June 14, 1932. C. H. THORDARSON 1,862,727

MECHANISM FOR WINDING COPPER RIBBON WITH TAPS INTO MULTIPLE COILS

Filed Feb. 1, 1930 2 Sheets-Sheet 1

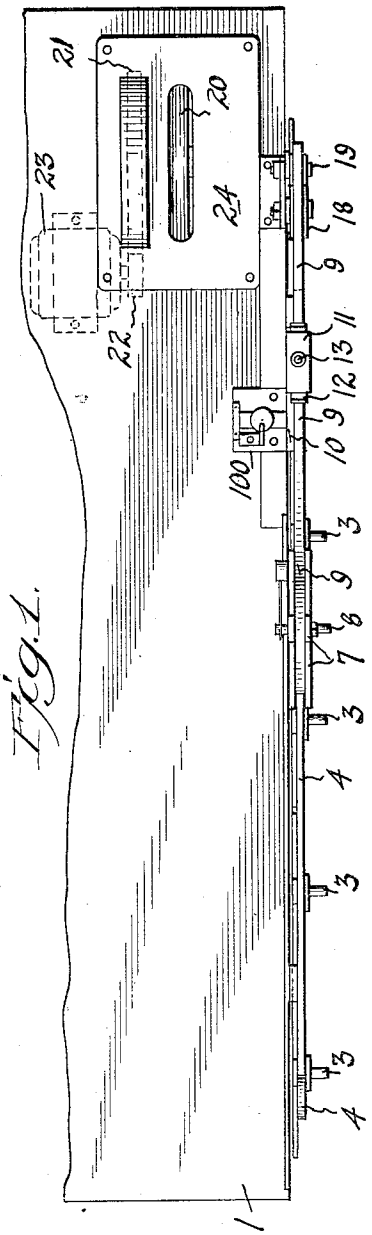


Fig. 1.

