April 18, 1933. C. H. THORDARSON 1,904,890

COIL FORMING DEVICE

Filed Feb. 12, 1931

Fig. 1.

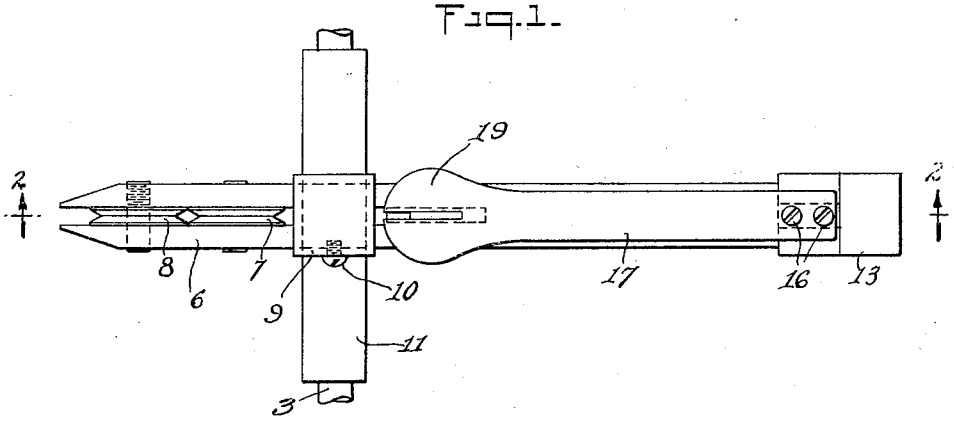


Fig. 2.

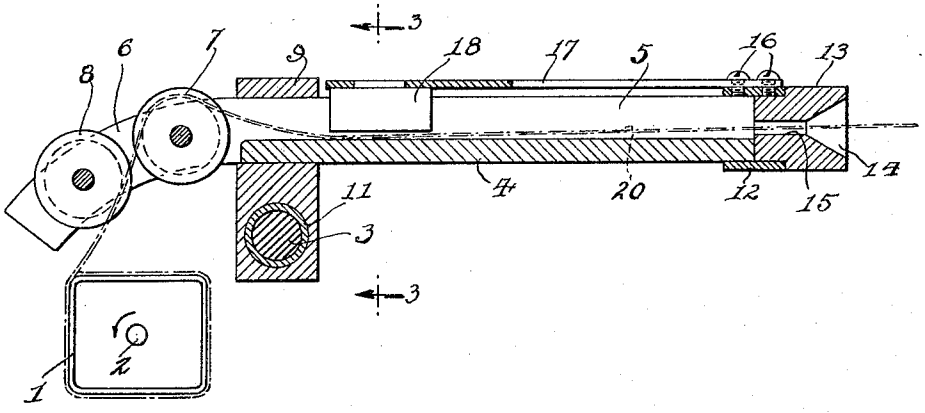
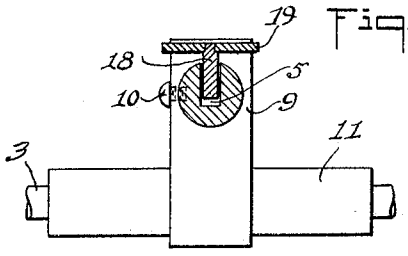


Fig. 3.



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Patented Apr. 18, 1933 1,904,890

UNITED STATES PATENT OFFICE

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COIL FORMING DEVICE

Application filed February 12, 1931. Serial No. 515,185.

This invention relates to winding devices, and with particularity to a hand tool for shaping wire during the winding operation.

An object of the invention is to provide an improved, simple hand tool for prebending wire that is to be formed into a convoluted winding such as ordinarily used in transformers and other electrical units. In the case of windings such as used in transformers, electrical machines and other devices requiring rather heavy wire, considerable difficulty is encountered in winding the coils uniformly and evenly. This is particularly true in the case of square or rectangular coils, since the wire must be bent around relatively sharp corners. This in itself entails considerable difficulty in the winding operation and when the operation is performed by hand the repeated binding and tensioning of the wire easily fatigues the hand.

Accordingly it is another object of the present invention to provide a hand tool which facilitates the bending and winding of heavy wire into square, rectangular or other similar shaped coils.

In the winding of coils with relatively heavy wire it has been found in order that the winding when finished may present a substantially uniform flat surface, it is necessary not only to bend the wire around the corners of the coil form, but also to give the portion of the wire intermediate the corners an end bend so that when the wire is not actually bent around the corners of the coil form the intermediate portion does not become bowed outwardly.

Accordingly it is another object of the present invention to provide a hand tool for enabling this corner bending and intermediate reverse bending of the wire to be accomplished expeditiously and easily by hand.

A feature of the invention relates to a hand tool for winding wire coils, which tool is provided with relatively simple means for bending the wire at appropriate points and for subjecting the wire to easily controlled tension.

Other features and advantages not specifically enumerated will be apparent after a consideration of the following detail description and the appended claims.

Referring to the drawing—

Fig. 1 shows a top plan view of a coil winding tool according to the invention;

Fig. 2 is a sectional view of Fig. 1, taken along the line 2—2 thereof;

Fig. 3 is a section of Fig. 2, taken along the line 3—3 thereof.

