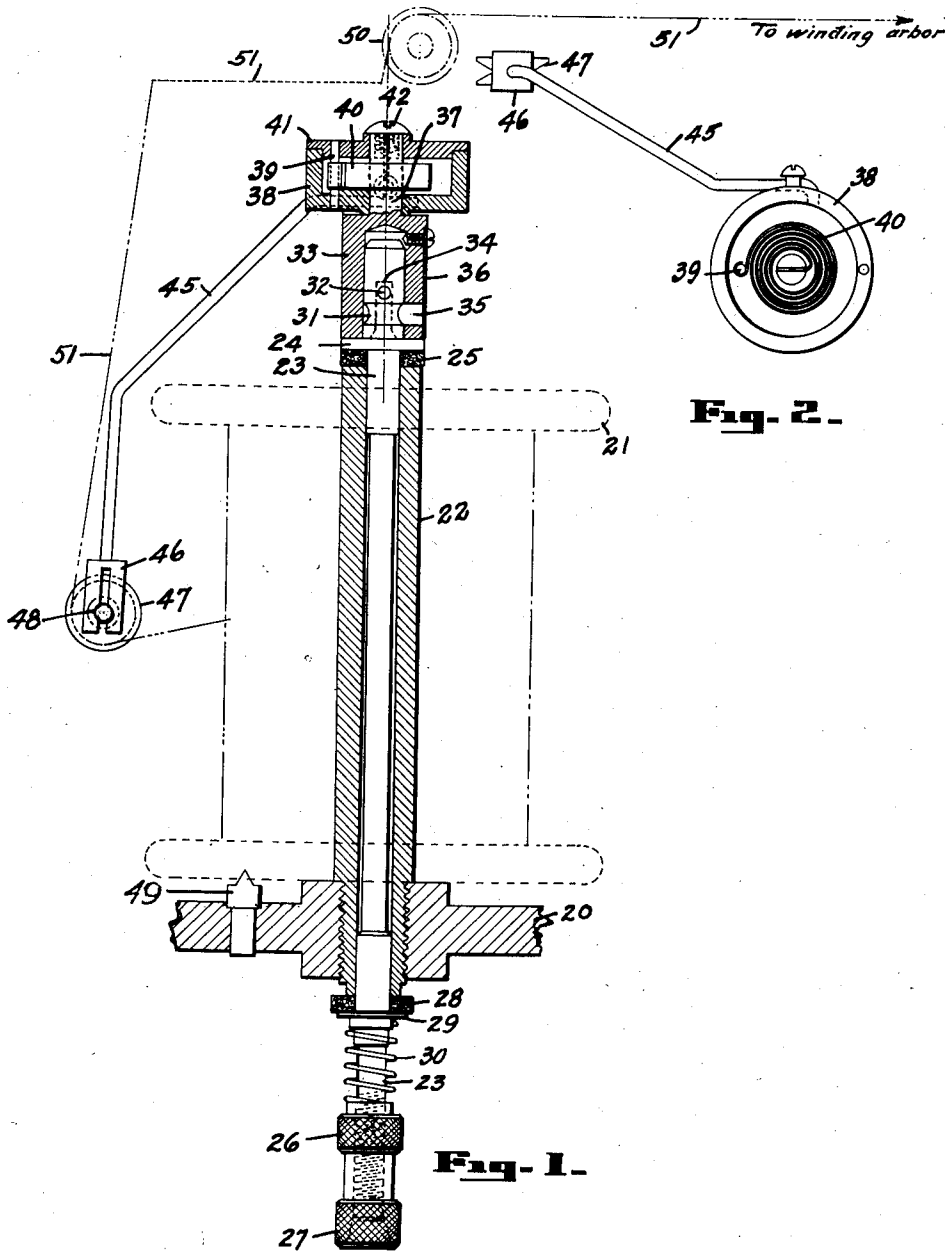


S. ROGERS.
UNWINDING DEVICE.
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1,348,321.

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Witnesses
H. R. Riefel
H. W. Schmieding

By

Inventors
Samuel Rogers
Herr, Page, Corfu and Hayward
Attorneys

UNITED STATES PATENT OFFICE.

SAMUEL ROGERS, OF ANDERSON, INDIANA, ASSIGNOR TO THE REMY ELECTRIC COMPANY, A CORPORATION OF INDIANA.

UNWINDING DEVICE.

1,348,321.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, SAMUEL ROGERS, a citizen of the United States of America, residing at Anderson, county of Madison, State of Indiana, have invented certain new and useful Improvements in Unwinding Devices, of which the following is a full, clear, and exact description.

