(No Model.) 2 Sheets—Sheet 1.

B. F. ORTON.

ARMATURE FOR DYNAMO ELECTRIC MACHINES AND MOTORS.

No. 331,155. Patented Nov. 24, 1885.

Fig. 1.

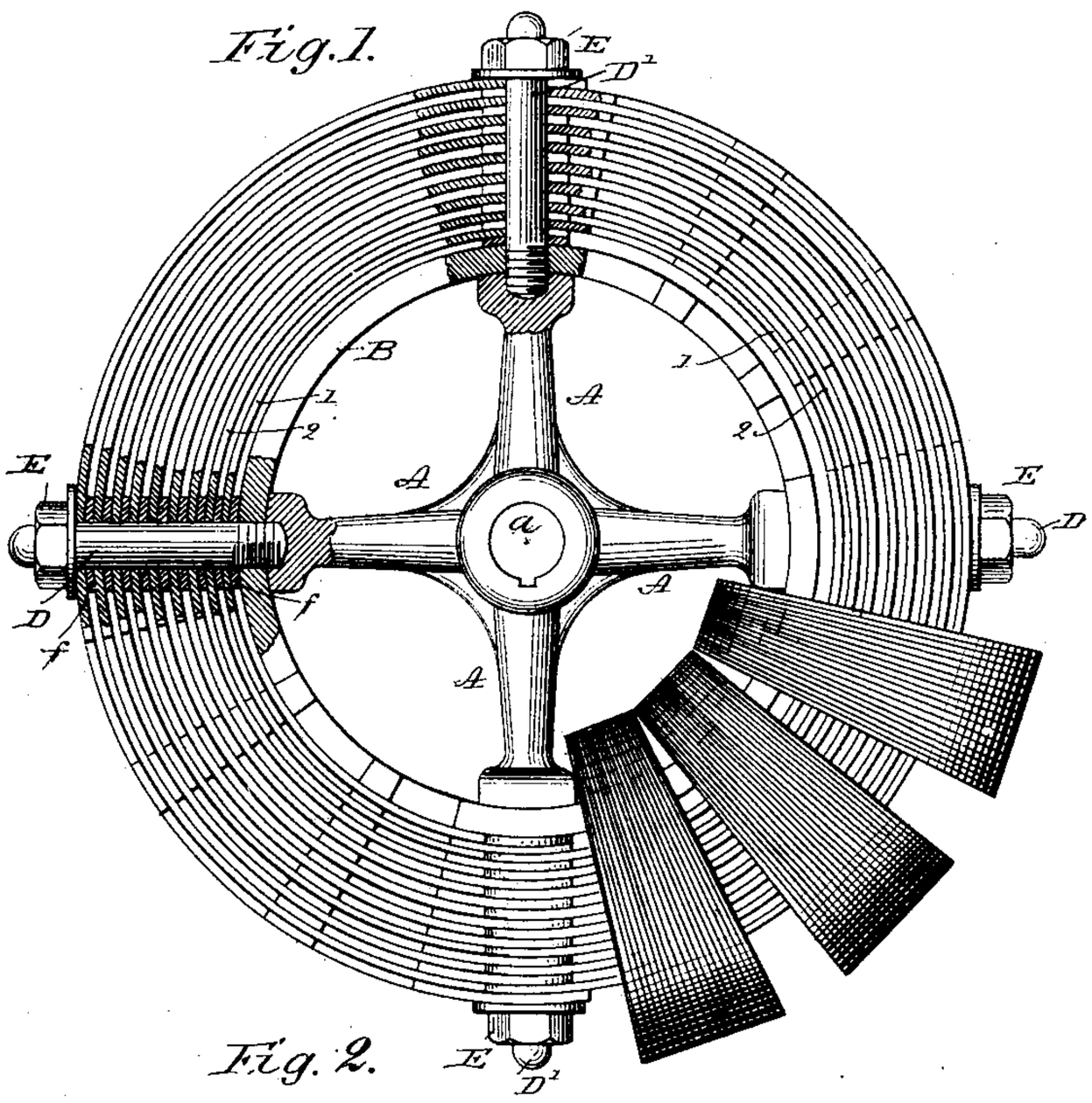
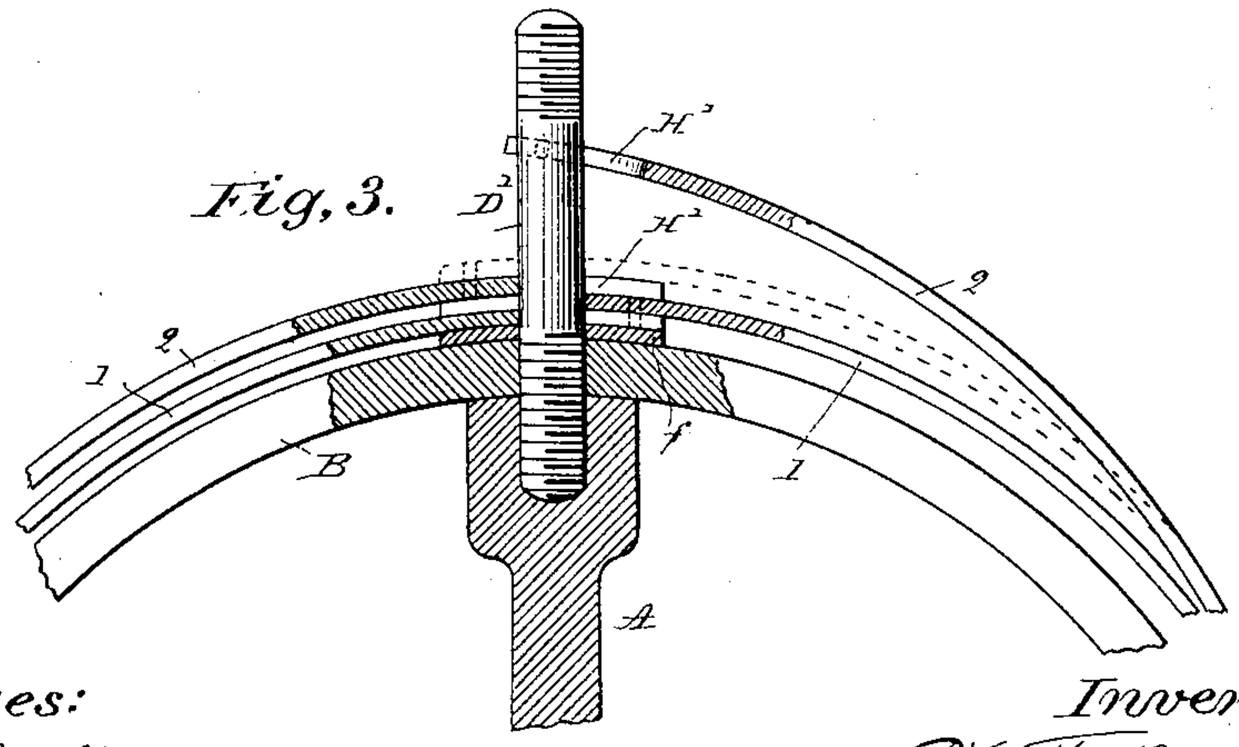


