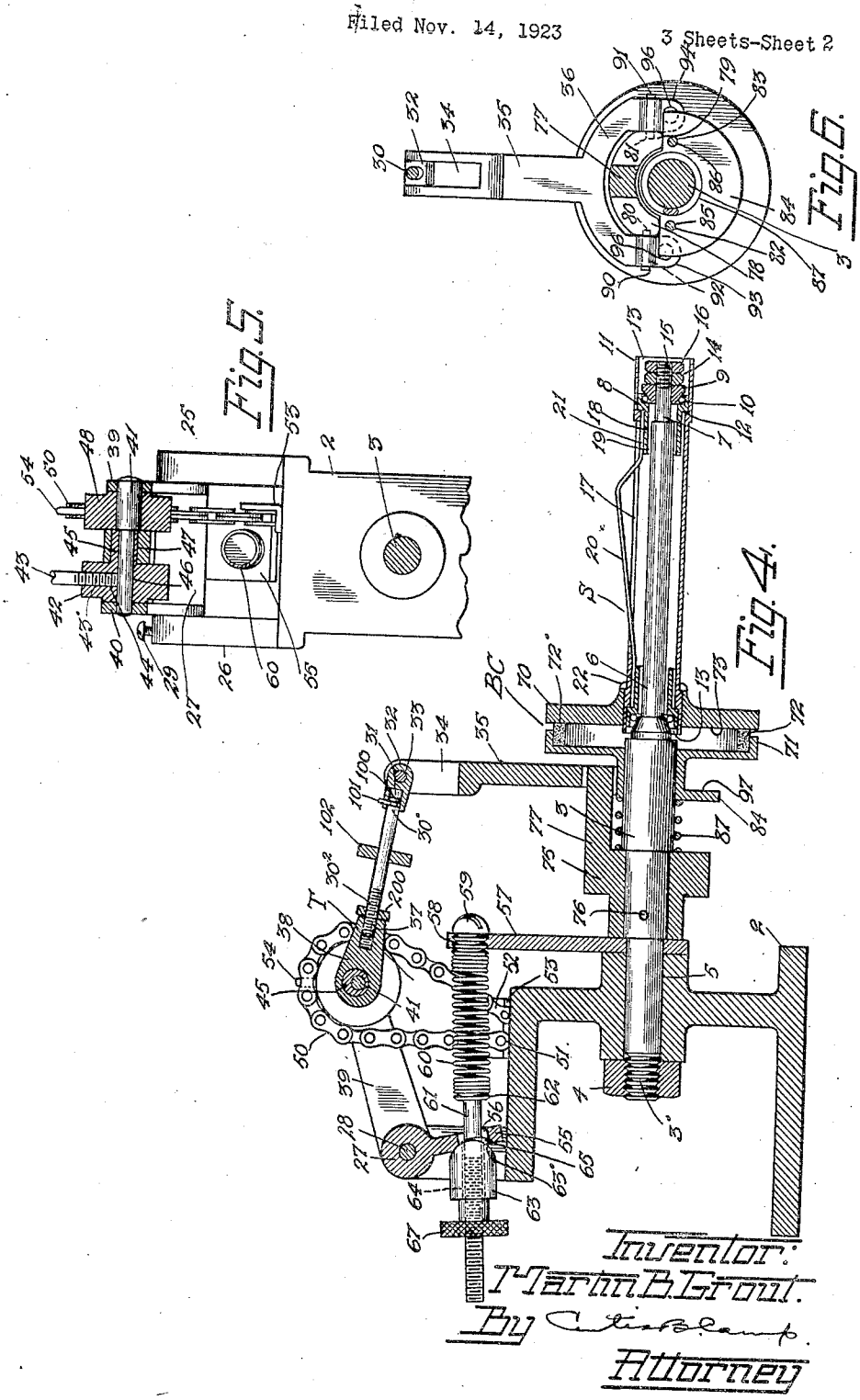


Fig. 4.

Fig. 5.

Fig. 6.

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Feb. 14, 1928.