Referring more particularly to the drawing, the numeral 1 represents a coil form of suitable material such as fibre, wood, or other insulating material. While the drawing shows this form as square, it will be understood that the invention is not limited thereto, but may be applied to the winding of rectangular or even round coils.

The coil form 1 is mounted for rotation in a suitable rotating shaft represented in the drawing by the numeral 2. Extending parallel to the shaft 2 is another shaft 3 upon which is slidably mounted the hand bending and tensioning tool according to the invention. This latter tool comprises a round rod 4 having a rectangular slot 5 cut therein and extending throughout the length thereof. The rod 4 terminates at its left hand end in a curved bifurcated portion 6 in which are rotatably mounted the guide rollers or pulleys 7 and 8 respectively. The roller 7 is designed of such a diameter as to give the necessary bend to the wire to conform it to the shape of the corners of the winding form 1. The rod 4 carrying the pulleys 7 and 8 passes through and is fastened to a block 9 by a set screw 10. The block 9 is adapted to rotate and slide on the shaft 3, and for this purpose the block 9 carries a cylindrical sleeve 11 to provide an appropriate bearing on the shaft 3. Surrounding the right hand end of the rod 4 is a ring 12 which may be held on the rod by drive fit or any other suitable manner. Fitted within the end of the ring 12 is a hard rubber bushing 13 having a tapered opening 14 and a straight perforated portion 15. The bushing 13 may be held within the sleeve or ring 12 by friction or drive fit.

Attached to ring 12 by screw 16 is a metal

strip 17 which carries at its left hand end a strip or block of fibre 18. The fibre strip 18 may be attached to the member 17 in any suitable manner, for example the strip 18 is frictionally held in the slotted end of the arm 17 as shown clearly in the drawing. The function of the member 18 is to provide a friction drag on the wire when the member 17 is depressed. The member 17 and the friction member 18 are normally in the position shown in Fig. 2, and the tool is adapted to be grasped with the fingers surrounding the rod portion 4 and the thumb resting on the portion 18 of the member 17. At all times, therefore, the person using the tool can instantly regulate the tension or drag on the wire 20.

As shown in Fig. 2, the wire from a suitable supply (not shown) passes through the member 14, thence through the longitudinal slot in the member 4, thence under the member 18 and outwardly over the pulley 7 and beneath the pulley 8. As the coil form 1 rotates in the direction of the arrow, at the appropriate point the attendant presses on the member 19 to exert a suitable drag or even stop the feeding of the wire through the device. This drag causes the wire to be given a positive bend around the pulley 7, after which the attendant may release the pressure and allow the feeding movement to continue. Of course it will be understood that instead of stopping the wire the attendant may just increase the drag over that normally exerted. In any event the wire is bent at intervals of increased pressure around the pulley 7, while at the same time the wire is moving it is being given a slight reverse curve by passing beneath the pulley 8. It is this reverse curve which enables the coil to retain its flat surface after being wound and prevents the individual turns from bulging outwardly.

As a result of the manner of mounting the tool on the shaft 3, the attendant is enabled to follow the feeding movement of the wire to advance it along the coil form as the latter rotates. There is thus provided a hand tool by which the tension and bending of the wire may be easily effected during the winding of relatively heavy wire coils.

Various changes and modifications may be made without departing from the spirit and scope of the invention.

What is claimed is:

1. A hand tool for shaping and winding coils, comprising a handle portion through which wire is fed, adjustable means cooperating with said handle portion for exerting a frictional drag on said wire, and a pair of wire guiding rollers rotatably mounted in one end of the tool.

2. A tool according to claim 1 in which the frictional means is mounted in the handle in a convenient position to be engaged by the thumb when the handle portion is naturally gripped.

3. A tool according to claim 1 in which the guide rollers are grooved and the tool terminates in a bifurcated portion in which the rollers are mounted.

4. A tool according to claim 1 in which one of the rollers serves to bend the wire at spaced intervals and the other roller serves to prevent the wire bulging outwardly between the first named bend portions.

5. A tool according to claim 1 in which one roller serves to make a bend in the wire in one direction and the other roller serves to make a bend in the wire in the opposite direction during winding.

6. A hand tool for shaping and winding coils, comprising a hand grip portion, a wire guiding portion, a pair of wire guiding rollers mounted in said guide portion, yieldable frictional means carried by said hand grip portion easily engaged by the thumb, and means for supporting the tool for longitudinal wire feeding movement and also for rotation.

7. A tool according to claim 6 in which the hand grip portion is longitudinally grooved to permit the wire to be fed therethrough to said rollers.

8. In a hand tool for shaping and winding coils, means for guiding wire, means for bending said wire in one direction at regularly recurrent points to shape the coil, and means for bending the wire between said points in an opposite direction to prevent said wire bulging outwardly on the finished coil.

9. A hand tool for winding wire coils, comprising a hand grip portion, yieldable frictional means carried by said tool, and means carried by said tool for prebending the wire at regularly spaced intervals.

10. A hand tool according to claim 9 in which means are also provided for bowing the wire in the opposite direction to the prebending thereof, to prevent bulging outwardly of the coil sides when formed.

In testimony whereof I have hereunto set my hand on this 9th day of February, A. D. 1931.

CHESTER H. THORDARSON.