May 30, 1933. K. SCHNEIDER 1,912,013

TENSIONING DEVICE

Filed Dec. 15, 1931

Fig. 1.

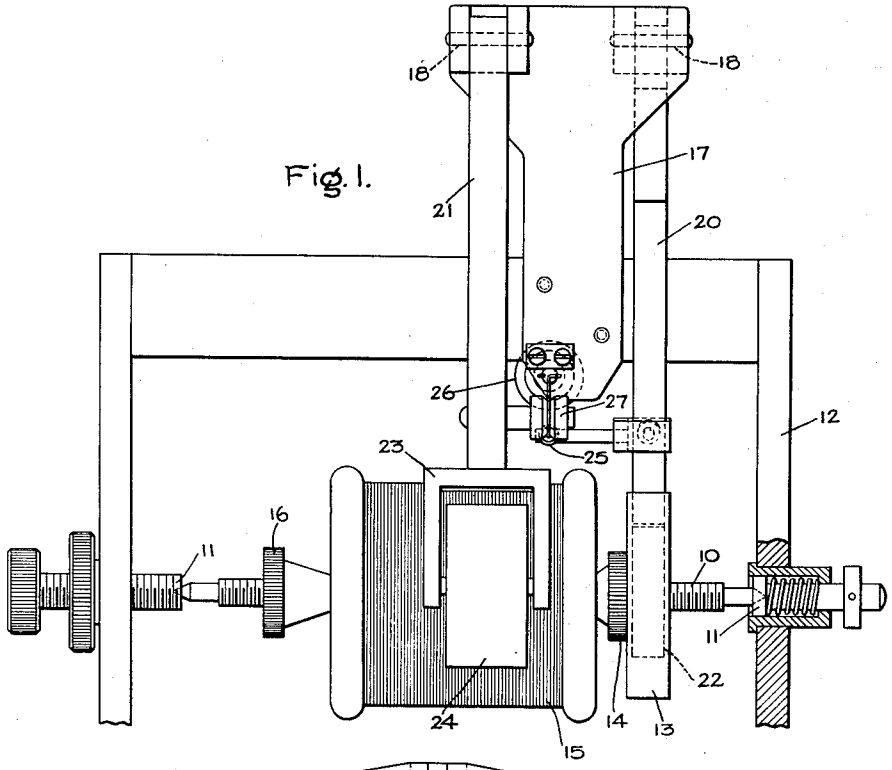
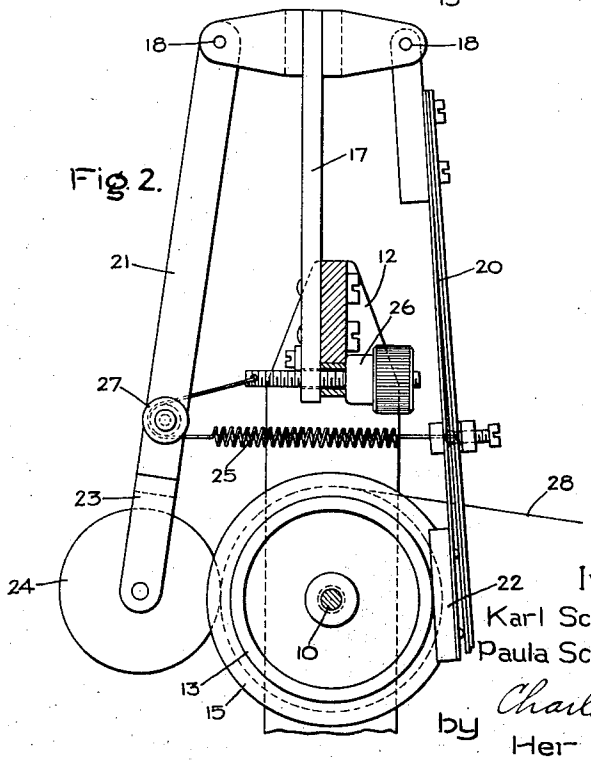


Fig. 2.