M. B. GROUT

1,659,259

TENSION DEVICE

Filed Nov. 14, 1923

3 Sheets-Sheet 3

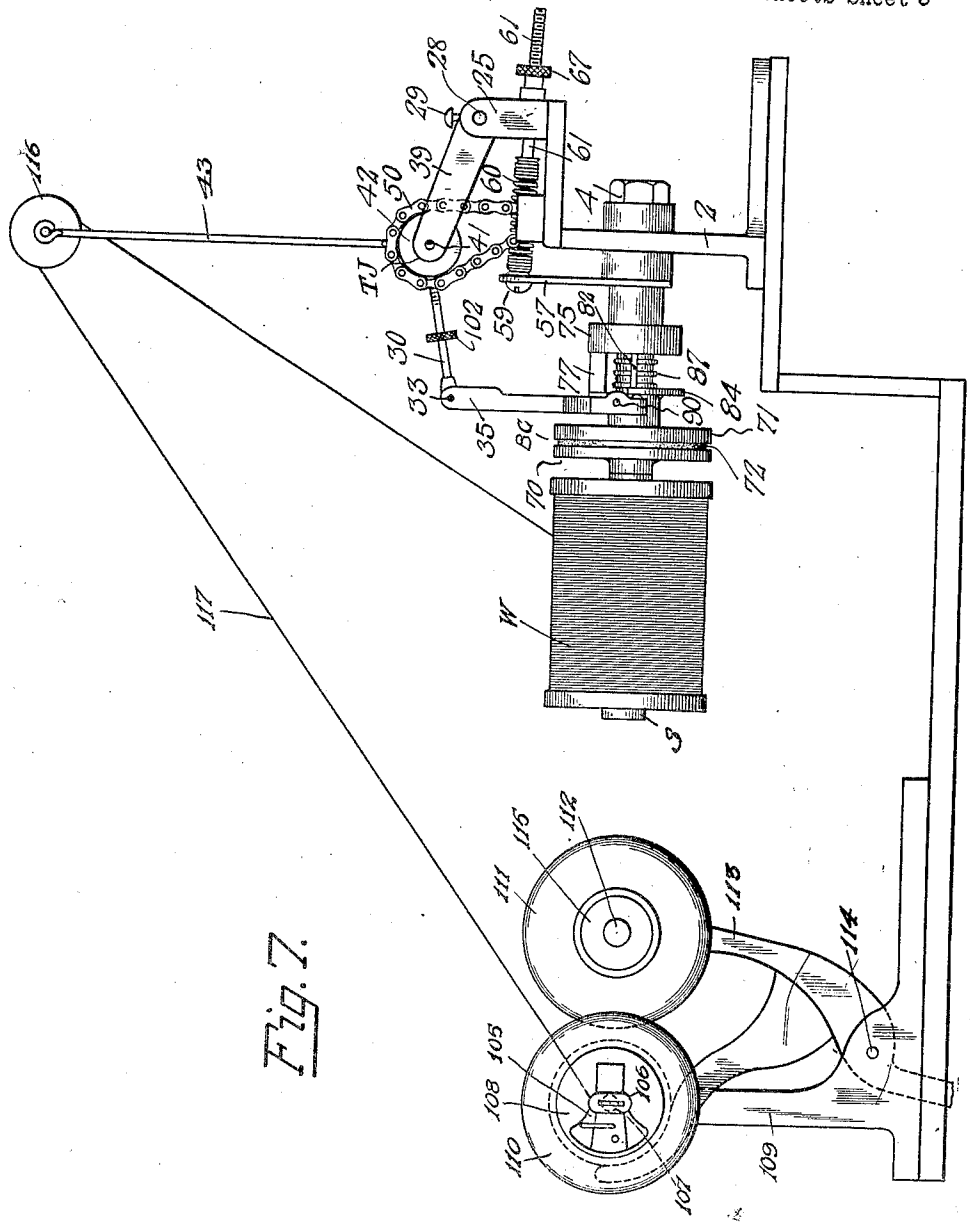


Fig. 7.

Inventor:
Martin B. Grout.
By Curtis & Curtis.
Attorney

Patented Feb. 14, 1928. 1,659,259

UNITED STATES PATENT OFFICE.

MARTIN B. GROUT, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

TENSION DEVICE.

Application filed November 14, 1923. Serial No. 674,623.

My invention relates to winding machines, and has to do more particularly with winding machines of the class which are used for winding coils, and the main object of my invention is to provide an improved winding machine in which coils made from insulated wire may be wound at high speed and at the same time a substantially constant tension may be maintained on the traveling strand which is being wound on the coil.

In winding coils it is important to keep the tension on the wire throughout the winding operation as nearly constant as possible, especially so when small coils, such as transformer and receiver coils or the like are being wound with a fine gauge wire. In the winding machine of my invention I provide a winding mandrel or chuck suitably operated by motor driven means, and the only connection between the winding mandrel or chuck and the tensioning device which carries the supply spool is the strand of wire itself. For the purpose of controlling the tension of the wire or strand being wound I provide a new and improved tensioning device, the controlling action of which is exercised at two points, namely, at the winding point of the mandrel or at the point of supply of the strand, my tension device is adapted for use not only with manually controlled winding machines but also with automatically controlled winding machines such as shown in my copending applications.

