Sept. 29, 1925. 1,555,756

P. RAUSCHENBACH

METHOD AND MEANS FOR WINDING ANNULAR BODIES

Filed Jan. 5, 1923

Fig. 1.

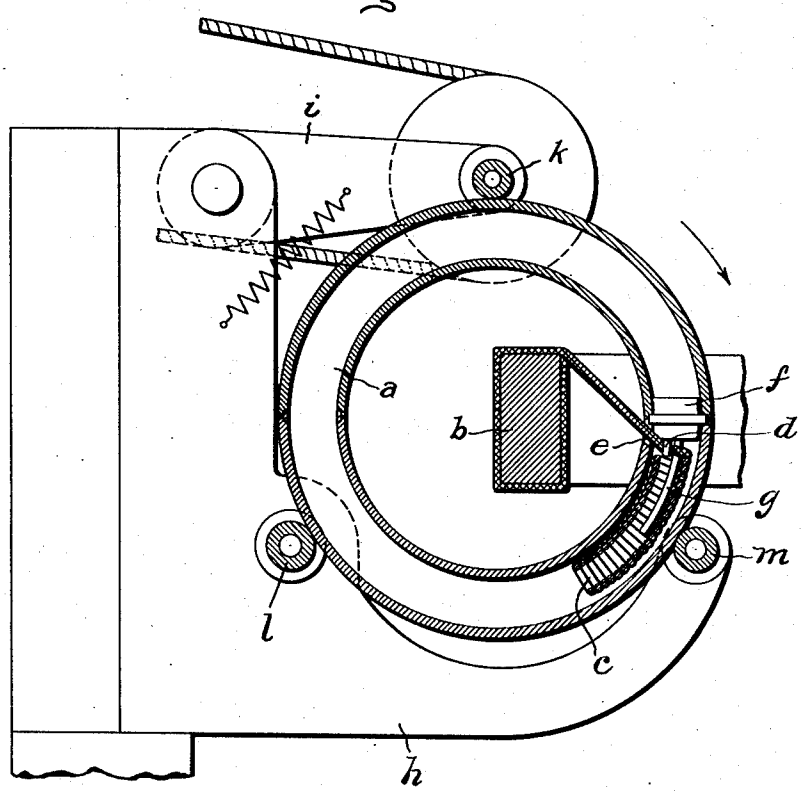
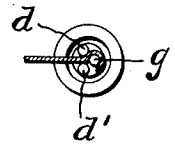


Fig. 2.



Inventor:
Paul Rauschenbach,
by Albert G. Davis
His Attorney.

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UNITED STATES PATENT OFFICE.

PAUL RAUSCHENBACH, OF MEHLEM-ON-THE-RHINE, GERMANY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

METHOD AND MEANS FOR WINDING ANNULAR BODIES.

Application filed January 5, 1923. Serial No. 610,947.

To all whom it may concern:

Be it known that I, PAUL RAUSCHENBACH, a citizen of the German Realm, residing at Mehlem-on-the-Rhine, Germany, have invented certain new and useful Improvements in Methods and Means for Winding Annular Bodies, of which the following is a specification.

In the machines for winding annular bodies heretofore known, the wire material used was taken from a supply-ring or winding-ring, which was rotated radially to the body to be wound. This arrangement had the disadvantage that each time, after the annular body to be wound was inserted in the winding or supply-ring (which was adapted to open out), the necessary wire material had first to be wound on the supply ring before being used. This operation was repeated at every new beginning of the process. A second solution, now in practice, is better than the former, this solution consisting in substituting for the supply or winding-ring a carrier-ring on which is placed a coil containing the necessary wire material. By this method it is only necessary to exchange the coil for each new operation, and in this way a more rapid sequence in the winding process may be obtained. This method also has one disadvantage, namely, a lack of ready accessibility to the point where the work is being done, and a restriction in the size of the coil for a given diameter of the annular body and therefore a restriction to a small quantity of wire.

