(No Model.) 2 Sheets—Sheet 1.

L. C. RICE.

DYNAMO ELECTRIC MACHINE.

No. 379,284. Patented Mar. 13, 1888.

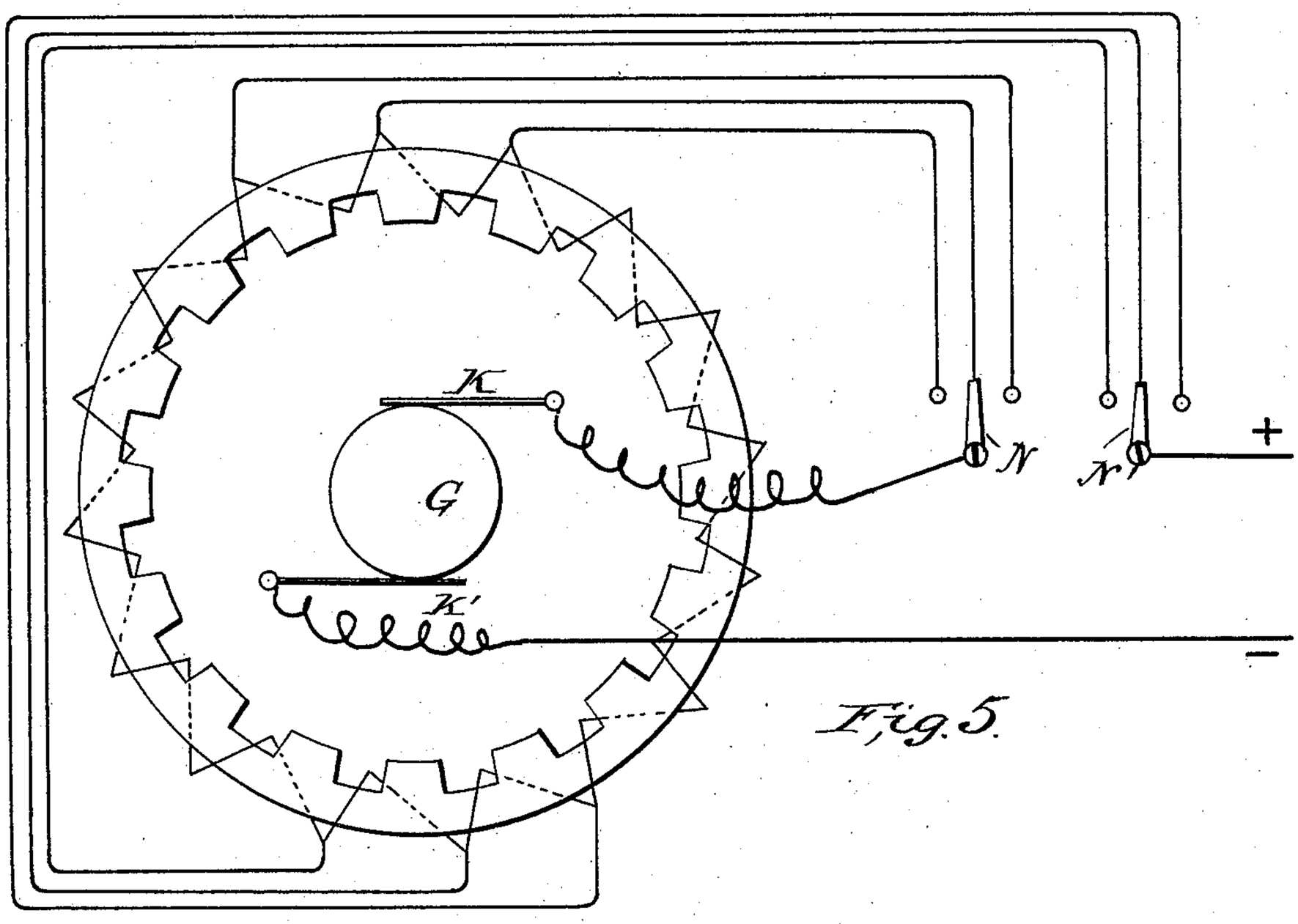

Fig. 5.

