(No Model.) 2 Sheets—Sheet 1.

S. H. SHORT.

DYNAMO ELECTRIC MACHINE.

No. 308,207. Patented Nov. 18, 1884.

Fig. 1.

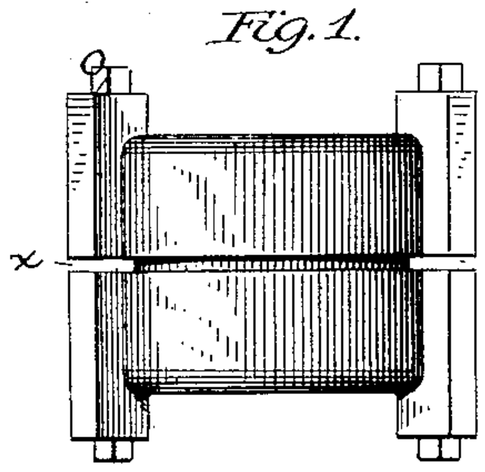


Fig. 2.

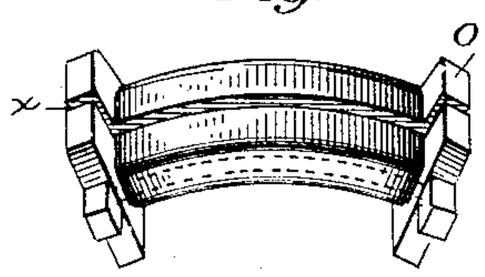


Fig. 3

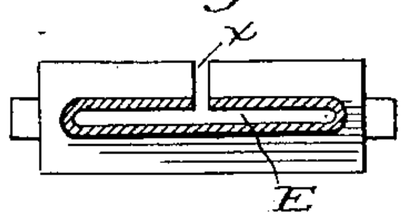


Fig. 4.

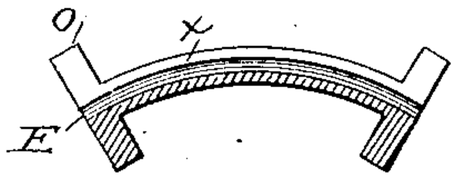


Fig. 5.

