July 5, 1949. W. C. EWALDSON 2,475,426

TENSION CONTROL

Filed April 16, 1947 2 Sheets-Sheet 1

FIG. 1

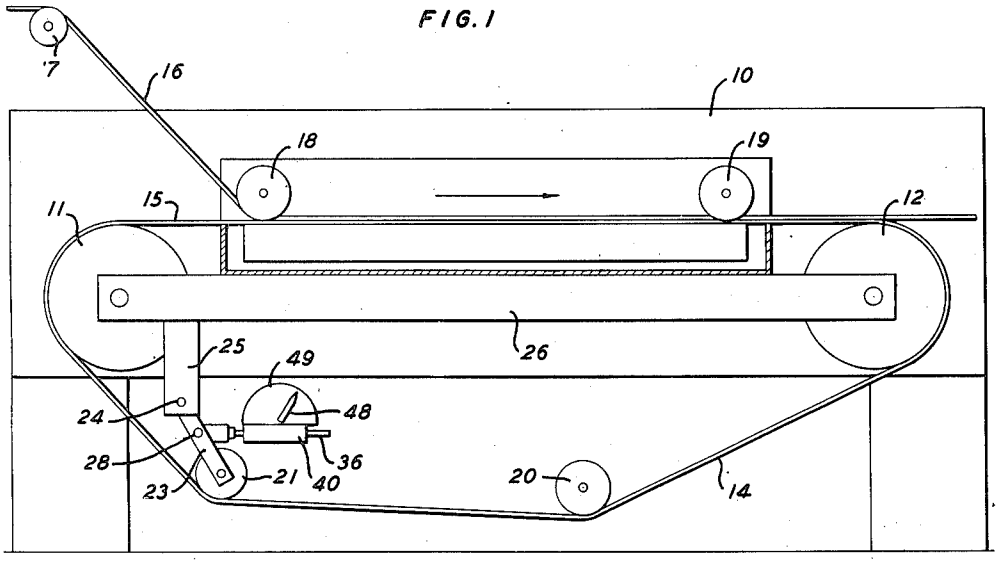
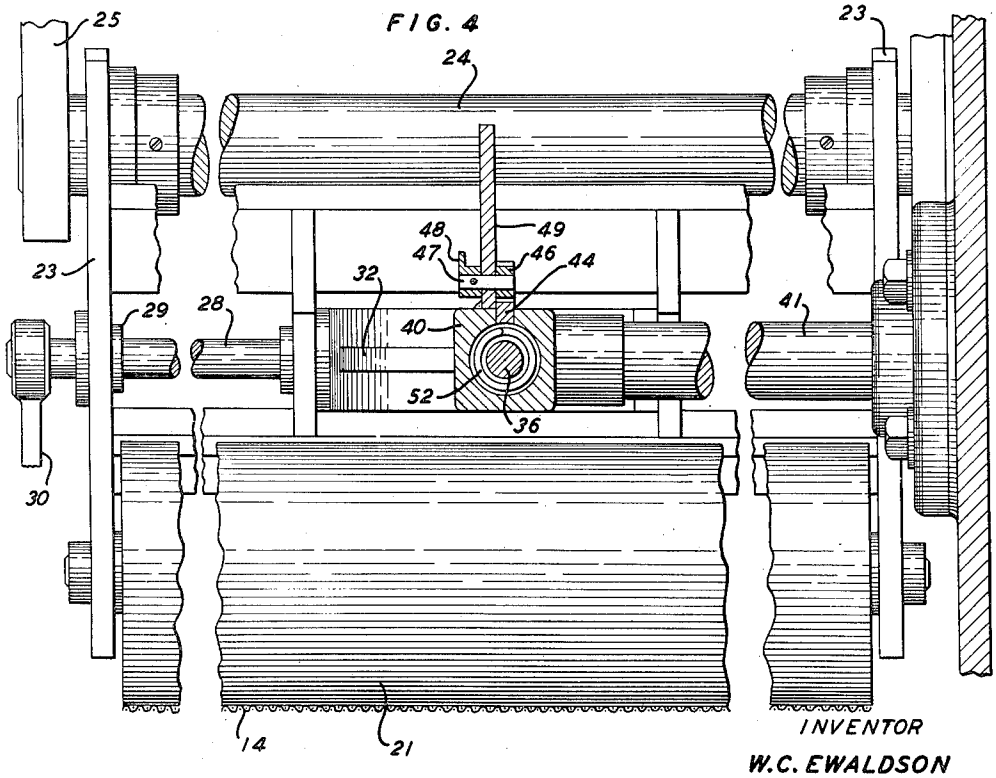