A feature of my invention is the provision of a sensitive take up device in which every variation in the rate of travel of the strand at the point of winding is instantly responsive to every decrease or increase of travel of the strand and will effect the corresponding necessary variations in the speed of travel of the supply means through the actuation of a novel combined clutch and braking means.

Another feature of my invention is the application of a toggle joint in combination with novel adjusting means whereby the take up device may be adjusted so that an approximately constant tension is placed upon the strand of wire in its travel from its source of supply to the point of travel.

Another feature of my invention is the provision of adjustable means for one arm of the toggle joint whereby a slight movement of the control arm will cause an instantaneous operation of the combined clutch and braking means.

A further feature of my invention resides in the fact that the spring tension on the control arm of my device is practically constant no matter in what position it may be.

A still further feature of my invention resides in the fact that spring means comprise the back stop for the control arm when it recedes to its vertical position.

Other features of my invention not hereinbefore referred to will be hereinafter described and claimed in the ensuing specification and claims.

For a more complete understanding of my invention reference may be had to the accompanying drawings, in which like reference characters in the several views of the drawings denote like parts, and in which

Fig. 1 is a side elevation of the winding machine of my invention;

Fig. 2 is a right end view of Fig. 1;

Fig. 3 is a plan view of Fig. 1;

Fig. 4 is a sectional view along the line 4—4 of Fig. 3 to more clearly illustrate the construction of the mechanism;

Fig. 5 is a sectional view along the line 5—5 of Fig. 1;

Fig. 6 is a sectional view along the line 6—6 of Fig. 1;

Fig. 7 is a side elevation of the machine of my invention illustrating it in association with a coil chuck and its power driving means.

Referring now more in detail to my invention as illustrated, it comprises a supporting frame 2 upon which the mechanism of the winding machine of my invention is supported. I provide a spindle rod 3 which is secured to the frame 2 in any suitable manner as by means of the nut 4 which has screw threaded engagement with the threaded end 3′ of the rod 3 which extends through a suitable orifice 5 in the frame 2.

A spool holder S is provided and is rotatably supported in bearings 6 and 7, which are of the usual ball bearing type comprising the usual ball race or cup 8, cone 9 and ball bearings 10. The spool holder S comprises a sleeve 11 whose interior end portions are slightly smaller in size than the diameter of the ball races 8, so as to produce a force fit, and when in position as illustrated in the drawings, they rest against the annular shoulder 12 formed by the enlarged end

openings 13 in the sleeve 11. The cones 9 are fitted tightly upon the spindle rod 3, and an adjusting nut 14 having screw-threaded engagement with the threaded end 15 of the rod 3 is turned down to force the cone 9 of the bearing 7 down so that when the proper adjustment of the spool holder S is obtained, that is, adjustment against longitudinal movement, a lock nut 16 having screw-threaded engagement with the threaded end 15 of the spindle rod 3 holds the sleeve 11 in its adjusted position. The ball races 8 of bearings 6 and 7 are provided with tubular extensions 18 which extend into the sleeve 11 a short distance and whose diameters are slightly smaller than the interior diameter of the sleeve 11 to form an annular opening 19.

The wall of the sleeve 11 is provided with a plurality of slots 17 which receive the spring wires 20, one end of each of said spring wires 20 passing through the slots 17 in the rear portion of the sleeve 11 and extending into the annular opening 19 formed by the ball races 8 of bearing 6 and the sleeve 11 and being secured therein against displacement in any suitable manner. The free ends 21 of the spring wires 20 also pass through the slots 17 at the forward end of the sleeve 11 and rest in the annular opening 19 formed by the ball races 8 of the bearing 7 and the sleeve 11. A spool of wire W, when slipped over the spool holder S, forces the spring wires 20 downward to place them under tension so as to hold the spool upon the spool holder S against displacement. I also provide a plurality of prongs 22 secured to the rear portion of the sleeve 11 in any suitable manner, said prongs 22 being provided with knife edges which engage the edge of the spool opening when the same is placed upon the spool holder S. The spring wires 20 in combination with the prongs 22 prevent the rotation of the spool W on the spool holder S when the machine is in operation.

