(No Model.) 2 Sheets—Sheet 1.

E. J. HOUSTON.

DYNAMO ELECTRIC MACHINE.

No. 258,649. Patented May 30, 1882.

FIG. 1.

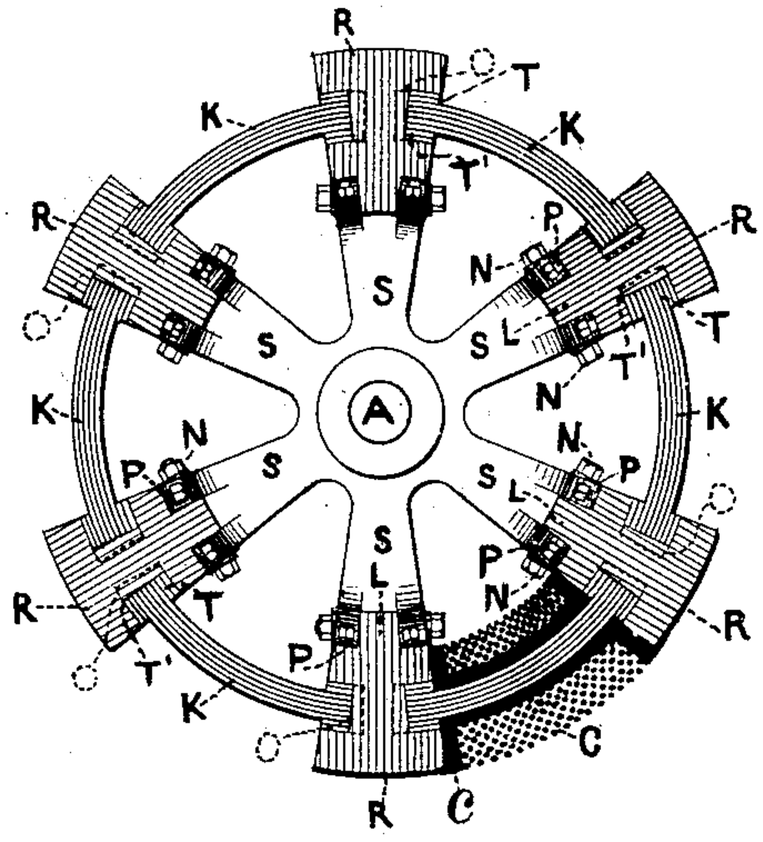
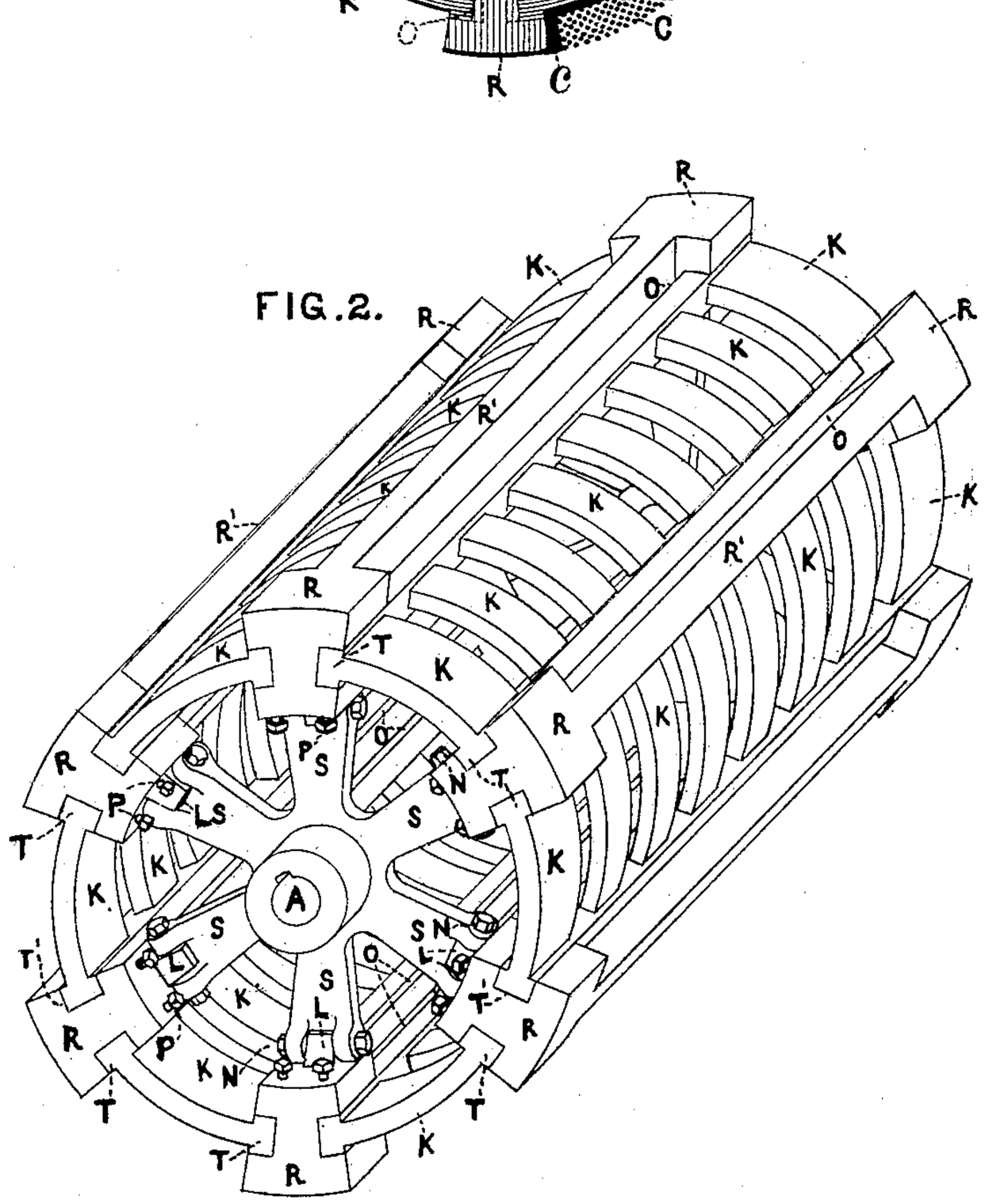


