

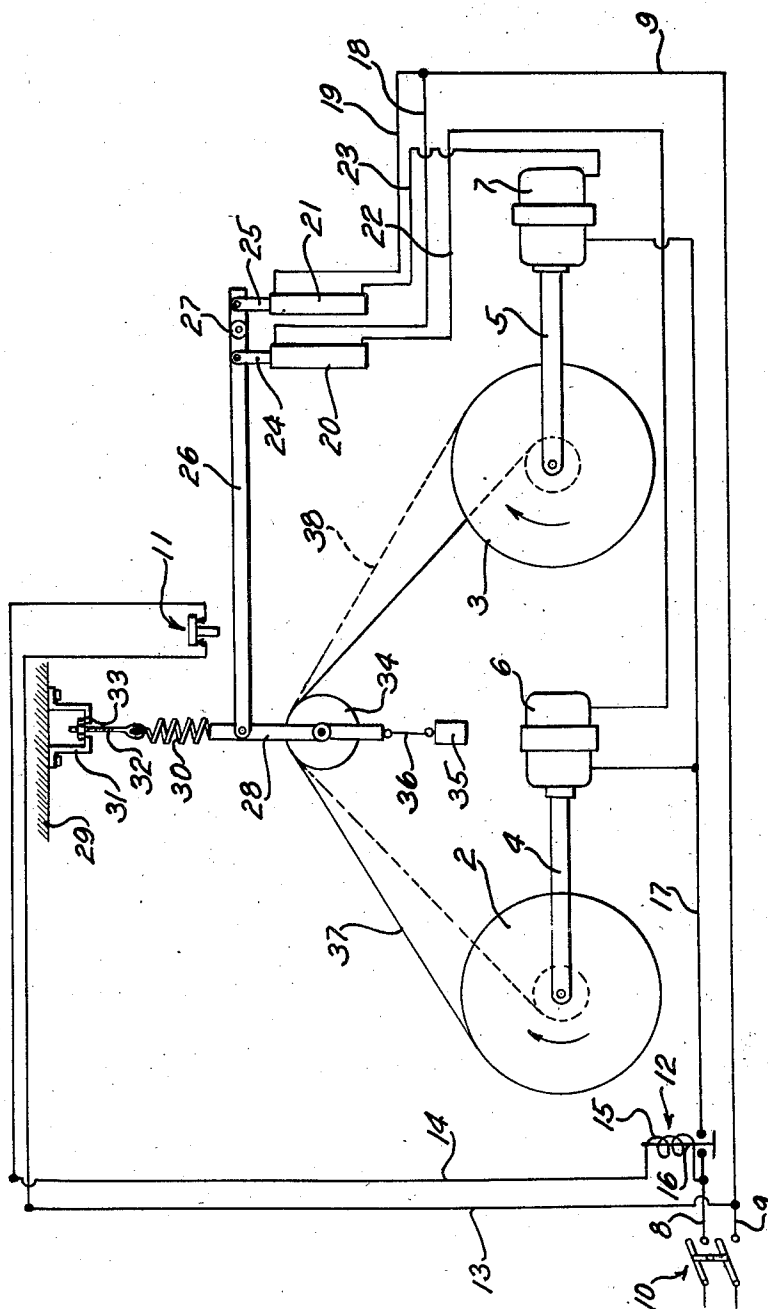
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WINDING DEVICE

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UNITED STATES PATENT OFFICE

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WINDING DEVICE

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This invention relates to winding devices, and more particularly to tension controlling mechanism for strand winding machines.

An object of this invention is the provision of a simple, reliable, and efficient device for maintaining a constant tension on material being wound.

In accordance with one embodiment, the invention contemplates the provision of a supply reel and a take-up reel, directly driven by separate electrical motors, the speeds of which are controlled by the variation in resistance of elements positioned in the current supply conductors serving the motors. The material being wound passes over an adjustable spring supported pulley carried by one end of a lever while means associated with the lever on either side of the pivot point thereof oppositely affect the resistances in response to the movements of the pulley to vary the speed of the motors and maintain a constant tension in the material being wound.

Other features and advantages of the invention will become apparent from the following description of one embodiment thereof, reference being had to the accompanying drawing showing a single diagrammatic view of a system embodying the features of this invention.

Referring now to the drawing the numerals 2 and 3 designate a supply reel and a take-up reel respectively, which are rotatable with shafts 4 and 5 driven by a pair of electrical motors 6 and 7, respectively. Electrical energy is supplied to the motors 6 and 7 from a suitable source, not shown, through conductors 8 and 9, a suitable switch 10 being positioned in the conductors.

A control circuit comprising an automatic cut out switch 11 and a circuit breaker 12 are provided for controlling the current supplied to the motors. Conductor 9 is connected through a lead 13, the switch 11, and a lead 14 to a coil 15 forming a part of the circuit breaker. Associated with and actuated by the coil 15 is a core 16 which is effective to connect the conductor 8 with a lead 17 running to the motors 6 and 7. The operating circuits are completed from the conductor 9 through leads 18 and 19, a pair of

suitable variable resistance elements such as compressible carbon pile resistors 20 and 21, and leads 22 and 23 to the motors 6 and 7, respectively.

