(No Model.) 2 Sheets—Sheet 1.

J. B. BLAIR.

DYNAMO ELECTRIC MACHINE.

No. 300,835. Patented June 24, 1884.

Fig. 1.

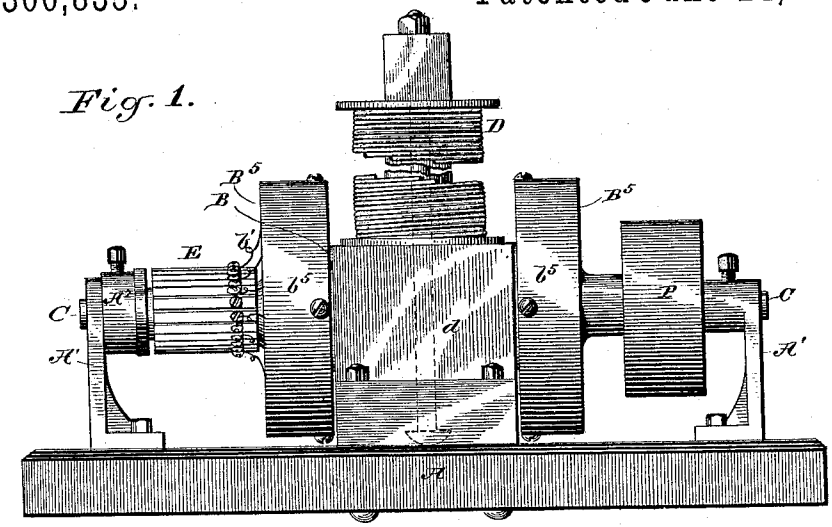


Fig. 2

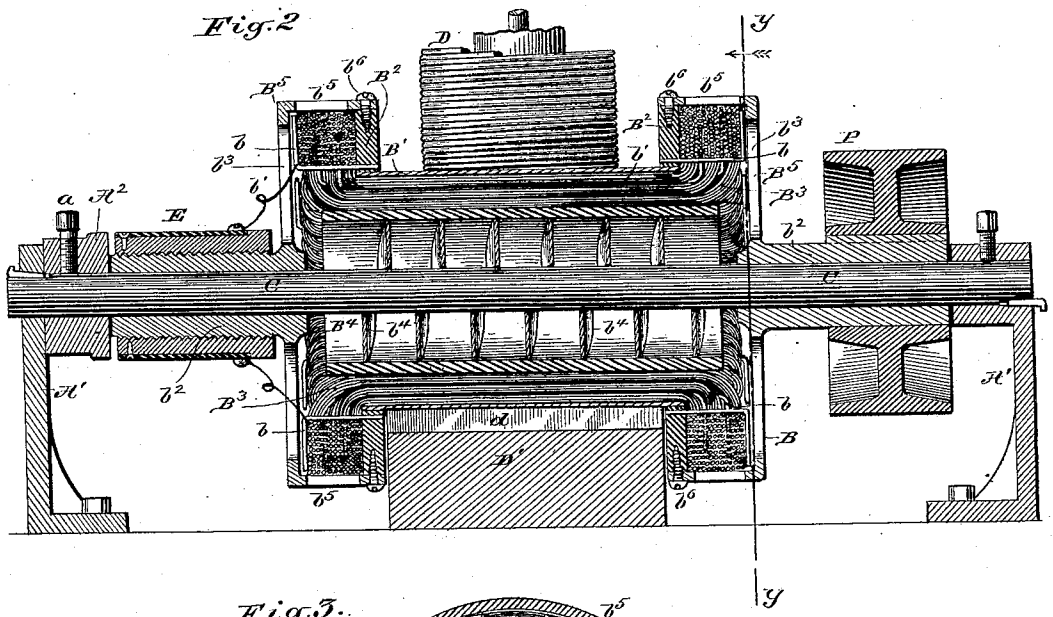
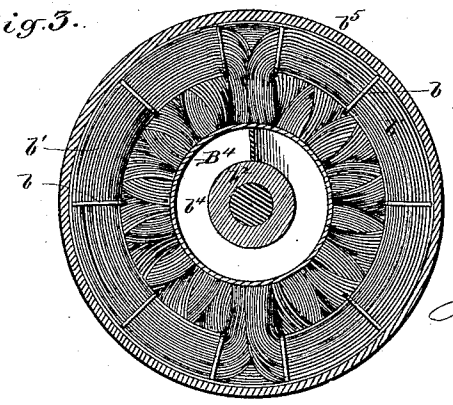


Fig. 3.