The winding mechanism of my invention is also provided with a combined clutch and tension device T which will now be described. The frame 2 is provided with a pair of integrally formed supporting brackets 25 and 26 which support a portion of the tension device T. The adjustable tension device T comprises a toggle joint TJ, one arm of which is in the form of a U shaped member 27 which rests between the brackets 25 and 26 and is pivotally supported on a pivot pin or shaft 28 which shaft 28 is in turn supported by the brackets 25 and 26 and secured against rotation by means of a set screw 29. The other arm of the toggle joint TJ is in the form of an adjustable rod 30 one end 30′ of which is rotatably supported in a suitable orifice 31 in a member 32 pivotally supported by a pivot pin 33 in the bifurcated end 34 of an arm extension 35 of a yoke 36. An annular groove 100 at the end of the rod is adapted to receive a pin 101 which passes through a suitable orifice in the member 32 and enters the groove 100 in the rod 30 thus rotatably holding the rod 30 in the member 32 against displacement. The rod 30 is also provided with a thumb member 102 which is for use in rotating the rod 30 to adjust the same in relation to the yoke 36 as will be more fully hereinafter described. The other end 30² of the rod 30 is threaded and has screw threaded engagement with a threaded orifice 37 in a member 38 which is pivotally supported between the arms 39 and 40 of the U shaped member 27 as will now be described. The arms 39 and 40 of the U shaped member 27 extend forward and support between them a pivot pin or shaft 41, and upon which shaft 41 is secured a disk 42.

An arm 43 provided with a threaded end portion 43′ has screw threaded engagement with a suitable tapped orifice 44 in the disk 42 and secures the arm 43 to the disk 42 and also serves as a set screw to secure the disk 42 on the shaft 41. The disk 42 is provided with an integrally formed eccentric portion 45 in relation to the central orifice 46 of the disk 42 and is of a size to enter the central orifice 47 of the member 38 which supports one end 30² of the rod 30. A disk 48 is also secured to the shaft 41 by means of a suitable set screw and is concentrically secured to the shaft 41 in relation to the disk 42. The shaft 41 supported by the arms 39 and 40 of the U shaped member 27 forms the pivot joint for the arms of the toggle joint TJ, one arm of which is the U shaped member 27 and the other arm being the rod 30 and its supporting members 38 and 32, respectively supported on the eccentric portion 45 of the disk 42 and the pivot pin 33. A chain 50 of suitable link construction is formed around the disk 48, its ends 51 and 52 being suitably secured to a bracket 53 which bracket is in turn secured to the frame 2. A pin 54 secured to the disk 48 extends through the link chain for purposes as will presently be described. The U shaped member 27 is provided with an integrally formed depending tongue 55 which is provided with a central orifice 56. An arm 57 supported by the spindle rod 3 is provided with a threaded orifice 58 which is adapted to receive a screw 59 upon which one end of the spiral spring 60 is threaded.

A rod 61 is provided which extends through the central orifice 56 of the depending tongue 55 and is provided with an enlarged threaded portion 62 upon which the other end of the spiral spring 60 is threaded. A member 63 having a rounded end 63′ is provided with a central orifice 64 which per-

mits it being slipped over the rod 61 and its rounded end 63′ of the member 63 rests in the concave depression 65 around the central orifice 56 of the depending tongue 55 to form a ball and socket joint between the rounded end 63′ of the member 63 and the depression 65 of the tongue 55. The other end of the rod 61 is threaded and is adapted to receive a thumb nut 67 which when threaded upon the rod forces the rounded end 63′ of the member 63 into the depression 65 of the tongue 55 and this thumb nut 67 is for the purpose of adjusting the tension upon the spring 60 for purposes as will presently be described.

I also provide a combined brake and clutch mechanism BC which is controlled by the movement of the toggle joint TJ and comprises a brake which consists of a disk 70 which is secured to the sleeve 11 by means of a drive fit, and a brake drum 71 which is cup-shaped in form and is slidably supported on the spindle rod 3. A ring 72 of suitable material such as leather rests in the cup portion of the drum 71 and is secured to the drum 71 in any suitable manner, the peripheral face 72′ of which is adapted to engage the face 73 of the disk 70. A member 75 pinned to the spindle rod 3 by means of a pin 76 abuts against the arm 57 and is provided with an integrally formed extension 77 extending forward parallel with the spindle rod 3. A pair of depending members 78 and 79 arcuately shaped and integrally formed with the extension 77 are provided with orifices 80 and 81 for purposes as will presently be described. The member 75 has suitably secured thereto a pair of pins 82 and 83 located diametrically opposite and the brake drum 71 is provided with an integrally formed flange 84 which is provided with a pair of orifices 85 and 86 located diametrically opposite each other through which the pins 82 and 83 secured to the member 75 extend. A spiral spring 87 around this spindle rod 3 rests between the member 75 and the flange 84 of the brake drum 71 and as the brake drum 71 is slidably supported upon the spindle 3 and held on the spindle rod 3 against rotation by the pins 82 and 83 entering the orifices 85 and 86 the said brake drum 71 is forced against the disk 70 with the face 72′ of the friction ring 72 engaging the face 73 of the disk 70, that is, when the machine is at rest as illustrated clearly in Fig. 1.

