(No Model.)

F. B. BADT & O. S. LYFORD, Jr.

RING ARMATURE.

No. 566,288. Patented Aug. 25, 1896.

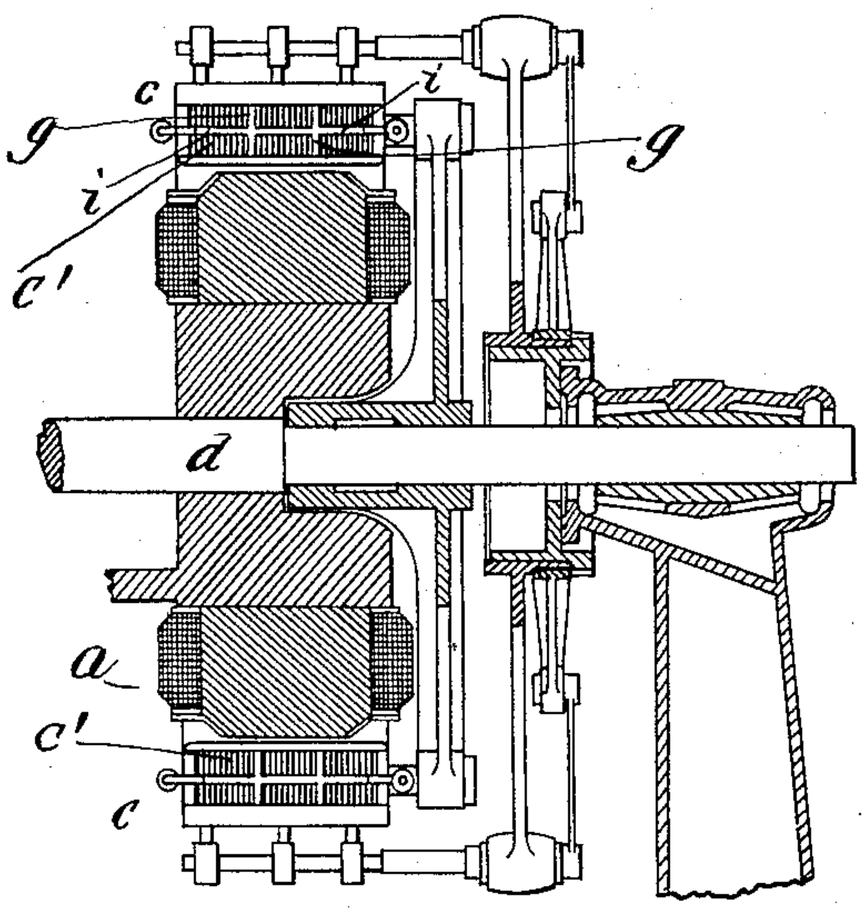
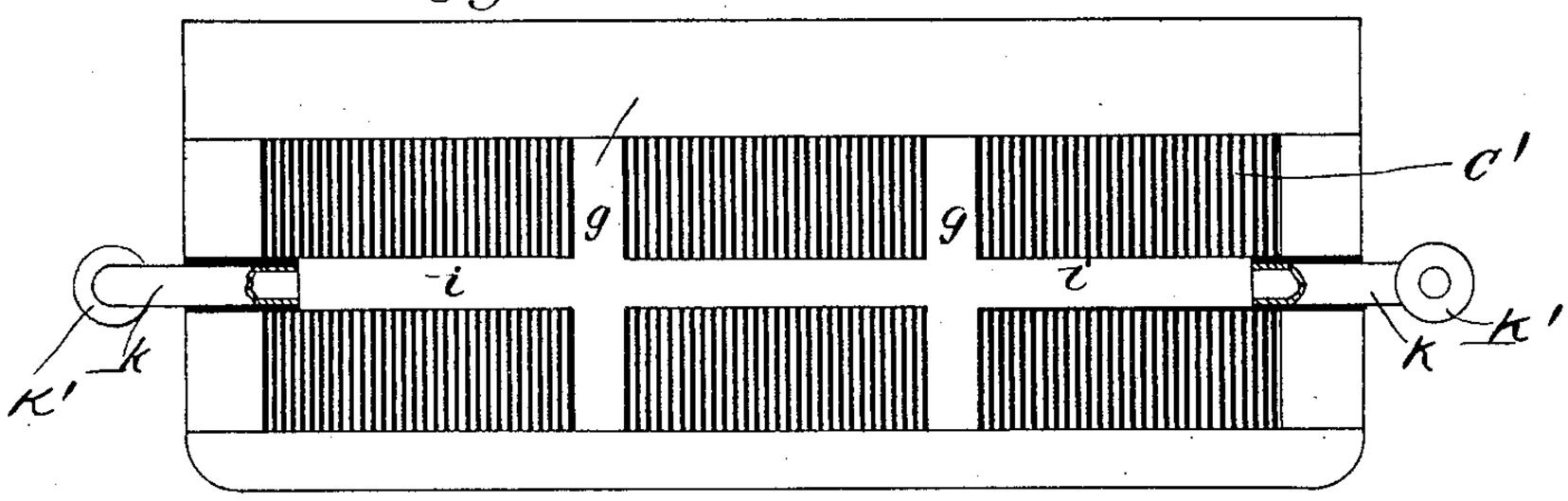