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UNITED STATES PATENT OFFICE

KARL SCHNEIDER, DECEASED, LATE OF BERLIN-PANKOW, GERMANY, BY ERICH FRAENKEL, ADMINISTRATOR, OF BERLIN-PANKOW, GERMANY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK

TENSIONING DEVICE

Application filed December 15, 1931, Serial No. 581,189, and in Germany August 18, 1930.

The invention relates to tensioning devices, more particularly to tensioning devices for coil winding machines, and has for its object the provision of an improved device of this character.

Although not limited thereto the invention is particularly useful in connection with machines for winding coils of relatively fine wire, such as are used in certain radio apparatus.

The wire wound on the winding former or coil body of such machines usually is drawn by the former or body from a delivery roll or spool. The tension of the wire and, therefore, the tightness and amount of wire wound on the coil depends upon the manner in which the delivery roll is braked. In certain known tensioning arrangements, a brake shoe is in resilient and frictional contact with the turns of wire on the delivery spool in order that the braking moment or the tension in the wire be maintained as uiform as possible during the winding operation when the amount of wire or the effective diameter of the supply of wire on the delivery roll gradually decreases by reason of the withdrawal of the wire. By this means the pulling and braking forces take effect on a lever arm always equal to the radius of the amount of wire on the delivery roll. A disadvantage of this arrangement is that oftentimes mechanical and thermal stresses of a detrimental character are set up in the insulating material as a result of the friction between the brake shoe and the turns of wire on the delivery roll, with the result that the insulation of the wire at times is damaged.

The invention in one of its aspects contemplates the provision of an improved tensioning device whereby a suitable tension is maintained in the material being wound without detrimentally affecting the material.

In carrying the invention into effect in one form thereof, there is provided a separate brake disc or drum for the delivery roll or its revolving spindle; and control the braking force applied to the drum in accordance with the effective diameter of the amount of wire on the delivery spool so that the coil is wound with the wire under a substantially uniform tension.

For a more complete understanding of the invention, reference should be had to the accompanying drawing in which Fig. 1 is a side elevation of a tensioning device embodying the invention, certain portions of the device being shown in section so as to illustrate certain structural details; and Fig. 2 is an end elevation of the tensioning device in Fig. 1, certain portions being shown in section.

Referring to the drawing, the invention has been shown in one form in connection with the winding of electrical coils, although obviously it may be used in connection with the winding of various other materials, such as fabrics. As shown, the tensioning device comprises a revolving spindle 10 with pointed or conical-like ends mounted between two cup bearings 11 in a supporting device formed by a frame 12. A brake disc 13 is threaded over one end of the screw-threaded spindle 10 and the screw connection is fixed by a lock-nut 14. A delivery roll or spool 15 is supported on the spindle 10. This spool is held in position on the spindle 10 by means of the conically turned nut 14 and a similar nut 16 between which the delivery spool is clamped.

A stationary yoke 17 is mounted on the supporting frame and carries the pivot points 18 of levers 20 and 21 oscillable about the said points 18. The lever 20 constitutes a brake lever and is provided with a brake shoe 22 rigidly mounted at its lower end and in frictional contact with the brake disc 13 when the delivery roll 15 revolves. The free end of the other lever 21 is shaped as a fork 23 in which fork is disposed a loosely mounted roller 24, preferably made of some suitable resilient material, such as soft rubber or leather, and which rolls on the wire wound on the delivery roll 15. It will be seen from Fig. 2 that the levers are in contact with the brake disc 13 and with the turns of wire on the delivery roll 15 respectively and on opposite sides thereof.

The levers 20 and 21 are urged one towards the other by a tension spring 25 which is preferably a helical spring. In order that

the tension of the spring 25 may be adjusted, the said spring is connected preferably, and in a rigid manner, with one of its ends to one of the levers, which in the constructional example is the lever 20, while the tension-adjusting means are on the other lever, which in the said constructional example is the lever 21. With reference to Fig. 2, a screw device 26 is provided on the stationary supporting frame 12 for accurately adjusting the tension of the spring. The reaction member of the spring 25 on the lever 21 is a roller 27 over which passes the wire-like end of the spring 25, the said end being attached to the end of the screw of the setting device 26. The tension of the spring is adjusted by means of the knurled screw which is easy of access, so that it is possible to adjust the braking force to suit the kind of wire in use and the type of coil to be wound.