By the present invention the above disadvantages are avoided. In addition to ready accessibility of the region where the operation is being effected, and the greatest possible utilization of the available space, the machine affords the possibility of replacing very rapidly the material used.

In the accompanying drawing, Fig. 1 shows in diagrammatic form one illustrative construction of my invention, while Fig. 2 is a plan view of the feeding mechanism. In the embodiment of the invention shown, the material, which may be an electrically conducting wire, is first wound helically, then put into a two-part winding-ring of tubular cross-section, and then passed about the body to be wound through an opening on the inner side of the winding-ring.

The winding-ring a, which consists of an annularly bent tube, is made in two parts or sections so that it may be passed through the ring that is to be wound so as to interlink therewith. The winding material is first wound helically, then the helix c of wire thus formed is put into the open winding-ring, one end of the wire being passed between the two guide-rollers d and d' (Fig. 2) and out of the opening e on the inner side of the winding-ring. The guide-rollers d and d' are to advantage located on the plug or closing device f, which has two projections engaging in the two halves of the ring. On the plug f is placed, in addition to the two guide-rollers, a guide spindle or tongue g which is slightly curved to conform to the winding-ring, and which extends into the wire helix c. The purpose of this tongue g is to prevent distortion of the wire on being drawn out. In the process of winding, by reason of the tongue g, the turns of the helix c cannot be simply adjusted, but the entire helix must rotate about its longitudinal axis in the winding-ring. By reason of the fact that the wire must first be passed about the guide spindle and then passed between the two guide-rollers d and d', there is a slight braking effect, which allows the wire to be drawn out easily without injuring the insulation, but which also prevents the wire from rolling up automatically, and therefore there is a sufficient tension. Also it is immaterial whether the winding-wire is brought into the winding-ring in the form of a right-hand or left-hand-wound helix, since the exit opening for the wire is in the center, and the wire therefore places itself against one or the other guide-roller d or d', according as it is drawn about the guide-spindle from one side or the other. No special device is necessary for keeping the wire tense so long as the central point of the winding-ring a lies in the cross-section to be wound. In this case the winding material is drawn off from the ring in all positions of the ring.

The winding-ring may, as shown in the drawing, be driven by friction rollers. On the machine frame h is mounted the swinging arm i which carries the actuating roller k. Moreover, the winding-ring a also lies between the two guide-rollers l and m. Instead of a friction gearing of course a gear-wheel drive may be used. In this case the winding-ring a would be provided with a toothed rim in which would engage a

toothed wheel instead of the friction-wheel *k*. The friction gearing however involves the great advantage that the winding-ring can be kept perfectly smooth outside, and thus there is no possibility of harm to the insulation of the wire wound on the body in question.

The process above described and the device employed therefor are particularly adapted for such wires as are provided with a delicate insulation, for example, wires having a silk covering. By reason of the fact that the winding material is arranged in an entirely closed winding-ring, and by reason of the special employment of a guide-spindle, it is impossible for the wire helix to become distorted so that injury to the insulation is virtually impossible.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. The method of winding annular bodies which consists in winding the material in the form of a helix, slipping the helix into a two-part winding-ring of tubular cross-section, and then leading the material to the body to be wound through an opening on the inner side of the winding ring, whereby the helix is rotated about its longitudinal axis.

2. Means for winding annular bodies comprising a tubular ring divided into sections so that it may be interlinked with the body to be wound, winding material wound into a helix and slipped into said ring, a guide spindle extending into said helix, a pair of guide rollers for said material, and means for rotating said ring so as to wind said material on said body.

3. Means for winding annular bodies comprising a tubular winding ring divided into sections so that it may be interlinked with the body to be wound, winding material wound into a helix and slipped into said ring, a closing device at the joint between the sections of said ring, a guide pin on said closing device extending into said helix, a pair of guide rollers on said device for said material, and means for rotating said ring so as to wind said material on said body, whereby said helix is caused to rotate about its axis.

In witness whereof I have hereunto set my hand this 15th day of December, 1922.

PAUL RAUSCHENBACH.