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per W. E. Dayton
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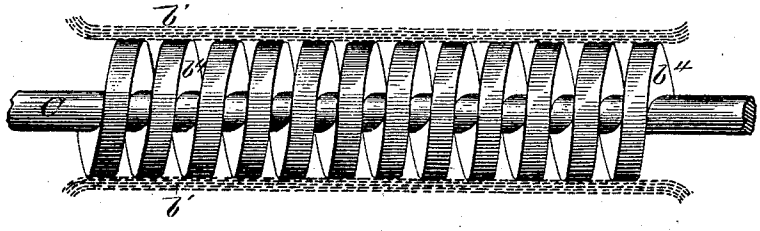
(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.



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UNITED STATES PATENT OFFICE.

JOHN B. BLAIR, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE BLAIR ELECTRIC COMPANY, OF SAME PLACE.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 300,835, dated June 24, 1884.

Application filed June 30, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. BLAIR, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electric Generators or Dynamos; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates more particularly to the construction of hollow cylindric armatures, and has for its principal object to provide for the ventilation of the interior of an armature of this class, whereby the latter is less inclined to heat in the operation of the machine.

To this end the invention consists in the matters hereinafter fully set forth, and pointed out in the appended claims.

A principal feature of my invention consists in an improved construction in the armature, in which the insulated wires forming the induction-coils are arranged in a hollow cylindric body around the armature-core and held in position exterior to central open spaces at the ends of the cylinder by annular supports located exterior to the inner surface of the said cylindric body of wires. The supports above mentioned preferably consist of annular plates or rings, which are suitably sustained from the central axis of the armature, and are provided with projections, over which the wires are trained or otherwise constructed to engage and hold the wires at the ends of the cylinder. In the construction herein shown the rings above mentioned are in the form of flanges upon an outer cylindrical casing, within which the insulated wires are arranged, said flanges being provided with a series of laterally-projecting pins upon their outer faces, over which the said wires are trained, as hereinafter more fully set forth.

In the drawings, Figure 1 is a side view of a dynamo having an upright magnet and a cylindrical armature containing my improvement. Fig. 2 is a vertical section through the axis of the armature. Fig. 3 is a section of the armature through *y y* of Fig. 2, looking in the direction of the arrow. Fig. 4 is a detached view of a particular form of spiral core for an armature containing my improvement.

A is the base of the machine. B is a rotating cylindric armature mounted on a shaft, C, which is supported from the base A by means of uprights A′ A′. D is a stationary electro-magnet, secured with its poles *d* proximate to the outer cylindric surface of the armature, and D′ is the immediate support for the magnet. E is a commutator attached to the armature. The armature is of the shell type, and, as here represented, has an outer cylindric casing consisting of a thin cylinder, B′, of brass or other diamagnetic substance. Said cylinder has secured to each of its ends an outwardly-projecting circular flange, B^2. From the outer plane face of this flange, and near its inner margin, project a series of pins, *b*, which may be alternately of different lengths, and which may at their outer ends be bent outward parallel with the adjacent plane face of the flange, as seen in Fig. 2. The insulated wires *b′*, forming the induction-coils B^3 of the armature, are laid on the inner surface of the cylinder B′, parallel with its axis, and are trained over or outside the projecting pins *b* around one-half the circumference of the flanges B^2, and thence into and along the opposite side of the cylinder B′, as indicated in Fig. 3. As many coils or groups of wires may be employed as may be considered necessary or desirable, and they may overlie each other or lie side by side within the cylinder, as may be found convenient. Within the cylinder thus lined with wire coils is placed the soft-iron core. As shown in Figs. 2 and 3, said core consists of a second cylinder of soft iron, B^4, preferably in contact with the wires *b′*, and adjusted concentrically with the axis of the armature. The double cylinder, composed of the metallic cylinders B′ and B^4, and inclosing the wires *b′*, is supported from its axis by means of heads B^5, made of brass or other diamagnetic material, and consisting of the hubs b^2, arms b^3, and rim or flange b^5. Said heads are secured to the flanges B^2 by means of screws b^6, passing through the free margins of the rims b^5, and radially into the periphery of the flanges B^2, as plainly indicated in Fig. 2. The shaft C is preferably non-rotating, and

the hubs b^2 are in that case fitted to turn thereon, as also shown in Fig. 2. One of said hubs carries the pulley P, and either or both may be provided with a commutator, E, with the slats or segments of which the several coils are connected in any of the well-known modes, as indicated in the drawings. The armature B is held longitudinally in position upon the shaft C by any suitable means, an adjustable collar, A^2, secured to said shaft by a set-screw, *a*, and the hub of the opposite upright herein serving such purpose.

