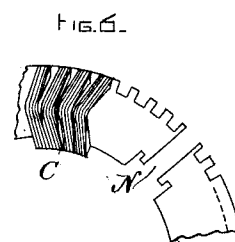
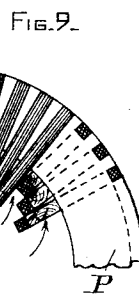
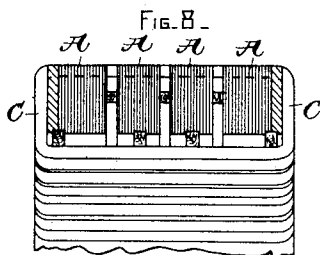
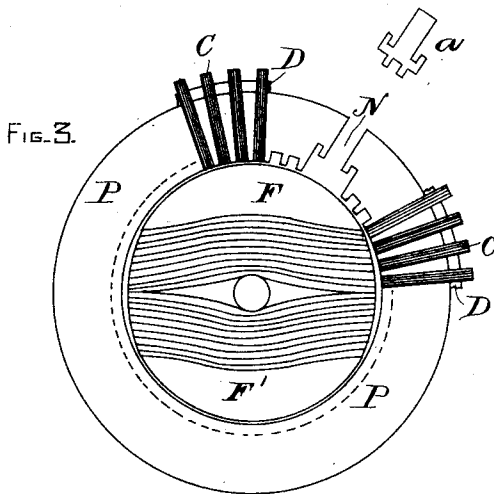
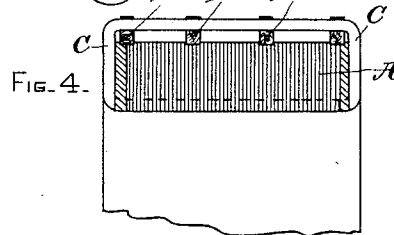
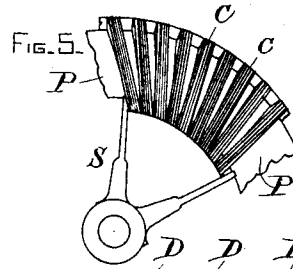
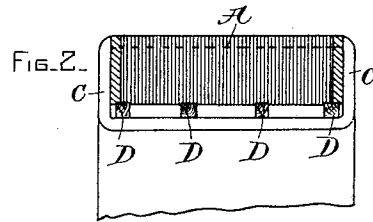
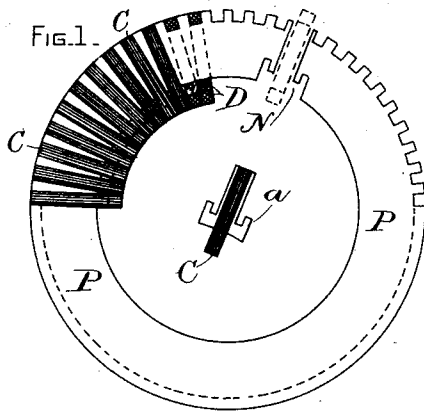


(No Model.)

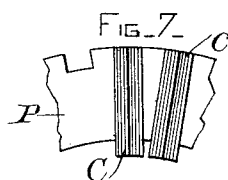
E. THOMSON.
ARMATURE FOR DYNAMOS AND MOTORS.

No. 483,700.

Patented Oct. 4, 1892.



WITNESSES.
Alfred F. McDonald.
A. C. One



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UNITED STATES PATENT OFFICE.

ELIHU THOMSON, OF SWAMPSCOTT, MASSACHUSETTS, ASSIGNOR TO THE
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ARMATURE FOR DYNAMOS AND MOTORS.

SPECIFICATION forming part of Letters Patent No. 483,700, dated October 4, 1892.

Application filed December 2, 1891. Serial No. 413,823. (No model.)

To all whom it may concern:

Be it known that I, ELIHU THOMSON, a citizen of the United States, residing at Swampscott, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Armatures for Dynamos and Motors, of which the following is a specification.

The object of my invention is to provide an easy and simple method of applying coils to a ring armature for magnetizing the same, particularly where the ring is laminated and provided with projections either internal or external.

My invention also secures a proper separation of coils and provides spaces for ventilation around and about them.

This invention is an improvement applicable to the armature construction shown in my patent, No. 400,973, adapting the same to certain types of armature, particularly those with projections, either internal or external.

In the accompanying drawings, Figure 1 is an end elevation of an armature, showing the process of construction thereof in accordance with my invention. Fig. 2 is a longitudinal section of a portion of the same. Figs. 3 and 4 are similar views showing another form of armature. Figs. 5, 6, and 7 show modifications. Figs. 8 and 9 show other features of my invention.

