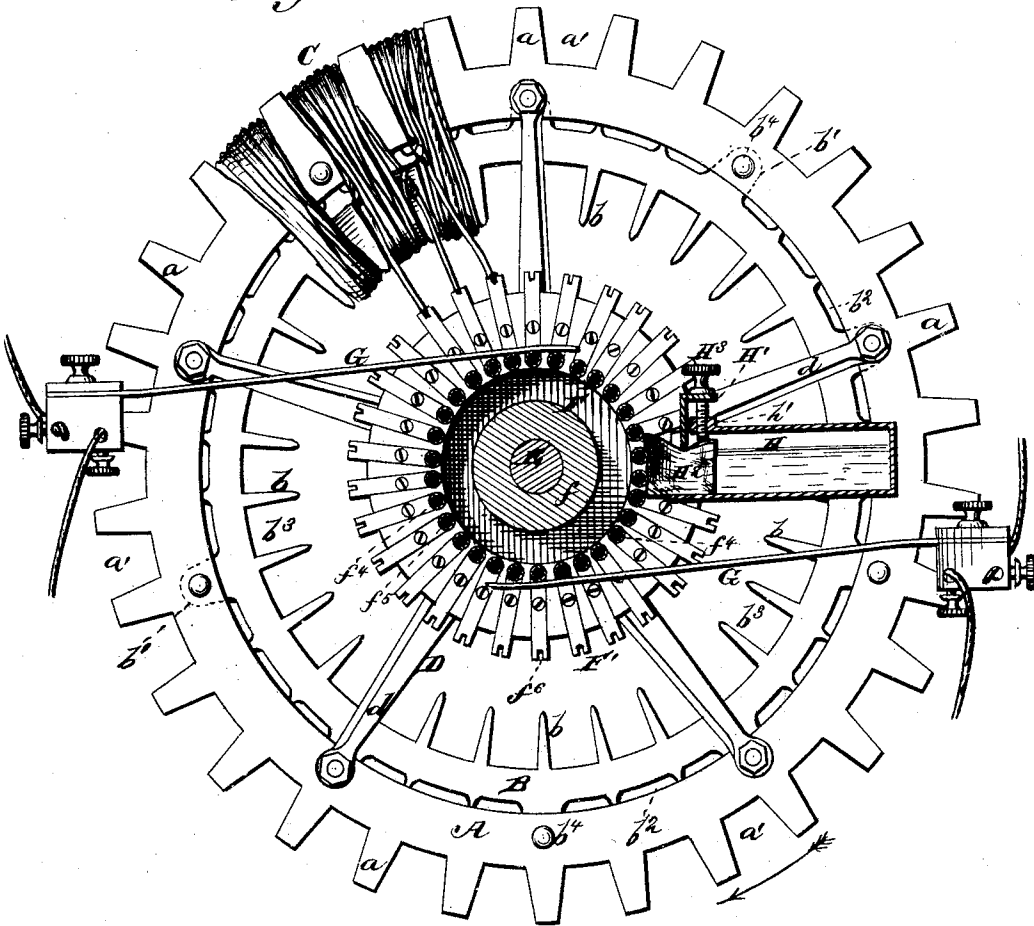


J. E. BRAUNSDORF.  
Dynamo-Electric Machines.

No. 226,483.

Patented April 13, 1880.

Fig. 1.