Fig. 2.

Fig. 3.



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Thos. Toomey.

Inventor:
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By his Attorney: H. L. Townsend

(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

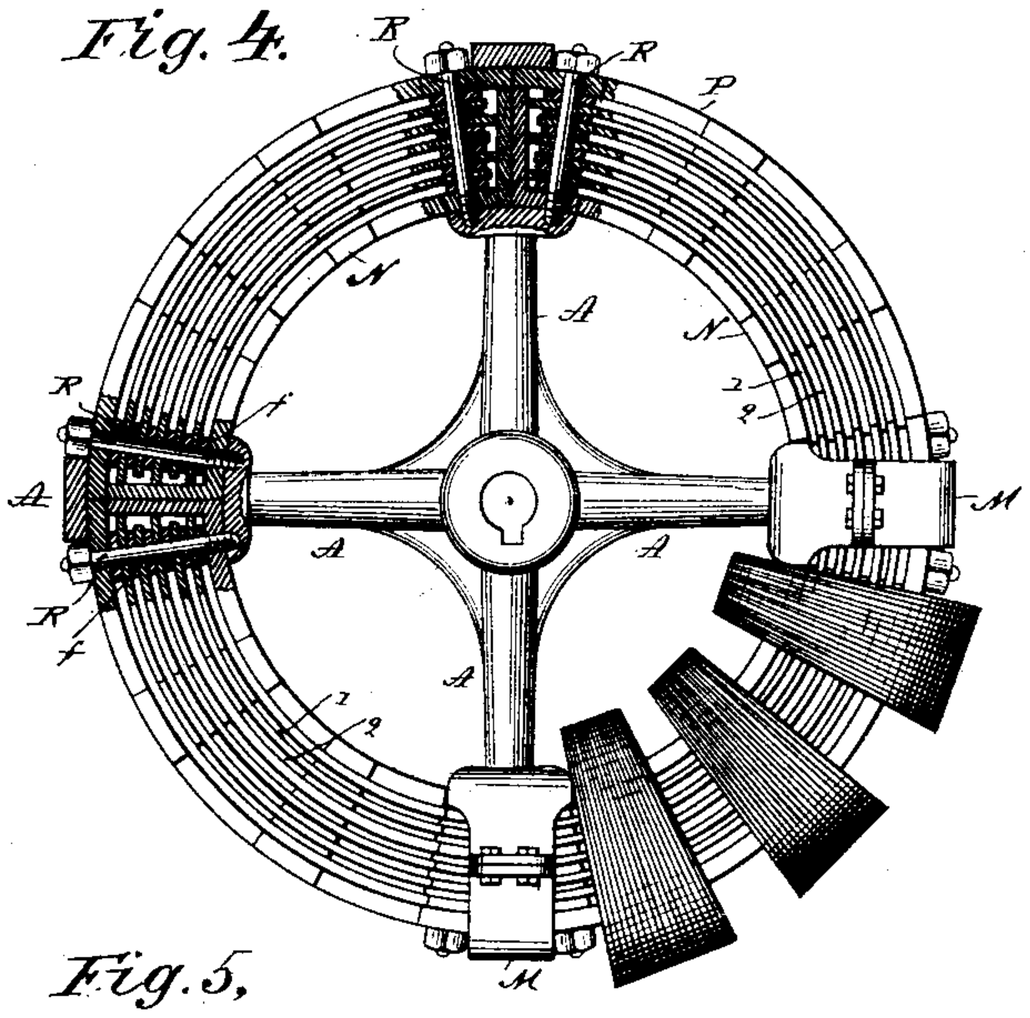


Fig. 5.