FIG. 2.



WITNESSES.

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(No Model.) 2 Sheets—Sheet 2.

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FIG. 3.

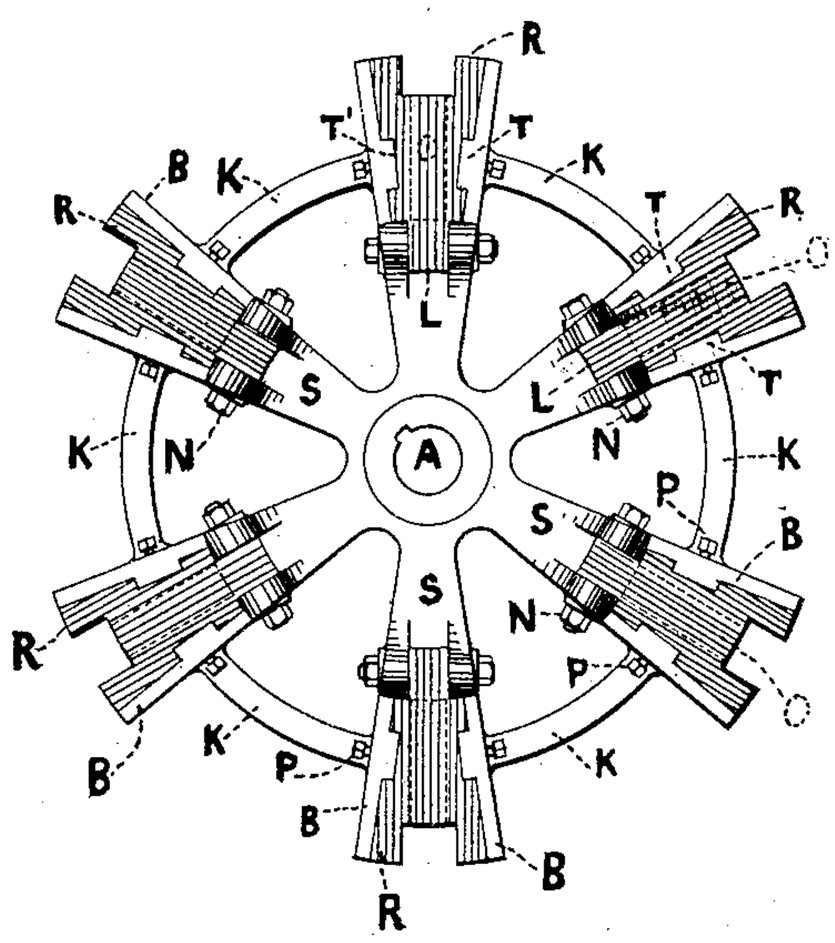


FIG. 4.

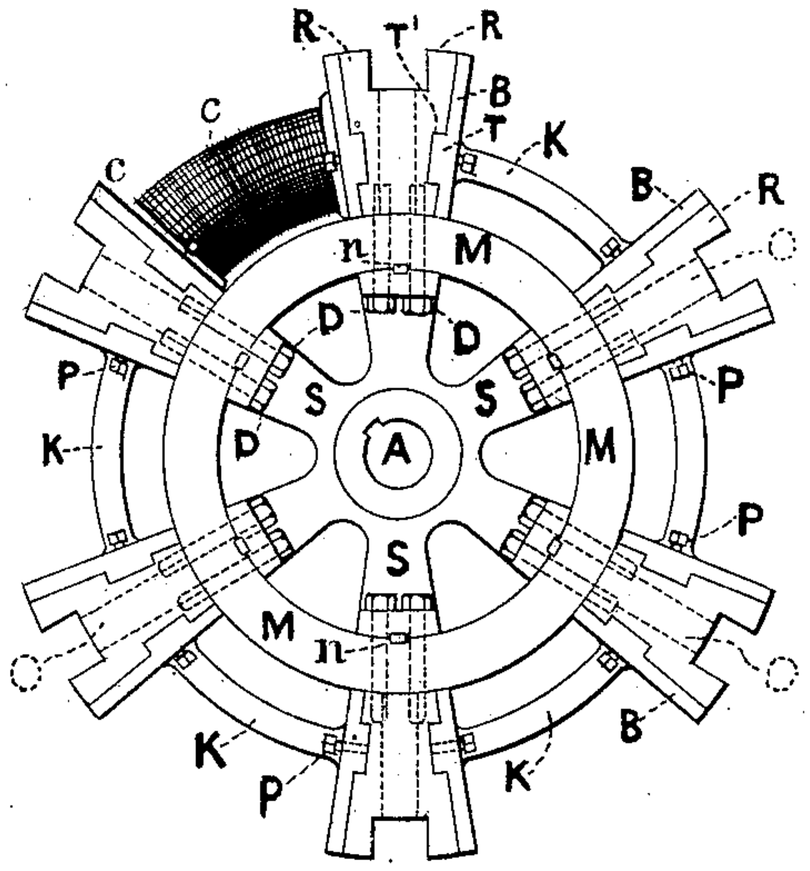
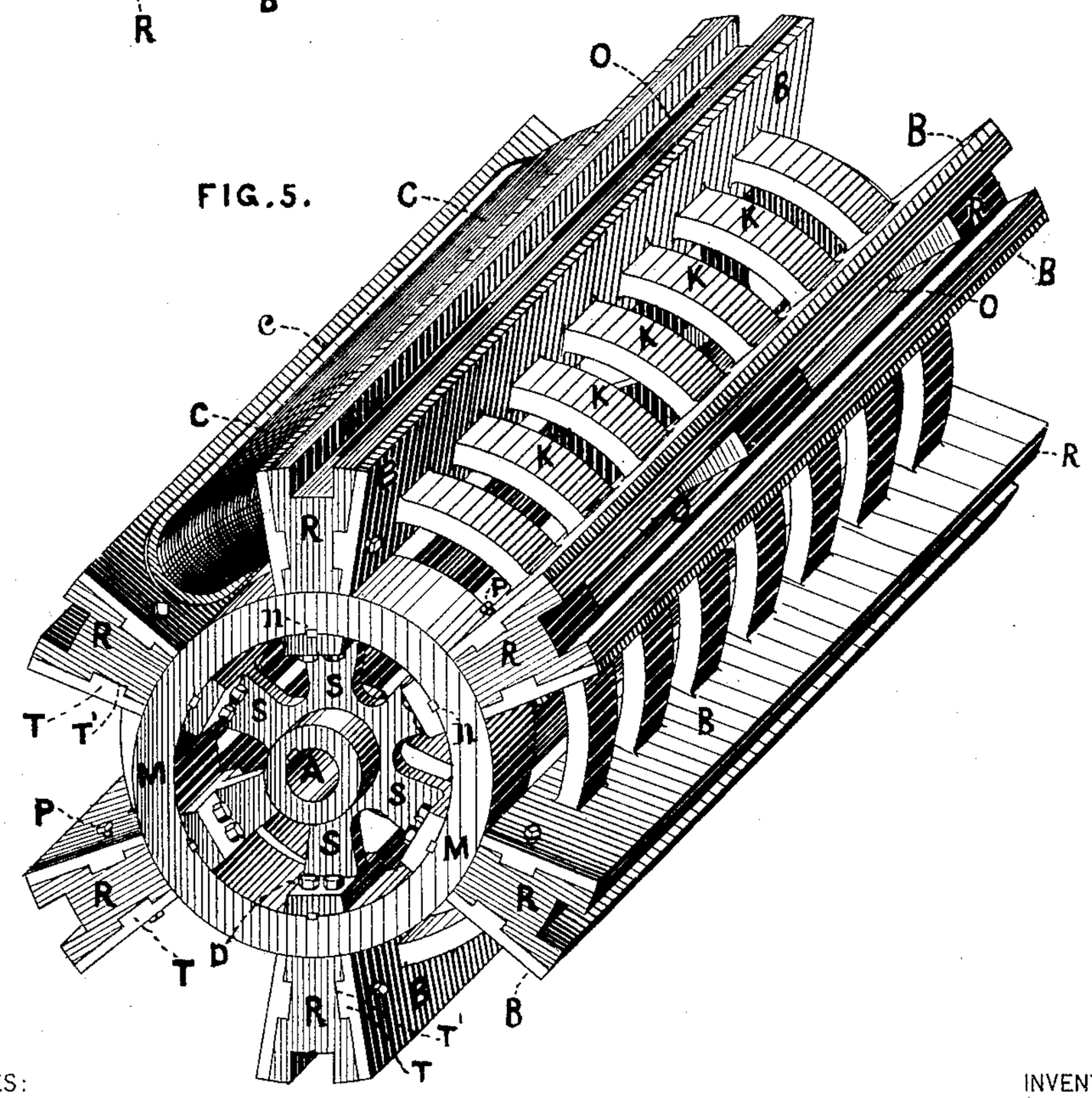