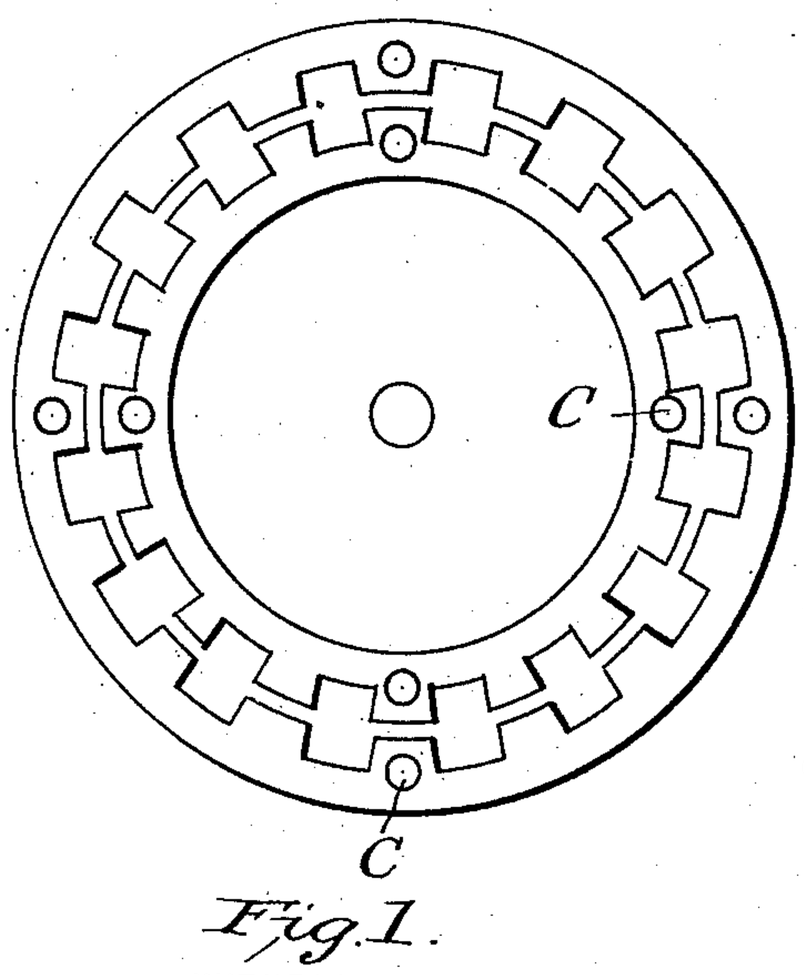

Fig. 1.

