H. J. BOE.

MECHANISM FOR COVERING CORES.

APPLICATION FILED MAR. 25, 1919. RENEWED DEC. 20, 1921.

1,405,710.

Patented Feb. 7, 1922.

2 SHEETS—SHEET 1.

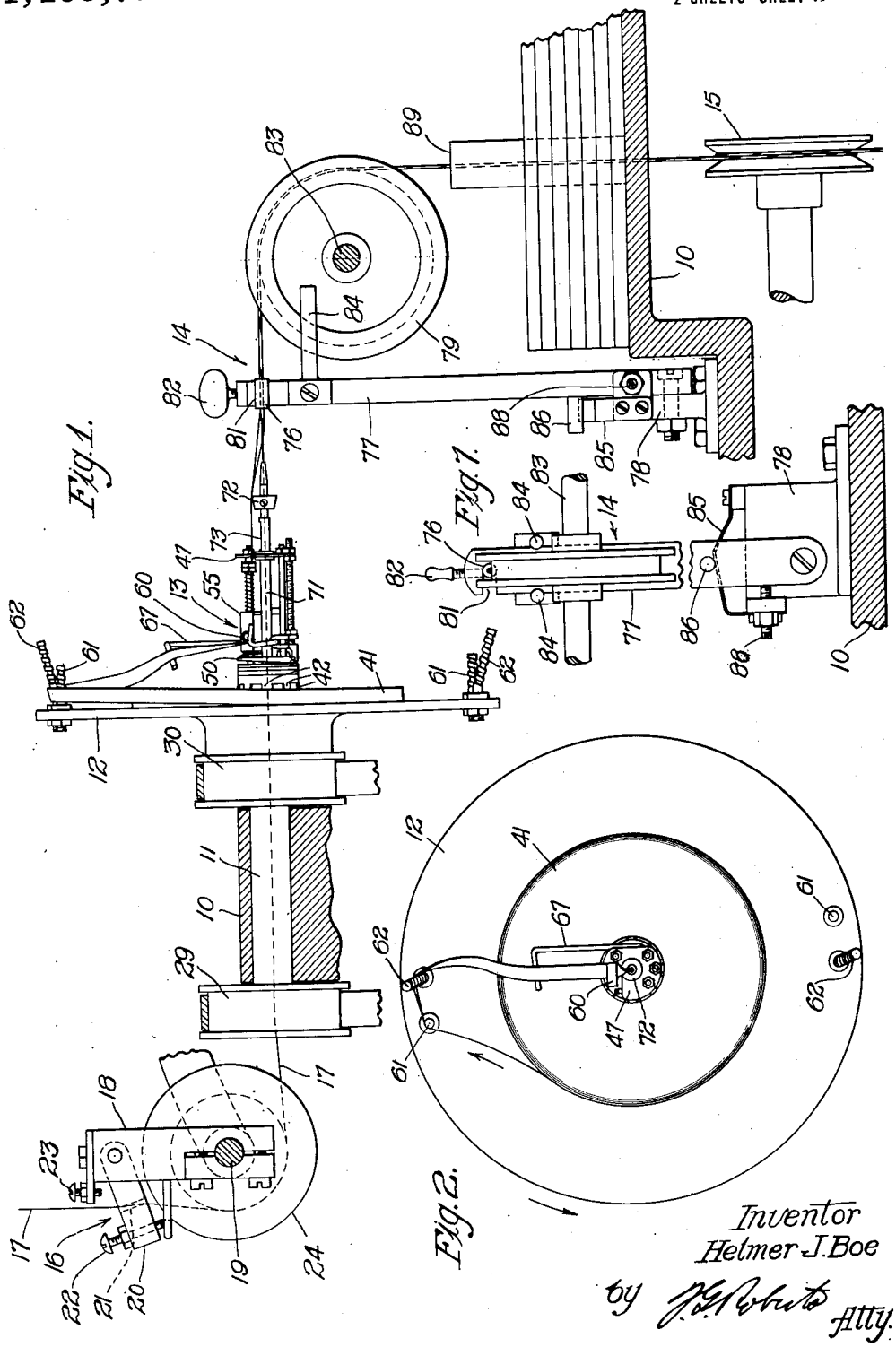


Fig. 1.