Fig. 1.

Fig. 2.



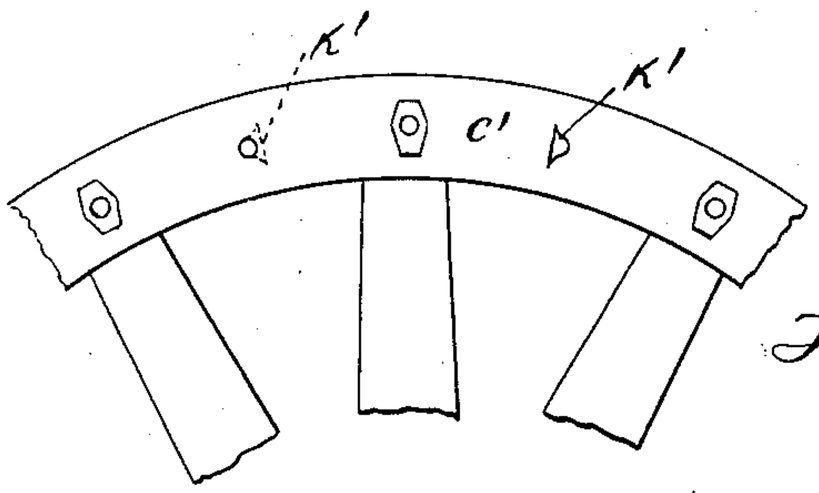


Fig. 3.

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UNITED STATES PATENT OFFICE.

FRANCIS B. BADT AND OLIVER S. LYFORD, JR., OF CHICAGO, ILLINOIS, ASSIGNORS TO THE SIEMENS & HALSKE ELECTRIC COMPANY OF AMERICA, OF SAME PLACE.

RING-ARMATURE.

SPECIFICATION forming part of Letters Patent No. 566,288, dated August 25, 1896.

Application filed January 15, 1896. Serial No. 575,563. (No model.)

To all whom it may concern:

Be it known that we, FRANCIS B. BADT and OLIVER S. LYFORD, Jr., citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Ring-Armatures, of which the following is a specification.

Our invention relates to dynamo-electric machines, and more particularly to that class of dynamo-electric machines in which ring-armatures are employed.

A form of dynamo employing ring-armatures that has been used to a large extent is fully illustrated in Patent No. 509,662, to C. Hoffmann, of November 28, 1893, in which the armature-core is composed of iron laminæ separated by layers of insulating material to reduce Foucault currents. In the form shown in this patent the commutator is mounted directly upon the armature-core, the segments of the commutator constituting portions of the winding of the armature, the winding in this case consisting of comparatively heavy strips of copper. We have found that when dynamos of this class have been built on a large scale the permissible heat-limit is reached long before the machine can work to the capacity which it would otherwise possess, since the radiating-surface which must carry off the heat caused by the passage of the current through the copper conductors and by heat contributed to the laminated iron core by Foucault currents existing therein and by hysteresis becomes comparatively very small. In applying our invention to the form of dynamo shown in the patent we provide in the armature-core one or more spaces which extend through the whole depth thereof in a plane perpendicular to the axis of the shaft and parallel to the plane of rotation of the armature, the number of these spaces depending largely upon the size of the machine in which they are employed. These spaces are preferably located so as to divide the armature-core into divisions having equal cross-sections. Through the core, at right angles to the radial spaces between the sections, we provide channels or lateral passages, which are preferably disposed at regular intervals throughout the core.