FIG. 5.



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UNITED STATES PATENT OFFICE.

EDWIN J. HOUSTON, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE AMERICAN ELECTRIC COMPANY, OF NEW BRITAIN, CONNECTICUT.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 258,649, dated May 30, 1882.

Application filed December 10, 1881. (No model.)

To all whom it may concern:

Be it known that I, EDWIN J. HOUSTON, of the city and county of Philadelphia, Pennsylvania, have invented certain new and useful Improvements in Armatures for Dynamo-Electric Machines, of which the following is such a description as will enable those skilled in the art pertaining thereto to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My invention consists in a novel construction of a ring or cylindrical armature for a dynamo-electric machine, the object being to provide an improved means of holding the separate sections of a sectional or ring armature firmly in place upon their rotating frame, and at the same time to give great stiffness and rigidity to the rotating structure.

A further object of my invention is to provide a means of ventilating the armature when constructed according to the plan proposed for giving rigidity to the frame and holding the sections firmly in place.

The nature of my invention will be readily understood from the accompanying specification and drawings.

Figures 1, 2, 3, 4, and 5 show the details of my invention. Fig. 1 is an end view, showing the details of construction and method of connecting the separate parts of the armature-core. Fig. 2 is an isometric perspective of the same, showing the appearance of the armature-core when completed. Fig. 3 is an end view of an armature, showing a modified arrangement of the separate parts in which the longitudinal iron ribs to which the separate sections are secured are of a somewhat different construction. Fig. 4 is an end view of a different method of mounting the iron ribs provided for the support of the sections, in which they are all cast in one piece and supported on iron rings at or near the ends of the core. Fig. 5 is an isometric perspective of an armature-core in which the supporting-ribs are of the form shown in section in Fig. 3, and cast in one piece and supported on rings, as shown in Fig. 4.

In Fig. 1 a spider, of brass or other suitable material, is mounted on an axis, A, and provided with radially-projecting arms S S S S S S. To these spider-arms are suitably attached longitudinal ribs R R′ R, Fig. 2, in any suitable manner. I have shown in Figs. 1, 2, and 3 a mode of connecting the longitudinal ribs to the spider-arms consisting in forming a groove in the end of each of the arms for the insertion of a corresponding tongue, L L L, and then securely bolting the two together by bolts, as shown. It is evident that they may be keyed in position or secured together in any other manner. The longitudinal ribs are so shaped that when placed in position and secured to the spider-arms they form portions of a cylindrical armature-core. Each of the longitudinal ribs is provided with grooves T′ T′ on each side. These grooves are designed to receive corresponding tongues, T T, &c., formed on the ends of sections T K K K K, cast in the form of a gridiron, with ribs extending circumferentially, as shown. These sections are so shaped that when properly secured by sliding the tongues T T, &c., in the grooves T′ T′, &c., they will, in connection with the longitudinal ribs R R′ R, form an armature-core with a cylindrical outline, as shown in Fig. 2. The separate sections are secured to the ribs R R by set-screws, or in any other suitable manner. The longitudinal supporting-ribs R R′ R are not made of the same breadth circumferentially through all parts of their length. As will be seen in Fig. 2, they are broadest at their ends R R, the portion R′ being of less breadth and thinner than the ends R at the point where the tenons T abut. This shape is given to the ribs so that, when the separate sections K K K, &c., are placed in position extending in a direction parallel to the axis of rotation, openings O O O will be left between their edges T and the central rib, R′, connected to the supporting-ends R R. These openings serve a double purpose—viz., they provide for the ventilation of the core and prevent the free circulation of local circuits in the iron of the core, due to its rotation in a magnetic field.

The sections of the armature-core so constructed and mounted are wrapped with coils of insulated wire in any suitable manner. I

have shown in Fig. 1 in section, and in Fig. 4 in end view, and in Fig. 5 in isometric perspective, one of the separate sections so wound. For this purpose the separate sections are removed from the armature-frame and separately wrapped with coils of insulated wire, preferably by rotation in a lathe, having been previously insulated by any good non-conducting material. These coils are preferably wrapped so as to come even with the top of the pieces R R, as shown in Fig. 1.

I have shown in all the figures a cylindrical or ring shaped armature in which there are but six separate sections. It is evident, however, that any number of sections may be provided without changing the nature of the invention.

Fig. 3 shows an end view of a somewhat modified form of longitudinal supporting-rib, R R. In this form a central slot extends longitudinally along the outer edge of the ribs in a direction parallel to the axis of rotation and the entire length of the rib, while the ribs R R are of the same breadth in all parts of their length. This form of supporting-rib is shown with a different mounting in Fig. 5. Slots or grooves T′ T′, &c., as before, are provided on the sides of the ribs R R for the insertion of the tongues T T, formed on the sides B B of the gridiron-shaped sections K K K, &c. In this form of supporting-rib the slot or groove T′ T′ extends the entire length of the core, and thus affords a more extended support for the separately-detachable gridiron-sections K K K K. The extended bearing thus afforded permits the sections to be securely fastened by set-screws, as shown, though any other method may be adopted.

