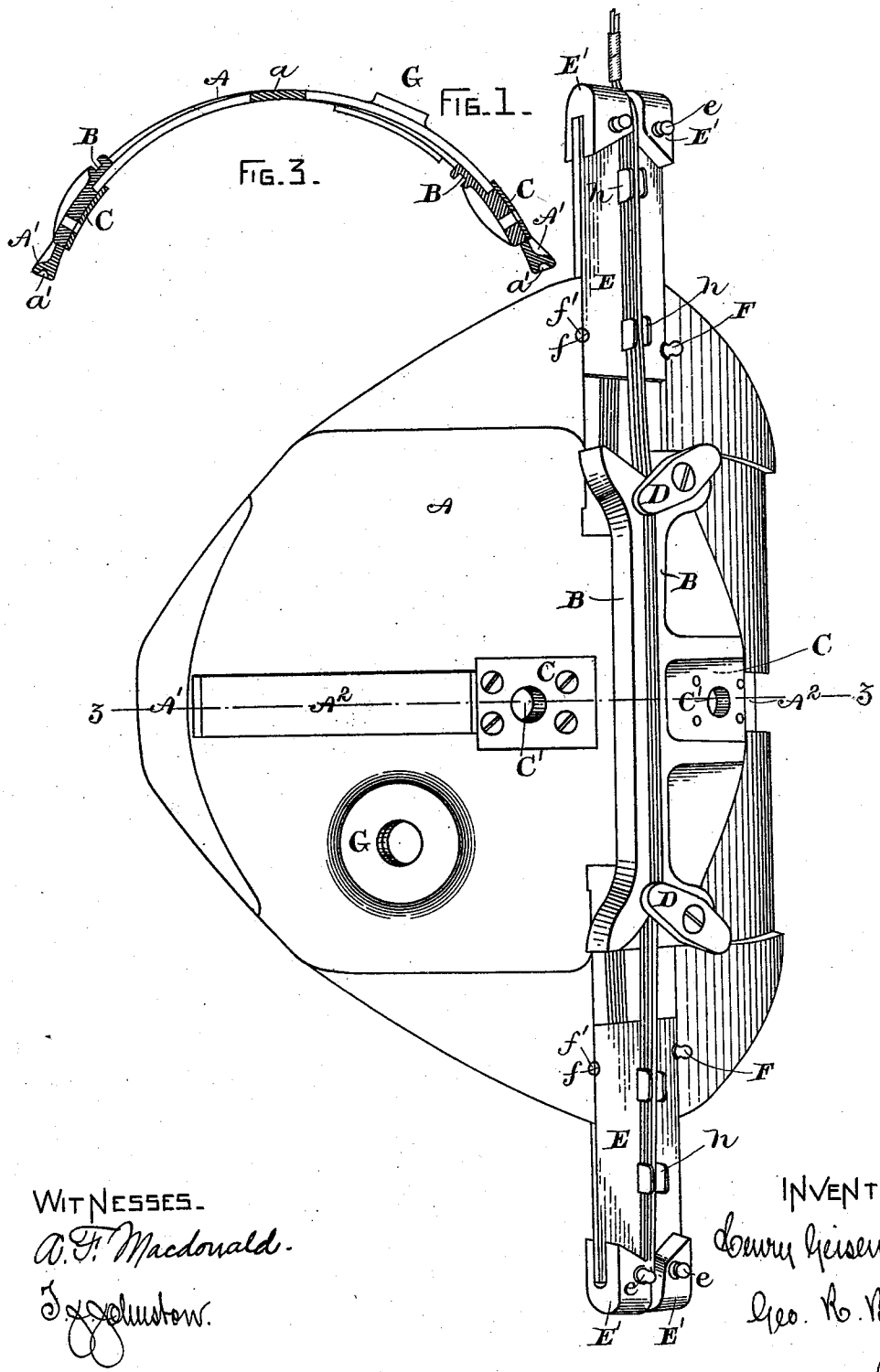
(No Model.) 2 Sheets—Sheet 1.

H. GEISENHÖNER.

APPARATUS FOR WINDING ARMATURE COILS.

No. 533,885. Patented Feb. 12, 1895.



WITNESSES.
A. F. Macdonald.
J. Johnston.

INVENTOR.
Henry Geisenhöner
by Geo. R. Blodgett.
Atty.

(No Model.) 2 Sheets—Sheet 2.

H. GEISENHÖNER.

APPARATUS FOR WINDING ARMATURE COILS.

