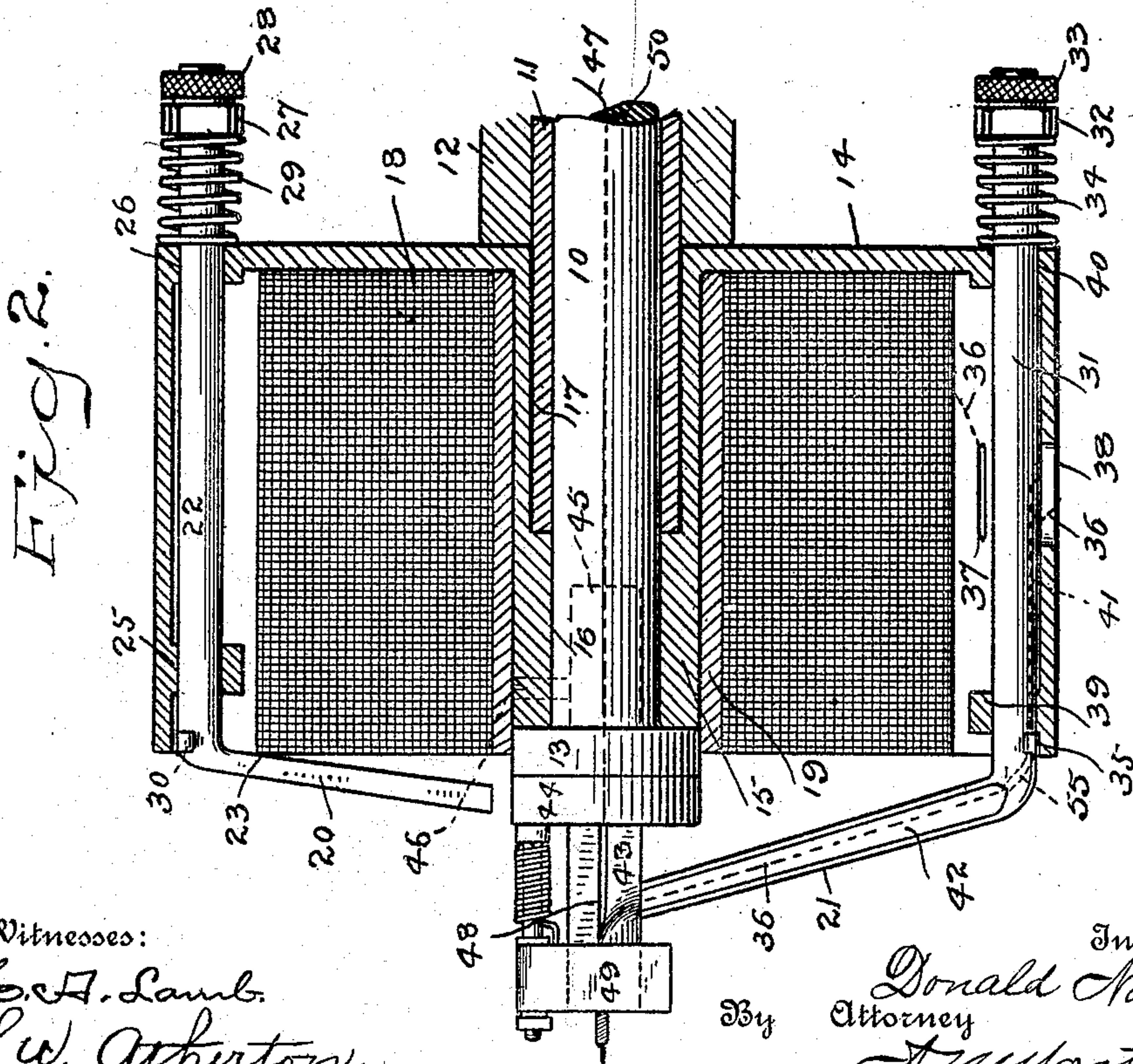
