Oct. 25, 1932. O. A. PEARSON 1,884,183

TENSION DEVICE FOR COIL WINDING MACHINES AND THE LIKE

Filed July 12, 1928 2 Sheets-Sheet 1

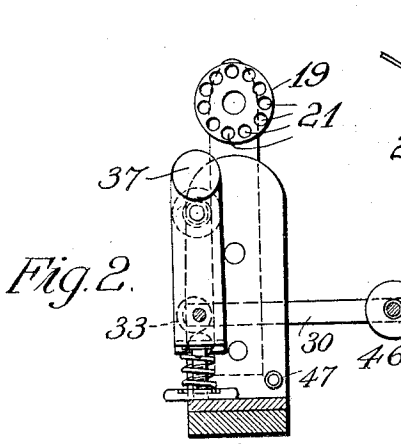


Fig. 2.

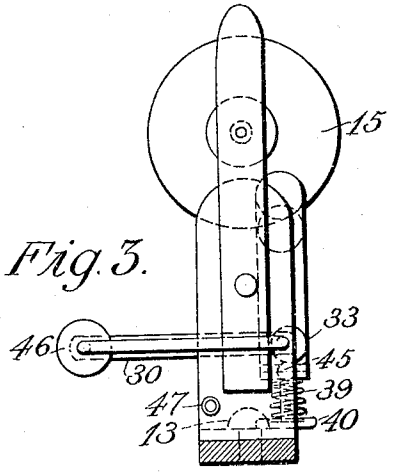


Fig. 3.

Fig. 1.

INVENTOR
Oscar A. Pearson
BY Brayton & Richards
ATTORNEY

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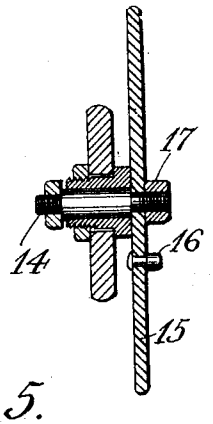


Fig. 5.

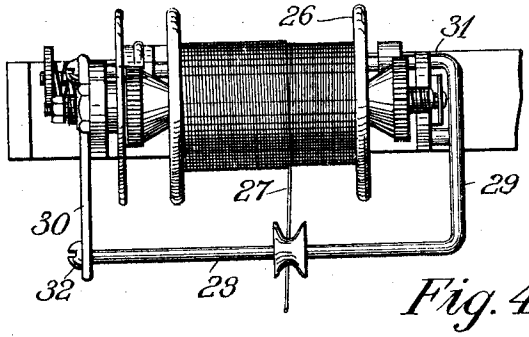


Fig. 4.

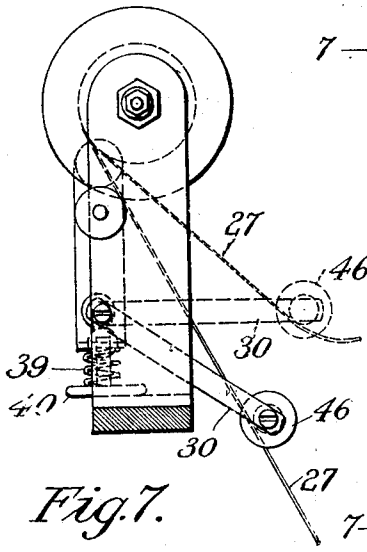


Fig. 7.