FIG. 4



INVENTOR
W.C. EWALDSON
BY
W. C. Parmele
ATTORNEY

July 5, 1949. W. C. EWALDSON 2,475,426

TENSION CONTROL

Filed April 16, 1947 2 Sheets-Sheet 2

FIG. 2

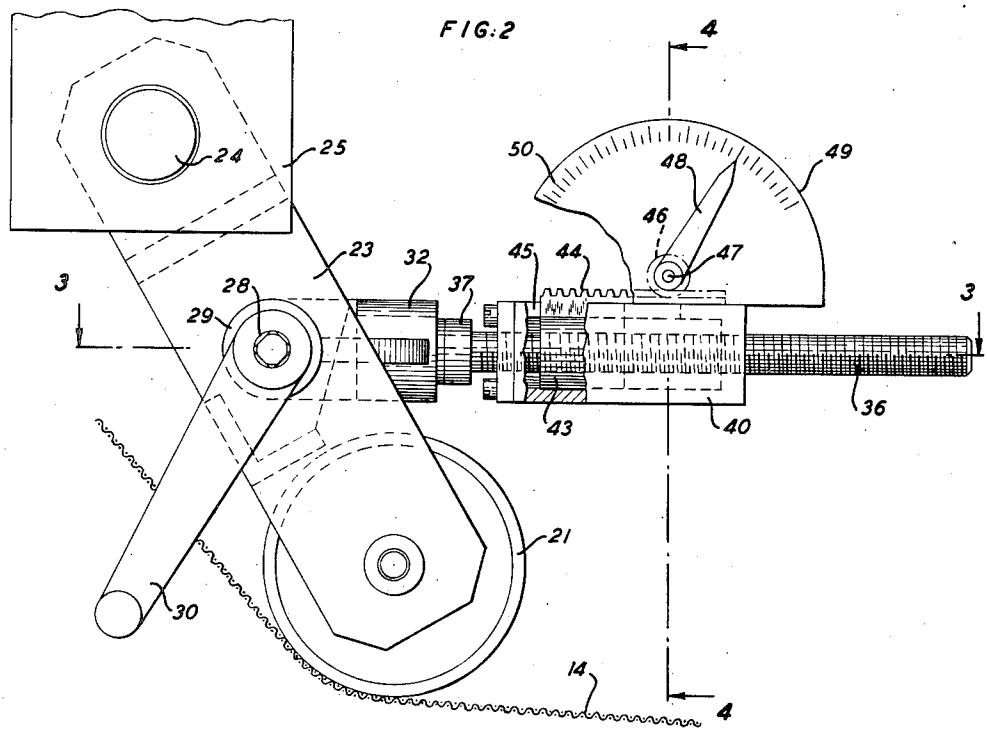
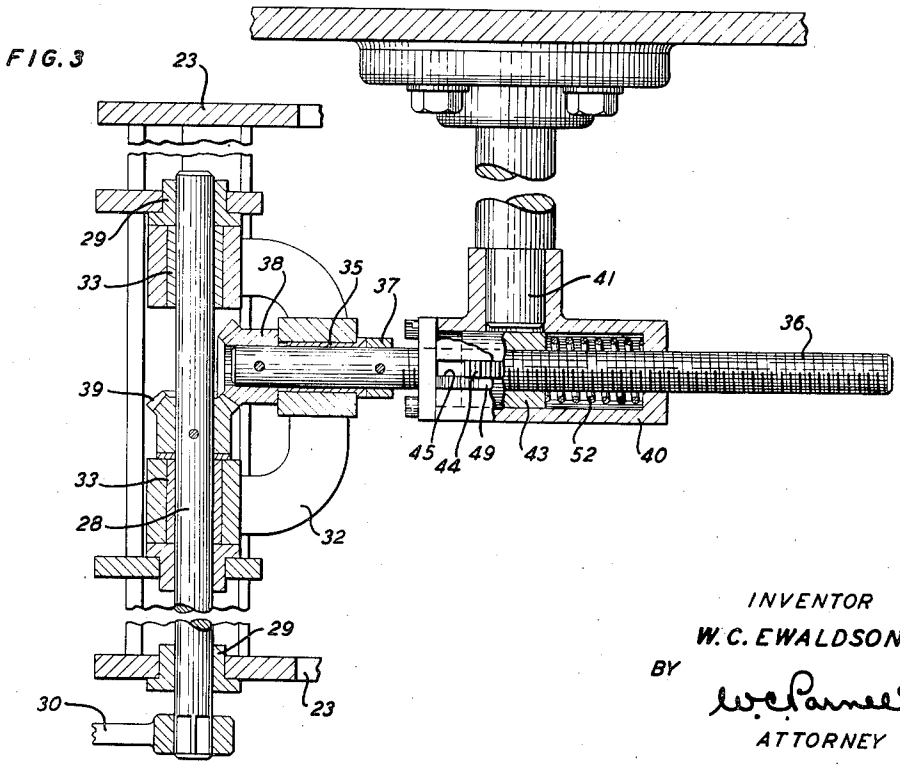