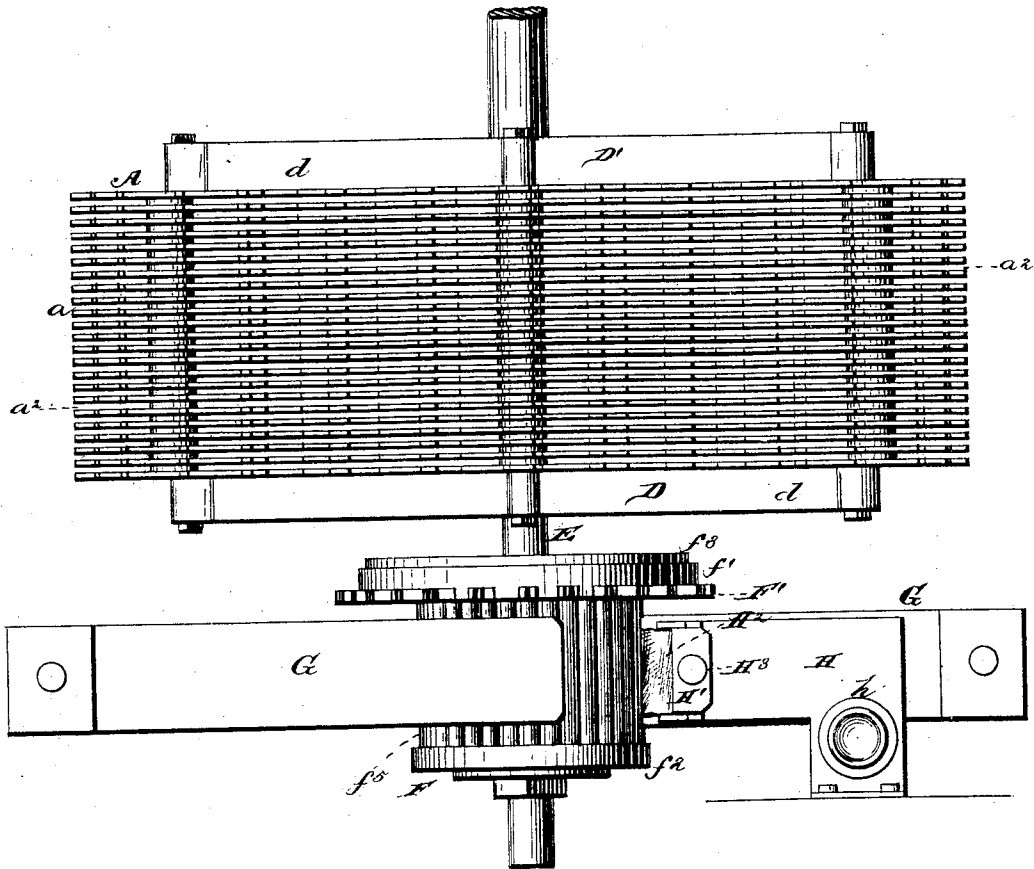


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*Fig. 2.*



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Fig. 3.

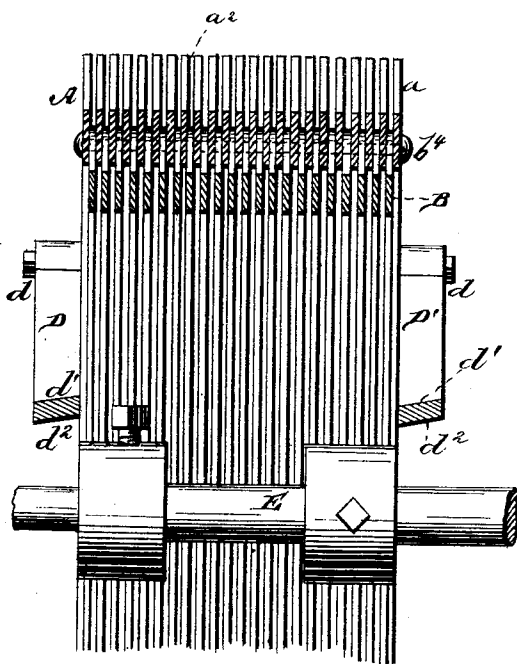
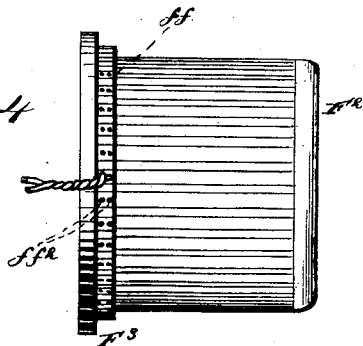


Fig. 4.



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# UNITED STATES PATENT OFFICE.

JULIUS E. BRAUNSDORF, OF PEARL RIVER, NEW YORK.

## DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 226,483, dated April 13, 1880.

Application filed May 24, 1879.