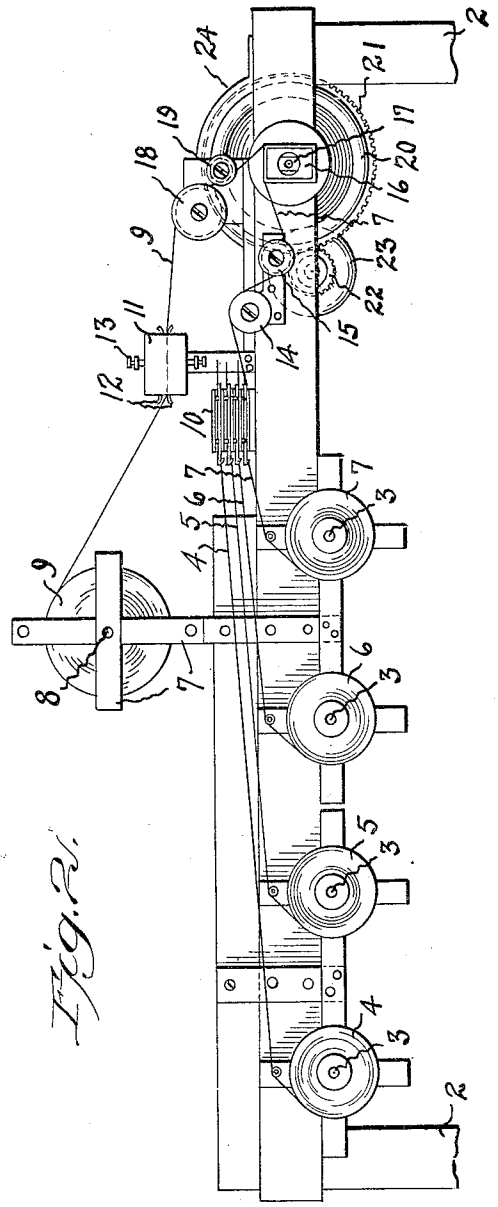


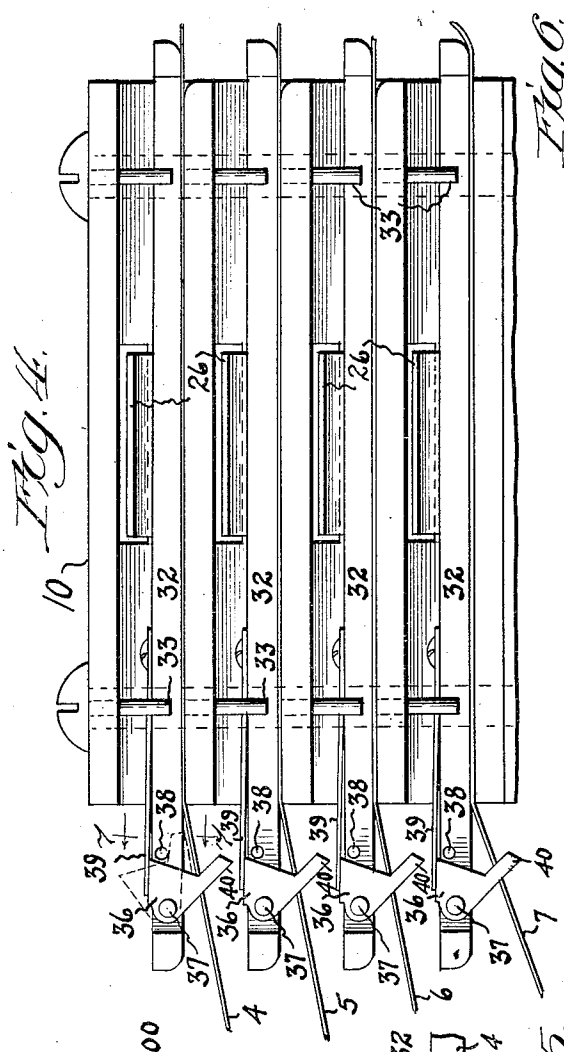
Fig. 2.

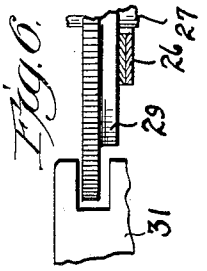
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his Attys

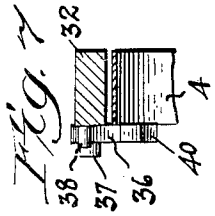
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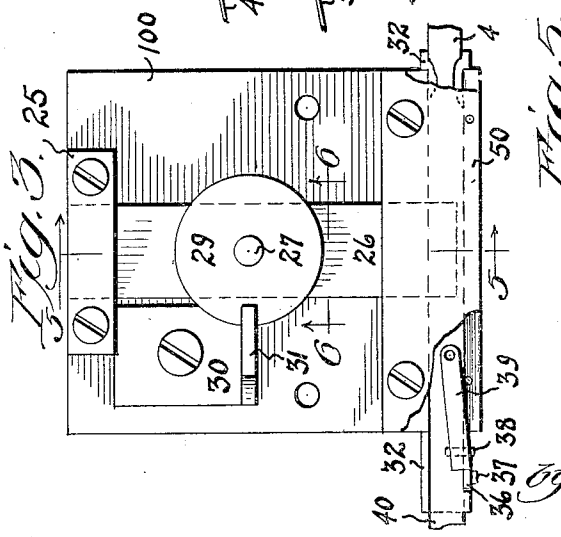
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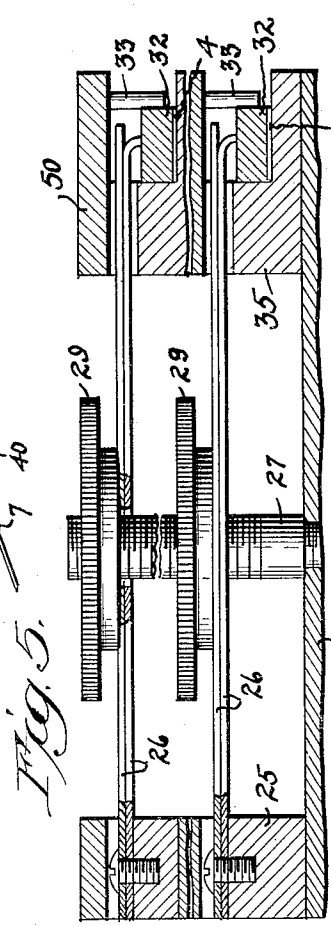
Filed Feb. 1, 1930 2 Sheets-Sheet 2













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Patented June 14, 1932 1,862,727

UNITED STATES PATENT OFFICE

CHESTER H. THORDARSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO THORDARSON ELECTRIC MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

MECHANISM FOR WINDING COPPER RIBBON WITH TAPS INTO MULTIPLE COILS

Application filed February 1, 1930. Serial No. 425,336.

This invention relates in general to an apparatus by means of which electric windings may be made from strips of copper or other metallic ribbon and insulating paper.

A further object of this invention is the provision of mechanism by means of which copper strips having suitably spaced taps to provide tabs for the windings may be wound into tapped coils.