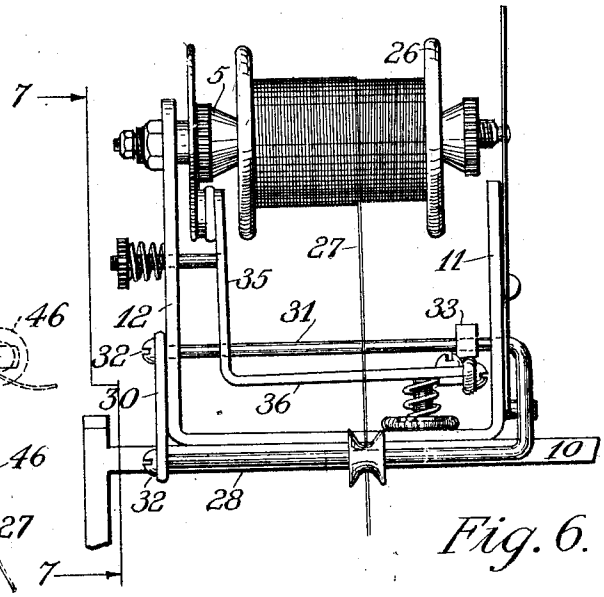


Fig. 6.

INVENTOR
Oscar A. Pearson
BY Brayton & Richards
ATTORNEY

Patented Oct. 25, 1932 1,884,183

UNITED STATES PATENT OFFICE

OSCAR A. PEARSON, OF OAK PARK, ILLINOIS, ASSIGNOR TO THORDARSON ELECTRIC MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

TENSION DEVICE FOR COIL WINDING MACHINES AND THE LIKE

Application filed July 12, 1928. Serial No. 292,300.

The invention relates to improvements in tension devices for coil winding machines and the like, the primary object of the present invention being the provision of an improved device of this character which is of simple construction and highly efficient in use.

Another object of the invention is the provision of a simple and convenient device of this character so constructed and arranged that the tension in a wire strand or the like being fed into such a machine, will automatically control its own tension.

Another object of the invention is the provision of simple and effective mechanism whereby breakage of the strand will automatically stop further travel thereof.

Another object of the invention is the provision of simple and convenient means whereby spools containing the wire strands or the like wound thereon may be readily removed and replaced in said machine.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification and in which—

Fig. 1 is a partial elevation of a portion of the supporting frame of a coil winding machine illustrating a plurality of tension devices embodying the invention and mounted thereon in position of use;

Fig. 2, a section taken substantially on line 2—2 of Fig. 1;

Fig. 3, a section taken substantially on line 3—3 of Fig. 1;

Fig. 4, a top plan view of one of the tension devices;

Fig. 5, an enlarged section taken substantially on line 5—5 of Fig. 6;

Fig. 6, a front elevation corresponding with Fig. 4; and

Fig. 7, a section taken substantially on line 7—7 of Fig. 6.

The constructions illustrated in the drawings comprise a main supporting bracket 10 constituting a portion of the frame of a coil winding machine adapted and arranged to utilize a plurality of wire strands passing thereto from the tension devices. Each of the tension devices comprises a substantially U-shaped supporting frame having two upstanding supporting arms 11 and 12 secured in place on the bracket 10 by means of screws 13.

The supporting arm 12 is somewhat longer than the arm 11 and has a spindle 14 rotatably mounted at its upper end.

The spindle 14 carries a friction disk 15 having an eccentric crank pin 16 thereon as shown. The inner end of the spindle 14 is formed into a bearing member 17 adapted to constitute a support for one end of a removable spool shaft 18 having an enlarged conical head 19 at the adjacent end thereof.

The conical head 19 is provided with a central recess or socket 20 adapted to receive the bearing member 17 which thereby constitutes a quickly removable mounting for the corresponding end of the spool shaft 18. The head 19 is also provided with a plurality of concentrically arranged sockets or recesses 21 adapted to receive the crank pin 16, so that when the head 19 is in position on the bearing member 17, said spool shaft 18 is locked to the spindle 14 so as to rotate therewith.

The other arm 11 of the supporting frame is equipped with a spring extension arm 22 carrying a trunnion member 23 adapted and arranged to fit within a bearing socket or recess 24 formed in the other end of the spool shaft 18.

A conical head 25 is threaded, as shown, on said other end of the shaft 18, and co-operates with the head 19 to clamp a centrally perforated spool 26 thereon. By this arrangement it will be noted that when desired the spool shaft may be readily removed from the supporting frame by simply bending back the spring arm 22 and that when so removed the spool may be readily removed from and replaced on the spool shaft by simply unscrewing the clamping head 25 therefrom. Obviously this arrangement constitutes a very simple and effective means for removing the unwound and empty spools from the machine and replacing them with other and fully wound spools.