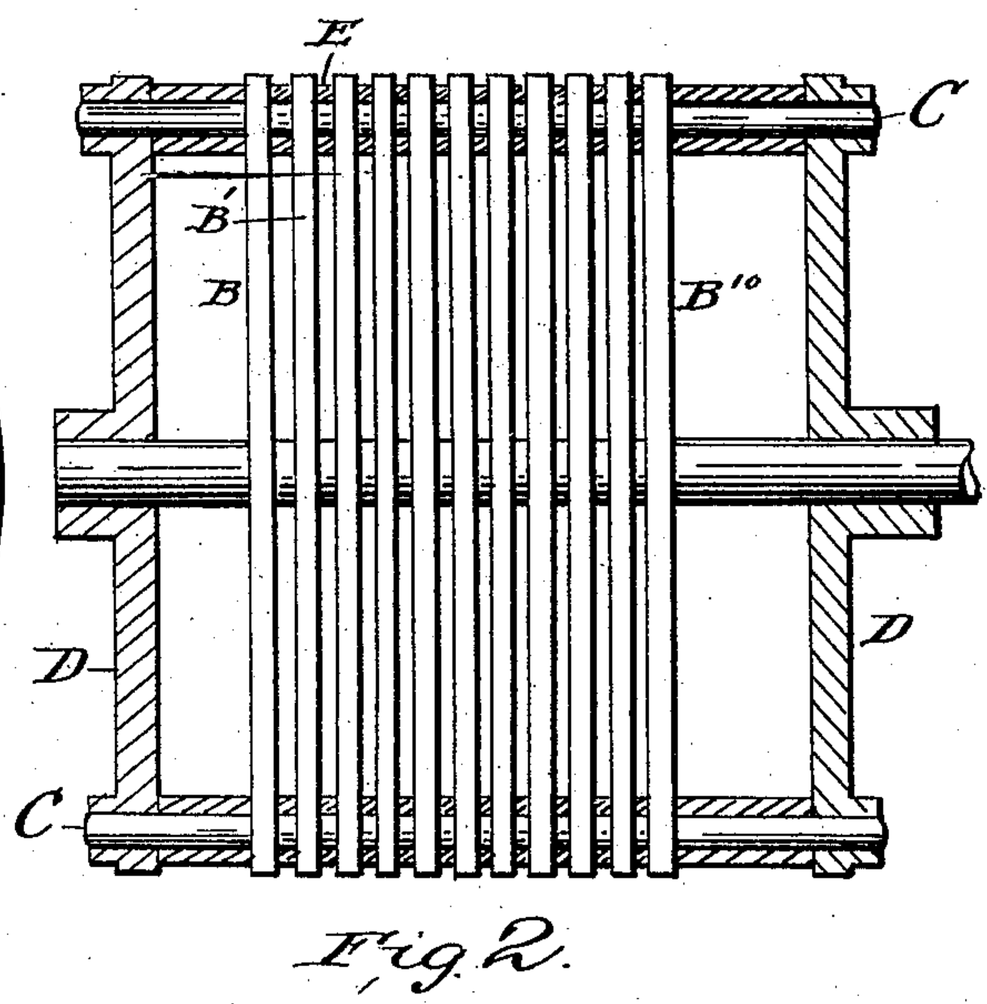

Fig. 2.

WITNESSES:

Wm. A. Rosenbaum.

G. H. Stockbridge.

INVENTOR,
Lewis C. Rice.

BY W. J. Johnston.

ATTORNEY.

(No Model.) 2 Sheets—Sheet 2.

L. C. RICE.

DYNAMO ELECTRIC MACHINE.

No. 379,284. Patented Mar. 13, 1888.