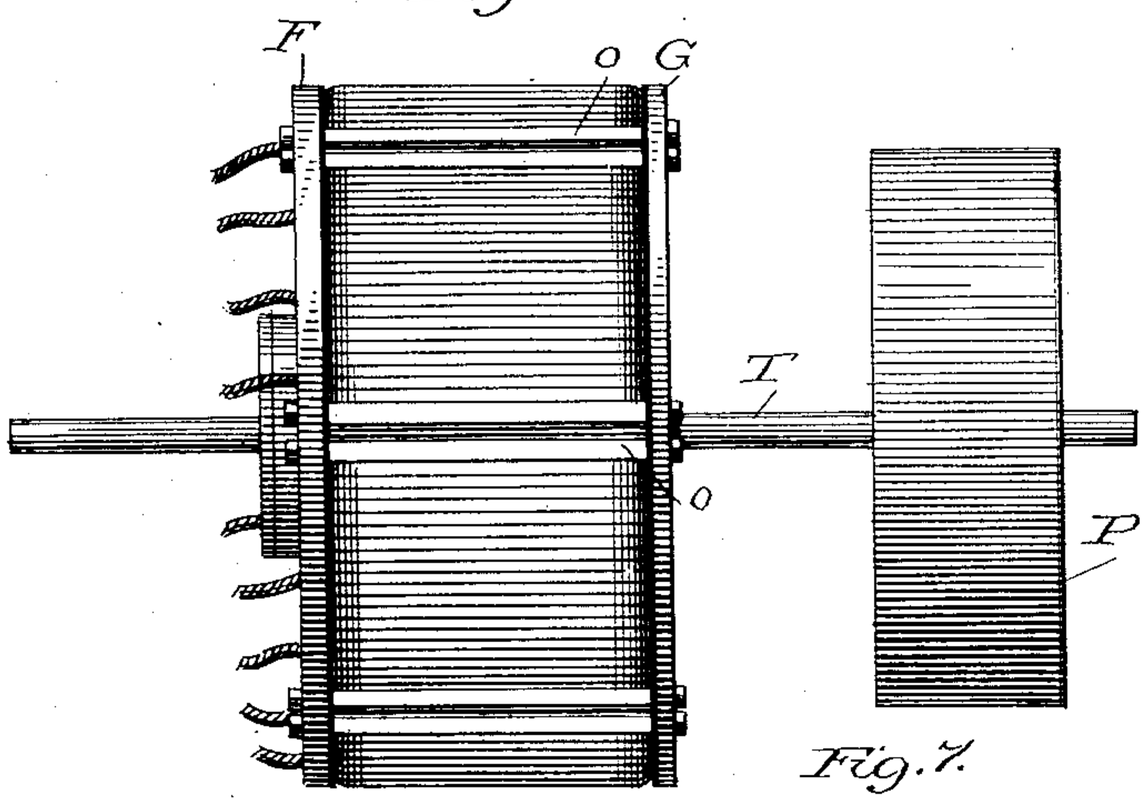


Fig. 6.

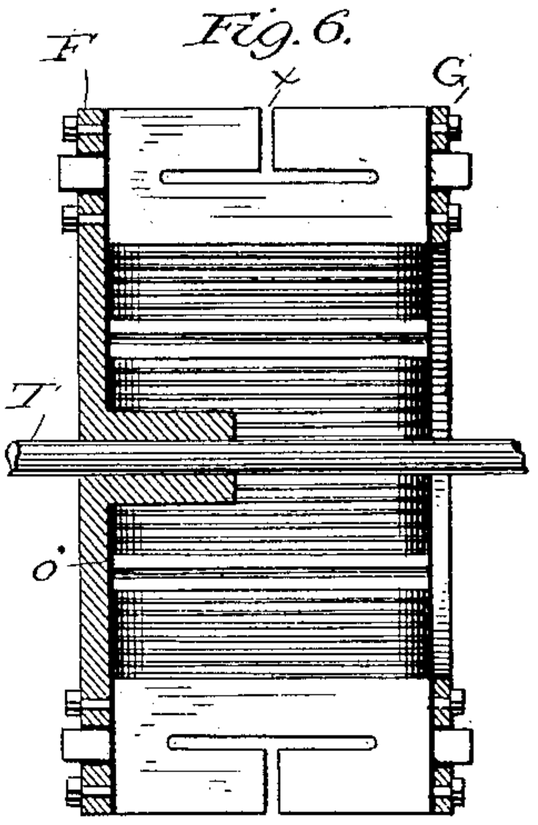
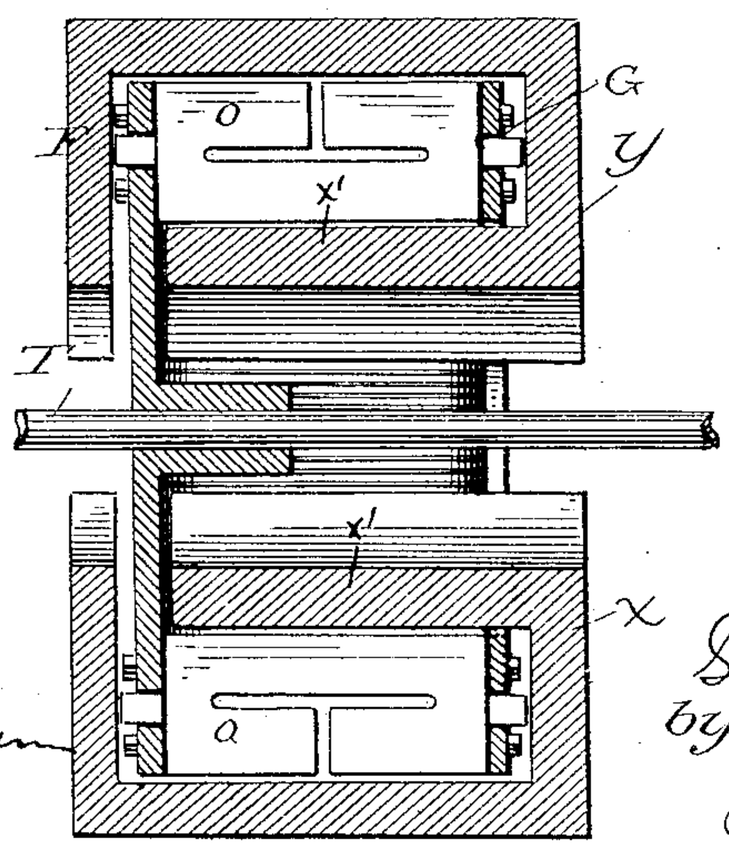


Fig. 7.



Attest:
Walter Macadam
S. W. Sury

Inventor
Sidney H. Short
by Joyce & Gear
Attys.