In the disposition of the armature-coils above described and shown in the drawings, a wide central open space is provided within the armature, through which the air may freely circulate, and thereby prevent said wires and contiguous parts from heating in the operation of the dynamo. To this end the heads B^5 are constructed with as few arms as are necessary to strength, and these are preferably of such form as to afford the least possible obstruction to the admission of the air between them into the interior of the armature. Without further provision the armature is calculated to preserve a low temperature; but for better accomplishing this purpose means may be advantageously employed for inducing a current of air through the armature. To this end the cylindric core B^4 may be constructed with a spiral flange, b^4, on its interior surface, as shown in Figs. 2 and 3. Said flange may be shallow, or it may be extended inward into proximity with the shaft C, as represented, and in case the shaft C is made to rotate with the armature, the spiral may be attached to the said shaft, and thus may in part or wholly support the armature therefrom.

Instead of having the form of a cylinder, the core B^4 may be constructed of a series of circular hoops, forming short sections of a cylinder, and the hoop form of core may be combined with the spiral for inducing an active passage of air through the armature by means of a structure similar to that shown in Fig. 4. When the spiral solely constitutes the core, however, the leaves or folds of the spiral are preferably made of considerable thickness and close together, as shown in the figure last mentioned.

In carrying the induction-wires from one side to the other of the armature over the pins *b*, one-half the wires of each group or coil may preferably be carried in each direction, as indicated in Fig. 3, in order to more perfectly fill the available space around the flanges B^2, and at the same time to preserve the balance of the armature.

The distinctive feature of the construction herein shown and described, so far as relates to the disposition of the wires of the induction-coils at the ends of the armature, will be seen to consist in means for supporting them exterior to a free or open space about the armature-axis, whereby air may be freely admitted to the interior of said armature, and whereby the wires are supported independently of the armature-core, and in such manner that said core may be removed and replaced without disturbing the said wires.

I do not wish to be restricted to the particular means shown for the purpose, inasmuch as other special devices may obviously be employed to the same end.

I am aware that armatures have been constructed in which a cylindric body of wires is supported by an inner cylindric casing constructed to sustain the wires at its ends in such manner that open spaces are left at the ends of the said cylindric casing, and such construction is not claimed by me, this invention, as it relates to the means for supporting the wires, being restricted to a construction in which the interior cylindrical support for the wires heretofore used is absent, and in which the wires are held at the ends of the cylinder by exterior annular supports constructed to retain the wires in their portion between such supports in cylindric form, and to maintain open spaces at the ends of the cylindric body of wires.

I claim as my invention—

1. The combination, with the core of a dynamo-armature and induction-wires arranged in a hollow cylindrical body around the core, of annular supports exterior to the cylindric body of wires, constructed to sustain the wires around central open spaces at the ends of said cylindrical body of wires, substantially as described.

2. The combination, with the core of a dynamo-armature and induction-wires arranged in a hollow cylindrical body around the core, of an exterior cylinder surrounding said cylindrical body of wires, and means upon the ends of the cylinder constructed to support the wires exterior to central open spaces at the ends of the said cylindrical body of wires, substantially as described.

3. In a dynamo-armature, the combination of the cylinder B′, flanges B^2, projections *b*, induction-wires trained within the cylinder and exterior to the projections *b*, as shown, an armature-core, and means (as B^5) for supporting the cylinder and wires clear of the axis, and constructed to afford a free passage for air through the armature, substantially as described.

4. In a dynamo-armature, the combination of the cylinder B′, having flanges B^2, projections *b*, fixed to said flanges, induction-wires trained within the cylinder outside said projections, a core constructed to afford a longitudinal passage through the armature, and open heads B^5, provided with wires b^5, for supporting the cylindric armature from its axis, substantially as described.

5. The combination, with the induction-coil wires of a rotating armature arranged in a hollow cylindrical body, and means exterior to the inner surface of the body of wires constructed to support said wires around central open spaces at the end of the cylinder, of a spirally-constructed core within the cylindric

body of wires, substantially as and for the purpose set forth.

6. In the armature described, the combination, with the exterior cylinder, B′, provided with flanges B^2, of the several coils B^3, having their wires separated at the ends of the cylinder and trained in opposite directions on the vertical flanges B^2, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

JOHN B. BLAIR.

Witnesses:
M. E. DAYTON,
JESSE COX, JR.