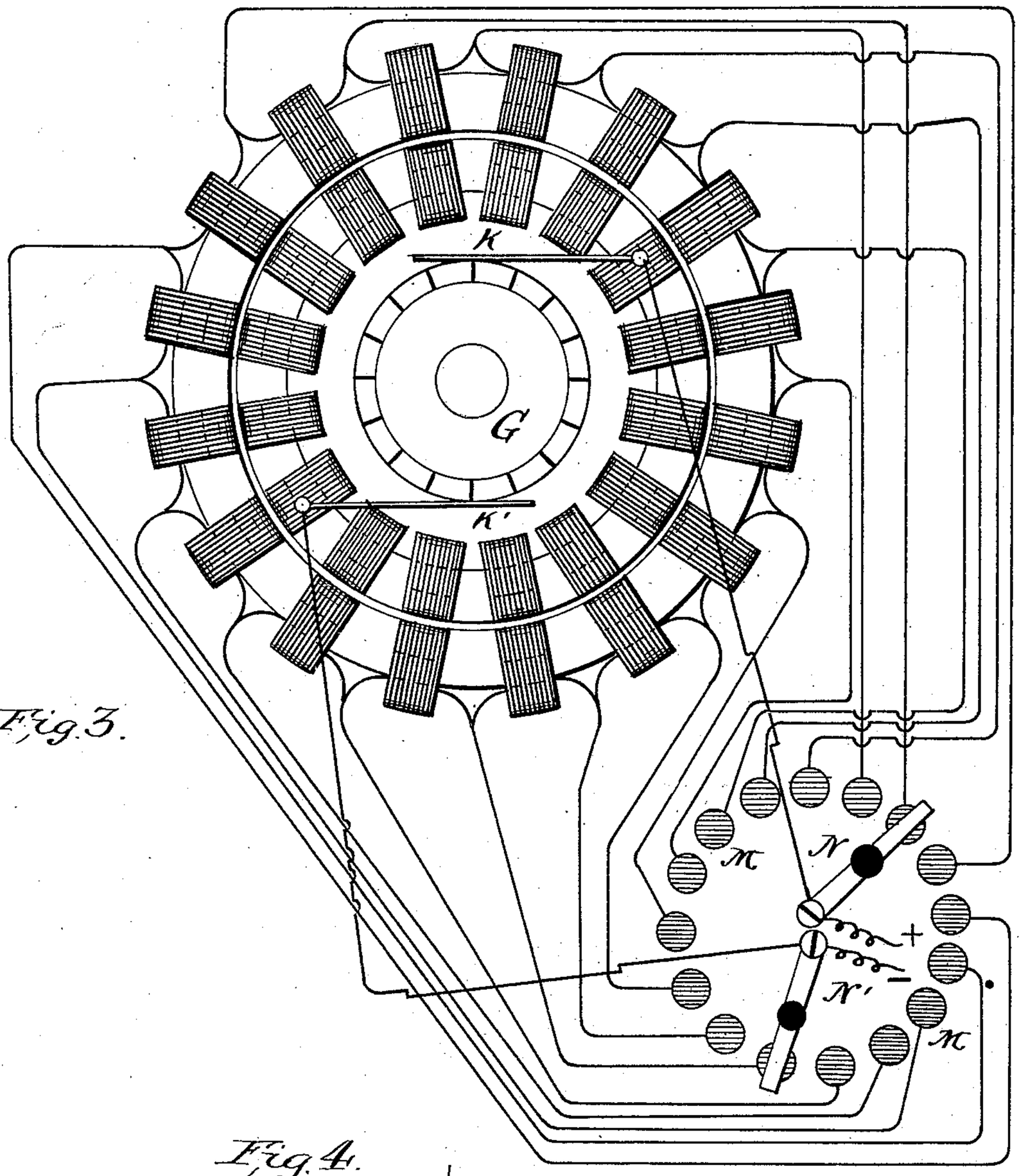

Fig. 3.

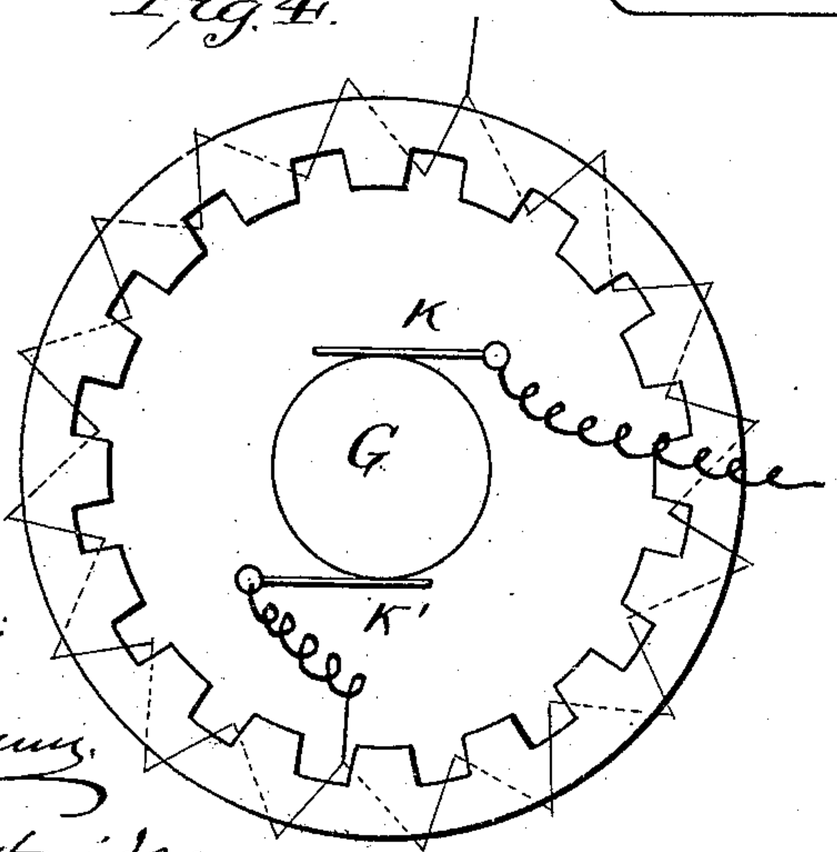

Fig. 4.

WITNESSES:

Wm. A. Rosenbaum.

G. H. Stockbridge.

INVENTOR.

Lewis C. Rice,

BY W. J. Johnston.

ATTORNEY.

UNITED STATES PATENT OFFICE.

LEWIS C. RICE, OF DENVER, COLORADO.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 379,284, dated March 13, 1888.

Application filed July 1, 1887. Serial No. 243,098. (No model.)