The yoke 36 is pivotally supported by pivot pins 90 and 91 which pass through suitable orifices 92 in the legs 93 and 94 of the yoke 36 and enter the orifices 80 and 81 in the arcuate depending members 78 and 79 of the member 75. The legs 93 and 94 of the yoke 36 are provided with bearing points 96 which engage the face 97 of the flange 84 of the brake drum 71. The bifurcated end 34 of the upwardly extending arm 35 of the yoke 36 pivotally supports the member 31 which slidably supports the rod 30 which is one arm of the toggle joint TJ.

Having described in detail the apparatus comprising the winding machine of my invention, I will now describe in detail the operation of the same in connection with its winding operation.

For the purpose of illustrating and describing my invention I have shown the winding machine operating in connection with a chuck for winding receiver coils but it is to be understood that the winding machine of my invention is applicable for other uses and may be used in conjunction with the machines of the multiple type such as a multiple winding machine as described in an application filed by me June 3, 1922, Serial No. 565,630.

The chuck 105 for holding the coil 106 to be wound may be of any suitable type such as illustrated in Fig. 7 and is secured to a shaft 107 which is rotatably mounted in bearings 108 of a suitable supporting bracket 109 which is mounted upon a suitable winding bench or table. A wheel 110 secured to the shaft 107 is operatively associated with a friction wheel 111 which is rotatably mounted on a shaft 112 rotatably supported in bearings of a rocking arm 113 which is pivotally secured to a bracket 109 at the pivot pin 114. The shaft 107 also carries a pulley wheel 115 which by means of suitable transmission such as a belt drives the shaft 107 and a friction wheel 110 secured thereto. The arm 113 is connected to a suitable starting foot pedal (not shown) which when actuated rocks the arm 113 and its parts as a whole and causes the wheel 111 to engage the wheel 110 on the shaft 107. Due to the frictional engagement between the wheels 111 and 110, the shaft 107, to which is attached the chuck 105 which holds the coil 106 to be wound starts to rotate. The spool of wire W held upon the spool holder S has its end threaded over the guide wheel 116 and secured to a terminal of the coil 106 to be wound. The instant that the shaft 107 starts to rotate, wire is placed upon the core of the coil 106 to be wound and the operator now guides the strand of wire 117 back and forth to place the requisite number of turns of the coil.

The instant that rotation is started, a tension is placed upon the wire strand 117. The arm 43 is in the position shown in Fig. 7 before the starting pedal is actuated and is held in this position by the spiral spring 60 whose pull or tension is such as to force the member 63 slidably supported on the rod 61 against the tongue extension 55 and due to this tension or pull against the tongue extension 55 of the U shaped member 27 the arms of the toggle joint TJ which consists of

the U shaped member 27 and the rod 30 and its associated parts and which are connected to the toggle pivot 41 are held in their raised position, the normal position of the toggle pivot 41 being controlled by the link chain 50 which rests on a portion of the peripheral face of the disk 48, the ends 51 and 52 of which are secured to the bracket 53. The instant, however, that the starting pedal is actuated a tension or pull is placed upon the strand of wire 117 caused by the rotation of the shaft 107. The tension or pull of the strand of wire 117 which as before described rides over the guide wheel 116 secured to the arm 43 causes the arm 43 to be moved downward due to the pull or tension of the strand of wire 117 that is attached to the core of the coil 106 held by the chuck 105. The arm 43 is secured to the disk member 42 and as the disk member 42 is secured to the shaft 41, the said shaft 41 is rotated in its bearings in the arms 39 and 40 of the U shaped member 27. The disk 48 which is also secured to the shaft 41 is also rotated and due to the pin 54 secured to the disk 48 and its connection with the link chain 50 which rests upon a portion of the periphery of the disk 48 and whose ends 51 and 52 are secured to the bracket 53, the pivot point 41 of the toggle joint TJ is forced downward and the arms 39 and 40 of the U shaped member 27 and the rod 30 which is connected to the pivot point 41 by the member 38 are also moved. This pull forces the ends of the arms 39 and 40 of the toggle joint TJ which are connected to the toggle pivot 41 downward causing the U shaped member 27 as a whole to rotate about its supporting shaft 28.