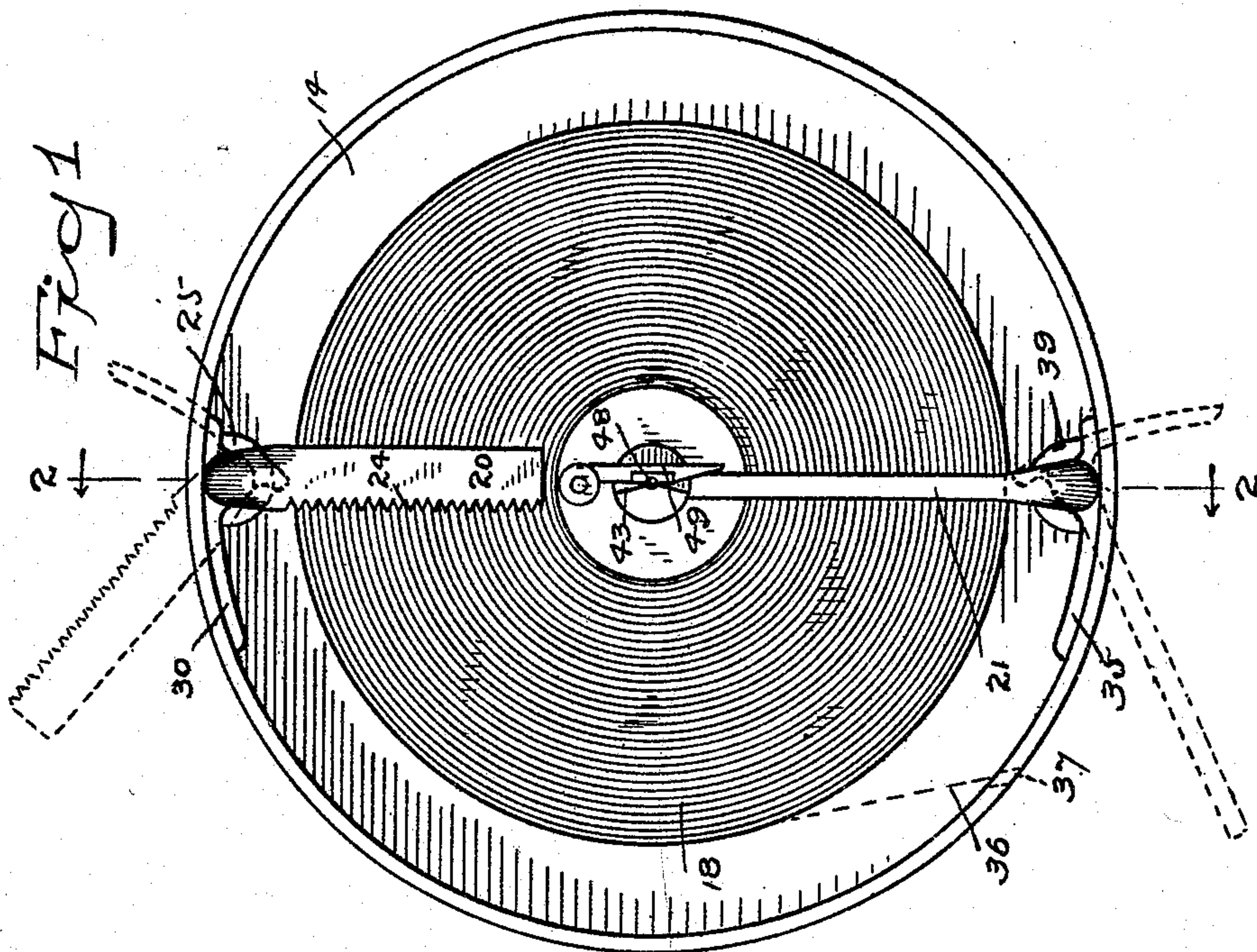