To all whom it may concern:

Be it known that I, LEWIS C. RICE, a citizen of the United States, and a resident of Denver, in the county of Arapahoe and State of Colorado, 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 my invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention, which is applicable both to dynamo-electric machines and to electric motors, consists in making both the field-magnet and the armature in a ring form, with Pacinotti projections from the core between the bobbins. These rings are placed one within the other, the inside one having external projections and the outside one having corresponding internal projections. These rings are made up of annular disks placed side by side, with an ample spacing between them for ventilation. The ventilating-spaces in the field-magnet and armature, respectively, are radially in line with each other, so that a current of air can pass from the center outward through both. Either the internal or the external ring can be held stationary, while the other is made to rotate in the usual manner. Both rings are wound with the same number of bobbins, which are connected in a closed series, as in the ordinary Gramme or Pacinotti winding. The bobbins of one ring are connected to the ordinary commutator or collector, upon which bear the usual sliding brushes, while the bobbins of the other ring are similarly connected to a stationary series of contact-points, and switches are made to bear adjustably upon these points, so that the connection may be varied at will and the magnetism of the ring correspondingly shifted.

In the accompanying drawings, Figure 1 is an end elevation of the cores of the two rings. Fig. 2 is a side elevation, partly in section, of the outside ring; and Figs. 3, 4, and 5 illustrate the electrical connections.

As shown in Figs. 1 and 2, the outer ring is made up of a series of annular disks, B B′, &c., placed side by side in such number that the ring becomes cylindrical in form. These disks are held in place by bolts C, parallel with the axis, and washers E, placed on the bolt between each pair of disks, separate them a sufficient distance to permit of ample ventilation. The ring is fastened to end hubs or spiders, D, in a well-known manner. The inner ring is made up in the same manner, being smaller in size or diameter, so as to be capable of rotating freely within the outer one. The Pacinotti projections on the internal ring extend outwardly, while those on the external ring extend inwardly. The air-spacing on the inner ring corresponds with that on the outer ring, so that the circulation may be direct radially. The cores of the two rings are made equal in cross-section, so that there is a complete magnetic satisfaction between armature and field and no preponderance of field over the armature, as is usually the case. Each ring has a bobbin wound on it between each pair of projections. These bobbins are connected in a closed series, as is usual in the Gramme or Pacinotti winding. On the inner ring a wire is led from a point between each pair of bobbins to an insulated plate or commutator, G, upon which the brushes K and K′ bear at diametrically-opposite points. The winding on the outside ring is the same; but the wires from between the bobbins lead to a series of stationary contact-points, M, upon opposite points of which bear, respectively, the two switches N and N′, through which the current is admitted to the coils. The two switches N and N′ are independently adjustable, so that the polar points need not be exactly diametrically opposite, but at any point desired for regulation or adjustment of the machine. As is well known, the current entering each ring will divide between the two halves of the ring, and create in the core consequent poles where the current enters and leaves the coils, respectively. In the outer ring the polar points can be shifted around the ring circumferentially by means of the switches N and N′, which determine the points of ingress and egress for the current, and when this ring is used as the field-magnet for the inner ring as an armature the shifting of the switches may take the place of the shifting of the brushes K and K′, which is the present method of adjustment. This arrangement permits a simple and easy regulation of the motor or gener-

ator, either by hand or automatically, as well as a means of adjustment to prevent abnormal sparking at the commutator-brushes. The outer ring can be in either serial or shunt relation to the inner ring.

In Fig. 3 the current passes directly from the brushes K and K′, respectively, to the switches N and N′, which form the terminals of the machine, while a shunt passes from N through the outer ring and back to N′.

In Fig. 5 the current from K passes to N, and thence through the outer ring to N′, the terminals being in this case N′ and K′, while the two rings are in series.

Fig. 4 is a diagram of the circuits in the outer ring, and will be readily understood from the description already given.

What I claim is—

1. In a dynamo-electric machine or motor, the combination of the concentric inner and outer rings having their cores composed of annular disks placed side by side with intervening air-spaces and in line radially, whereby the air-spaces may be in direct alignment.

2. In a dynamo-electric machine or motor, a field-magnet having the location of its two polar points independently adjustable relative to the armature, whereby the machine may be regulated and adjusted.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

LEWIS C. RICE.

Witnesses:
J. R. HOMER,
H. R. CLISE.