No. 533,885. Patented Feb. 12, 1895.

FIG. 2.

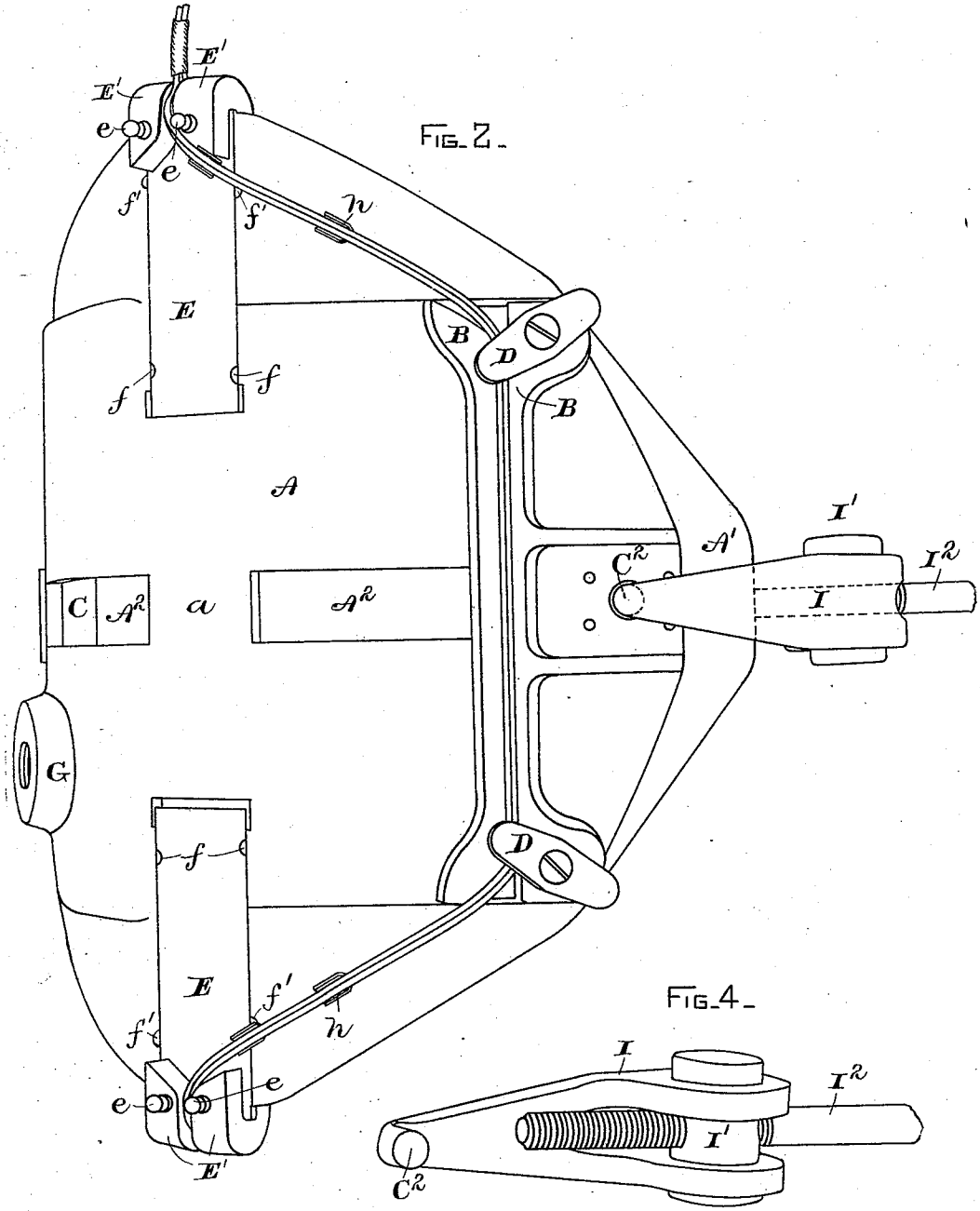


FIG. 4.

WITNESSES.
A. F. Macdonald.
J. J. Johnston.

INVENTOR.
Henry Geisenhöner by
Geo. R. Blodgett.
Atty.

UNITED STATES PATENT OFFICE.

HENRY GEISENHÖNER, OF SCHENECTADY, NEW YORK, ASSIGNOR TO THE THOMSON-HOUSTON ELECTRIC COMPANY, OF SAME PLACE.

APPARATUS FOR WINDING ARMATURE-COILS.

