(No Model.) 2 Sheets—Sheet 1.

R. C. HINDLEY & W. S. BUFFHAM.

DYNAMO ELECTRIC GENERATOR.

No. 266,290. Patented Oct. 24, 1882.

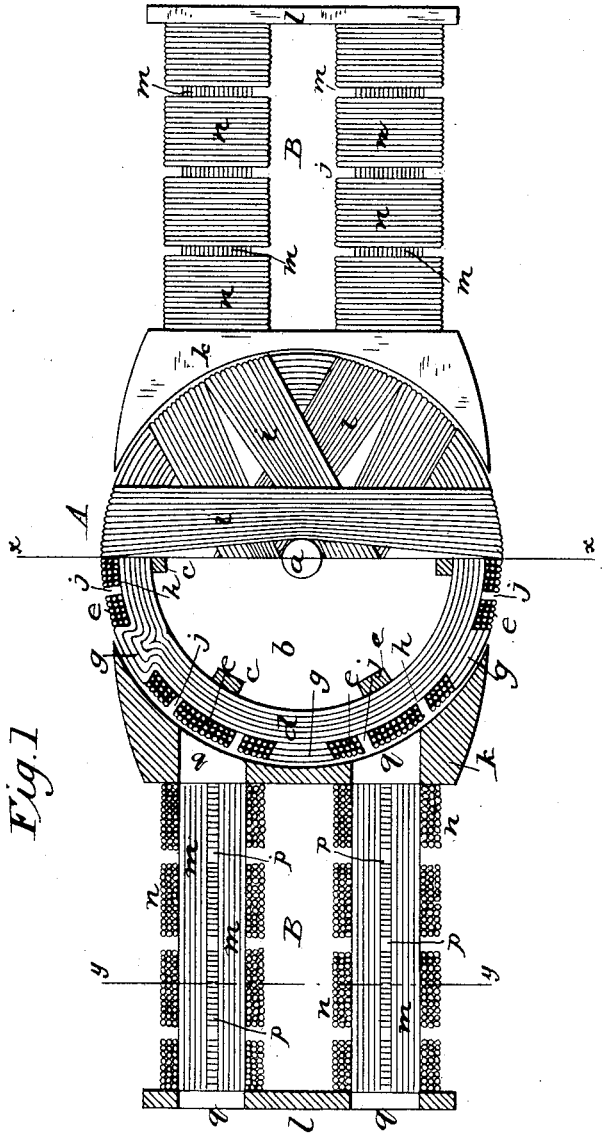

Fig. 1

Attest.
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Fig. 2.

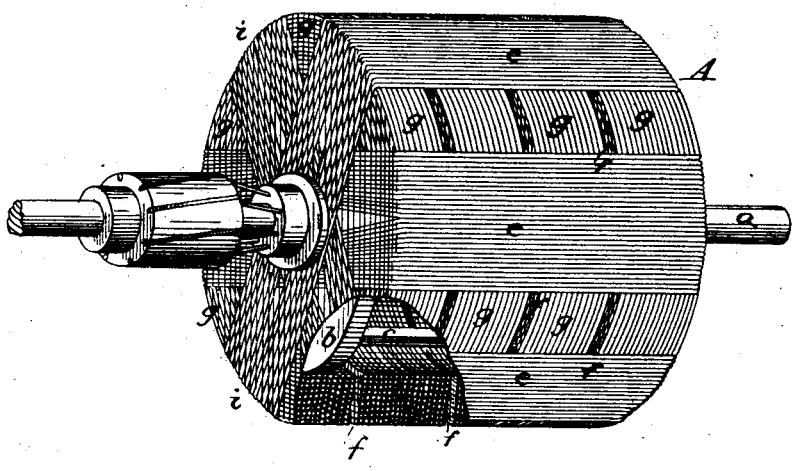


Fig. 3.