Fig. 7.

Fig. 2.

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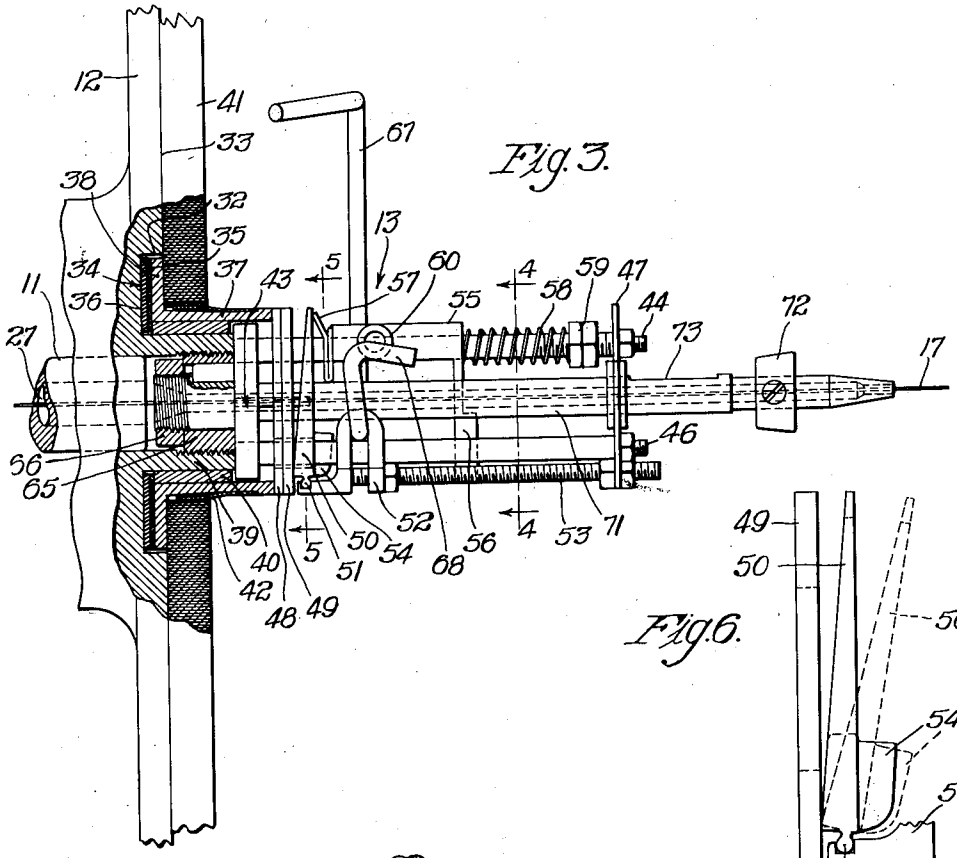


Fig. 3.

Fig. 6.

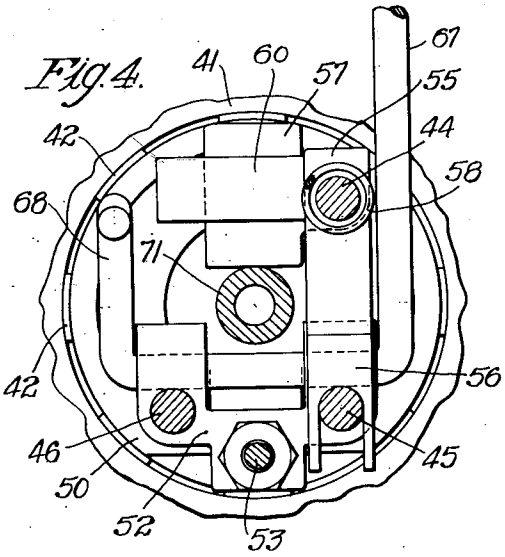


Fig. 4.

