C. F. BRUSH.

Armature for Dynamo-Electric Machines.

No. 203,413. Patented May 7, 1878.

Fig. 1.

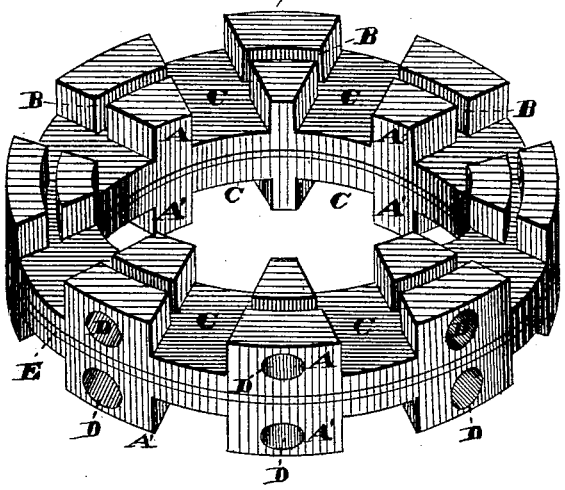



Fig. 2.

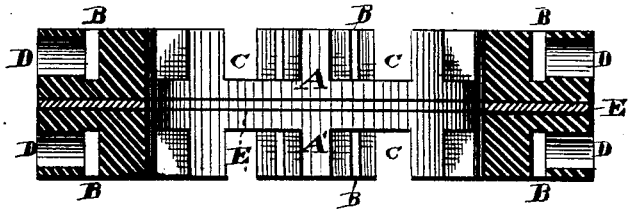
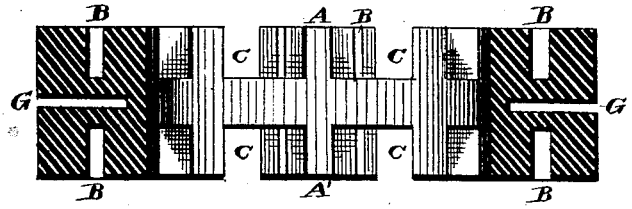



Fig. 3.




WITNESSES

E. L. Nottingham

A. M. Bright.

INVENTOR

Chas. F. Brush.

By Leggett & Leggett.

ATTORNEYS

# UNITED STATES PATENT OFFICE.

CHARLES F. BRUSH, OF CLEVELAND, OHIO.

## IMPROVEMENT IN ARMATURES FOR DYNAMO-ELECTRIC MACHINES.

Specification forming part of Letters Patent No. **203,413**, dated May 7, 1878; application filed January 23, 1878.

*To all whom it may concern:*

Be it known that I, CHARLES F. BRUSH, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Armatures for Dynamo-Electric Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention relates to that class of dynamo-electric machines in which annular armatures are employed, and especially to the armature of such machines.

My said invention consists, first, in so splitting or dividing the armature and insulating its parts from each other as to practically or entirely prevent the induction of currents in the same when it is revolved in a magnetic field, thus eliminating the principal source of heat and waste of power in such armatures; second, (when the armature is of such pattern as to make it desirable,) in perforating portions of the same, both for the purpose of removing superfluous stock of metal, and to increase the heat-radiating surface, and thus favor the dissipation of the heat which is always generated in armatures when in service, and due to the rapidly-changing magnetism.

In the drawings, Figure 1 represents, in perspective, one form of annular armature constructed according to my invention; and Fig. 2 represents a cross-section of the same.

In both the above figures the armature is shown naked of its wire and disconnected from the other parts of the machine. I prefer to construct the armature from cast-iron, although in this respect I do not limit myself in any degree, as any suitable metal may be used.

The armature is constructed substantially as shown in the drawings; and consists primarily of two parts, A A′, firmly secured together, with any suitable insulating material, E, interposed between them. B represents an annular groove formed upon one or both sides of the armature, and, for reasons which will appear, there may be more of these grooves than are shown, if desirable. C C are depressions in the armature, which, in the completed machine, are wound full of insulated wire. D D are holes piercing the armature from its periphery to the annular grooves B, and are provided for the purpose already specified.

When this armature is revolved (in its own plane) in a suitable magnetic field, electric currents will be induced in a direction at right angles to its circumferential length, and will traverse the wire wound in the depressions C. It will now be obvious that if such an armature is made of one solid piece of metal, the induced currents will also circulate in the armature itself, thereby wasting a large portion of the inductive effect of the magnetic field and rapidly heating the armature. The insulating material E prevents the passage of these currents around the entire cross-section of the armature, and confines them, in greatly-diminished force, to each half of the cross-section. These diminished currents are again checked by the grooves B, (which may properly be regarded as insulating air-spaces,) on the principle that if an electric circuit is broken in one point, the entire current is stopped. The passage of the current is thus confined to each quarter of the armature's cross-section, and thus becomes so reduced as to be insignificant.

It will now be obvious that the insulating material E may be replaced by a deep groove, G, as shown in Fig. 3 of the drawings, thus leaving the metal of the armature in a single piece, and still accomplishing the desired end.

Another modification would be to construct the body of the armature from separate concentric rings, insulated from each other, placed one within another, and thus secured.

I am aware that in previous devices armatures have been constructed of a bundle of wires formed into annular shape; but I have found this description of armature not to be practicable.

I am also aware that in Patent No. 189,997, granted to me April 24, 1877, I mention incidentally that an armature, instead of being made from one solid piece, may be formed from parallel disks or plates; but in this patent I did not specify, nor did I contemplate, any insulation between the component disks going to make up my armature; and it will more-

over be observed that the wires composing the armature of Patent No. 20,057, of date October 17, 1871, are not specified as being insulated from each other; and from my knowledge of the machine referred to in said patent No. 20,057, I know the component wires of its armature to be naked; but in my present device I provide the novel feature of insulating from each other the component parts of my armature; and in this very important feature resides a radical distinction between this invention and any other preceding it of which I am aware.

What I claim is—

1. An annular armature constructed from a single solid piece of metal, and grooved upon its periphery or sides, or both, substantially as and for the purpose shown.

2. An annular armature consisting of two or more plates formed with grooved sides or peripheries, or both, and insulated from each other, substantially as set forth.

3. An annular armature, provided with holes, perforations, or depressions D, or their equivalents, substantially as and for the purpose shown.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES F. BRUSH.

Witnesses:
L. L. LEGGETT,
JNO. CROWELL, Jr.