

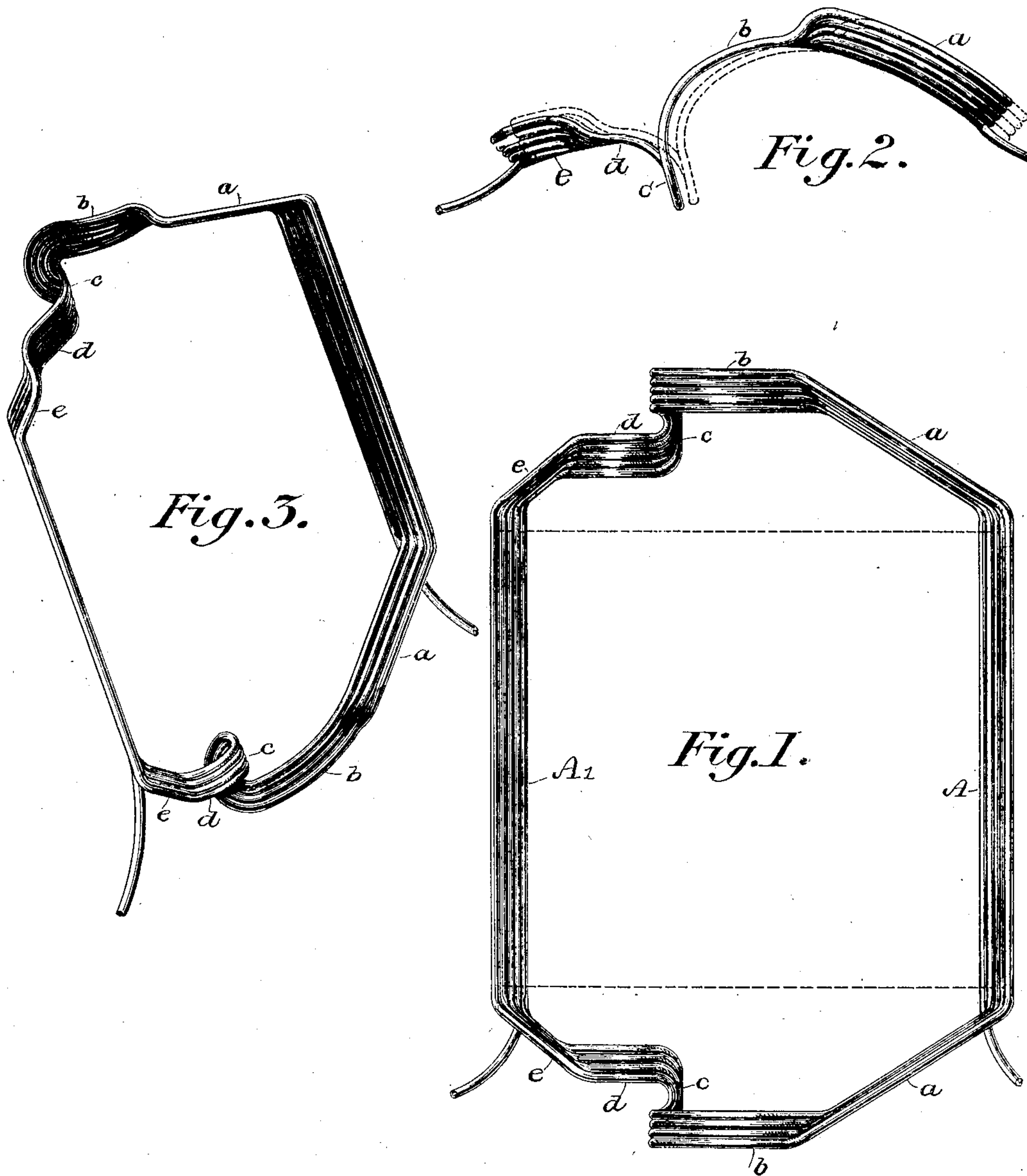
No. 755,029.

PATENTED MAR. 22, 1904.