The tongue extension 55 of the U shaped member 27 is moved to the left with reference to Fig. 4 and forces the member 63 and the rod 61 and its adjustable screw 67 as a whole to the left against the normal tension of the spiral spring 60, thus placing the spring 60 under additional tension. The rod 30 which serves as the other arm of the toggle joint TJ due to its connection with the toggle pivot 41 and the arm 35 of the yoke 36 is also forced downward and this movement of the rod 30 causing the integrally formed arm 35 of the yoke 36 to be moved to the right with reference to Fig. 4. The movement of the arm 35 of the yoke 36 to the right causes the yoke 36 to swing about its pivot pins 90 and 91 to cause the legs 93 and 94 of the yoke 36 which engage the face 97 of the flange 84 of the brake drum 71 to the left against the normal tension of the spring 87. This movement of the brake drum 71 causes the friction ring 72 of the brake drum 71 to partially disengage the face 73 of the disk 70 removing the drag from the spool holder S to permit the spool holder S and the spool of wire W as a whole to rotate more freely to relieve the extra strain upon the wire strand 117 placed thereon when the shaft 107 started rotating. After the machine is started and has picked up speed and is rotating at a uniform speed the combination of the arm 43 in association with the toggle joint TJ and the spring 60 and the brake drum 71 and disk 70 in association with the spring 87 will keep the strand of wire 117 at as near a constant tension as possible.

The member 38 into which one end 30² of the rod 30 is threaded is pivotally supported on the eccentric extension 45 of the disk 42 to give the rod an additional movement as will now be described. As the arm 43 starts its downward travel the disk 42 is rotated as just described causing the toggle joint TJ to start its downward travel and as the disk 42 rotates its eccentric extension 45 is also rotated and due to its eccentric position on the shaft 41 its rotation also causes the member 38 which is pivotally supported on this eccentric portion 45 of the disk 42 to be moved to the right. This movement is in addition to its normal movement caused by the downward movement of the toggle pivot 41 and as the rod 30 is threaded to this member 38 the rod 30 is also moved to the right in addition to the steady downward movement caused by the downward movement of the pivot point 41 for purposes as will now be described. Coils such as are used in receivers and transformer coils and especially those used in connection with radio receiving sets are wound with a very fine wire to obtain a high ohmic resistance for the receivers and the coils of the transformers. When the machine upon which these coils are wound is started a sudden strain is placed on the fine wire and if means are not provided to equalize this strain the wire would snap.

Now with the tension means of my invention the instant the starting pedal is actuated a tension or pull is placed upon the strand 117 caused by the starting of the machine and as the coil to be wound starts rotating the wire strand starts to unwind from the spool W and as the spool W and its wire which is supported by the spool holder S is dead weight all the strain in starting the spool holder S and its supported spool of wire rotating as a whole is placed on the fine strand of wire. The arm 43 in its downward movement causes the toggle joint TJ to function in a steady even movement to cause the yoke 36 to swing about its pivot pins 90 and 91. The instant this movement takes place the eccentric portion 45 of the disk 42 also acts and gives the rod 30 of the toggle joint TJ an additional thrust causing the yoke 36 to instantly respond to this additional thrust and permit the friction ring 72 of the brake drum 71 to instantly disengage the disk 70 permitting the spool of wire W and spool holder S as a whole to run entire-

ly free until the spool holder S and the spool W supported by it has picked up speed when the arm 43 and its associated parts operate to automatically regulate the tension of the strand of wire 117.