Fig. 1 shows an armature in process of construction according to my invention. The sheets or plates of iron P P, forming the body of the armature, are not continuous rings, but have one or more notches N cut through them. This gives a space for the passage of coils and the slipping of said coils over the ring into the position shown at C C. If the iron core has projections or teeth extending outwardly, it is evident that the coils in entering the spaces between the projections will project inwardly from the inner surface of the core, as at D, leaving a space between the core and coil. This leaves the coils unsupported at their inner sides, and in order to firmly support them I insert wedges at D between the coils and the windings of the cores P P, which wedges may be of insulated pieces of metal or hard wood, and which block up the coils so as to hold them securely in the

spaces or between the projections on the outside while the coils are being applied to the ring structure and afterward while the machine is in use. After the coils are in place all around the ring the closing of the notch or gap N is accomplished by inserting the plug *a*, which may carry the last coil, the plug *a* being made up of a number of plates or laminations of a form to fit the notch N and bind the ring together as nearly as possible. It is not essential that the plug *a* carry a coil, as the extra ones in the vicinity of the plug may be slipped upon the ring while the plug is being inserted and afterward distributed. The armature may be bound over with wire of suitable character, such as iron wire or German-silver wire, as a final finish and suitably mounted for revolution. In case it is not desirable that the coils stand off the inner line of the core, as at D, Fig. 1, the coils may be wound in a proper form and inserted in the projections, so that they may be afterward turned on a slant, as in Fig. 5, and thereby be made to bear upon the inner surface of the core-piece P P. A spider or carrier S, which carries the core P P, serves to firmly space and hold the coils in position.

In Fig. 4 the core-piece or laminated plates built up in the form of a ring, as before, are provided with projections on the interior surface, some only of which are indicated. In this case the procedure for laying on the coil is simply the reverse of that in Fig. 1, the coils being drawn into the spaces between the projections on the inner surface of the ring and held there by wedges or pieces placed upon the exterior of the core, as at D, and serving to hold the exterior portions of the coils off the core. The insertion of the laminated plug *a* into the gap N, as before, locks the whole together.

The armature shown in Fig. 3 is suitable for revolution around a stationary field F F', wound with a suitable field-coil for magnetizing the same, or the field coil and core F F' may revolve in the interior of such an armature otherwise kept stationary. My invention therefore in both forms allows the easy construction and winding of any laminated ring structure with projections for use in electric motors and dynamos of any design.

Fig. 6 indicates a procedure, which may be used instead of that shown in Fig. 5, for closing up the interior portions of the coils of a projection armature where such coils have been slipped through a notch N and over the projections to position. It consists simply in extending or bending the end of the coils, as indicated, so as to narrow them or take up the excess of width which would otherwise cause them to stand off from the interior. In this case, as in each of the others, the core has a toothed and a plain portion and the coils are secured between the teeth and have a bearing against the plain portion, so as to hold them firmly in place.

In Fig. 2 the core A is shown as consisting of a series of plates piled together without break. In Fig. 8 this construction is modified and the plates are built up in sections A A A A, with air spaces between, which of course give rise to openings on the exterior of the structure. This allows air to be discharged from the interior and the coils, standing off, as they do in Figs. 1 and 3, from the unnotched part of the core, permit free movement of air between the coil and core. To increase this effect, the coils may be wound, as in Fig. 9, so that the successive coils stand off to different extents from the interior of the core, as C¹ C² C³, &c. This leaves spaces between the narrow and the wide coil for the entrance of air in the space underneath the coils and the discharge of air through the gaps in the core between the sections A A A A, Fig. 8. I find the construction Fig. 9 useful even in the case of the armature-coils not being wound or placed in accordance with the other part of my invention. In other words, I find that coils may be wound upon a core in any way or placed thereon in any way and allowed to project unequally on the interior of the ring structure, so that passages exist between the coils for the entrance of air into the spaces of the core itself, and as an improvement this part of my invention is applicable generally to dynamos and motors whether the coils be wound upon smooth cores by winding the wire itself around a ring or whether the cores are, as in the previous figures, wound separately and inserted through a notch and then brought to position.

My invention is applicable to the placing of wire upon annular magnetic structures of any kind, and the coils themselves may be single coils or double coils, as desired. In the construction of continuous-current transformers the apparatus may demand two coils

which must lie close together on the same core, and in this case the coils may be wound separately or wound together and treated afterward as one coil. Fig. 7 indicates a portion of an armature with several such double coils in place.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with the annular magnetic core having one or more notches and filling-plugs and having projections on its inner surface, of the separable coils of a size and shape enabling them to be passed through the notch and over the projections, said coils being secured in place between such projections.

2. The combination, with the annular magnetic core having one or more notches and filling-plugs and having projections on its surface, of the separable coils of a size and shape enabling them to be passed through the notch and over the projections, said coils being secured in place between such projections by a bearing against the armature.

3. The combination, with the annular magnetic core having a notch and a filling-plug and having a toothed and a plain portion, of coils of a size and shape enabling them to be passed through the notch and over the projections and having a part secured between the projections and a part supported firmly adjacent to the plain portion of the armature.

4. The combination, with the notched ring core having toothed and plain portions, of the coils large enough to pass over the teeth and secured between said teeth and blocks interposed between said coils and a plain part of the core.

5. The combination, with an annular core composed of sections having ventilating-openings between them, of coils around the same of larger diameter than the core, whereby there is left an intermediate space between the coils and core, and blocks inserted at intervals in such space.

6. The combination of a magnetic core, coils around the same having different diameters, and thereby leaving spaces of different size between the coils and core, and blocks inserted at intervals in such spaces.

In witness whereof I have hereunto set my hand this 28th day of November, 1891.

ELIHU THOMSON.

Witnesses:

JOHN W. GIBBONEY,
BENJAMIN B. HULL.