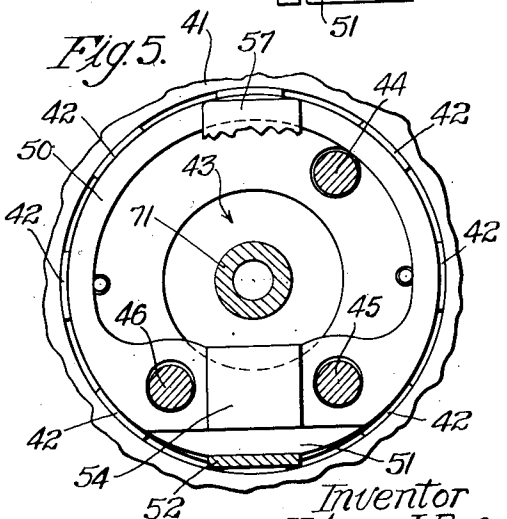


Fig. 5.

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UNITED STATES PATENT OFFICE.

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MECHANISM FOR COVERING CORES.

1,405,710. Specification of Letters Patent. Patented Feb. 7, 1922.

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To all whom it may concern:

Be it known that I, HELMER J. BOE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Mechanism for Covering Cores, of which the following is a full, clear, concise, and exact description.

This invention relates to a mechanism for covering cores, and more particularly to a mechanism for applying a covering material to wire or other types of cores.

The main object of this invention is to provide a mechanism by means of which fibrous covering material may be served or wrapped onto a wire at a very high rate of speed and in which the breakage of the covering material as it is drawn from the supply source is minimized. While the application of this invention is shown and described in connection with a paper serving head, it will be apparent that in its broader aspects the invention is applicable to mechanism for serving other materials upon cores.

To attain this object a mechanism is provided whereby the covering material is drawn from a supply source at a substantially uniform tension. This is preferably accomplished by mounting the covering material in coil form on a carrier which is friction driven by a rotatable head. The frictional contact between the coil carrier and the head is regulated by the tension of the covering material as it is drawn from the coil which operates a brake pair to decrease or increase the friction between the coil carrier and the head. The varying tension on the covering material is mainly caused by the diminishing size of the coil. With the head driving the coil through the carrier the covering material which is drawn therefrom in the opposite direction is relieved of any work of rotating the coil.

Other features of this invention relate to details of construction and combination of parts, as will hereafter more fully appear.

In the drawings illustrating this invention—

Fig. 1 is a fragmentary side view of a paper insulating machine embodying the features of this invention;

Fig. 2 is a front view of the complete winding head with a coil of paper mounted thereon;

Fig. 3 is an enlarged fragmentary side view, partly in section, of the winding head;

Fig. 4 is an enlarged vertical section taken on the line 4—4 of Fig. 3;

Fig. 5 is an enlarged vertical section taken on the line 5—5 of Fig. 3;

Fig. 6 is an enlarged side view of the brake pair shown in a maximum braking position, the released position being shown in broken lines, and

Fig. 7 is a front view of Fig. 1, parts being broken away and with the winding head omitted.

As illustrated in the drawings, the machine base has not been shown except as a mounting means for parts concerned in this invention. Referring to Fig. 1, 10 represents a machine base from which is suitably mounted a driving shaft 11 for driving a winding head 12 which carries with it a paper tension regulating mechanism 13. Mounted in front of the winding head 12 is a releasing and displacing mechanism 14 for facilitating the placing of a fresh coil of paper on the winding head without cutting the wire, and a little below and in front of same is a capstan 15 for drawing the wrapped wire, which is then led to a suitable take-up mechanism, not shown.

Mounted from the machine base 10 and at the rear of the winding head is a wire tensioning device 16. The wire tensioning device 16 puts a required tension on the wire 17 while it is being wrapped and consists of a supporting bracket 18 carried in a vertical position on a rod 19. Pivotally attached to the bracket 18 is an arm 20 provided with an opening 21. An adjustable stop screw 22 on the end of the arm 20 limits its downward movement and a suitable stop 23 limits its upward movement. The wire 17 coming from a supply coil (not shown) is led over an idler pulley (not shown) and then down to the arm 20, threaded through the opening 21 therein and is then run under an idler pulley 24. The weight of the pivoted arm 20 moves the wire from its normal line of travel to that shown in Fig. 1, causing it to bear on opposite sides at opposite ends of the opening 21 and thereby putting a tension or drag on the wire, the amount of which may be regulated by the adjustable stop screw 22 which will change the angular position of the arm 20. It is frequently necessary to

draw the wire back in the opposite direction and this is usually done by hand, at which time it is not necessary and is a great convenience not to have any appreciable tension on the wire. In drawing the wire back through the opening 21, the arm 20 will merely tend to raise, and the wire passes through the opening without any appreciable tension on same. The wire after passing under the idler pulley 24 passes through an opening 27 (shown in Fig. 3) in the shaft 11, through the center of the winding head 12 and the paper tension regulating mechanism 13.