The resistance interposed in the motor circuits by the resistor elements may be varied by varying the pressure on the resistor elements by means of pressure members 24 and 25 pivoted to a lever 26 and consequently the speed of rotation of the reels 2 and 3 may be correspondingly changed. Lever 26 is fulcrumed and supported at a fixed point 27 intermediate the two resistor elements and is positioned under the switch 11 in such a manner that movement of the lever upwardly beyond a predetermined point will open the switch. The opposite end of the lever 26 is pivotally attached to a vertically reciprocable rod 28 which is resiliently suspended from a suitable support 29 by a spring 30 adjustably secured by a bolt 32 and a nut 33 to a bracket 31 which is fastened to the support 29. An idler pulley 34 is rotatably mounted on the rod 28 between the point at which the lever 26 is pivoted and the bottom of the shaft, and a counter-weight 35 is suspended from the bottom of the shaft by a link 36.

It is believed that a clear understanding of the device will be had from the following description of the operation thereof. Assuming that the reel 2 has a supply of wire wound thereon which it is desired to transfer to the reel 3, the wire 37 is passed over the pulley 34 and connected to the core of the reel 3 whereupon the switch 10 is closed and energy supplied from the conductors 8 and 9 through the closed switches 10 and 11 to energize the coil 15 to move the core 16 upwardly and connect the lead 17 to the conductor 8. Electrical energy will then be passed from the conductors 8 and 9 through the resistor elements 20 and 21 to the motors. The motors will tend to drive the two reels at substantially the same speed whereupon the material being wound from reel 2 will be delivered to the reel 3 at a rate faster than it can be taken up by the reel 3 due to the difference in dimension of the circumference of the surfaces upon which the wire is being wound on the reel 3 and from which it is being unwound on the

reel 2. The nut 31 having been adjusted so that the desired tension will prevail in the wire, when the peripheral speed of the reel 3 is less than the peripheral speed of the winding surface of the reel 2, a slack condition will occur in the wire being wound. When this happens the spring 30 will move the left end of the lever 26 upwardly whereupon the pressure on the resistor element 21 will be increased and the pressure on the resistor element 20 will be decreased, thus decreasing the amount of resistance in the resistor element 21 and increasing the resistance in the resistor element 20. This action of the resistor elements will tend to increase the speed of the motor 7 and decrease the speed of the motor 6 so that the speed of rotation of the reel 3 will increase and the speed of rotation of the reel 2 will decrease sufficiently to take up the slack in the wire whereupon the vertical component of the taut wire acting through pulley 34 will move the left end of the lever 26 downwardly until the speeds of the two reels are such that a constant tension will be maintained on the pulley 34.

As the diameter of reel 3 builds up and the reel 2 empties, the wire will assume the position indicated at 38 and the position of the lever 26 will change in response to the tension of the wire on the pulley 34 so that the tension of the wire will remain constant throughout the rewinding operation.

When the wire being reeled breaks or when it is completely withdrawn from the reel 2 and wound on the reel 3, the tension on the pulley being completely released the left end of the arm 26 will raise until it engages the switch 11 and opens it. The opening of the switch 11 will break the circuit to the circuit breaker 12 causing the core 16 to move downwardly to open the operating circuit and stop the motors.

Although the invention has been described as a control for a wire winding apparatus, it is capable of many other applications and should be limited only by the scope of the appended claims.

What is claimed is:

1. In a material rewinding device, spaced rotary members, independent electrical driving motors therefor, individual current supply leads for said motors, variable resistances interposed in each of said leads, means common to both resistances to vary their effectiveness and responsive to tension in the material being rewound, and means responsive to an abnormal release in tension in the material being rewound to render the motors inoperative.

2. In a material rewinding device, spaced rotary members, independent electrical driving motors therefor, individual current supply leads for said motors, variable resistances interposed in each of said leads, means com-

mon to both resistances to vary their effectiveness and responsive to tension in the material being rewound, and means controlled by the last-mentioned means for rendering the motors inoperative in response to an abnormal release in tension in the material being rewound.

3. In a material rewinding device, a supply member, a take-up member, independent driving motors therefor, individual control circuits for said motors, variable resistances interposed in each of said circuits, separate means for varying the resistances of said circuits, control means for said separate means comprising a lever pivoted intermediate the separate means, adjustable yielding means for supporting the lever, an idler pulley carried by the yielding means for supporting the material being passed from the supply to the take-up members, and means secured to the lever for controlling the first-mentioned means in response to the movement of the lever due to variations in tension in the material supported by the idler pulley.

4. A material winding device comprising a pair of members for containing a supply of material, independent means for driving each of said members, means for supplying motive power to each of said driving means, separate control means for each of said supply means, and a tension arm pivoted therebetween for oppositely affecting said control means in response to variations in tension in the material being wound.

5. A material winding device comprising a pair of members for containing a supply of material, independent means for driving each of said members, a pivoted control member movable in response to variations in tension in the material being wound, and separate means controlled by said control member positioned on opposite sides of the pivot point of the member and oppositely affected thereby to control the speed of each of said driving members.

6. A material winding device comprising a pair of members for containing a supply of material, independent means for driving each of said members, a pivoted control member movable in response to variations in tension in the material being wound, and means individual to each driving means mounted on opposite sides of the pivot point of said control member for varying the speed of each of said driving means.

In witness whereof, I hereunto subscribe my name, this 19th day of February, A. D., 1929.

CLAUDE THEODORE SIEBS.