FIG. 3



INVENTOR
W. C. EWALDSON
BY
W. C. Parmele
ATTORNEY

Patented July 5, 1949 2,475,426

UNITED STATES PATENT OFFICE

2,475,426

TENSION CONTROL

Waldemar C. Ewaldson, Millington, N. J., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

Application April 16, 1947, Serial No. 741,920

3 Claims. (Cl. 74—242.1)

1

This invention relates to tension controls for continuous flexible elements, and more particularly to a tension control for a Fourdrinier wire in a pulp insulating machine for forming insulating coverings of pulpous material on electrical conductors.

The Fourdrinier wire in the pulp insulating machine is driven about its supporting rollers, the upper portion of the wire travelling with the conductors in the area where the pulpous material is applied to the conductors. The electrical conductors in this area are guided in a common plane and maintained taut by the introduction of a given tension in the conductors. It is important that the Fourdrinier wire have a given tension created therein to cause the upper portion thereof of travelling with the conductors to lie in a given plane substantially parallel with the said plane of the conductors to control the even formation of the paper pulp about the conductors.

An object of the invention is to provide a tension control for a continuous flexible element, particularly a Fourdrinier wire which is simple in construction, highly accurate and readily actuable.

With this and other objects in view, the invention comprises a tension control for a continuous flexible element mounted on spaced supporting rollers and driven linearly, the tension control including a tension roller positioned to engage the element at a position spaced from the supporting rollers, a support therefor, and means to move the support to cause the tension roller to apply a variable force to the element to create a variable tension in the element.

More specifically, the tension control is for a Fourdrinier wire in a pulp insulating machine for forming an insulating covering of pulpous material on a plurality of electrical conductors as they advance longitudinally in a plane parallel with and adjacent the wire, while the wire is driven about spaced supporting rollers. The tension control includes a tension roller equal to or greater in length than the width of the Fourdrinier wire and positioned transversely of the wire. The tension roller is supported by a pivotal frame which is movable relative to the wire by a threaded shaft carried by an element, in the form of a yoke, pivotally connecting one end of the threaded shaft to the frame. A fixed position housing, apertured for the threaded shaft to extend therethrough has a nut longitudinally movable therein through which the threaded shaft exends, the nut being backed up by a compression spring which is also disposed in the

2

housing concentric with the threaded shaft. The tension created in the Fourdrinier wire originates in the spring and as the spring is compressed, the tension in the wire increases. A dial positioned adjacent the housing is graduated to indicate the tension in the wire. A pointer movable relative to the dial is driven by a rack carried by the nut and interengaging a pinion concentric with a pivotal support for the pointer and fixed thereto.