A still further object of the invention involves the use of copper strips with taps so placed thereon that when the strip is wound into coils the device will project from the side of the coil in alignment.

A further object of this invention is the provision of mechanism by means of which an insulating strip of material may be wound between adjacent turns of the conducting strip.

A further object of this invention is the provision of means by which the strips employed may be held under proper tension and maintained in a convenient accessible position when they are cut off from the winding.

A still further object of this invention is the provision of guiding means for the several strips of copper which also acts to maintain the proper tension on the strips.

This device is also provided with guides which cooperate with the projecting tabs to permit them to move therethrough without injury to the tabs.

A still further object of this invention is the provision of mechanism comprising a plurality of cooperating elements by means of which all of these objects may be carried out.

These and many other objects as will appear from the following disclosure are secured by means of this invention.

This invention resides substantially in the combination, construction and relative location of parts, all as will be described below.

Referring to the drawings:

Fig. 1 is a top plan view of the device with a portion of the support broken away;

Fig. 2 is a side elevational view;

Fig. 3 is a top plan view of the mechanism for adjusting the pressure on the guide and tension shoes;

Fig. 4 is a front elevational view of the guide and tension device;

Fig. 5 is a cross sectional view taken on the line 5—5 of Fig. 3;

Fig. 6 is a cross sectional view taken on the line 6—6 of Fig. 3;

Fig. 7 is a cross sectional view taken on the line 7—7 of Fig. 4;

Fig. 8 is a plan view of the metal strip with the contacting tabs thereon.

The invention will be clearly understood by direct reference to the drawings.

A suitable supporting table 1 having the legs 2 is provided on which are mounted a plurality of spindles 3. Each spindle is provided with a roll of metallic conducting strip such as copper, for example as shown at 4, 5, 6 and 7. A suitable standard 7 is supported on spindle 8 on which is mounted a roll of paper strip 9. The guide and tensioning means for the copper strips is shown generally at 10. Suitably supported in the path of travel of the paper strip 9 is guide 11 having opposed spring shoes 12 between which the paper strip slides. The tension on these strips can be varied in any obvious manner by means of the adjusting screw 13. Mounted on the side of the machine, as shown, are the guide rollers 14 and 15 for the copper strip. A spindle 17 is provided on which the winding form 16 is supported. Mounted in the path of travel of the paper strips are the guide rollers 18 and 19. Mounted on spindle 17 is a fly wheel 20 and a gear wheel 21 which are protected by means of the casing 24. At 23 is mounted an electric motor which has the driving pinion 22 meshing with the gear 21.

Referring to the remaining figures the guide and tensioning device 10 is shown in greater detail. Mounted on a suitable plate 100 are the supporting blocks 25 to which one end of the leaf springs 26 are secured. A threaded post 27 mounted on the support 100 extends upwardly through openings in the leaf springs as shown, and has mounted therein adjusting thumb nuts 29, one for each set of leaf springs. Also mounted on the plate 100 is the guide 30 having a notched vertical portion 31. The portion 31 has a notch for

each adjusting nut 29 to limit its movement in either direction. Also mounted on the plate 100 is the block 35 which has an opening therethrough through which the leaf springs 26 extend. Block 35 is provided with a plurality of curves formed by ledges, and has mounted on the top a cover plate 50. The cover plate 50 and ledges are provided with downwardly projecting pins 33 which hold for vertical movement, pressure shoes 32. The leaf springs 26 press on the pressure shoes which are free to move vertically under the guidance of pins 33 against the force exerted by the springs 26. One end of each pressure shoe is provided with a guide plate 36 which is pivotally supported thereon at 37. Leaf springs 39 engage the top of the guide plates 36, and fixed pins 38 are provided to limit the rotary movement of the plates in either direction. The plates 36 are provided with projecting portions 40. As clearly shown in Fig. 7 the guide plates 36 hold the strips in place, so that they will pass smoothly and evenly under the pressure shoes 32.

The metallic strip is shown in the top plan view of Fig. 8 with the tabs 4A welded thereto in proper spaced relation to provide tabs for the finished winding. It may be well to point out here that the copper strip is previously provided with the tabs properly spaced so that the winding builds up as each tap comes into place thereon, which will be directly over the preceding ones, so that all the taps are in alignment. Where large numbers of coils are made with the machine of this type, the spacing between the taps is calculated once and for all, and then they may be welded to the strip in preparing it for use in this machine.