Our invention will be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a sectional elevation of a dynamo-electric machine with the commutator mounted upon the ring-armature, wherein the device of the present application is employed. Fig. 2 is a sectional view of the armature on a plane coincident with the axis of the shaft. Fig. 3 is a detail view of the armature-core.

Like letters refer to like parts throughout the several figures.

The field-magnets *a* are stationarily mounted. The armature *c*, surrounding the field, is mounted upon the shaft *d*, by which it is rotated by means of a spider. The said armature *c* consists of a core *c'*, composed of iron laminæ insulated from one another by layers of paper or other suitable insulating material to prevent Foucault currents, about which are wound the armature-coils, consisting in this case of comparatively heavy strips of copper.

We have shown the core divided into three sections, spaces *g g* intervening between the different sections and extending throughout the core in planes at right angles with the shaft *d*. These spaces materially assist in reducing the Foucault currents in the armature-core. At frequent intervals we provide channels *i i*, transverse to the passages *g g*, said channels extending through the armature in planes coincident with the axis of the shaft. In these channels *i i* we preferably insert short pipes *k k*, each of which is provided with a bell-shaped ventilator *k' k'*, the openings of the ventilators on one side of the armature extending in the direction of rotation thereof, while the ventilators on the other side of the armature extend in the opposite direction. As the armature rotates the air is taken in at one set of ventilators *k'* upon one side of the armature, circulated through the passages *g g* and *i i*, and expelled at the ventilators *k'* upon the other side of the armature, the air on one side of the armature being forced into the ventilators, whereas on the other side of the armature a partial vacuum is created in front of the other ventilators. By this arrangement a strong current of air is forced through the passages *g g* and *i i* of

the armature from one side to the other, the temperature of the armature being thereby greatly reduced.

We have described our invention more particularly in connection with the type of machine shown in patent No. 509,662, in which the armature rotates about internal fields; but it is obvious that our invention is applicable to other types of machine.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In an armature for dynamo-electric machinery affording practically no passage for the exit of air-currents at its outer circumference, the combination with a laminated armature-core constructed in sections, of continuous radial spaces provided between the said sections parallel to the plane of rotation of the armature, and lateral passages provided at intervals in the body of the armature-core connecting the said radial spaces with the external air, thereby permitting a circulation of air through the said radial spaces and the lateral passages, substantially as and for the purpose described.

2. In an armature for dynamo-electric machinery affording practically no passage for the exit of air-currents at its outer circumference, the combination with an armature-core constructed of laminated iron plates insulated from one another and arranged in sections parallel with the plane of rotation of the armature, of continuous radial spaces provided between the said sections parallel to the plane of the armature's rotation, lateral passages provided at intervals in the body of the armature-core connecting the said radial spaces with the external air, and means controlled by the rotation of the armature for directing the circulation of air-currents through the lateral passages from one side of the armature to the other, substantially as and for the purpose described.

3. In an armature for dynamo-electric machinery, the combination with the sectional laminated core c' of continuous radial spaces g between the sections thereof at right angles to the axis of the said armature, lateral passage i extending through the armature and connected with the radial spaces between the armature-sections, pipes k k connected with the lateral passage i, bell-shaped or flaring extensions k' k' of the said pipes respectively turned toward and from the direction of rotation of the said armature and thereby adapted to create a circulation of air in the passages and between the sections thereof, substantially as described.

4. In an armature for dynamo-electric machinery affording practically no passage for the exit of air-currents at its outer circumference, the combination with radial spaces or channels in the armature-core, of lateral passages provided at intervals in the body of the said core near the circumference of the armature connecting the radial spaces with the external air and adapted to create a circulation of air-currents throughout the body of the armature-core, substantially as and for the purpose described.

In testimony whereof we affix our signatures in the presence of two witnesses.

FRANCIS B. BADT.
OLIVER S. LYFORD, JR.

Witnesses:
JOHN W. SINCLAIR,
GEORGE L. CRAGG.