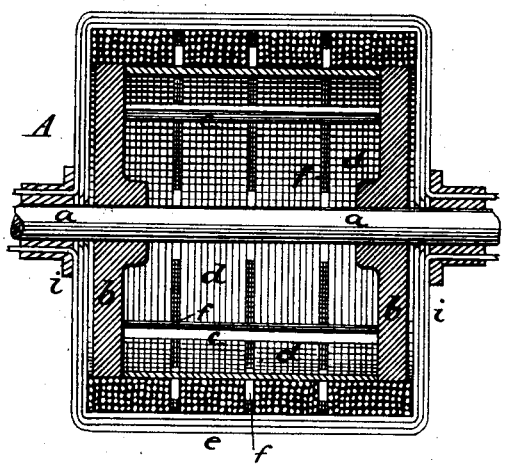
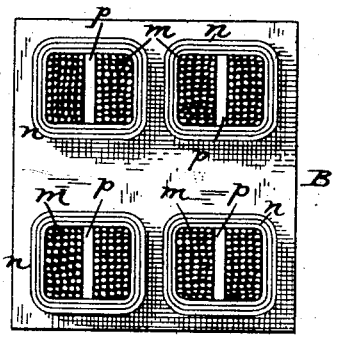


Fig. 4.



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Inventors:
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UNITED STATES PATENT OFFICE.

ROBERT C. HINDLEY AND WILLIAM S. BUFFHAM, OF RACINE, WISCONSIN.

DYNAMO-ELECTRIC GENERATOR.

SPECIFICATION forming part of Letters Patent No. 266,290, dated October 24, 1882.

Application filed April 28, 1882. (No model.)

To all whom it may concern:

Be it known that we, ROBERT C. HINDLEY and WILLIAM S. BUFFHAM, of Racine, in the county of Racine and State of Wisconsin, have invented certain Improvements in Dynamo-Electric Generators, of which the following is a specification.

Our invention relates to dynamo-electric generators; and the improvements consist in forming the armature and field-magnets of wire bound together by a metal or other substance capable of insulating the wires magnetically, but not electrically; and in a novel manner of arranging the wires, whereby openings or spaces are provided for the free circulation of air; in a composite field-magnet the pole-faces and back plates of which are formed of solid metal and the body portion of wire, and in other features and details hereinafter explained.

In the accompanying drawings, Figure 1 represents an end or side view of the revolving armature and field-magnets of a dynamo-electric machine embodying our improvements, one-half of said figure being shown in section; Fig. 2, a perspective view of the armature removed from the machine; Fig. 3, a vertical longitudinal section through the armature; Fig. 4, a cross-section of one of the field-magnets.

The objects of our invention are to secure rapid and perfect magnetization and demagnetization, and to overcome in a great degree the generation of heat in dynamo-electric machines. The first of these objects we propose to attain by constructing the body of the armature and magnets of bundles of wire bound together by non-magnetic material or substance, and the second by leaving or forming air passages or openings in the iron-wire body and the enveloping copper coils of both. These features of construction will be more perfectly understood by referring to the drawings, in which A represents the armature, and B B the field-magnets.

As shown in Figs. 1, 2, and 3, the armature A consists of a central shaft, *a*, upon which are mounted and secured circular heads or plates *b*, between which extend longitudinal ribs or bars *c*, to support the cord *d*, formed of iron wire wound in sections or groups, and over or around which the copper induction-wire *e* is wound, as shown. The core *d* of the armature consists of a series of bundles or groups of wire coiled in layers around the ribs or bars *c*, and bound together by zinc, brass, or other non-magnetic substance capable of conducting electricity, either melted and cast upon and around the wires, as indicated, or wrapped in the form of ribbons or bands, the first plan being preferred. Spaces *f* are left between the bundles or groups *d*, at right angles to the shaft or axis of the armature-cylinder, and the wire is either bent outward and back, as shown at the upper side of Fig. 1, to form projecting pole-pieces *g*, or said pole-pieces may be formed by winding or coiling the core-wires to the circumference of the cylinder, and subsequently cutting away intermediate recesses, *h*, to receive the copper wire *i*, which is wound or wrapped into said spaces or recesses and across the ends or heads of the cylinder, as shown, a sufficient number of layers being wound on to bring the outer surface flush with the outer face of the pole-pieces *g*; or the pole-pieces may be formed by winding or piling the wires longitudinally and subsequently uniting them by the non-magnetic substance. In winding or wrapping the copper wire the same arrangement or plan is followed as in winding the coils *d*—that is to say, the wire is arranged in groups or bundles with intervening spaces, *j*. It will thus be seen that the spaces *f* and *j* cross each other at right angles, and that numerous and uninterrupted passages are thereby afforded for the travel of air from the outside to the inside of the armature-cylinder, or vice versa, both the core-wire bundles and the induction-wire bundles being exposed to the air on all sides. The armature thus constructed will not become highly heated and interfere with the efficient action of the machine, as often happens with various other constructions.