D. NOBLE.
TENSION DEVICE FOR WIRE COVERING MACHINES.
APPLICATION FILED DEC. 9, 1907.

919,751.

Patented Apr. 27, 1909.

2 SHEETS—SHEET 1.



Witnesses:
H. A. Lamb.
S. W. Atherton.

Inventor
Donald Noble
By Attorney
A. M. Wooster

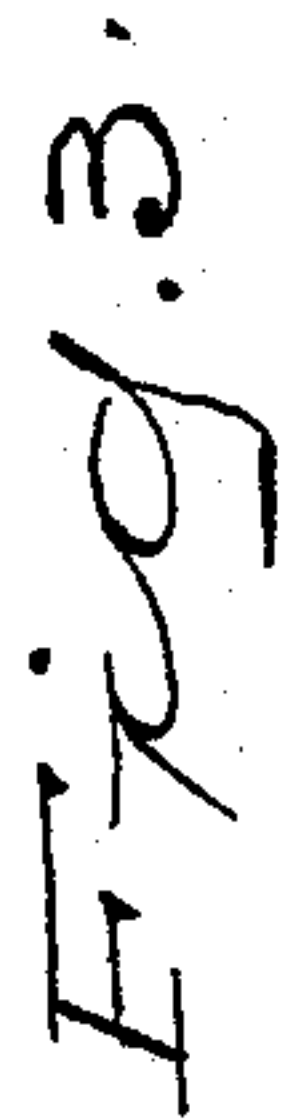
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21- 26 34
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UNITED STATES PATENT OFFICE.

DONALD NOBLE, OF BRIDGEPORT, CONNECTICUT.

TENSION DEVICE FOR WIRE-COVERING MACHINES.

No. 919,751.

Specification of Letters Patent.

Patented April 27, 1909.

Application filed December 9, 1907. Serial No. 405,656.

To all whom it may concern:

Be it known that I, DONALD NOBLE, a subject of the King of Great Britain, residing at Bridgeport, county of Fairfield, State of Connecticut, have invented a new and useful Tension Device for Wire-Covering Machines, of which the following is a specification.

This invention relates to machines for covering wire or cord with yarn or other material for various purposes as for insulating magnet wire.

Heretofore great trouble has been experienced in keeping a uniform tension on the cop or cylinder of yarn which revolves with the spinning head, also in the breaking of the yarn when the head starts suddenly or when and great variation of speed takes place.

The present invention therefore has for its object to provide an adjustable tension device that will cause the cop to travel with the head, will prevent any irregular or undue strain upon the yarn that might cause breakage and will be automatically compensating to the size of the cop so that the tension will be uniform from a full cop down to the last few yards of yarn.

With these and other objects in view I have devised the novel tension device which I will now describe, referring to the accompanying drawings forming a part of this specification and using reference characters to indicate the several parts.

Figure 1 is a front elevation of my novel tension device as in use, showing a full cop of yarn therein; Fig. 2 a section on the line 2—2 in Fig. 1, looking in the direction of the arrows; Fig. 3 a similar view illustrating a variant form of the device; and Fig. 4 is a view partly in elevation and partly in section, illustrating still another form of the device.

10 denotes the spindle which rotates in a stationary bearing sleeve 11 supported by a bearing 12 and 13 a collar at the outer end of the spindle.

14 denotes the spinning head or cup, shown as mounted between the bearing and collar 13. This head or cup is provided with a central hub 15 having a longitudinal opening, indicated by 16, to receive the spindle and an enlargement of said opening, indicated by 17, to receive bearing sleeve 11 about which the head rotates freely, the function of said sleeve being to provide a

long bearing for the spindle and thereby insure steadiness of movement of the head.

18 denotes a cop of yarn and 19 the cop tube upon which the cop is wound. In use the cop lies within the head, the cop tube passing over hub 15 of the head. Collar 13 is shown as lying partly within the head and the cop tube as partly overlying said collar which is of uniform diameter with hub 15.

20 denotes the tension finger and 21 the guide finger for the yarn. The tension finger is carried by a shank 22 and engages the outer end of the cop of yarn.