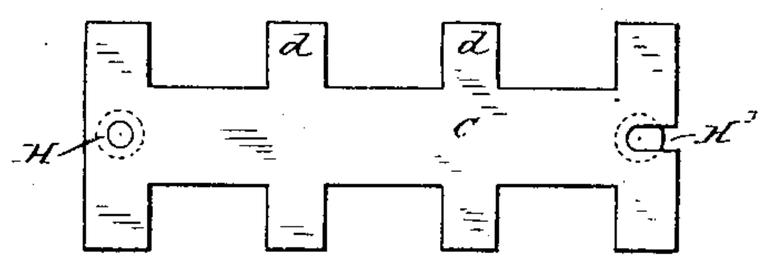
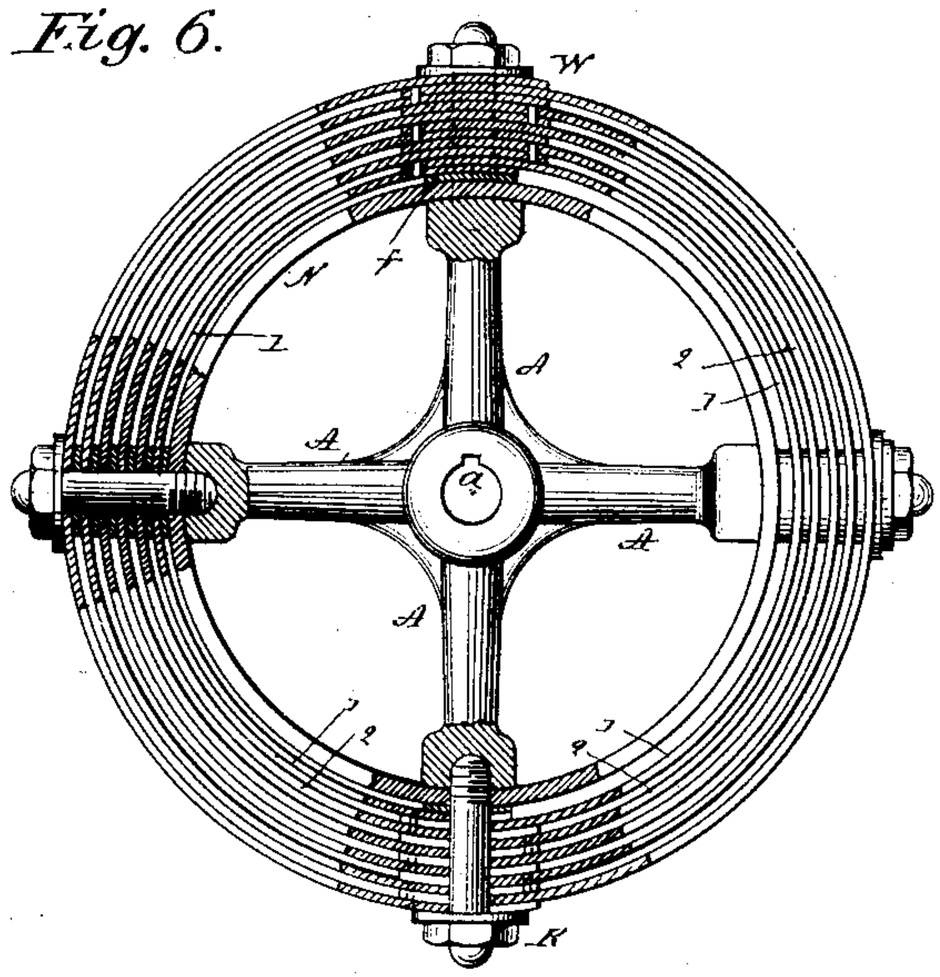


Fig. 6.



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UNITED STATES PATENT OFFICE.

BENJAMIN F. ORTON, OF EAST SAGINAW, MICHIGAN.

ARMATURE FOR DYNAMO-ELECTRIC MACHINES AND MOTORS.

SPECIFICATION forming part of Letters Patent No. 331,155, dated November 24, 1885.

Application filed June 13, 1884. Serial No. 134,732. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. ORTON, a citizen of the United States, and a resident of East Saginaw, in the county of Saginaw and State of Michigan, have invented certain new and useful Improvements in Armatures for Dynamo-Electric Machines and Motors, of which the following is a specification.

The principal object of my invention is to secure immunity, as far as may be, from the evils of heating, induction, &c., in the armatures of dynamo-electric machines, and to thus obtain a considerable increase in the generating capacity of the machine.

The object of my invention is, further, to secure the desired ends by a simple and cheap construction that is at the same time well adapted to receive and hold in place the armature coils or bobbins.

My invention consists in certain details of construction and combinations of parts, which will be specifically stated in the claims at the end of this description.