This invention relates to devices for unwinding wire and the like from a bobbin or spool preparatory to rewinding upon a rotating form such as used in coil winding machine, and the like.

It is an object of this invention to provide an unwinding device which will maintain an even tension, and a tension of the proper amount in the wire for all speeds at which the wire is unwound from the reel. In particular, it is an aim of this invention to provide an unwinding device that will not unduly stretch soft wire of the fine wire sizes, and thus increase the resistance of the finished coil; that will not crack the enamel insulation and thus decrease the electric strength of the coils; and that winds each coil of a series or lot with the same relative tension and gives a finished coil of approximately the same diameter irrespective of the amount of wire on the supply spool.

Another object of the invention is to provide an unwinding device in which the liability of breakage of the wire due to sudden starting of the unwinding device will be reduced to a minimum.

Another object of the invention is to provide an unwinding device which includes means for taking up any slack which may occur in the wire both during the operation of the unwinding device and when the device has stopped.

Other and further objects of the present invention will be apparent from the following description, reference being had to the accompanying drawing, wherein a preferred embodiment of the present invention is clearly shown.

In the drawings:

Figure 1 is a longitudinal sectional view of the wire unwinding device; and

Fig. 2 is a top view of the device shown in Fig. 1, certain parts being removed for sake of clearness.

Referring to the drawings, 20 designates a platform which is suitably supported near

the machine such as a machine for winding coils of wire used, for example in electrical apparatus. The platform 20 supports a tubular post 22 which supports for rotation a spindle 23. The spindle 23 is provided with a shoulder 24 which rests upon a felt washer 25 which in turn is supported upon the upper surface of the post 22. The lower end of the spindle 23 is threaded for engagement by nuts 26 and 27. A felt washer 28, or one with similar mechanical effect, and a metallic washer 29 are mounted upon the spindle 23 and are held in position by means of spring 30. By adjusting the nut 26 the tension in the spring 30 may be varied whereby to vary the friction between the shoulder 24 of the spindle 23, the washers 25 and 28 and the washer 29.

The upper end of the spindle 23 is provided with a pin 32 extending transversely thereof and projecting beyond the cylindrical surface of said spindle. A hub member or thimble 33 fits over the upper end of the spindle 23 and is provided with notches 34 which engage with the projecting ends of the pin 32. In this manner a driving connection between the thimble 33 and the spindle 23 is effected. The thimble 33 is provided with a plunger 35 which is yieldingly held in engagement with a groove 31 provided on the spindle 23, by means of a leaf spring 36.

The thimble 33 is provided with a reduced upper end portion 37 upon which is mounted for rotation a cup 38. The cup 38 carries a pin 39 to which one end of a coil spring 40 is connected. The other end of the spring 40 is connected with the reduced upper end portion 37 of the thimble 33. A cover 41 coöperates with the cup 38 to form an inclosure for the spring. A screw 42 having threaded engagement with the portion 37 maintains the cover 41 and cup 38 in position upon the thimble 33.

An unwinding finger 45 is secured at one end upon the cup 38, and at its lower end, carries a fork 46 which supports a shaft 48 upon which is rotatably mounted a grooved wheel 47.

It is apparent that the thimble 33 and parts carried thereby can readily be disassembled from the spindle 23 by pulling said thimble upwardly as viewed in Fig. 1. The spindle 23 being freed of the thimble 33, the bobbin or reel carrying the wire as received

from the manufacturer, can be slipped down over the post 22. A dog 49 mounted upon the platform 20 is provided for purposes of piercing the lower wooden end of reel 21 in order to prevent said reel from turning relatively to the post 22. The free end of the wire 51 wound upon the reel 21 is brought around the grooved wheel 47 and thence upwardly around a suitably supported guide-wheel 50 and thence to the spindle or arbor located on the coil winding machine, which is not shown. It is apparent that when the winding spindle is rotated that the tension in the wire 51 will cause the finger 45 to be rotated in a counter clockwise direction as viewed in Fig. 2, around the reel 21. The guide wheel 50 is located with its groove tangent to the vertical axis of the spindle 23. This location is necessary in order that the turning moment which causes the rotation of the finger 45 may be constant.

Upon the initial rotation of the spindle upon which the wire 51 is to be wound, the finger 45 and the cup 38 supporting it will first commence to rotate and to cause the winding up of the spring 40. When sufficient stress is attained in the spring 40 to overcome the friction between spindle 23 and the post 22, said spindle will begin to rotate. The purpose of the spring 40 is to provide a yielding connection between the finger 45 and the spindle 23 in order that the wire may gradually take up the strain due the inertia of the moving parts and to friction. It is apparent therefore, that the liability of breakage of the wire upon a sudden starting of the arbor upon which the wire is wound will be substantially eliminated.

