

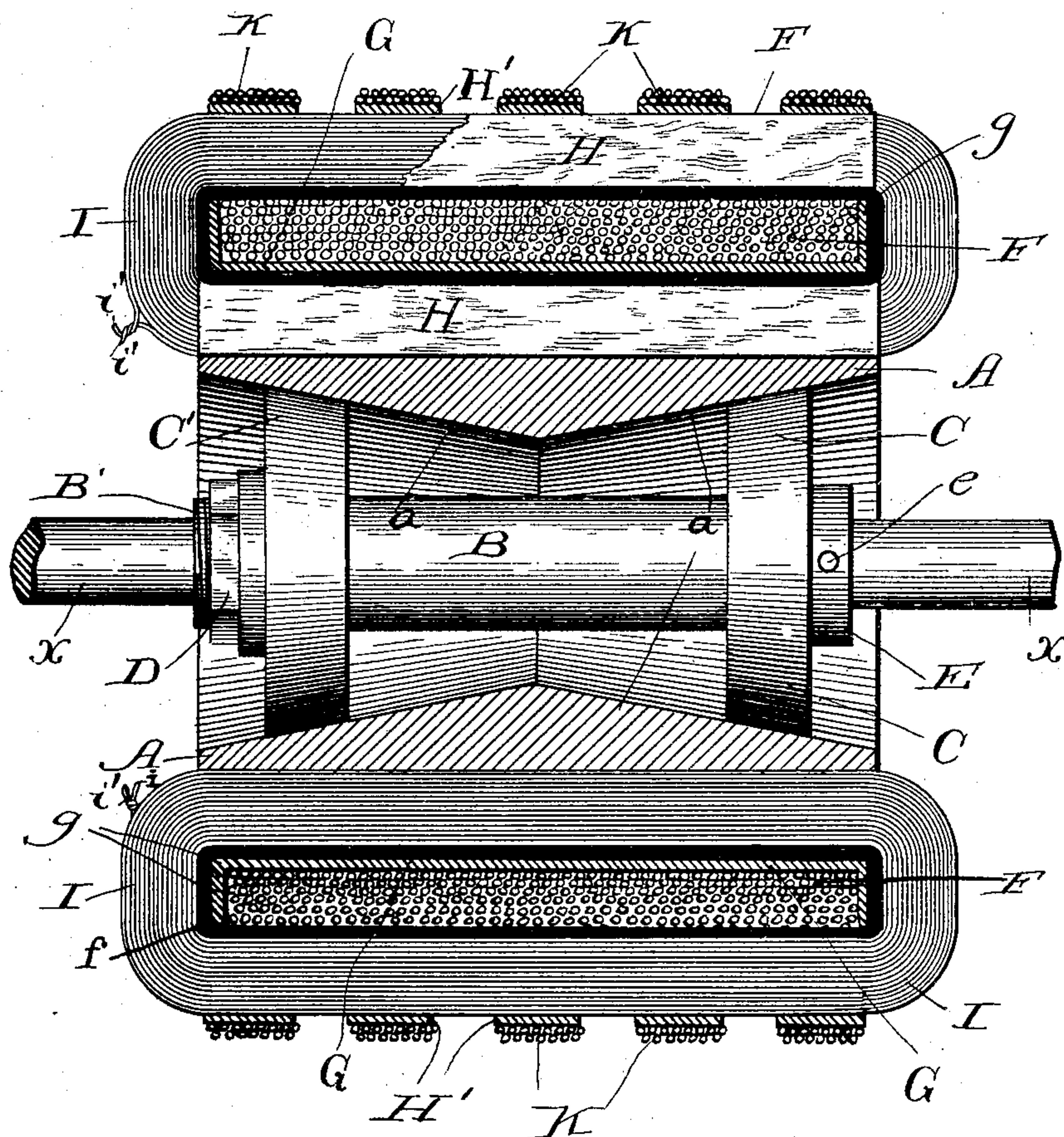
(No Model.)

E. J. O'BEIRNE.

# ARMATURE FOR DYNAMO ELECTRIC MACHINES.

No. 377,046.

Patented Jan. 31, 1888.



Witnesses:  
Eas. & Gaylord.  
Edward Thorpe.

Inventor:  
Edward J. O'Beirne  
By Charles T. Brown  
Atty



# UNITED STATES PATENT OFFICE.

EDWARD J. O'BEIRNE, OF ELGIN, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE NATIONAL ELECTRIC COMPANY, OF SAME PLACE.

## ARMATURE FOR DYNAMO-ELECTRIC MACHINES.

SPECIFICATION forming part of Letters Patent No. 377,046, dated January 31, 1888.

Application filed March 3, 1887. Serial No. 229,595. (No model.)

*To all whom it may concern:*

Be it known that I, EDWARD J. O'BEIRNE, a citizen of the United States, residing at Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Gramme Armatures for Dynamos; and I hereby declare the following to be a full and complete description thereof, reference being had to the drawings forming a part of this specification.

My invention relates to a Gramme armature, and has more particular reference to the method of constructing an armature and of attaching such armature to its driving-shaft.