*To all whom it may concern :*

Be it known that I, JULIUS E. BRAUNSDORF, of Pearl River, in the county of Rockland and State of New York, have invented certain new and useful Improvements in Dynamo-Electric Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a side elevation, partly in section. Fig. 2 is a plan view. Fig. 3 is a vertical sectional view, and Fig. 4 is a perspective detail view.

Identical parts in the drawings are designated and referred to by the same letters.

My invention relates to armatures and commutator for dynamo-machines; and it consists of an armature constructed of a double set of iron rings so connected that ventilation is provided for in radial and horizontal currents; also, the arms of the spiders are so formed that when the armature is in action they produce strong horizontal currents of air through the armature.

It also consists in a positive connection between the commutator-pieces and the commutator-hub, and the manner of locating and attaching the same to the hub.

It also consists in sleeves or tubes placed over the bars of the commutator, and lubricating-box provided with an adjustable opening so constructed that the flow of oil may be regulated at will.

Fig. 1 represents a side elevation of the armature as designed by me. This armature is to be supplied and operated in connection with the common horseshoe or stationary magnet provided with the field-magnets for producing the electric currents, which are constructed and connected in the common way, so as to form a complete circuit from the positive binding-post to the negative binding-post of the dynamo-machine.

A are the outer rings of an armature. These rings are provided with projections *a*, which give a spur-wheel appearance to the outer face of the armature.

B are the inner rings of the armature, and

they are also provided with projections *b*, which extend inward. These projections are equal in number with the projections *a* of the rings A, and so constructed as to be on the same radial lines with the projections *a*. These rings are also provided with projections *b'*. The outer diameter of the rings B are somewhat less than the inside diameter of the rings A, so that as these two sets of rings are placed together to form the periphery of the armature there will be horizontal openings *b<sup>2</sup>* through the same for the circulation of currents of air to keep down the temperature of the armature and avoid burning of the insulation of the armature-wires C.

The armature is formed by laying up the rings A and B alternately with the projections *a*, *b*, and *b'* on radial lines. The projections *b'* serve as washers to separate the rings A, and thus provide openings or air-spaces *a<sup>2</sup>* for the action of vertical air-currents through the periphery of the armature. This construction also produces two armatures, one inside of the other, thus greatly increasing the magnetic power of the armature.

The number and diameter of the rings A and B can be increased or diminished in the construction of the armature to suit the purposes and provide the electric currents which may be desired. In ordinary cases an increase of the number, where an increased current is desired, is preferable to an increase in diameter.

C represents the wires which conduct the currents of electricity from the armature to the commutator. The projections *a* and *b* form the recesses *a'* and *b<sup>3</sup>*. Two insulated wires are wound in these recesses, with openings between the wires of the several recesses, which communicate with the horizontal opening between the two series of rings. These wires are wound and connected in a manner similar to like wires upon other armatures.

D D' are the spiders, which are rigidly attached to the shaft E. The radials *d* of the spider are bolted to the ring A. These bolts pass through all the plates or separate rings which form the outer ring, A, and hold them firmly together. The rings which form the ring B are attached to the ring A by the bolts *b<sup>4</sup>*, which pass through projections *b'* of the rings B and the body of the rings A.

The radials  $d$  of the spiders  $D D'$  have their faces  $d'$   $d''$  inclined from the line of the shaft  $E$  at angles of about fifteen degrees to form air-blades. The purpose of this construction of the radials is, that as the armature is revolving in the direction indicated by the arrow the radials of  $D$  will draw the air from the eye of the armature and the radials of  $D'$  will force air into the eye, thus creating a strong current of air through the eye of the armature, and keeping up a rapid circulation of air over and about the armature, which, in connection with the vertical and horizontal openings in the armature, contribute greatly to maintaining a proper temperature in the armature. In case the revolutions of the armature be reversed the opposite faces of the radials will produce a similar current of air in the reverse direction, and with like effect.