(No Model.) 2 Sheets—Sheet 2.

S. H. SHORT.

DYNAMO ELECTRIC MACHINE.

No. 308,207. Patented Nov. 18, 1884.

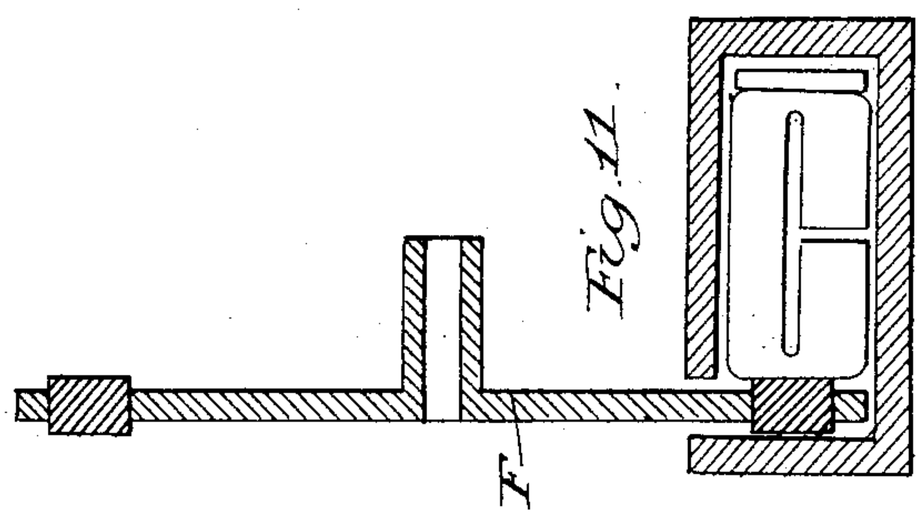


Fig. 11.