On the shaft 11 are mounted a pair of belt pulleys 29 and 30. The main drive pulley 29 drives the winding head 12 and through the pulley 30, and other suitable driving connections, not shown, drive the capstan 15. The pulley 29 may be driven from any suitable source of power.

The winding head 12 is provided with a circular recess 32 formed in its front face 33. Against the back inside surface of the recess 32 is secured a friction washer 34 made of a layer of canvas 35 backed with a thickness of rubber 36. A friction sleeve 37 equipped with a flange 38 is carried on a projecting sleeve 39 of the winding head 12 which sleeve extends forward from the back surface of the recess 32. The friction sleeve 37 is provided with an anti-friction bearing 40 which rotates free on the sleeve 39. The back face of the flange 38 is in frictional contact with the washer 34 and forms a driving connection between the winding head 12 and the coil of paper 41 which is mounted on the friction sleeve 37 through the action of the spring fingers 42 around which the core of the coil of paper is pressed.

Screw threaded into the winding head 12 and rotating therewith is the paper tension regulating mechanism 13. Fastened to a spindle 43 which is held tightly against the front end of the sleeve 39 are guide pins 44, 45, and 46, the other ends of which are fastened to an end plate 47. Loosely carried on the pins 44, 45, and 46 are the brake washers 48 and 49 respectively. The brake washer 48 is in contact with the forward end of the sleeve 37, and directly in front of the brake washer 49 with its lower portion in contact with it is a brake shoe 50 which is provided with a bearing surface 51 in engagement with a notch on a U-shaped member 52. The U-shaped member 52 is adjustably supported on the pins 45 and 46 and controlled by a screw 53 which will move the lower part of the brake shoe 50 into closer or out of engagement with the brake washer 49 which will increase or decrease the friction between the flange 38 on the sleeve 37 and the friction washer 34 on the winding head 12. The brake shoe 50 is tapered in thickness from its lower contacting surface to its upper portion. A counter weight 54 integral with and on the front face of the brake shoe 50 just above its pivot point tends to move it forward about its pivot point, due to centrifugal force acting on the counterweight 54 when the head is revolving.

Mounted loosely on the guide pin 44 is a slide 55 which is held from turning on the pin 44 by a downwardly projecting finger 56 which straddles the guide pin 45. The slide 55 is equipped with a backwardly extending finger 57 which is always in engagement with the upper front face of the brake shoe 50 due to the action of the counterweight 54 on the brake shoe. A coil spring 58 on the pin 44 between the front face of the slide 55 and the adjusting nuts 59 forces the slide backward, causing a maximum or initial pressure between the lower portion of the brake shoe 50 and the brake washer 49. This pressure in turn is transmitted by the intervening brake washer 48 to the flange 38 on the friction sleeve 37 which is forced into a maximum frictional engagement with the friction washer 34 on the winding head 12. The tension of the spring 58 is regulated by turning the nuts 59. On the slide 55 is fastened a pin or roller 60 which is located in line with and above but at right angles to the axis of the winding head 12, and under which the paper passes as it is drawn from the coil of paper. The coil of paper is put on the sleeve 37 with the free end uncoiling in the same direction as the rotation of the winding head. Located on the winding head on its front face and near its periphery are the pins 61 and 62 and over which the free end of the paper coil is led to the pin 60. Two pair of pins 61 and 62 are mounted on the head disk 180° apart to properly balance same and also provide another set of pins when one pair is worn down by the friction of the paper passing over them through long use.