In the normal operation of the device, each of the spools 26 carries a flexible wire strand 27 wound thereon in the same manner as thread is wound upon an ordinary spool of thread, said strands being led from the device into the machine with which the device co-operates as will be readily understood, said machine automatically drawing the strand from the spool by means of the normal tension of operation of the machine.

Arranged in each supporting frame is a stud shaft 28 mounted upon rocker arms 29 and 30 which are secured to opposite ends of a rocker shaft 31 mounted transversely in the lower portions of the arms 11 and 12 in a position below and substantially parallel to the axis of the spool shaft 18. In the arrangement illustrated, the stud shaft 28, the rocker arm 29 and the rocker shaft 31 are all formed from a single piece of steel rod bent into substantially U-shape and joined at the ends by means of the rocker arm 30 secured thereto by screws 32 thereby forming a substantially rectangular frame with the rocker shaft 31 at one end and the stud shaft 28 at the other.

The rocker shaft 31 carries an eccentric cam 33 adjustably secured thereto by means of a set screw 34 and whereby said cam may be nicely adjusted on said rocker shaft.

A bell crank lever is arranged with its vertical arm 35 perforated and fulcrumed on the shaft 31 and its horizontal arm 36 arranged in co-operative relationship with the eccentric cam 33. At its upper end, the vertical arm 35 carries a brake shoe 37 arranged to bear against the brake disk 15 on the spindle 14. The horizontal arm 36 of said bell crank is perforated to fit loosely over an upstanding guide post 38 and the spring 39 is imprisoned between the arm 36 and an adjusting wheel 40 threaded on said post whereby the tension of said spring may be adjusted.

The arm 35 also carries a pin 41 projecting loosely through an opening 42 in the frame arm 12.

A compression spring 43 is imprisoned between the arm 12 and an adjusting nut 44 threaded on the outer end of the pin 41 and whereby the tension of the spring 43 may be adjusted.

A bearing roller 45 is mounted at the end of the arm 36 and bears upon the eccentric cam 33 on the rocker shaft 31.

A grooved guide pulley 46 is loosely mounted on the stud shaft 28 so as to be capable of free rotation and also free axial movement thereon. The supporting frames 11—12 are arranged in suitable positions on the machine so that the wire strands 27 from the spools 26 may be passed under the guide pulleys 46 as indicated in Fig. 7 so that the normal tension in said strands will hold the rocker arms 29 and 30 in elevated positions against the resistance of springs 39 and 43. The arrangement is such, however, that when the tension in any of the strands 27 decreases, the corresponding brake shoe 37 is applied to the corresponding brake disk 15 with increasing pressure as will be readily understood.

The tension in the springs 39 and 43 is readily adjustable and also the eccentric cam 33 is adjustable on the rocker shaft 31 so that this relation between the brake shoe 37 and the corresponding brake or friction disk 15 may be nicely regulated to vary the tension in the strand 27 as desired. Should one of the strands 27 break in the normal operation of the machine, this at once relieves all tension in the corresponding strand and the corresponding guide rollers 46 will drop under the action of the springs 39 and 43 into the full line position illustrated in Fig. 7.

The dropping of the pulley 46 causes rocking of the eccentric cam 33 to free the brake shoe 37 so that the same will be applied with full force to the brake disk 15 thereby at once stopping the corresponding spool 26 and preventing further unwinding of the wire strand and consequent entanglement of the same in the machine. It is also to be noted that each pulley 46 is free to travel laterally on its stud shaft so that it can readily follow and will be carried along by the necessary lateral movement of the strand as it unwinds from its spool. The specific arrangement of parts is a simple and effective one for the purpose.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details disclosed but desire to avail myself of such variations and modifications as fall within the scope of the appended claims.