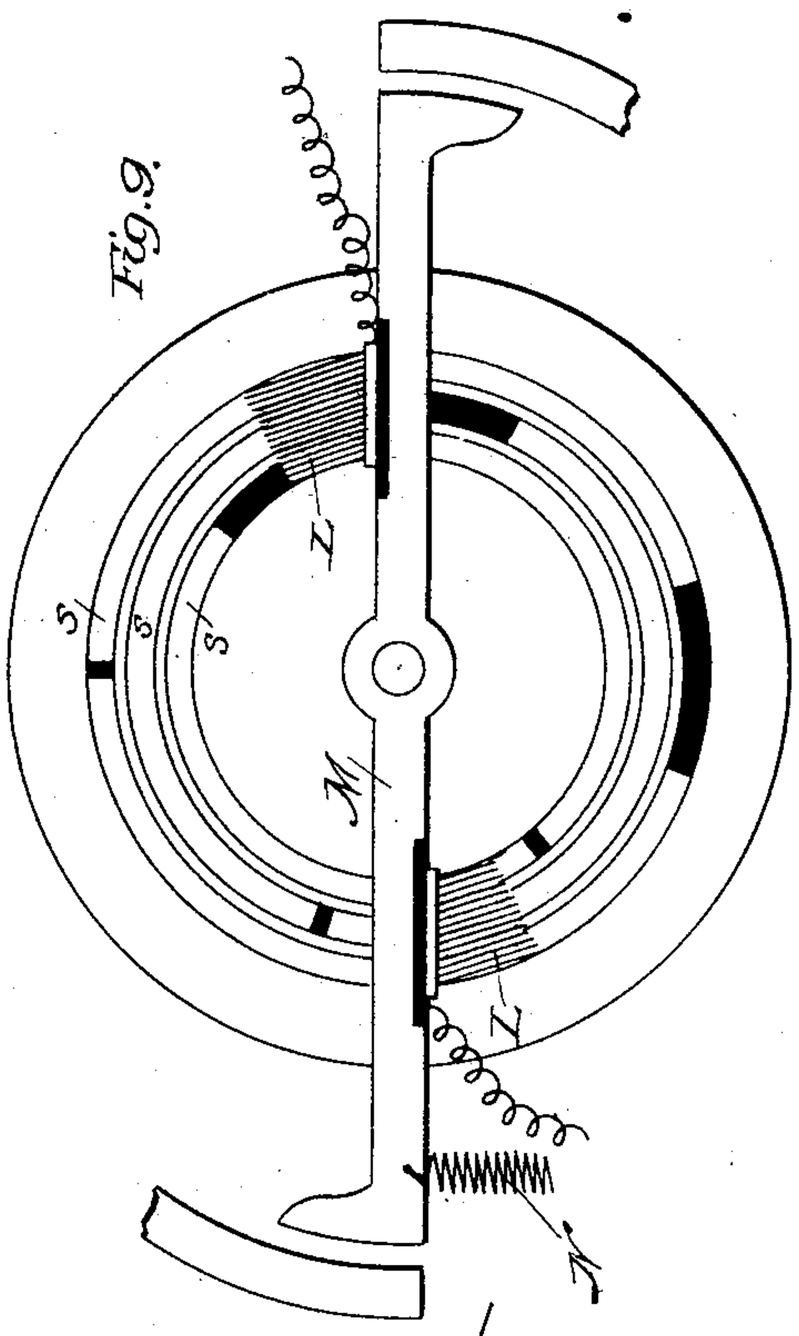


Fig. 9.

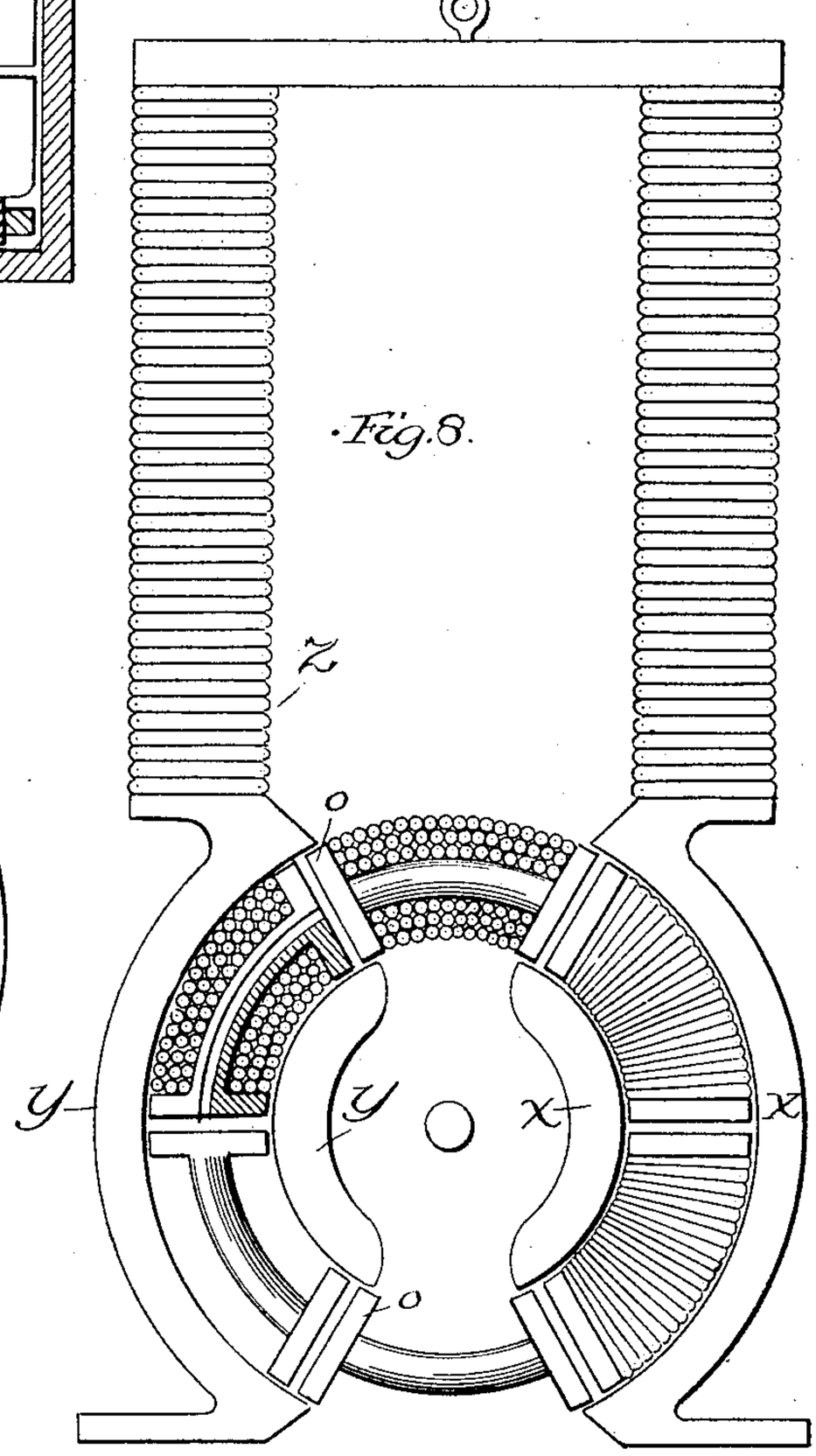


Fig. 8.