SPECIFICATION forming part of Letters Patent No. 533,885, dated February 12, 1895.

Application filed August 22, 1894. Serial No. 521,044. (No model.)

To all whom it may concern:

Be it known that I, HENRY GEISENHÖNER, a citizen of the United States, residing at Schenectady, in the county of Schenectady and State of New York, have invented certain new and useful Improvements in Apparatus for Winding Armature-Coils, of which the following is a specification.

My invention relates to the manufacture of armature coils for dynamo-electric machines; and has for its object to provide an apparatus by which such coils may be made rapidly and accurately, at the same time being capable of ready insulation and being made in interchangeable form; while, when partially completed, they become practically integral in construction although formed of a number of convolutions, thus affording great facility in the subsequent handling necessary, in their efficient insulation, and in their application to the armature core. I do not however in this application claim either the coil itself or the method of forming the same, as these are not my invention, my claims being restricted to the apparatus which I have devised for their ready manufacture; although I do not mean to limit myself to the apparatus shown and described, as it may be varied in form without departing from the principles involved.

My invention then consists in a tool or apparatus by which the coil may be formed first of a number of convolutions lying side by side in the same vertical plane, the two parts of the coil being approximately straight, and then being pulled open sidewise so as to form the coil into a six-sided figure, the pulling open sidewise at the same time bringing the ends of the coil nearer together and the whole operation keeping the wires composing the coil under tension so that the parts between the points of flexure are straightened; or, more accurately, shaped to the true curve required in some parts, and straightened in others.

The accompanying drawings show my improved apparatus, and therein—

Figure 1 is a perspective view looking to the right with the coil in its first position; Fig. 2, a perspective view looking to the left with the coil in its second position and substantially completed. Fig. 3 is a cross-section upon the line 3—3 of Fig. 1 and upon a smaller scale and with the channel-irons in position at the sides of the apparatus; and Fig. 4 is a perspective view of the appliance which I use to effectually straighten the sides of the coils and put the wires under an equal tension.

Referring by letter, A is the body of the tool, formed of thin metal, preferably by casting. In practice I have used a brass composition, although this part of the tool may be made of any appropriate substance having the requisite strength. As illustrated in Fig. 3, it presents a curved or approximately cylindrical surface which is preferably of the same radius as the armature core upon which the coils are to be applied, although minor variations from this are immaterial. Upon each side of the body piece A I secure a channel-iron B. The wires of the coils are designed to pass through the groove or channel in this part of the apparatus and to be secured firmly therein by the buttons D, D. The top and bottom of the groove are rounded off in the direction of flexure of the coil so that the wires may not be bent against a sharp edge. Attached to this channel-iron and on the opposite side of the body-piece is a block or plate C, and through the block and the projecting part of the channel-piece B is a hole C′ for the insertion of the stretching tool illustrated in Fig. 4. This plate or block C is designed to secure the channel-piece B in place so that it may reciprocate upon one surface of the body A, the block C and the projecting part of the channel-piece having a bearing in the slot A^2 cut in the body A. One of these channel-pieces B is upon each side of the apparatus, and when the coil is being wound they register with each other in the same vertical plane.

Upon the body piece A is a boss G by which it is secured to a suitable upright support, not shown. The edge A′ of the piece A is cast thicker, and, as shown in Fig. 3, has a small groove a' upon the part opposite the slot A^2, the groove being designed to take the end of the screw in the tool shown in Fig. 4. A cen-

tral portion a of the body piece A in the line of the slots A^2 is left to strengthen the structure, and to form a stop at the center for the channel-pieces B, B.

At the top and bottom of the body piece are reciprocating slides E held in place by pins F in holes f, f, registering with similar holes $f' f'$ in the thickened upper and lower portions of the body piece A. Upon the ends of these slides E are projecting blocks E', E' also held in place by suitable pins e, e.

The operation of winding a coil upon my improved apparatus is as follows: The coil is first wound with the tool in the position shown in Fig. 1, preferably with an operator upon each side of the tool, and after the wire is in place and the ends secured together, the buttons D, D are turned to prevent the wire jumping out of the groove in the channel-piece B. The clips h, h are slipped under it to hold the wires in place, the pins F, F are withdrawn, and the channel-pieces B, B are then moved from the center to the sides of the apparatus, shaping the coil as shown in Fig. 2, and at the same time pulling down the slides E, E to the position shown in that figure. The tool shown in Fig. 4 is placed in position, as illustrated in Fig. 2, with its end C^2 engaging with the hole C', and the screw I^2 engaging with the groove a' in the part A' of the body piece A. This screw has a corresponding thread in the pintle I' which revolves in the body part I of the tool. The screw I^2 is then turned (it being understood that two of the tools I are employed, one upon each end), until the coil is stretched tight. The blocks E', E' are then moved, either by slipping out the pins e or by turning the blocks about the pins as an axis, and the coil is removed from the form, after which it is wrapped with insulating tape, and the clips h removed. More insulation is then applied in the usual ways, if necessary, this forming no part of my invention.