I am aware that armatures have heretofore been constructed in which the hubs, of diamagnetic metal, having arms projecting radially therefrom, are secured to the shaft of said armature in such manner that the lessening of the distance apart of said hubs shall firmly secure to said hubs the coils of the armature, the said coils being formed as follows: Rings of soft iron having teeth extending from their periphery and holes parallel to the axis thereof are suitably secured together in the desired number to form an armature of the required length, each ring being insulated from the next one, and said rings being so arranged and secured as to produce and form diagonal or longitudinal grooves between the teeth and diagonal or spiral passages through the connecting-holes from one end to the other of the armature so constructed, in which grooves the wire is afterward wound, and through which diagonal or spiral passages currents of air will be drawn by the rotation of the armature, thus securing thorough internal ventilation, as is more fully described and set out in Letters Patent of the United States granted James DuShane for a dynamo-electric machine on the 18th day of December, 1883, and numbered 290,550; and I am also aware that an armature has been constructed by placing upon an open-ended iron cylinder of suitable weight a series of rings of iron, each made up by preference of a number of layers, which can be done by winding continuous strips thereon, these rings being so arranged and fastened on the iron cylinder as to leave annular air-

spaces between said rings, and with the usual insulated wires wound across the cylinder and rings (formed as above) from end to end inside and outside of said cylinder, but not crossing its open ends, to form bobbins, such bobbins separated by bars, preferably of wood, and that the armature so constructed is attached to the armature-shaft by slipping two collars thereon, which are forced into the ends of the cylinder and held firmly therein and on the shaft by nuts; but so far as I am aware no armature has been constructed in which a continuous wire is or may be wound around a wooden or diamagnetic core or cylinder at right angles to the shaft thereof, forming a ring around which and at right angles to the strands whereof bobbins may be wound, the said bobbins being separated by wooden slats, and that portion of said bobbins coming inside of said wire ring being between said ring and the diamagnetic core or cylinder, the inner surface of said core or cylinder tapering toward the center, forming truncated cones, all secured to the armature-shaft by beveled disks sliding on said shaft and adjustably secured thereto; and the objects I have in view in my invention are to obtain a stronger and more substantial armature than has heretofore been attained, and one so constructed as to allow of the entire internal and external surface of said ring to be evenly and uniformly wound with coils of copper wire, thereby obtaining a more even and constant current than by the armatures now constructed, and the specific devices by which I accomplish these results are described herein.

The figure is a longitudinal sectional view of the armature invented and constructed by me.

Like letters refer to like parts throughout.

X is the main shaft of the armature.

A is a hollow wooden or other insulating material cylinder, having cone-shaped inner surfaces, *a a*.

B is a hollow shaft having head E at one end and thread B' at the other end thereof, its inner diameter being the diameter of main shaft X and its outer diameter being the diameter of holes in the center of disks C C'.



The outer surface or periphery of disks C C' is cone-shaped and fits closely to the inner cone-shaped surface of cylinder A.

D is an ordinary nut, having a thread cut therein fitting on thread B' on hollow shaft B.

Wooden cylinder A may be at any time secured firmly to hollow shaft B by placing disks C C' in the position illustrated in Fig. 1 and turning nut B' firmly against the washer D, which is interposed between disk C and said nut B', the tendency of the force exerted by the bringing together of the disks C C' being to press apart cylinder A. I do not, therefore, secure said cylinder to the hollow shaft B until the armature is completely built up, or nearly so, in the following manner:

Wire F is wound closely around cylinder G. This cylinder G is formed of tin or other thin metal, and has upturned flanges *g*, and the wire F is wound around the cylinder to about the outer surface or periphery of the disks formed by the flaring edges *g g*. A heavy coating of suitable insulating material, *f f*, (indicated by the heavy black line surrounding wire F and cylinder G and flaring edges *g g*,) is then placed around the cylinder and wire. The cylinder G and wire F thereon being insulated, as described, a series of coils, I, termed by me "bobbins," is then wound around the cylinder in the manner illustrated by the lower portion of the figure shown.

As each bobbin I is wound, a slat or strip of wood or other insulating material, H, is placed between adjoining bobbins, the said slat being of about the length of the cylinder G and insulating-covering *f* thereon, and of sufficient width to extend a slight distance nearer the center of the armature than does the inner edge or surface of said bobbins, and short slats H', of wood or other insulating material, are placed between said bobbins on the part or portion of the said bobbins outside of cylinder G. Around the series of bobbins thus formed, and upon or over the slats H', are wound a number of brass-wire bands, K K, firmly holding the armature, as thus partially constructed, together, and it is now ready for the insertion of cylinder A, which is put into place, the inner surface of slats H alone com-

ing in close contact with the outer surface or periphery of the cylinder. Hollow shaft B, with disk C thereon, is then placed in cylinder A and disk C' placed on the shaft B, and the two disks brought firmly together by nut B'. The armature may then be placed on a shaft, as X, and secured thereto by a key and feather, or by a bolt in hole *e* of hollow shaft E. Disks C C' may, if desired, be secured to hollow shaft B by pins or bolts.

By my devices, as herein described, I am able to dispense not only with spokes in an armature, but also with the air-passages in the body of the ring around which the bobbins are wound, as described. The area of said bobbins on a given size of armature is thereby increased from six to twelve per cent., with a like increase in the power of the dynamo to generate an electrical current; and, further, in case the form of the armature as constructed prior to the introduction of cylinder A therein in the manner described is other than the form of a true cylinder, or at least comparatively so, by the drawing together of disks C C', cylinder A is or may be pressed apart by said disks and a well-balanced and cylindrical armature secured.

Having thus described my invention and its construction and operation, what I claim, and desire to secure by Letters Patent, is -

In an armature, the combination of an insulated cylinder formed of wire wound upon a sheet-metal cylinder having upturned flanges, bobbins suitably wound on said insulated cylinder, and slats placed between said bobbins upon both the inner and outer surface of said insulated cylinder, with a wooden cylinder having a cone-shaped inner surface, and a hollow shaft having disks thereon fitting said cone-shaped inner surface of the wooden cylinder, one of said disks being secured to said hollow shaft and the other movable thereon and held adjustably in position by a nut placed on said hollow shaft, substantially as described.

EDWARD J. O'BEIRNE.

Witnesses:

C. H. WAYNE,  
L. M. KELLEY.