The field-magnets are constructed in a similar manner, except that the pole-pieces and the back plate are of solid metal, the core or body portion being of iron wire, as in the armature. This construction is illustrated in Figs. 1 and 4, in which B represents the magnet as a whole, *k* the pole-face, *l* the back plate or end piece,

m the core, and *n* the coil wrapped or wound upon the core, as shown. In this, as in the armature, the core-wires are divided into groups and the coils wound in sections or groups at right angles thereto, so that the spaces *o* between the groups of wire coils cross the spaces *p* between the core-wire bundles, thus affording a free inlet for the air throughout all parts of the magnet.

The pole-face block and the rear end plate may be drawn together and held in place by bolts or rods extending from one to the other, said parts being recessed to receive the ends of the wires; or the pole-face block and end plate may be cast upon the ends of the core-wire, as indicated, the latter construction being preferred. Openings *q* will be formed in the end plate and pole-faces opposite the spaces *p*, to permit the free entrance of air.

The core-wires *n* will preferably be bound together by a non-magnetic metal or substance, as in the armature.

In all points of construction and detail not herein fully set forth and explained the machine may be of usual construction.

We are aware that it is not broadly new to magnetically insulate the wires forming the coils—one coil from another—by a non-magnetic electric conductor; but, so far as we are aware, no one has ever before made the non-magnetic substance serve also as the binding material by which the core or armature is bound together.

We are also aware that the core of an armature has been made up of separated coils, and this we do not claim; but we believe ourselves to be the first to so construct a field-magnet of a dynamo-machine, or to combine with this feature that of winding the induction-coils of the armature or the enveloping-coils of the magnet in separated groups, so that air can freely circulate through them, and that we are the first to combine the armature and magnets thus constructed.

We do not broadly claim an armature-core composed of wire and provided with seats or depressions to receive the induction-coils, but only claim such core when the wires forming the body thereof are bound together by a fusible substance separating and enveloping them, as above explained.

Having thus described our invention, what we claim is—

1. An armature-core for dynamo-electric generators, composed of wire wound in coils, said coils being bound together and magnetically insulated from each other by a non-magnetic substance applied in a fluid state and allowed to set or harden.

2. An armature for dynamo-electric generators having a core composed of wires arranged in groups with intervening spaces, substantially as shown and described, the wires being magnetically insulated from one another and bound into a compact mass by a non-magnetic substance, substantially as set forth.

3. A dynamo-electric generator provided with a field-magnet having a core composed of wire arranged in groups or bundles, said bundles being separated by open spaces, substantially as and for the purpose set forth.

4. In a dynamo-electric machine, the combination of a field-magnet and an armature, both formed with cores of wire arranged in groups or bundles, said bundles being separated by open spaces, substantially as and for the purpose set forth.

5. In a dynamo-electric generator, a field-magnet having a core composed of separated bundles of wire and an enveloping coil or wire wound thereon in separated groups or bundles, whereby communicating air-spaces are formed through the induction-coil and core.

6. In a dynamo-electric machine, a field-magnet consisting of a wire core, solid end piece, and a surrounding coil, the wire of the core and of the surrounding coil being arranged in separated bundles or groups, as shown.

7. A core for magnets or armatures, consisting of a bundle of iron wires bound together by a non-magnetic substance passing between the individual wires, and thereby serving also to magnetically insulate them one from another.

8. The herein-described method of constructing cores for magnets and armatures, consisting in winding or arranging a series of wires side by side and at short distances apart, pouring between and around them a non-magnetic substance in a fluid condition, and permitting said substance to set or harden, and thereby to bind the wires into a compact body and to magnetically insulate them one from another.

9. The herein-described armature-core, consisting of wire wound or wrapped circumferentially in bundles or coils, united and formed into a solid body by a binding material applied in a fluid state and allowed to set or harden upon and between the wires, said core being formed with seats or recesses to receive the induction-coils, substantially as set forth and shown.

10. The herein-described dynamo-electric generator, consisting of armature A, provided with a wire core formed of separated sections, and with induction-coils, also wound in separate groups or bundles, and the field-magnets B B, provided with the solid end plates, divided wire cores, and coils wound in separated groups or bundles upon the cores, as explained.

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WILLIAM S. BUFFHAM.

Witnesses:
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