It sometimes happens that the wire upon the supply spool W is crossed for a few turns, casing a sudden pull upon the strand 117 that is being fed to the coil 106 being wound; in a case of this kind, the instant the sudden pull occurs, the added strain on the strand 117 becomes effective immediately and overcomes the tension of the spring 60 which tends to hold the arm 43 in its normal position, causing the arm 43 to be instantly drawn down against the tension of spring 60, causing the toggle joint TJ to function and the movement of the toggle pivot 41 downward causes the rod 30 to be forced to the right with the additional thrust brought about by the eccentric 45 as before described and causing the tongue extension 55 to be moved to the left to place the spring 60 under further tension. This movement of the rod 30 causes the yoke 36 to instantly rotate about its pivot pins 90 and 91 to force the brake drum 71 to the left to permit the spool holder S to run entirely free to release the strain placed upon the strand 117 being fed to the coil being wound. Now when this added strain or pull has stopped due to the crossed windings having been removed during the winding operation, the tension of the spring 60 is powerful enough to force the tongue extension 55 to the right causing the U shaped member 27 to rotate and move its integrally formed arms 39 and 40 upward and by means of the spring 60 and chain 50 in combination with the toggle joint TJ the yoke 36 is rotated about its pivot pins 90 and 91 and with the aid of the spring 87 to again force the friction ring 72 of the brake drum 71 against the face 73 of the disk 70 to again check the speed of the spool holder S so as to again permit the proper tension to be placed upon the strand of wire 117 that is being fed to the coil 106 being wound.

Should the strand of wire 117 on the supply spool W become tangled the arm 43 is instantly moved to its extreme down position against the tension of the spring 60. If the tangle continues the wire strand 117 snaps and the spring 60 forces the arm 43 back to its normal position as before described and as the spring 60 is under added tension due to the movement of the arm 43, the said arm 43 when released due to the snapping of the wire strand 117, is moved back with considerable force. To check the blow of the toggle joint and its associated parts when moved back to their normal position the pin secured to the disk 48 acts upon the link chain 50 causing the parts on the shaft 41 which is rotatably supported by the arms 39 and 40 of the U shaped member 27 to rotate in an opposite direction to force the pivot point 41 of the toggle joint TJ downward, again placing added tension on the spring 60. The spring 60 in this instant absorbs the blow of the returning toggle joint TJ and supported parts and acts as a buffer, and with this arrangement I may dispense with a fixed stop as the chain 50 in combination with the spring 60 will always tend to hold the arm 43 in its normal position.

The rocking arm 43 and its guide wheel 116 constitutes a light rocking element freely movable in one direction under the influence of the tension exerted by the loop of wire from the supply spool to the coil being wound, when the machine is started and also freely movable in an opposite direction under the influence of the spring 60 which opposes the pull of the loop. The arm 43 will move upward as the tension of the strand of wire 117 between the point of supply and the winding point decreases and will move downward as the tension of the strand of wire 117 increases and becomes effective to overcome the power exerted by the spring 60 tending to hold the arm 43 in its normal position. Through the medium of the movable arm 43 which is under an adjustable spring tension in combination with a brake drum 71 and disk 70 which is automatically disengaged or engaged the instant the arm 43 moved up or down through the agency of the yoke 36 which is always under spring tension, the tension of the strand of wire being fed to a coil may be maintained approximately constant at all times.

The thumb nut 67 on the threaded end of the rod 61 may be turned to the right or left so that when the machine is started the operator may by turning the thumb nut 67 to the right or left as the case may be decrease or increase the tension of the spring 60 so that just the right amount of tension may be placed on the spring 60 to keep the tension on the strand of wire approximately constant at all times for different gauges of wire. The thumb nut on the rod 30 may be turned to the right or left as the case may be, and being secured to the rod 30, this arm of the toggle joint TJ may be shortened, in which case the nut 102 is turned to the right to thread the threaded end 30^2 of the rod 30 further into the threaded orifice 37 of the member 38. As this arm of the toggle joint TJ is shortened, the yoke 36 is moved about its pivot pins 90 and 91, causing the legs 93 and 94 to move away from the face 97 of the flange 84, so that the toggle pivot 41 of the toggle joint TJ moves downward a considerable distance before the arms 93 and 94 engage the flange 84 to move the brake drum 71 away from the disk 70. This adjustment is used for the coarser gauges of wire. Now

when the thumb nut 102 is turned to the left, the rod 30 is lengthened and this being the case the yoke 36 is moved about its pivot pins 90 and 91 to move its legs 93 and 94 toward the flange 84 so that the toggle pivot 41 of the toggle joint TJ only moves slightly in a downward direction to cause the brake drum 71 to move away from the disk 70 through the agency of the legs 93 and 94 of the yoke 36 engaging the flange 84. This adjustment is used for the finer gauges of wire. The adjustment of rod 30 in any of its adjusted positions is maintained by a lock nut 200.

From the above it may be seen that by means of the adjustable thumb nut 67 for adjusting the tension of the spring 60 and the adjustable thumb nut 102 for adjusting the throw of the legs 93 and 94 of the yoke 36 in relation to the flange 84 a very fine adjustment may be obtained so that just the right tension may be maintained on the strand of wire.