Since, due to their momentum it is impossible to stop the coil winding arbor and the unwinding spindle at the same time there may be a certain amount of slack in the wire after the machine has entirely stopped. The spring 40, however, takes up the slack of this wire automatically. The spindle 23 being held from rotating by friction, the spring 40 will cause the finger 45 to rotate in a clockwise direction as viewed in Fig. 2, or in a direction opposite to that in which it rotates when unwinding the wire. Therefore, the finger 45 will be actuated by the spring 40 to take up any slack in the wire 51 which might occur between the reel 21 and the coil winding arbor.

Considerable difficulty has been experienced in providing a friction device for maintaining a tension in the wire which will be suitable for all unwinding speeds. Where it is undertaken to obtain friction by metal to metal contact, as where the shoulder 24 of the spindle 23 rests directly upon the upper surface of the post 22, it has been found that there is considerable unevenness of operation of such a friction device, par-

ticularly at low speeds. It is found in order to prevent sticking of the metallic surfaces and jerking of the wire at low speeds the tension in the spring 30 has to be adjusted in such a manner as to be unsuitable for a high unwinding speed. When the tension of the spring 30 is adjusted properly for high unwinding speed it has been found that the friction existing between the metallic surfaces will be uneven at low speeds, and will cause frequent breaking of the wire.

This difficulty has been overcome by providing felt washers, or washers of similar mechanical effect between the revolving and stationary metallic surfaces. The tension in the spring 30 can be adjusted to secure the friction necessary to maintain the wire taut, and this friction will be substantially uniform at all unwinding speeds.

While the form of mechanism herein shown and described constitutes a preferred form of embodiment of the invention, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

1. In an unwinding device, the combination with a rotatably mounted unwinding finger; of a friction device for retarding the free movement of the finger; and a yielding connection between said finger and the friction device.

2. In an unwinding device, the combination with a rotatably mounted unwinding finger; of a rotatable spindle; a support for the spindle; a friction device for retarding the free movement of the spindle; and a yieldable connection between the finger and the spindle.

3. In an unwinding device, the combination with a rotatably mounted unwinding finger; of a rotatable spindle; a support for the spindle; a friction device for retarding the free movement of the spindle; and a yieldable connection between the finger and the spindle, said yieldable connection consisting of a spiral spring adapted to wind up upon the initial turning of the finger, and finally to overcome the friction device and cause the rotation of the spindle.

4. In an unwinding device the combination with an unwinding finger; of a rotatable spindle carrying the finger; a support for the spindle; and a friction member located between the spindle and support.

5. In an unwinding device the combination with an unwinding finger; of a rotatable spindle carrying the finger; a support for the spindle; a friction member located between the spindle and support; and yielding means for applying pressure to said friction means.

6. In an unwinding device the combination with an unwinding finger; of a rotatable spindle carrying the finger; a support for the spindle; a friction member lo-

cated between the spindle and support; and yielding means for applying pressure to said friction means; and means to adjust said yielding device whereby to vary the pressure applied to the yielding device.

7. In an unwinding device, the combination with a rotatably mounted unwinding finger; of a spindle supporting the finger; a post of metallic material in which the spindle is journaled; a friction device for retarding the free movement of the spindle relatively to the post, said device including portions of the spindle and post, a member composed of felted material inserted between said portions, and means for maintaining pressure between said felted material and the spindle and post.

8. In an unwinding device, the combination with a rotatably mounted unwinding finger; of a rotatable spindle; a post upon which the spindle is journaled; means for maintaining friction between the spindle and post; and a quick detachable connection between the finger and spindle.

9. In an unwinding device, the combination with a rotatably mounted unwinding finger; of a rotatable spindle; a post upon which the spindle is journaled; yieldable connection between the finger and spindle; and a quick detachable connection between said finger and spindle.

10. In an unwinding device, the combination with a rotatably mounted unwinding finger; of a rotatable spindle; means for supporting the spindle for rotation; and a friction device for retarding the free movement of the finger, said friction device being provided with means for varying the amount of friction.

11. In an unwinding device, the combination with a rotatably mounted unwinding finger; of a rotatably mounted spindle provided with a shoulder; a post upon which the spindle is journaled; a washer of felted material located between the washer and the spindle and the post, said means being adjustable whereby the friction retarding the movement of the finger may be varied; and means for attaching the finger to the post.