F. A. MERRICK.
ARMATURE WINDING OR COIL.

APPLICATION FILED NOV. 9, 1899. RENEWED DEC. 16, 1901.

NO MODEL.



WITNESSES:
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ARMATURE WINDING OR COIL.

SPECIFICATION forming part of Letters Patent No. 755,029, dated March 22, 1904.

Application filed November 9, 1899. Renewed December 16, 1901. Serial No. 86,069. (No model.)

To all whom it may concern:

Be it known that I, FRANK A. MERRICK, of Johnstown, in the county of Cambria and State of Pennsylvania, have invented a new and useful Improvement in Armature Windings or Coils, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to windings or coils for the armatures of dynamo-electric machines, and more particularly to an improvement in machine-wound separable coils which are now extensively used on the drum-armatures of motors and generators. Various forms of these coils have heretofore been devised, the peculiarity of each consisting for the most part in the particular form and disposition of the end or connecting portions of the coils at the ends of the armature.

The present invention is designed to provide a coil of this general type in which the end connections are so constructed and arranged as to minimize the extent of their end projection beyond the body or core of the armature and also to prevent the approach of such connections inwardly toward the armature-shaft to such an extent as to cause them to unduly crowd in each other. I accomplish this object by providing a coil having its ends constructed and arranged in the peculiar manner hereinafter described and claimed, whereby the outer portions of such ends are obliquely disposed in cylindric planes approximately concentric with the axis of their armature-shaft, while their inner inwardly-deflected portions are disposed in planes transversely of such axis. In this manner I am able to limit the longitudinal projection of the coil ends to such an extent as to materially reduce the space occupied by the armature in the direction of the length of its shaft and also to arrange the inner portions of such ends in an annular plane of sufficient inner diameter to prevent undue crowding of adjacent coils.

The invention will be better understood by reference to the accompanying drawings, in which—

Figure 1 is a plan view of one of my armature-windings unwrapped. Fig. 2 is an end view of the same, indicating a second winding in dotted lines; and Fig. 3 is a perspective view.

Usually several of these windings are combined and wrapped together to form one complete coil in the usual manner.

A A' designate the two straight sides of the winding, which are preferably of equal length and consisting each of a number of turns or lengths of wire wound on a suitable form or mold and lying side by side in converging radial planes, so as to fit within the grooves of an armature-core in the usual manner. These sides have a slight end projection beyond the end of the core. (Indicated in dotted lines in Fig. 1.) The two ends or connecting portions of each winding are of counterpart form, and each consists of five different portions, (designated, respectively, by the letters *a*, *b*, *c*, *d*, and *e*.) The portions *a* and *e*, which immediately join the respective sides A A' and which extend obliquely in a cylindric plane concentric with the axis of the armature, are formed by bending the wire at obtuse angles without changing the edgewise disposition of the individual turns or lengths of wires, so that the cross-section of *a* or *e* is the same as the cross-section of the sides A A'.

To form the portions *b* and *d*, which immediately join the portions *a* and *e*, respectively, the wires composing the winding are brought into positions to form a flat web whose plane is perpendicular to the ends of the armature-core and also arched upwardly somewhat, as best shown in Fig. 2.

The portion *c*, which connects the portions *b* and *d*, is a compound bend inward toward the axis of the armature, longitudinally in the direction of the axis of the coil, and again outwardly toward the periphery, whereby the

inner wire of the side portion A and end portions *a* and *b* becomes the outer wire of the side portion A' and the end portions *d* and *e*, and vice versa.

5 It will be observed that in the particular coil shown the portions *a* and *e* do not make the same angle with their respective sides A A', the angle between *a* and A being somewhat greater than the angle between *e* and A';
 10 also, that the portion *a* is longer than the portion *e* and the portion *b* is longer than the portion *d*, the bent portion *c* being in consequence to one side of the longitudinal axis of the coil. This is explained by the fact that
 15 this particular coil is especially designed to be placed upon an armature in such a manner that the side A will lie in the bottom portion of its groove, while the side A' will lie in the upper portion of its groove according to
 20 a well-known method of placing the coils. I take advantage, therefore, of the greater diameter of the circular plane in which the side A' will lie to reduce the projection of the portions *d* and *e*. This, however, is not an essential feature of the invention, as the bend *c*
 25 may be at the center of the coil.