In the accompanying drawings, Figure 1 is a side view and partial section of an armature constructed according to my invention. Fig. 2 is a plan of a preferred form of one of the strips or layers of iron spread out on the plane of the paper. Fig. 3 illustrates in detail a portion of the armature. Fig. 4 is a side view and partial section of another form of my invention. Fig. 5 is a plan of a layer or strip of iron employed in the armature shown in Fig. 4. Fig. 6 shows an armature in which the successive layers or strips are part of the same continuous strip, made by lapping and riveting together a number of strips bent to the form of the armature.

In Fig. 1 four arms of an armature frame or spider keyed to the armature-shaft *a* are indicated at A A A A.

At B is indicated a ring joining or bolted to the arms A, and constituting a base-ring or circular plate upon which the armature is formed, or to which it is applied, and secured by any suitable mechanical devices.

The armature of Fig. 1 is built up from thin strips of sheet-iron, one of which is shown in plan in Fig. 2.

D D indicate pins or bolts fixed in the frame or spider in any suitable manner, and provided at their outer ends with the nuts E E.

Each strip—such as shown in Fig. 2—is a little longer than is necessary, to make it cover one-half of the circumference of the circle in which it is bent, so that it may be lapped upon and riveted to the next strip (proceeding outward or inward) upon the opposite side of the armature. At the center of each strip is a perforation at H, through which a pin or bolt, D, passes, while at H′ H′ are slots adapted to receive the pins or bolts D′ D′, when the strip is bent down to proper place, as indicated in Fig. 3. K K, &c., indicate holes for rivets, by which the overlapping ends of the strips shown in Fig. 3 may be riveted together, so as to form from each two strips a ring or hoop. In building up the armature a strip or piece of sheet-iron—such as shown in Fig. 2—is slipped upon a pin, D, at its perforation H. Its ends are bent down to the pin or bolt D′, Fig. 3, and are riveted to a similar piece applied to the diametrically-opposite bolt D. Two more strips are then applied on top of the first two, and are similarly secured together, the operation being continued until an armature of the requisite size is built; or, instead of bending the strips after applying them to the pins D, they may be previously bent to a curve of the proper radius by a former, or in other suitable manner, and then applied to the pins, the end of one being slipped under the end of the other and riveted. The nuts at the ends of the bolts D D′ assist in holding the parts together.

It is obvious that the riveting might be dispensed with and the nuts at the ends of the pins D′ D′ depended on for holding the ends of the strips down. The iron in this case is made by preference quite thin and flexible. L L indicate perforations in the strips, which may be used for additional bolts, in case it be desired to employ additional means for holding the strips together, or may serve as bolt-holes for bolts, whereby an armature-ring built up in the manner described may be attached to a suitable spider.

The strip from which the armature is made is provided with lateral or transverse projections *d d*, which serve to hold the armature

bobbins or coils in place, and to also form projecting masses of iron that will move in close proximity to the field-magnets, where such field-magnsts have their poles presented to the sides of the armature, as in some forms of dynamo-electric machines. The portion *c* of the strip is the body or annular portion of the armature-core. It is of course to be understood that the projections *d d* on those portions of the strip or strips nearer the axis of the armature are nearer together than are the projections upon the portions farther from the axis, so that the projections may extend across the side of the armature in a radial line. The overlapping of the ends of the strip-sections at the bolts D′ D′ produces a free air-space in a transverse direction between the successive layers for the circulation of air.

If desired, additional separating-pieces, as at *f*, may be used. These are preferably of iron and in the form of washers, although they may be applied at other points and held in place by other means. The inner of the pieces *f*, or that next the ring B, keeps the inner layer of the strip away from the ring B and leaves a free air-space at such part of the armature.