12. In an unwinding device, the combination with a rotatably mounted unwinding finger; of a rotatably mounted spindle; means for supporting the spindle; a friction device for retarding the free movement of the spindle; a thimble mounted upon the spindle; means providing a yielding connection between the finger and thimble; and a quick detachable connection between the thimble and the spindle.

13. In an unwinding device, the combination with an unwinding finger and a rotatably mounted support therefor; of means connecting the finger and the support and tending to cause a reverse rota-

tion of the unwinding finger whereby to take up slack in the wire when said device has stopped.

14. In an unwinding device, the combination with a movable finger for unwinding wire from a spool; of a friction device for retarding the free movement of the finger; and means cooperating with the finger and friction device whereby upon pulling the wire so as to move the finger the tension in the wire will be gradually increased to a value such that the resultant pull on the finger will be sufficient to overcome friction at the friction device.

15. In an unwinding device, the combination with a movable finger for unwinding wire from a spool, said finger having relatively small inertia; of a movable member supporting the finger and having greater inertia; and means cooperating with the finger and supporting member whereby upon pulling the wire so as to move the finger the tension in the wire will be gradually increased to a value such that the resultant pull on the finger will be sufficient to overcome the inertia of the supporting member.

16. In an unwinding device, the combination with a rotatable unwinding finger; of a rotatable spindle for carrying the finger; and a quick-detachable driving connection between the finger and spindle.

17. In an unwinding device, the combination with a rotatable unwinding finger; of a hub member supporting the finger; a spindle for supporting the hub; said hub and spindle having cooperating provisions whereby a quick-detachable driving connection between the hub and spindle may be effected.

18. In an unwinding device, the combination with a rotatable unwinding finger; of a hub member supporting the finger; a spindle for supporting the hub; said hub and spindle having cooperating provisions whereby a quick-detachable driving connection between the hub and spindle may be effected; and yielding means for retaining the hub upon the spindle.

19. In an unwinding device, the combination with a rotatable unwinding finger; of a hub member supporting the finger; a spindle for supporting the hub; said hub and spindle having cooperating provisions whereby a quick-detachable driving connection between the hub and spindle may be effected; and yielding means mounted on the hub for retaining the hub upon the spindle.

20. In an unwinding device, the combination with a rotatable unwinding finger; of a hub member supporting the finger, and having a central bore, and a notch extending into the cylindrical wall thereof; a spindle for supporting the hub and having a portion adapted to extend into the bore of the

hub, and carrying a pin adapted to engage said notch.

21. In an unwinding device, the combination with a rotatable unwinding finger; of
 5 a hub member supporting the finger, and having a central bore whereby to provide a thimble portion, the wall of said thimble being provided with a radially extending hole and with a notch; a plunger slidably mounted
 10 in said hole; a leaf spring attached to the thimble and engaging said plunger; and a spindle for supporting the thimble and having a portion adapted to extend into said bore, and having an annular groove engaged
 15 by said plunger, and carrying a pin adapted to engage said notch.

22. In an unwinding device, the combination with a rotatable unwinding finger; of a rotatably mounted member for supporting
 20 the finger; and a yieldable driving connection between said finger and said member.

23. In an unwinding device, the combination with a rotatable unwinding finger; of a rotatably mounted member for supporting
 25 the finger; a finger carrying member rotatably mounted upon said supporting member; and a spiral spring connecting said supporting member and said finger carrying member.

30 24. In an unwinding device, the combination with a rotatable unwinding finger; of

a rotatably mounted member for supporting the finger; a cup-shaped finger carrying member rotatably mounted upon said supporting member; a cover for said cup-shaped
 35 member; a pin carried by said cup-shaped member and extending into a hole in said cover; a spiral spring connecting the pin with said supporting member; and a screw cooperating with said supporting member
 40 for holding the cover in position.

25. In an unwinding device, the combination with a rotatable unwinding finger; of a rotatable spindle for carrying the finger; said spindle being provided with a shoulder
 45 near finger supporting end, and having the other end screw-threaded; a hollow post through which the spindle extends; a washer slidably mounted adjacent the threaded end of the spindle; a friction washer between the
 50 collar of the spindle and one end of the post; a friction washer between said first named washer and the other end of the spindle; a nut cooperating with the screw-threaded end of the spindle; and a spring between
 55 said nut and said first-named washer.

In testimony whereof I affix my signature.

SAMUEL ROGERS.

Witnesses:

FREDERICK J. HARDMAN,
 J. W. McDONALD.