In operation; when the radius of the amount of wire on the delivery roll diminishes as a result of using the wire for winding the coil, the lever 21 responds to the pull of the spring 25 and the frictional pressure between the brake shoe 22 and the brake disc 13 is lowered so as to maintain a substantially uniform tension in the material 28 being drawn by the winding machine. The insulation of the wire cannot be damaged, as was the case with the frictional brake shoe of certain devices known heretofore, because the roller 24 rolls over the wire on the delivery roll 15 and moreover, is made of relatively soft material. The arrangement of the invention, therefore, makes it possible to automatically maintain a uniform tension on the wire fed to the coil; this is effected by regulating the pressure exerted by the brake, and without damaging the insulating material covering the wire.

While a particular embodiment of the invention has been shown, it will be understood, of course, that it is not wished to limit said invention thereto since many modifications may be made, and it is, therefore, contemplated by the appended claims to cover any such modifications as fall within the true spirit and scope of the invention.

What is claimed as new and desired to be secured by Letters Patent of the United States is:

1. A tensioning device for material being drawn from a supply spool comprising a brake drum for said spool, a pair of pivoted levers, a member connected to one of said levers bearing on the material on said spool, a brake shoe operated by the other of said levers bearing on said brake drum and a resilient member mechanically connected to said levers arranged to apply forces to said levers so as to bias said member against said material and said shoe against said drum.

2. A tensioning device for material being drawn from a supply spool comprising a brake drum for said spool, a pair of pivoted levers, a roller member carried by one of said levers bearing on the material on said spool, a brake shoe carried by the other of said levers bearing on said brake drum and a spring mechanically connecting said levers arranged to apply forces to said levers so as to bias said roller against said material and said shoe against said drum.

3. A tensioning device for material being drawn from a supply spool comprising a brake drum for said supply spool, a brake shoe, a movable member controlling the application of said brake shoe, a second movable member, spring means connecting said movable members so that the tension of said spring and the applied braking force is controlled by the movement of said second member and means for moving said second member in accordance with the effective diameter of said supply spool.

4. A tensioning device for coil winding machines comprising in combination with a spool from which the material being wound is drawn, a brake drum for said spool, a pivoted brake lever cooperating with said brake drum, arranged to apply a braking force to said drum, a pivoted lever having a portion thereof bearing on said supply spool, a tension spring interposed between and connecting said brake lever directly with said second lever whereby the tension in said spring and the braking force is controlled in accordance with the effective diameter of said supply spool so as to maintain a substantially constant tension in said material and auxiliary means for controlling the tension in said spring to adjust the tension maintained in said material.

5. A tensioning device for coil winding machines comprising in combination with a spool from which the material being wound is drawn, a brake drum arranged to rotate with said spool, a pair of levers on opposite sides of the axes of rotation of said spool and drum, the first opposite said spool and the second opposite said drum, means pivotally mounting said levers for movement toward and away from said spool and drum respectively, a roller carried by said first lever bearing on the supply of material on said spool, a brake shoe on said second lever bearing on said drum, a second roller on said first lever intermediate its ends, a tension spring having one end secured to said second lever and its opposite end passed over said second roller and means securing said latter spring end whereby said levers are biased toward said spool and drum respectively.

6. A feeding device for coil winding machines comprising a spool from which the material being wound is drawn, a brake drum arranged to rotate on an axis substantially coincident with the axis of rotation of

said spool, a pair of vertically arranged levers on opposite sides of the axes of rotation of said spool and drum, the first opposite said spool and the second opposite said drum, means pivotally mounting said levers for movement toward and away from said spool and drum respectively, a fork carried by the lower end of said first lever, a resilient roller member mounted to rotate in said fork and arranged to bear on the supply of material on said spool, a brake shoe on the lower end of said second lever arranged to bear on said brake drum, a second roller on said first lever intermediate its ends, a tension spring having one end secured to said second lever intermediate its ends and its opposite end passed over said second roller and means securing said latter spring end whereby said levers are biased toward said spool and drum respectively.

In witness whereof, I have hereunto set my hand.

ERICH FRAENKEL,
Administrator of the Estate of Karl Schneider, Deceased.