A spiral groove is cut in the pins 61 and 62 which reduces the friction between the paper and the pins. The pin 62 is set at such an angle to the face of the winding head that the paper after leaving the pin 62 is not led at an abrupt angle from its line of travel to the pin 60. It is desirable that the center of the pin or roller 60, the pin 62 and the axis of the winding head always be in line with each other, looking from the front. For the purpose of insuring this alinement when the paper tension regulating mechanism 13 is screw threaded into the winding head a threaded sleeve 65 is keyed onto a rear portion of the spindle 43 but slidable thereon. Outside of the sleeve 65 a nut 66 is threaded onto the rear portion of spindle 43. By threading the nut 66 in or out when the parts are not in alinement and then turning the paper tension regulat-

ing mechanism until the spindle 43 thereon is tightly up against the sleeve 40, the pins 62 and 60 may be alined properly, the reason for this being the changed position of the threads on the sleeve 65 with those on the rear portion of the spindle 43. Pivotally supported from the stationary piece 52 is a guide 67 for guiding the paper from the pin 62 to the pin 60 and also as a support for the paper from wind pressure due to the speed of the winding head. The lower end of the guide 67 is turned up and forms a guard 68 for preventing the paper from sliding off the pin 60 when the machine is stopped and the operator is threading the end of the coil to is proper place. The front portion of the spindle 43 is turned down and extends forward to form a support 71 for the end plate 47 and a paper serving ring 72, the wire passing through the center thereof. When a coil of wire runs out, the end of a new coil is roughly joined to its end to be later properly brazed together at a convenient location just before being wrapped with paper.

An opening or slot 73 is formed in the support 71 for this purpose and through which the roughly joined ends of the wires are fished out to be brazed. Located a short distance from the end of the support 71 is a polisher 76. The polisher 76 is held in line with the axis of the winding head by a pivoted arm 77 of the releasing and displacing mechanism 14 which is pivoted to a bracket 78 fastened to the frame of the machine. The insulated wire after passing through the polisher passes over an idler pulley 79, down to the capstan 15 and then to a suitable take-up mechanism. The polisher 76 is held in a slot 81 in the arm 77 by a thumb screw 82.

The idler pulley 79 is loose on a rod 83 and is held in a proper position by the wire passing over it and the pins 84 fastened on both sides of the arm 77 which is held in a vertical position by the action of a spring 85 under a pin 86 on the arm 77 and an adjustable stop screw 88 both fastened to the bracket 78.

When starting the machine and before the wire is led to the capstan a number of coils of paper are put over a tube 89 which is fastened to the frame of the machine, the reason for this being that when a coil of paper runs out, a new coil can be put on without cutting the wire by merely turning the thumb screw 82 and moving the arm 77 to one side against the action of the spring 85 which will carry with it the idler pulley 79 through the co-operation of the pins 84. The polisher 76 will be left behind and supported by the wire. A coil of paper may now be lifted and passed between the tube 89 and the rod 83 and over the paper tension regulating mechanism to the sleeve 37, the guide 67 being swung down about its pivot. After a new coil of paper is put on, the arm 77 is swung back into place, the pin 86 riding up one inclined side of the spring 85 to the other inclined side and stopping in a vertical position against the stop screw 88. The action of the spring 85 will now hold it in place. The polisher 76 is inserted in the slot 81 in the arm 77 and the thumb screw turned down, thereby holding it in place.

The operation of this mechanism is as follows:

Before threading the wire through the machine from the supply coil to the capstan the operator will place a supply of paper coils over the tube 89. The wire is now threaded through the wire tensioning device 16 which puts sufficient tension on it due to the angle of the opening 21 in the arm 20 through which the wire passes. The angle of the arm 20 is regulated by turning the screw 22. In drawing the wire back in the opposite direction, as is necessary at times, the tension is absent, the arm merely moving up with the wire. After passing through the opening 21 the wire passes around and under the idler pulley 24, through the center of the shaft 11, the winding head 12 and through the support 71 of the paper tension regulating mechanism 13 mounted thereon. After passing through the support 71 the wire is run through the polisher 76, the tube 89 and around the capstan to a suitable take-up mechanism. When mounting a coil of paper on the sleeve 37 it is pressed over the spring fingers 42 thereon with the free end of the coil uncoiling in the same direction as the rotation of the winding head. As shown in Figs. 1 and 2, the end of the coil is led over the pins 61 and 62 to the guide 67 under the pin or roller 60 during which movement it is turned 90° from its original position. From the pin 60 the paper is led over the paper serving ring 72 which by its location from the polisher 76 determines the angle of application of the paper to the wire. The end of the paper is passed through the polisher which is held around the wire, the machine started, and the wrapped wire is then drawn by the capstan and wound up by the take-up mechanism. Through the friction between the washer 34 and the flange 38 on the sleeve 37 on which the coil of paper is mounted the coil of paper is revolved in the saame direction as the winding head but at a difference in speed due to the drawing of the paper from the coil as it is wrapped on the advancing wire by the revolving winding head.