I claim:

1. A device of the class described comprising in combination a supporting frame substantially in U-form and provided with two upstanding side arms one of said arms being longer than the other; a spindle member rotatably mounted on the upper end of the longer arm; a friction disk secured to said spindle and provided with an eccentric crank pin; a rotatable spool shaft having an enlarged conical head at one end provided with an axial recess to receive the end of said spindle and with an eccentric socket to receive said crank pin; an outwardly yieldable spring arm secured to the other arm of said frame and provided with a trunnion member in axial alignment with said spindle member, said spool shaft being provided with a recess in its other end to receive said trunnion; an adjustable conical head threaded on said other end of said spool shaft and brake mechanism contacting with said friction disk.

2. A device of the class described comprising in combination a supporting frame sub-

stantially in U-form and provided with two upstanding side arms one of said arms being longer than the other; a spindle member rotatably mounted on the upper end of the longer arm; a friction disk secured to said spindle and provided with an eccentric crank pin; a rotatable spool shaft having an enlarged conical head at one end provided with an axial recess to receive the end of said spindle and with an eccentric socket to receive said crank pin; an outwardly yieldable spring arm secured to the other arm of said frame and provided with a trunnion member in axial alignment with said spindle member, said spool shaft being provided with a recess in its other end to receive said trunnion; an adjustable conical head threaded on said other end of said spool shaft; brake mechanism contacting with said friction disk; a rocker shaft mounted in said frame below and parallel to said spool shaft; rocker arms on said rocker shaft; a stud shaft mounted between the ends of said rocker arms; a grooved guide pulley loosely mounted on said stud shaft; an eccentric cam adjustably mounted on said rocker shaft; a bell crank lever fulcrumed on said rocker shaft; a brake shoe on one arm of said bell crank in operative relation with said friction disk; a roller on the other arm of said bell crank bearing upon said eccentric cam; and a spring yieldingly pressing said brake shoe against said friction disk.

3. A spool mounting for coil winding machines and the like comprising a supporting frame substantially in U-form and provided with two upstanding side arms one of said arms being longer than the other; a spindle member rotatably mounted on the upper end of the longer arm; a friction disk secured to said spindle and provided with an eccentric crank pin; a rotatable spool shaft having an enlarged conical head at one end provided with an axial recess to receive the end of said spindle and with an eccentric socket to receive said crank pin; an outwardly yieldable spring arm secured to the other arm of said frame and provided with a trunnion member in axial alignment with said spindle member, said spool shaft being provided with a recess in its other end to receive said trunnion; and an adjustable conical head threaded on said other end of said spool shaft.

4. A device of the class described comprising in combination a supporting frame; a spool rotatably mounted in said frame; a yieldable brake for said spool; a rocker shaft mounted in said frame; means, operable by tension in a strand unwinding from said spool, for operating said shaft; an eccentric secured to said shaft; and a lever connection between said eccentric and said brake.

5. A device of the class described comprising in combination a supporting frame; a spool rotatably mounted in said frame; a yieldable brake for said spool; a rocker shaft mounted in said frame; means, operable by tension in a strand unwinding from said spool, for operating said shaft; an eccentric adjustably secured to said shaft; and a lever connection between said eccentric and said brake.

6. A device of the class described comprising in combination a supporting frame; a spool rotatably mounted in said frame; a yieldable brake for said spool; a rocker shaft mounted in said frame; means, operable by tension in a strand unwinding from said spool, for operating said shaft; an eccentric secured to said shaft; and a spring-held bell crank lever fulcrumed on said frame, having one arm operable by said eccentric and its other arm carrying said brake.

7. A device of the class described comprising in combination a supporting frame; a spool rotatably mounted in said frame; a yieldable brake for said spool; a rocker shaft mounted in said frame; means, operable by tension in a strand unwinding from said spool, for operating said shaft; an eccentric adjustably secured to said shaft; and a spring-held bell crank lever fulcrumed on said rocker shaft, having one arm operable by said eccentric and its other arm carrying said brake.

In witness that I claim the foregoing as my invention, I affix my signature this 2nd day of July, A. D. 1928.

OSCAR A. PEARSON.