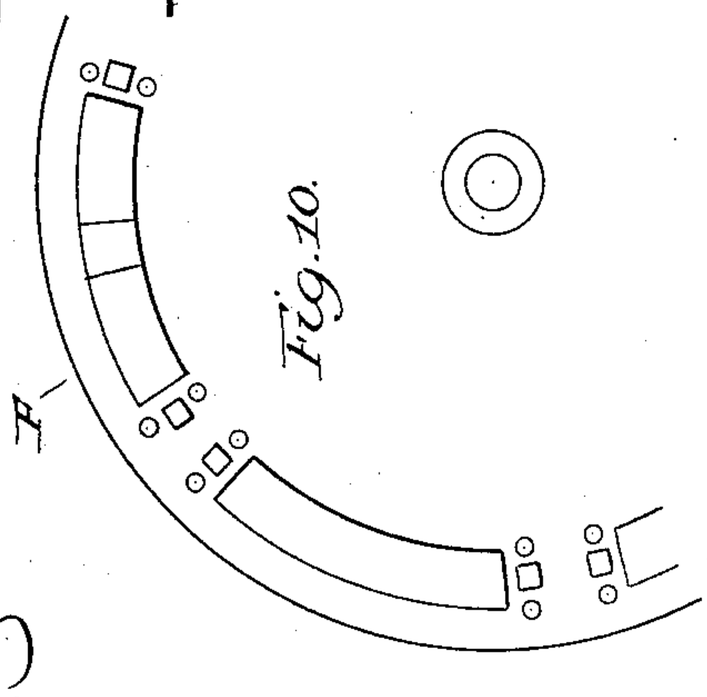


Fig. 10.

Attest:
S. W. Seely
F. L. Middleton

Inventor
Sidney H. Short
by Joyce & Spear
Attys.

UNITED STATES PATENT OFFICE.

SIDNEY H. SHORT, OF DENVER, COLORADO.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 308,207, dated November 18, 1884.

Application filed December 15, 1883. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY H. SHORT, of Denver, in the county of Arapahoe and State of Colorado, have invented a new and useful Improvement in Dynamo-Electric Machines; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates to improvements in the construction of dynamo-electric machines.

The object of my invention is to attain simplicity and cheapness in construction, facility of manufacture, and efficiency of operation, and to produce the greatest possible concentration of magnetism upon the revolving armature.

Another object of my invention is to prevent the circulation of induced currents in the armature, and the consequent loss of energy by the heating of the armature-core by the circulation of such currents. This is accomplished by a system of insulation by which each part composing the armature is insulated from the rest.

Another object is to subject every portion of the armature-coils to the action of the inducing-body by practically surrounding such coils with a strong field-of-force magnet.

Another object is to surround the armature and inclose it, so that its revolution will not create currents of air to retard its motion to the extent that it would if the armature were exposed.

The invention consists in the various features of construction necessary to accomplish the above-specified objects, and, further, in novel details and arrangements of the parts, as fully hereinafter described and claimed in the drawings accompanying this application, in which—

Figure 1 is a front view of a section of the armature-core. Fig. 2 is a side view of the same. Fig. 3 is an end view of the same. Fig. 4 is a section of the same. Fig. 5 is a view of the armature, its shaft, and driving-pulley. Fig. 6 is a cross-section on the line of the driving-shaft. Fig. 7 is a similar section, which includes the U-shaped poles of the field-magnets. Fig. 8 is an end view of the armature and field-magnet. Fig. 9 is an elevation of the commutator and regulator. Figs. 10 and 11 show modified forms of the face-plate to which the sections of the armature are connected.