As the coil becomes smaller the leverage becomes less and the tension on the paper is greater, but this is immediately offset by the movement of the pin 60 on the slide 55 in response to the tension on the paper which allows the brake shoe 50 to move forward about its pivot point, which movement de-

creases the pressure between the washer 34 on the revolving winding head and the flange 38 on the sleeve 37. When a fresh coil of paper is put on, the leverage is greater on account of the greater diameter of the coil. As the coil becomes smaller the leverage decreases, but at the same time the pressure between the washer on the winding head and the sleeve which carries the paper becomes correspondingly less, thereby keeping the tension on the paper practically constant. This allows the winding head to be revolved at a very high speed, thereby increasing the output of the machine and with a minimum number of breaks in the paper. To adjust the pressure between the brake shoe 50 and the brake washer 49 the screw 53 is turned which will move the pivot point of the brake shoe, and to regulate the amount of tension required to move the slide 55 the tension in the spring 58 is regulated by moving the nuts 59. The guide 67 tends to keep the paper from bowing back, due to the wind pressure created by the high speed of the winding head. Centrifugal force has little effect on the paper tension regulating mechanism. The only detrimental effect of this is to increase the pressure between the slide 55 and the pin 44. For this reason the slide 55 is made as light as possible.

When a coil of paper runs out and a fresh coil is to be put on, the thumb screw 82 is unscrewed and the arm 77 is moved about its pivot to one side. This movement slides the idler pulley 79 to one side through the cooperation of the pins 84 on the arm 77. A coil of paper may now be lifted from the tube 89 and slipped over the wire and onto the sleeve 37, the guide 67 being lowered at the time.

What is claimed is:

1. In a wire covering mechanism, a rotatable winding head, a friction driven member carrying a supply of covering material and driven by said head, means for moving the friction member longitudinally of the axis of said head in response to the tension of the material whereby it will engage said head with pressures varying in accordance with the tension of the material.

2. In a wire covering machine, a rotatable winding head, a friction driven member carrying a supply of covering material mounted on and driven by said head, and means for regulating the friction between said head and friction member in accordance with the tension of said material whereby a substantially uniform tension is maintained on said material as it is drawn from the supply.

3. In a wire covering machine, a rotatable winding head, a friction driven sleeve carrying a supply of covering material mounted on and driven by said head, and braking mechanism for said sleeve including a brake pair which is operated in accordance with the tension of said material to release or increase the pressure of the sleeve on the head whereby a substantially uniform tension is maintained on said material as it is drawn from the supply.

4. In a wire covering mechanism, a rotatable winding head provided with a friction surface, a sleeve carrying a supply of covering material rotatably mounted upon said head and adapted to be frictionally driven thereby, and means controlled by the tension of the material for moving the sleeve longitudinally of its axis to vary the frictional driving pressure between the head and the sleeve whereby the tension of the material is maintained practically constant.

5. In a wire covering mechanism, a rotatable winding head, a friction driven sleeve carrying a supply of covering material and driven by said head, means for regulating the driving of said supply carrying sleeve comprising a brake pair and a slide operated in one direction by the tension on the material to operate said brake pair to release the pressure of said sleeve on said head, and means for operating said slide in another direction to operate said brake pair to increase the pressure of said sleeve on the head whereby a substantially uniform tension is maintained on said material as it is drawn from the supply.

6. In a wire covering mechanism, a rotatable winding head, a friction driven sleeve carrying a supply of covering material and driven by said head, braking mechanism for said sleeve including a brake pair and a slide the movement of which in response to the tension of said material operates said brake pair which releases or increases the pressure of said sleeve on the head whereby a substantially uniform tension is maintained on said material as it is drawn from the supply, means to adjust the pressure of the brake pair, and means for regulating the force necessary to operate said slide.

In witness whereof, I hereunto subscribe my name this 11th day of March, A. D. 1919.

HELMER J. BOE.