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawings, wherein

Fig. 1 is a schematic side elevational view of a portion of a pulp insulating machine illustrating the invention;

Fig. 2 is an enlarged fragmentary detailed view of the tension control;

Fig. 3 is a fragmentary sectional view taken along the line 3—3 of Fig. 2; and

Fig. 4 is a fragmentary sectional view taken along the line 4—4 of Fig. 2.

Referring now to the drawings, the portion or unit 10 of the pulp insulating machine selected to illustrate the invention includes supporting rollers 11 and 12 for a continuous flexible element 14 which in the present embodiment is a Fourdrinier wire. The upper portion 15 of the wire travelling in the direction of the arrow between the supporting rollers 11 and 12 travels through an area where a pulpous material (not shown) is fed to the wire around a plurality of electrical conductors 16 guided to and through the material applying area by sheaves 17, 18 and 19. The tension in the conductors 16 causes the portions of the conductors between the rollers 18 and 19 to lie in a given plane. It is important therefore that the portion 15 of the wire 14 lie within a given plane parallel to the plane of the conductors to cause uniform formation of the pulpous material about the conductors. If the wire is not held taut between the rollers 11 and 12 and is allowed to sag, it is apparent that the pulpous material may not surround the conductors between the sheaves 18 and 19. Furthermore, undue tension created in the Fourdrinier wire may damage the wire and for this rason, it is important that the proper tension be maintained in the wire. This is brought about through the tension control mechanism, assisted by an idler roller 20.

The tension control mechanism includes a tension roller 21 which is equal to or greater in length than, the width of the Fourdrinier wire and is

positioned transversely of the wire as shown in Figs. 1, 2 and 4. The roller 21 is rotatably supported at the lower end of a frame 23, the upper end of the frame being pivotally supported at 24 on a downwardly extending bracket 25 of the main frame 26 which also rotatably supports the rollers 11 and 12. A crank shaft 28 is journalled in suitable bearings 29 in the frame 23 and has a hand crank 30 mounted on the outer end thereof. A yoke 32 has its legs provided with bearings 33 through which the shaft 28 extends and in this manner, the yoke 32 is supported by the shaft, the shaft being free to rotate in the bearings 33. The yoke 32 is also provided with a bearing 35 for rotatably supporting a threaded shaft 36 which is held against axial movement in one direction by a fixed collar 37 and in the other direction by a beveled gear 38. A companion beveled gear 39, fixedly mounted upon the crank shaft 28 and interengaging the beveled gear 38, operatively connects the crank shaft to the threaded shaft.

The threaded shaft 36 extends through a housing 40 which is pivotally supported at 41, which may be described a fixed position, it being important that the housing be held against movement relative to the tension roller 21, but permitted to pivot at 41 during adjustment of the control mechanism to move the frame 23 about its pivot 24. A nut or threaded element 43 is slidably disposed in the housing 40 and carries a rack 44 which extends through a slot 45 in the upper wall of the housing. The rack 44 interengages a pinion 46 which is mounted on a shaft 47 of a pointer 48. The pointer 48 is movable relative to a dial 49 having graduations 50 to indicate the pounds pressure applied to the wire 14 through the tension control mechanism. The force to create variable tensions in the wire originates in a compression spring 52 disposed in the housing 40 concentric with the threaded shaft 36 back of the nut 43. The nature of the spring 52 is such that as the spring is compressed by the nut 43, causing rotation of the pointer 48 relative to the dial 49, a known force, indicated by the pointer, will be applied to the wire 14.

The tension control mechanism is located at a position where it is possible for the operator to determine readily at any time the tension in the wire and vary the tension without stopping the machine. This is accomplished by rotating the crank 30 clockwise to reduce the tension and counterclockwise to increase the tension. For example, let it be assumed that the operator wishes to increase the tension in the wire 14. This is brought about by rotating the crank 30 counterclockwise to rotate the crank shaft 28 to drive the gears 39 and 38 to rotate the threaded shaft 36 in a direction whereby it will move to the left in the nut 43. By rotating the threaded shaft 36 in the direction specified, the distance between the nut 43 and the yoke 32 is widened, simultaneously compressing the spring 52 to increase the force therein and applying this force to the wire through the pivotal frame 23 and the tension roller 21. It will therefore be apparent that as the threaded shaft 36 moves the nut 43 to the right to compress the spring 52, the shaft will be moved to the left to cause clockwise movement of the frame 23 about its pivot 24, to move the tension roller 21 outwardly to increase the tension in the wire 14.