In order to provide for the ventilation of the armature and to prevent excessive heating due to the circulation of local circuits in the iron of the core from its rotation in a magnetic field, slots or openings O O, extending through the ribs in a direction parallel to the axis of rotation, are provided, as shown.

In the armature-cores I have just described the longitudinal supporting-ribs are separately cast and attached to the radial arms of the spiders, as shown. In order to simplify the details of construction, I have somewhat modified the form of armature-core, as is shown in connection with Fig. 4.

In Fig. 4 the ribs R R R, &c., are cast in one piece with the supporting-rings M M M M placed one at each end, and with one or more additional rings between the ends, if so desired. The rings are suitably mounted on a spider, S S S S, &c., of brass or other suitable non-magnetic material, provided with an axis, A.

The mode of supporting the ring and securely fastening it to the spider-arms is shown in Fig. 4 in end view, and more clearly in isometric perspective in Fig. 5. The arms S S, &c., are provided at their ends with heads of suitable cylindrical outline to fit the inner surface of the rings M M M, which are securely fastened to the heads by bolts, as shown. In order to still more securely hold it, keys are inserted at N N, &c.

I have shown the separate sections K K K K, &c., as formed of gridiron-shaped pieces. It is evident, however, that they may be made of any suitable form which would enable them, when placed in position, to complete the cylindrical outline of the armature-core. For example, instead of being formed in the shape of a gridiron, they may be composed of a simple frame of iron wrapped with iron wire in a direction parallel to the length of the ribs K K K K, &c., or thin sheets of iron, suitably mounted and separately insulated from one another, or not, as desired, may be suitably clamped between end plates, which latter may enter the slots in the sides of the longitudinal ribs and be securely fastened thereto.

It is evident, too, that where the number of separate coils it is desired to wind on the same armature core is increased it is desirable to lessen the breadth of the longitudinal supporting-ribs R R, &c., so as to leave a greater space on the core for the coils of wire. This breadth of iron between any two contiguous coils may be lessened considerably by making the section R of smaller dimensions circumferentially.

It is also apparent that instead of forming the grooves in the longitudinal ribs I may form them in the ends of the armature-sections and provide the ribs with entering projections or tenons.

What I claim as my invention is—

1. A supporting-frame for a sectional armature, constructed, substantially as described, of a spider-frame connected to the armature-shaft and longitudinal grooved supporting-ribs for the armature-sections attached to said spider-frame.

2. A supporting-frame for a sectional armature, constructed, substantially as described, of a spider-frame attached to the armature-shaft and longitudinal ribs attached to said spider-frame and shaped so as to form portions of a cylindrical outline.

3. A supporting-frame for a sectional armature, constructed, substantially as described, of supporting disks or spiders and longitudinal supporting-ribs provided with side grooves, in combination with separately-detachable armature-sections having supporting tongues or projections which enter the side grooves, and by which said sections are supported.

4. The combination, in a ring-armature, of a supporting armature-frame constructed substantially as described, and separately-detachable armature-sections, supported at each end upon the armature-frame by tongues and grooves formed in or upon the armature-frame and in or upon the ends of the separate sections.

5. A supporting-frame for a sectional armature, constructed of a spider-frame and longitudinal stiffening or supporting ribs slotted or

perforated so as to provide openings for ventilation and to prevent circulation of induced currents.

6. In an armature-core for dynamo-electric machines, the central longitudinal rib, R R, provided with a longitudinal slot or groove extending along the entire length of its upper face, and with central openings, O O, &c., and side grooves or slots, T′ T′, substantially as and for the purpose set forth.

7. The combination, with the separately-detachable sections in a ring-armature, of longitudinal supporting-ribs provided with side grooves and central openings or slots for ventilation.

8. In an armature-core for dynamo-electric machines, the supporting-rings M M and the longitudinal ribs R R, cast in one piece with the rings and furnished with slots or grooves for the insertion of the separate detachable sections, substantially as and for the purpose set forth.

EDWIN J. HOUSTON.

Witnesses:
Z. HOPPER,
GEO. I. RICHÉ.