Figs. 1, 2, 3, and 4 show different views of a section of the armature-core on which is wound the induction-coil. It is a thin piece of soft iron, bent or otherwise formed into the arc of a circle, and having radial end flanges, *o*, between which the coil is formed on the core. The section is hollow throughout its whole extent, as shown at E, Fig. 4, and is slotted from end to end, as shown at *x*, Fig. 1. This slot is to prevent the circulation of electrical currents induced in the core. It is not necessarily formed on the outside of each of the core-sections, as in Fig. 1, but may be made on the opposite or concave side of all the sections, or upon the concave side of some and the convex side of others. These sections are wound transversely to their curvilinear extent with wire of suitable size for the purpose, and a sufficient number to form the complete armature-ring are mounted upon a face-plate, F, Fig. 5, by bolts which enter the edge of the flanges *o*. Similar bolts secure the opposite end to an annular disk, G. The sections of the armature are insulated from the plate F and disk G in any well-known manner, as shown in Fig. 5, and also from each other, Fig. 6, the object and effect being to prevent the flow of induced currents within the armature. The face-plate F and disk G may be made of some diamagnetic material to prevent it from forming an armature between the pole-pieces of the field-magnets; or it may be made of magnetic material. The wires of the bobbins or sections pass through the face-plate F, being insulated therefrom, to the commutator, hereinafter described. The face-plate F is mounted rigidly upon the shaft T, which has a driving-pulley, P, upon it. The completed armature forms a hollow cylinder mounted upon the driving-shaft, and the object of this construction is to utilize to the greatest possible extent the source of induction by causing the poles of the field-magnets to enter the cylinder and come into proximity to the armature both inside and outside, whereby currents are induced upon all sides of the wires.

Fig. 7 shows a cross-section, and Fig. 8 a side view, of the poles *x y* of the field-magnets. In cross-section they are of rectangular or ob-

long shape, so as to surround the armature, one side, *x'*, entering the spaces between the shaft and the armature. The coils of the field-magnets are shown in Fig. 8 at Z. The revolution of the armature causes each of its insulated sections to act as a true armature in passing between the poles of the magnets, which induces a current of very high electro-motive force in the bobbin. If an even number of bobbins be used, (and the drawings so illustrate,) two of these bobbins will be constantly between the two pole-pieces; but I do not confine myself to any particular number of bobbins, that being a matter of choice. Currents of high or low intensity may be produced by connecting the bobbins with each other or with the commutator. The field-magnets may be excited by sending the entire current directly through their coils, or by a derived circuit from the commutators; or a portion of the bobbins of the armature-ring may be devoted to furnishing the currents to excite these magnets, and the remainder to producing one or several distinct currents to be used outside the machine.

Fig. 9 shows the form of commutator I prefer to use, although any suitable kind may be employed. To this commutator the wires from the armature-coils pass and are connected, so that either an intermittent or a continuous current of either high or low intensity may be delivered at the poles of the machine, according to the manner in which the connection is made. The commutator is composed of a disk, *a*, of non-conducting material, and mounted on the driving-shaft next to the armature, so as to turn with it. Secured upon the face of this ring is a series of concentric rings, *s*, made of conducting material and insulated from each other. Portions of these rings are removed and the space filled with some insulator—like hard rubber—so that the current in each segment will be delivered to the brush in turn. The wires from the armature-bobbins are connected to these insulated segments, of which six are shown in the drawings, corresponding to the number of bobbins. A regulator-bar, M, is pivoted loosely on the armature-shaft, or on a sleeve thereon, so as to have an independent motion and swing freely. The bar is preferably made of soft iron, and its ends extend outward, so as to be in close proximity to the opposite pole-pieces of the field-magnets. The commutator-brushes L are mounted upon this swinging bar in such a manner that as the bar moves the brushes will be in contact with the face of the disk. Connected to one end of the bar is a spring, N, which tends to draw the bar constantly in one direction. The bar is constantly attracted against the tension of the spring by the magnet, the attractive force varying according to the strength of the current. The position of the bar and brushes with respect to the commutator is therefore uniformly regulated according to the strength of the current. The brushes are insulated from the bar, and the wires which pass from them are flexibly secured, in order to permit the bar to revolve.

I prefer to form the face-plate F as shown in Figs. 10 and 11, where bars of iron *w* are inserted in its face, projecting beyond such face, so as to come nearly in contact with the pole-pieces.

Having thus described my invention, I claim as new—

1. A hollow armature-core for a dynamo-electric machine, formed of hollow sections having transverse winding, such sections being insulated from one another, substantially as described.

2. The hollow sections of the armature-core having the longitudinal slot, substantially as set forth.

3. The hollow sections of the armature-core wound transversely, and having radial end flanges, and also having the longitudinal slots, substantially as described.

4. The armature-sections, in combination with the disk F, the driving-shaft, the annular disk G, and the rectangular-shaped segmental pole-pieces.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SIDNEY H. SHORT.

Witnesses:
M. F. SHORT,
H. C. BAUM.