In the operation of the device the strips 4, 5, 6 and 7 are fed under the pressure shoes 32 and allowed to project a short distance thereon as shown in Fig. 2. The lower strip 7 is first fed after the guide rollers and attached to the winding form 16. The paper strip 9 is then fed down over the guide rollers for it and placed on top of the copper strip on the winding form. The motor 23 is then started and the apparatus driven until the winding employing strip 7 is finished. As each tab on the strip passes the guide plate 37 it strikes the lower surface of the extension 40 and causes the guide plate to rotate in a counter clockwise direction against the action of spring 39 so that the top may easily pass these guide plates. The tension on springs 26 is properly adjusted so that the resistance to sliding movement of the strip is sufficient to cause the winding to be under the proper tension. As soon as the winding being made from strip 7 is of the proper size the strip is cut off and several layers of paper allowed to wind thereon. The next strip 6 is then attached to the winding form and the winding to be made of that strip completed. Several more layers of paper are wound on and the next winding begun on strip 5, and so on until all four strips have been wound. It may be well to point out here that at the point where the strip is severed the tab may be of double width so that the end of the winding will have a tab and the beginnings of the next winding with that strip will have a tab. In each case as the strip is cut off it is maintained in easily accessible condition by the pressure shoe and guide, as clearly shown in Fig. 2, to be easily reached when it is to be used again.

From the foregoing disclosure it will be apparent that I have devised a winding machine having certain principles of construction and operation which may be embodied in other physical forms than those shown and described for purposes of illustration, and I do not therefore desire to be strictly limited to the disclosure as given for purposes of illustration but rather to the scope of the appended claims.

What I seek to secure by United States Letters Patent is:

1. A guide and tensioning means for strips having transverse tabs comprising a support over which a metallic strip may slide, a pressure shoe on said strip, a movable guiding arm mounted on said shoe, and means for varying the pressure on said shoe, the tabs on the strip engaging said arm to move it out of their path.

2. A guide and tensioning means for strips having transverse tabs comprising a support over which a metallic strip may slide, a pressure shoe on said strip, a movable guiding arm mounted on said shoe, means for varying the pressure on said shoe, and means for holding the pressure shoe in place and permitting vertical movement thereof, the tabs on the strip engaging said arm to move it out of their path.

3. A guide and tensioning means for strips having transverse tabs comprising a support over which a metallic strip may slide, a pressure shoe on said strip, means for varying the pressure on said shoe, means for holding the pressure shoe in place and permitting vertical movement thereof, and pivoted means on said pressure shoe for pressing against the side of the strip to guide it, said pivoted means being engageable by the tabs to move it out of their path of movement.

4. In a guide and tensioning device of the type described for guiding longitudinal movement of a strip having transversely projecting tabs on one side thereof, comprising a support over which the strip slides, a pressure shoe on said support, means for varying the pressure on said pressure shoe, and a pivoted guide mounted on said pressure shoe to bear against the edge of the strip and

mounted to be rotated when a tab strikes it, to permit the tab to pass thereunder.

5. In a combined guide and tensioning device of the type described for guiding longitudinally under tension a strip having transversely projecting tabs on one side thereof, comprising a plurality of supports, a pressure shoe for each of said supports, means for varying the pressure on each of said shoes, the strip being adapted to slide between the supports and the pressure shoes, a guide plate pivotally supported on the side of each shoe, and means for holding it in guiding position, said pivoted guide being adapted to rotate when one of the tabs on the strip strikes it to move it out of the path of movement of the tab.

6. In a winding machine of the type described for making windings from metallic conducting strip having transverse tabs thereon, the combination comprising means for supporting a plurality of rolls of conducting strip, means for guiding the strip under tension, means on said guiding means arranged to move out of the path of the tabs to permit them to pass through the guiding means, means for supporting an insulating strip, a winding form, and means for driving the winding form, any one of said strips being available to be wound on the winding form and the insulating strip being also available to be wound on the winding form between successive layers of conducting strip.

7. In a winding machine as described, the combination comprising means for supporting a roll of conducting strip having spaced transversely projected tabs secured thereto, means for supporting a roll of insulating strip, a driven winding form, means for guiding the insulating strip onto the winding form under tension, means for guiding the conducting strip under tension onto the winding form so as to overlie the insulating strip, and a movable finger pivotally mounted to bear against the edge of the conducting strip so as to be moved out of the path of the projecting tabs as they pass thereby.

In testimony whereof I have hereunto set my hand on this 31st day of January A. D., 1930.

CHESTER H. THORDARSON.