It will be readily seen that when a succession of these coils is placed on an armature the portions *a* and *e* will lie side by side in a
 30 plane concentric with the armature-axis, while the portions *b* and *d* will overlies each other in a plane transverse to the said axis. The extent to which I am thus enabled to shorten the coil will be readily seen by supposing the
 35 portions *a* and *e* to be projected to a point where they would meet in the bend *c* with the portions *b* and *d* omitted and comparing the same with the present coil. It will also be seen that the bend at *c* is made at a point
 40 which is but a comparatively short distance within the peripheral line of the armature and where there is ample room for the like bends of all the coils to be symmetrically disposed without crowding.

45 The particular shape which I have shown is not essential to my invention, since the relative proportions of the several parts of the coil ends and the character and angle of the connecting bends may be considerably varied
 50 without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to protect by Letters Patent, is—

55 1. An armature coil or winding having end connections, two portions of which are obliquely disposed in a cylindric plane concentric with the longitudinal axis of the armature and two other portions of which are disposed transversely of said axis, substantially
 60 as described.

2. An armature coil or winding having parallel equal sides and end connections the two

outer portions of which are disposed obliquely in a cylindric plane concentric with the longitudinal axis of the armature, and inner portions of which lie transversely of the said axis, substantially as described. 65

3. An armature coil or winding of the character described, having parallel side portions 70 and end connections consisting of oblique portions adjacent to each side portion, intermediate transverse portions, and a short connecting portion joining together the intermediate portions and bent toward the axis of the armature and also in the longitudinal direction 75 of such axis.

4. An armature coil or winding having straight sides and bent ends, portions of the latter being shaped to lie side by side with 80 corresponding portions of the adjacent coils in a cylindric plane concentric with the armature axis, and other portions to overlies corresponding portions of adjacent coils in a direction transverse to said axis with their edge- 85 wise planes perpendicular as desired.

5. An armature coil or winding having straight sides and symmetrically-bent ends which leave the sides obliquely in the cylindrical plane of said sides, and are thence bent 90 transversely to the longitudinal axis of the coil, with an intermediately-connecting portion deflected toward the axis of the armature, and also in the longitudinal direction of said axis, substantially as described. 95

6. An armature coil or winding having straight parallel sides lying in radially-converging planes, the conductors composing said sides passing from one side to the other by end portions having arms bent obtusely 100 to the respective sides and extended in a cylindric plane concentric with the axis of the armature and thence carried inwardly toward each other transversely across the ends of the armature, the two arms being connected by 105 short compound bends whereby the inner wire of one arm becomes the outer wire of the other arm, and vice versa, substantially as described.

7. An armature-coil having straight parallel sides and symmetrically-bent ends disposed partly within the cylindrical plane of the sides by means of an oblique end extension beyond the armature-core at each side and partly in planes transversely to the armature axis by 115 means of transverse and inward deflections, which also reverse the relative dispositions of the individual turns or conductors composing the coil, so that the inner conductor of one side becomes the outer conductor of the 120 opposite side, substantially as described.

8. The herein-described armature coil or winding having the straight sides A, A' and the symmetrically-bent ends consisting each of the oblique portions *a* and *e*, the transverse 125 portions *b* and *d*, and the bent portion *c* con-

necting the portions b and d , substantially as described.

9. The herein-described armature coil or winding having the straight sides A , A' and the symmetrically-bent ends consisting each of the oblique portions a and e , the transverse portions b and d , and the bent portion c connecting the portions b and d , the portions a

and b being relatively longer than the portions d and e , substantially as described. 10

In testimony whereof I have affixed my signature in presence of two witnesses.

FRANK A. MERRICK.

Witnesses:

MYRTLE E. SHARPE,
H. W. SMITH.