Thin sheets of insulating material—such as paper, varnish, or other material—may be applied between the successive layers of the strip—that is, the layer made up of the sections 1 1 may be insulated at D′ D′ from the layer made up from the sections 2 2, if desired; or such insulation may be applied between the layers of the sheet-iron strip and the washers *f f*. The oxide on the surface of the sheet metal will, however, ordinarily answer the purpose.

The sheet-iron strip may be made in any desired manner, such as will readily suggest itself to workers in sheet metal, and the strip or strips may be of any convenient length. If a section of the strip be longer than is sufficient to make one complete turn, the distance between the projections *d d* should obviously increase with each successive portion of a section adapted to make a complete circle.

I do not limit myself to the special holding devices herein shown, as many others might be used in their place without departing from the main feature of the invention.

In the form of armature already described the coils or bobbins cannot be wound upon the armature until the latter is completed.

The construction shown in Fig. 4 is adapted for a sectional armature, and permits the coils to be applied before the building up of the armature. In this case the armature is made in four sections, each consisting of a tray-like portion or holder, N, having upturned ends, and on which the strips of thin sheet-iron are secured in any desired manner. The upturned ends of the trays abut against one another, at which points they rest upon tables or plates formed on the ends of the spokes A. An exterior ring or band, P, may be used for assisting in holding all the parts together, or the cross-pieces or stirrups M may be employed for the purpose. The latter will extend transversely across the armature, and are bolted to the upturned sides of the plates or tables at the ends of the arms or spokes A. Bolts or pins which screw into the ends of the spokes A and the trays N may be used as a means of fastening, and each section of the armature may be, if desired, built up, after the manner described in connection with Fig. 1, by slipping one end of a strip upon a bolt at one end of the tray, and bending its other end down to the bolt at the other end of the tray. Separating-pieces may be applied in any desired manner to leave free transverse air-spaces, as indicated. The pieces are preferably of iron, and applied in the form of washers at points where the bolts pass through.

The strips in Fig. 4 can obviously extend only through something less than a quarter of the circle in which they lie after bending.

In both armatures, Figs. 1 and 4, the laterally-projecting portions *d d*, while serving the purposes before described, do not interfere with the free circulation of air between the successive layers of sheet-iron, being formed integral with the sheet-iron strips.

In Fig. 6 I have indicated an armature in which the strip is made continuous by riveting the end of one turn or layer to the beginning of the next turn or layer. The armature may be built up after substantially the same manner as that of Figs. 1 and 2, but instead of riveting both ends of the sections forming the inner layer together they are united at one end only, and the other end of one of them is riveted to an end of a section in the next superimposed layer. Thus sections 1 1 are riveted at W, but at R one end of one section is united to an end of the sections 2 2, and so on, thus making a complete spiral built up on the frame into superimposed layers by riveting together successive sections.

What I claim as my invention is—

1. An armature built up from thin superposed sheet-iron strips or plates bent in the armature-plane, and having lateral or transverse projecting portions integral with said strips or plates, and extending parallel with the axis of the armature, the superposed projecting portions being separated from one another by free air-spaces.

2. In a dynamo-electric machine or motor, a ring-armature having lateral projections at the spaces between the armature-coils, said projections being composed of thin sheet-iron plates placed one above the other in a radial line extending from the armature-center and separated from one another by air-spaces in planes transverse to such radial lines.

3. The combination, with a radial pin or bolt, as D, of two or more perforated sheet-metal strips having slots, as at H′, for a radial pin or bolt, as D′.

4. In an armature for a dynamo-electric machine or motor, the combination, with two or more superimposed sheet-metal strips, each having lateral extensions, and bent in

the armature-plane of rotation, of interposed separating-pieces of iron.

5. In an armature made from iron in thin strips bent to the form of the armature, and having air-spaces extending laterally between the layers, lateral extensions integral with the bent strips.

Signed at New York, in the county of New York and State of New York, this 12th day of June, A. D. 1884.

BENJAMIN F. ORTON.

Witnesses:

THOS. TOOMEY,

WM. H. BLAIN.