The blocks E', E' may be bodily removed to remove the coil more easily, and other means of stretching the coil might be employed without affecting the principle of my invention; and it is manifest that variations of form in the tool may be made. Mere modifications such as these I aim to embrace in the claims annexed to this specification.

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

1. In an apparatus for winding dynamo-electric coils, a supporting body part, reciprocating parts engaging the sides of the coil, and reciprocating slides engaging its ends; the parts engaging the ends of the coil approaching each other as the parts engaging the sides of the coil separate.

2. In an apparatus for winding coils for dynamo-electric machinery, a supporting body part, reciprocating parts provided with grooves for the wire forming the sides of the coil, and reciprocating slides engaging the coil ends; the grooved parts and the slides being in the same vertical plane during the winding of the coil, and the grooved parts arranged to separate and the slides to approach as the coil is shaped.

3. In an apparatus for winding coils for dynamo-electric apparatus or machinery, a supporting body part, reciprocating parts engaging the sides of the coil, reciprocating slides engaging its ends, and means for holding the slides apart or permitting them to approach at will.

4. In an apparatus for winding coils for dynamo-electric machinery, a supporting body part, reciprocating parts engaging the sides of the coil, reciprocating slides engaging its ends, the parts occupying approximately the same vertical plane during the winding of the coil, and means adapted to hold the slides apart while the coil is being wound and to permit them to approach as the coil is shaped.

5. In an apparatus for winding coils for dynamo-electric armatures, a curved supporting body part, and parts reciprocating therein and engaging the sides and ends of the coil, as set forth.

6. In an apparatus for winding coils for dynamo-electric armatures, a curved supporting body part of approximately the same radius as the armature core to which the coil is to be applied, and parts reciprocating upon such body part engaging the sides and ends of the coil, as set forth.

7. In an apparatus for winding coils for dynamo-electric armatures, a curved supporting body part, reciprocating parts engaging the sides of the coil, and reciprocating slides engaging its ends; the slides arranged to approach each other as the parts engaging the sides of the coils separate.

8. In an apparatus for winding coils for dynamo-electric machinery, a curved supporting body part, parts reciprocating therein adapted to engage the sides of the coil, reciprocating slides adapted to engage its ends, and means for holding the reciprocating slides in place while the coil is being wound and permitting them to approach as the parts engaging the sides of the coil separate in the process of shaping the coil, substantially as set forth.

9. In an apparatus for winding coils for dynamo-electric machinery, a supporting body part, reciprocating slides adapted to engage the ends of the coil, and reciprocating parts adapted to engage the sides of the coil, one of such reciprocating parts being upon each side of the body or supporting part as set out.

10. In an apparatus for winding coils for dynamo-electric armatures, a curved supporting body part of approximately the same radius as the armature core to which the coil is to be applied, reciprocating parts provided with grooves adapted to engage the sides of the armature coil, one of such parts being upon each side of the curved body part, means for

retaining the wires of the coil in place in the reciprocating part, and slides for engaging the ends of the coil; the slides arranged to approach as the parts engaging the sides of the coil separate.

11. In an apparatus for winding coils for dynamo-electric machinery, a curved supporting body part of approximately the same radius as the armature core to which the coil is to be applied, reciprocating parts upon each side thereof provided with grooves for engaging the sides of the armature coil, means for retaining the wires of the coil in the grooves, and slides for engaging the ends of the coil provided with movable blocks upon their ends; the parts arranged to co-operate, as herein set out, whereby the coil may be wound in a single vertical plane, the reciprocating parts engaging the sides may be separated and the slides brought nearer together to shape the coil, and the retaining means upon the reciprocating parts and the blocks upon the sides may be moved to release the coil from its engagement with the apparatus and permit its removal, substantially as set out herein.

In witness whereof I have hereunto set my hand this 13th day of August, 1894.

HENRY GEISENHÖNER.

Witnesses:

B. B. HULL,

R. E. BRIZEE.