While I have illustrated and described a preferred embodiment of my invention, it is to be understood that changes and modifications will readily suggest themselves to those skilled in the art, and I, therefore, aim to cover all such changes and modifications as come within the spirit and scope of the appended claims.

What I claim as new and desire to secure by United States Letters Patent, is:—

1. In a winding machine of the character described including a source of wire supply and a winding mandrel, a rocking element having a to and fro movement, a toggle joint associated with said rocking element, means on said toggle for supporting said rocking element, and means controlled by the tension of said strand between said winding mandrel and said source of supply for actuating said toggle for maintaining a constant tension upon said strand.

2. In a winding machine of the character described including a source of wire supply and a winding mandrel, a rotatable support for said source of supply, a rocking element, a toggle joint upon which said rocking element is supported, and means controlled by the movement of said rocking element and said toggle joint for maintaining a substantially constant tension upon said strand between said winding mandrel and the said source of supply.

3. A winding machine of the character described including a winding mandrel and a source of wire supply, a rotatable holder for said source of supply, a rocking arm and a guide wheel therefor, a toggle joint and supporting means on said toggle joint for said rocking arm, control means associated with said toggle joint actuated when said toggle joint is moved by the movement of said arm to maintain a substantially constant tension upon the strand of wire between the said winding mandrel and said source of supply.

4. In a winding machine of the character described including a winding mandrel and a source of supply, a rotatable holder for said source of supply, a toggle joint, a rocking arm supported by said toggle joint, and spring means for holding said rocking arm and said toggle joint in a position of rest, braking means, and means actuated when said rocking arm moves in one direction under the influence of the tension of the strand between the source of supply and said mandrel to actuate said brake means to permit the free rotation of said rotatable holder.

5. In a winding machine of the character described including a source of supply and a winding mandrel, a rotatable holder for supporting said source of supply, a toggle joint, a rocking arm and supporting means on said toggle joint for said rocking arm, spring means for holding said toggle joint in a position of rest, a guide wheel for said rocking arm over which the strand from said source of supply travels to said winding mandrel, brake means, means functioning when the rocking arm moves in one direction to move said toggle joint against the tension of said spring to operate said brake means to permit the free rotation of said rotatable holder, said spring moving said toggle joint in the opposite direction when the tension of the strand is such as to permit said toggle joint to actuate said brake means to check the free rotation of said rotatable holder.

6. In a winding machine of the character described including a source of supply and a winding mandrel, a rotatable holder for supporting said source of supply, a toggle joint including an arm supporting a strand of the source of supply between the said source of supply and the winding mandrel, a chain supported by said toggle joint, brake means associated with said toggle joint, said chain being acted upon when said arm moves in one direction under the influence of a tension of said strand to move said toggle joint to actuate said brake means to maintain a substantially constant tension in said strand between the winding point and said supply point.

7. In a winding machine of the character described including a source of supply and a winding mandrel therefor, a rotatable holder for supporting said supply means, a toggle joint including a pair of arms, a disk secured to said toggle joint supporting an arm, an eccentric extension for said disk, a supporting member on said eccentric carrying one arm of said toggle joint, a chain supported by said toggle joint, brake means connected to said one arm of said toggle joint, said chain being acted upon when said arm moves in one direction under the influence of a ten-

sion on said strand to move said toggle joint, said eccentric acting upon said one arm to give said one arm an additional thrust in combination with the movement of said one arm due to the movement of said toggle joint to actuate said brake means.

8. In a winding machine of the character described including a source of wire supply and a winding mandrel, a rotatable support for said source of supply, a rocking element, a toggle joint including a pivoted device upon which said rocking element is supported, adjustable tensioning means for said rocking element, and means controlled by the movement of said rocking element and said pivoted device for maintaining a substantially constant tension upon said strand between said winding mandrel and the said source of supply.

9. A winding machine of the character described including a winding mandrel and a source of wire supply, a rotatable holder for said source of supply, an arm and a guide wheel therefor, a toggle joint including a swinging member and supporting means on said member for said arm, adjustable tensioning means comprising spring means for holding said swinging member in a position of rest, control means associated with said member actuated when said member is moved by the movement of said arm to maintain a substantially constant tension upon the strand of wire between the said winding mandrel and said source of supply.

Signed by me at Chicago, county of Cook and State of Illinois, this 12th day of November, 1918.

MARTIN B. GROUT.