$F$  is a commutator, which is rigidly attached to the shaft  $E$ , and it consists of the hub  $f'$  and the disks  $f'$  and  $f''$ . The disk  $f'$  is re-enforced by the metal disk  $f''$ . The hub and disks  $f'$   $f''$  are of a material that is a non-conductor of electricity.

$F'$  are bars of a metal that is a conductor of electricity, and they are securely set in the non-conducting disk  $f'$ . The bars  $f'$  are connected with the inner ends of these bars  $F'$ , and their other ends inserted in the non-conducting disk  $f''$ . A sleeve,  $f^3$ , of conducting material, may be placed over these bars  $f'$ . The wires  $C$  from the armature are attached to the bars  $F'$  by being placed in the notches  $f^6$  upon the end of the bars for receiving them, and they are retained by being soldered in position; but the manner of constructing an armature which I prefer is represented in Fig. 4. It consists of a hub,  $F^2$ , of non-conducting material, provided with an annular flange,  $F^3$ , in which are inserted the bars  $f f'$ . These bars are provided with proper apertures for receiving and rigidly retaining the wires  $C$  from the armature by driving or otherwise forcing them into the holes or apertures  $f f''$ . This mode of construction is more positive and durable than the other.

$G$  are brushes, formed of a conducting metal, and transfer the electric currents from the commutator to the field-magnets of the engine proper, which are not represented.

$H$  is an oil-receptacle, provided with the oil-cup  $h$ .  $H^2$  is the lubricator, which extends into the oil-receptacle, and its outer end is adjusted in contact with the bars  $f f'$  of the commutator.  $H'$  is an angled plate, forming the end of the oil-receptacle.

$H^3$  is a thumb-screw, which passes freely through the horizontal portion of the plate  $H$ , and works in the bar  $h'$  of the receptacle. The vertical portion comes in contact with the lubricator.

By adjusting the thumb-screw  $H^3$  the flow of oil may be regulated at will.

I hereby disclaim the invention of the com-

bination of a disk mounted on the armature-shaft, said disk containing radial conducting-strips, loose conducting-strips in the hub, and with which strips the radial conductors connect, and a nut and washer of insulating material applied at one end of the hub, as shown and described in the application of **N. S. Maxim**, filed February 21, 1879; and I do also disclaim the invention of the following, to wit: an armature for dynamo-electric machines provided with wings or vanes revolving with said armature, for the purpose of affording a circulation of air through the armature to prevent heating, as shown and described in the application of **H. S. Maxim**, filed February 25, 1879; and I further disclaim the invention of the following, to wit: an armature for magneto-electric machines composed of a series of annular plates separated by air-passages from each other and from the armature-shaft, the said plates having outer and inner projections so constructed as to keep the coils separate from each other and leave air-passages between them.

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

1. In an armature of a dynamo-machine, a series of outer rings,  $A$ , provided with the projections  $a$ , in combination with a series of inner rings,  $B$ , provided with the projections  $b$  and  $b'$ , as and for the purposes substantially as set forth.

2. In an armature of a dynamo-machine, a series of outer rings,  $A$ , provided with the projections  $a$ , in combination with a series of inner rings,  $B$ , of less diameter than the eye or opening in the rings  $A$ , and provided with the projections  $b$  and  $b'$ , as and for the purposes substantially as set forth.

3. In an armature for dynamo-electric machines, the spiders  $D D'$ , provided with the radials  $d$ , having their faces  $d'$   $d''$  inclined at angles of about fifteen degrees from the line of the shaft  $E$ , as and for the purposes set forth.

4. In an armature for dynamo-electric machines, the spiders  $D D'$ , having the faces  $d'$   $d''$  of the radials  $d$  inclined from the shaft  $E$  at an angle of about fifteen degrees, in combination with the rings  $A$  and  $B$  of the armature, provided with radial and horizontal openings, as and for the purposes set forth.

5. In a dynamo-machine, the lubricator  $H^2$ , in combination with the commutator and the plate  $H'$ , thumb-screw  $H^3$ , oil-receptacle  $H$ , and oil-cup  $h$ , as and for the purposes substantially as set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

JULIUS E. BRAUNSDORF.

Witnesses:

HENRY FIGGE,

JAMES SENEN.