In a similar manner, the tension in the wire 14 may be decreased by rotating the crank 30 in the opposite direction to cause rotation of the threaded shaft 36 in the threaded element 43 to release a given amount of the force created in the spring 52 reducing the force applied to the wire through the control mechanism.

At all times, the tension in the Fourdrinier wire depends on the force created in the spring. Furthermore, the force in the spring depends on the position of the nut 43 relative to the right end of the housing 40, and for this reason movement of the nut will cause actuation of the pointer 48 relative to the dial 49 to indicate the force applied to the wire or the tension created therein. Any action of the crank 30 to vary the tension in the wire 14 will cause movement of the pointer to notify the operator, at all times, the tension in the wire.

Although specific improvements of the invention have been shown and described, it will be understood that they are but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined by the appended claims.

What is claimed is:

1. A tension control for a Fourdrinier wire in a pulp insulating machine for forming an insulating covering of paper pulp on a plurality of electrical conductors as they advance longitudinally in parallel guided paths adjacent the wire while the wire is driven about spaced supporting rollers, the tension control comprising a tension roller equal to or greater in length than the width of the wire and positioned transversely of the wire, a pivotal frame supporting the tension roller, a threaded shaft, an element rotatably supporting the shaft pivotally connected to the frame, a fixed position housing apertured for the threaded shaft to extend therethrough, a nut threadedly mounted on the shaft and movably disposed in the housing, a compression spring disposed back of the nut concentric with the shaft to urge the shaft to move the frame to cause the tension roller to create a given tension in the wire, and means to cause rotation of the shaft relative to the nut to vary the compression of the spring to vary the tension in the wire.

2. A tension control for a Fourdrinier wire in a pulp insulating machine for forming an insulating covering of paper pulp on a plurality of electrical conductors as they advance longitudinally in parallel guided paths adjacent the wire while the wire is driven about spaced supporting rollers, the tension control comprising a tension roller equal to or greater in length than the width of the wire and positioned transversely of the wire, a pivotal frame supporting the tension roller, a threaded shaft, an element rotatably supporting the shaft pivotally connected to the frame, a fixed position housing apertured for the threaded shaft to extend therethrough, a nut threadedly mounted on the shaft and movably disposed in the housing, a compression spring disposed back of the nut concentric with the shaft to urge the shaft to move the frame to cause the tension roller to create a given tension in the wire, means to rotate the shaft relative to the nut to vary the distance between the nut and the frame to vary the compression of the spring resulting in movement of the nut in the housing and variation of the tension in the wire, and indicating means actuable by the movement of the nut in the housing to indicate the tension in the wire.

3. A tension control for a Fourdrinier wire in a pulp insulating machine for forming an insulating covering of paper pulp on a plurality

of electrical conductors as they advance longitudinally in parallel guided paths adjacent the wire while the wire is driven about spaced supporting rollers, the tension control comprising a tension roller equal to or greater in length than the width of the wire and positioned transversely of the wire, a pivotal frame supporting the tension roller, a threaded shaft, an element rotatably supporting the shaft pivotally connected to the frame, a fixed position housing apertured for the threaded shaft to extend therethrough, a nut threadedly mounted on the shaft and movably disposed in the housing, a compression spring disposed back of the nut concentric with the shaft to urge the shaft to move the frame to cause the tension roller to create a given tension in the wire, a drive shaft rotatably supported by the frame, gears operatively connecting the shafts, and a crank mounted on the

drive shaft externally of the frame to rotate the drive shaft, whereby the threaded shaft will be rotated relative to the nut to vary the compression of the spring to vary the tension in the wire.

WALDEMAR C. EWALDSON.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
598,658	Gilman	Feb. 8, 1898
1,744,746	Brown	Jan. 28, 1930

FOREIGN PATENTS

Number	Country	Date
84,672	Switzerland	Aug. 20, 1920