The essential feature of the invention is that an edge of the cop has a bearing on an incline down which the edge of the cop is caused to slide as the cop diminishes in size. In the form illustrated in Fig. 2, the incline is on the tension finger which lies at an acute angle to the outer edge of the cop of yarn and has a bearing thereon which is indicated by 23. The forward edge of the tension finger may or may not be provided with teeth 24 which rest upon the edge of the cop and engage the yarn of the cop sufficiently to hold it in place in the head so that when the head starts quickly the engagement of the teeth on the tension finger with the yarn of the cop will pull the cop around with the head and keep it constantly in rotation with the head. The shank 22 of the tension finger is free to oscillate and to move longitudinally in an eye 25 upon the inner side of the head and in a hole 26 in the base of the head. The outer end of the shank is threaded and is provided with a nut 27 and a set nut 28. A coil spring 29 bearing against the base of the head and nut 27 acts to draw the shank backward and consequently to keep the bearing point 23 of the tension finger constantly in engagement with the edge of the cop and to press it inward. It should be understood that this bearing point is not fixed but is constantly changing, as the yarn is drawn from the cop, through the action of the spring in drawing the tension finger inward. It should be understood furthermore that when the cop is full, a stronger tension is required than when it has been partly used up. In other words, it is required that the tension be strongest when the cop is full and weakest when the cop is nearly used up and that the tension shall diminish automatically and evenly as the yarn is drawn from the cop. This is perfectly effected by spring 29 which is at its

greatest compression when the cop is full and gradually lengthens out and grows weaker as the yarn is drawn from the cop, owing to the fact that the tension finger lies at an acute angle to the edge of the cop and the point of engagement therewith (indicated by 23) is constantly moving inward as the cop diminishes in size. The tension of the spring may be adjusted by turning nut 27 in or out on the shank, the set nut acting to lock the nut in place after adjustment. 30 denotes a shoe near the forward end of shank 22 which is adapted to bear upon the inner wall of the head to retain the tension finger against oscillation. In inserting or removing a cop, the tension finger is drawn forward against the power of the spring sufficiently to draw the shoe outside the wall of the head, after which the tension finger may be swung around out of the way, as indicated by dotted lines in Fig. 1.

In the form illustrated in Fig. 3, the tension finger may lie at a right angle to shank 22, as shown, or at a more or less acute angle thereto, as in Fig. 2, it being of course obvious that the exact angle of the tension finger to the shank is not of the essence of the invention but may be varied to suit the requirements of use. In this form, the necessary incline is provided by a dish-shaped washer 51 which is placed at the base of the head and rotates therewith and against which the inner edge of the cop bears, as at 52. As the cop diminishes in size the inner edge thereof slides down the incline of the dish-shaped washer, the bearing point 52 constantly moving toward the center as the cop is moved inward on hub 14 by the spring.

In the form illustrated in Fig. 4, the tension finger may be at right angles to the shank, or at a more or less acute angle thereto, as preferred, and the washer is dispensed with. The necessary incline in this form is provided by a dish-shaped recess 53 at the base of the head, the inner edge of the cop having a bearing on the incline of the recess as at 54. As the cop diminishes in size the inner edge thereof slides down the incline of the recess, the bearing point 54 constantly moving toward the center as the cop is moved inward on hub 14 by the spring, the operation being the same as in Fig. 3.

It will be obvious that the dish-shaped washer of Fig. 3 or the dish-shaped recess of Fig. 4 may, if preferred, be used in connection with a tension finger at a more or less acute angle to the shank, as in Fig. 2.

The guide finger 21 is carried by a shank 31 which is free to oscillate and move longitudinally in an eye 39 upon the inner side of the head and in a hole 40 at the base of the head and the outer end thereof is threaded and is provided with a nut 32 and a set nut 33. A coil spring 34 bears against the base

of the head and nut 32 and acts to draw the shank backward in the same manner as the shank of the tension finger. The guide finger also is provided with a shoe 35 which bears upon the inner wall of the head and retains said finger in place in use. In inserting or removing a cop, the guide finger may be drawn outward against the power of the spring and swung around out of the way in the same manner as the tension finger, as indicated by dotted lines in Fig. 1.

The yarn, which is indicated by a dotted line as at 36, passes from the cop through a slot 37 in the head, then inward through a slot 38 in the head, through a groove 41 and an eye 55 in shank 31 and through a groove 42 in the guide finger to the nozzle 43 which is of ordinary construction and which forms a delivery guide for the yarn in line with the axis of rotation of the cop and head. The nozzle is shown as provided with a collar 44 which rests against collar 13 and with a hub 45 which extends into a corresponding opening in the spindle and is engaged by a set screw 46 (see dotted lines Fig. 2) to secure the nozzle to the spindle. The wire or cord to be covered, indicated by 47, passes through a longitudinal opening 50 in the spindle and hub 45 to a groove 48 in the nozzle where the yarn is delivered through groove 42 in the guide finger and is wound about the wire or cord by the rotation of the head. At the forward end of the nozzle is a spring-controlled polisher 49 which smooths and polishes the covered wire or cord as it leaves the nozzle.

Having thus described my invention I claim:

1. In a tension device of the character described comprising a cop carrying head, an incline opposite an end of the cop and against which an edge of the cop bears, a delivery guide for the yarn substantially in line with the axis of the head, and a spring-controlled tension finger carried by the head and bearing against the cop, whereby an automatically diminishing tension is provided as the cop diminishes in size.

2. A tension device of the character described comprising a cop-carrying head, a spring-controlled tension finger carried thereby opposite an end of the cop and adapted to bear on the edge of the cop and provide an automatically diminishing tension therefor from a full cop down to the last few yards, and a delivery guide for the yarn substantially in line with the axis of the head.

3. A tension device of the character described comprising a cop-carrying head and a spring-controlled tension finger carried by the head and provided with teeth adapted to bear on the edge of the cop so that the cop will travel with the head and a tension will be imparted to the cop.

4. A tension device of the character described comprising a cop-carrying head, a tension finger adapted to bear on the cop and having a shank mounted to oscillate and move longitudinally in the head and provided with a shoe bearing on the head and a spring acting to draw the shank backward and to retain the finger in engagement with the cop, said shank being adapted to be drawn forward against the power of the spring and permit the tension finger to be swung out of the way when the shoe is drawn out of engagement with the head.

5. A tension device of the character described comprising a cup-shaped head adapted to receive a cop, a tension finger adapted to bear on the cop, a shank for said finger mounted to oscillate and to move longitudinally in the head, a shoe on said shank adapted to engage the inner side of the head, for the purpose set forth, and a spring surrounding the shank and acting to draw the shank inward and retain the finger in close engagement with the cop.

6. The combination with a cop-carrying head of the character described, of a spring-controlled tension finger opposite an end of the cop and adapted to bear on the cop, and a delivery guide for the yarn substantially in line with the axis of the head.

7. The combination with a head having a central hub adapted to carry a cop of yarn, of a tension finger opposite an end of the cop, means for causing said finger to bear on the cop as the yarn is drawn off, and a delivery guide for the yarn substantially in line with the axis of the head.

8. The combination with a head having a central hub adapted to carry a cop of yarn, a spindle by which the head is carried, and a stationary sleeve on which the spindle rotates and which extends into the hub, of a tension finger provided with teeth adapted

to engage the edge of a cop and a spring acting on the tension finger and producing tension on the cop.

9. The combination with a cop-carrying head of the character described and a nozzle carried by the head, of a spring-controlled tension finger opposite an end of the cop and adapted to bear on the edge of a cop, a spring-controlled guide finger by which yarn from the cop is delivered to the nozzle, and a delivery guide for the yarn substantially in line with the axis of the head.

10. The combination with a cop-carrying head of the character described and a nozzle carried by the head, of a tension finger adapted to bear on the edge of a cop, a guide finger by which yarn from the cop is delivered to the nozzle, said fingers being provided with shanks adapted to oscillate and to move longitudinally in the head, and shoes engaging the inner side of the head and springs acting to draw said shanks backward and retain said fingers in operative position, said shanks being adapted to be drawn forward against the power of the springs to permit the fingers to be turned out of the way and a cop to be inserted or removed when the shoes are drawn out from the head.

11. The combination with a cop carrier, of a spring-actuated tension member adapted to bear on the end of the cop and movable to bear with varying pressure on the cop as its diameter varies, and a delivery guide for the yarn substantially in line with the axis of the cop.

In testimony whereof I affix my signature, in presence of two witnesses.

DONALD NOBLE.

Witnesses:

A. M. WOOSTER,
L. W. ATHERTON.