(No Model.) 3 Sheets—Sheet 1.

E. J. HOUSTON.

DYNAMO ELECTRIC MACHINE.

No. 286,612. Patented Oct. 16, 1883.

Fig. 1.

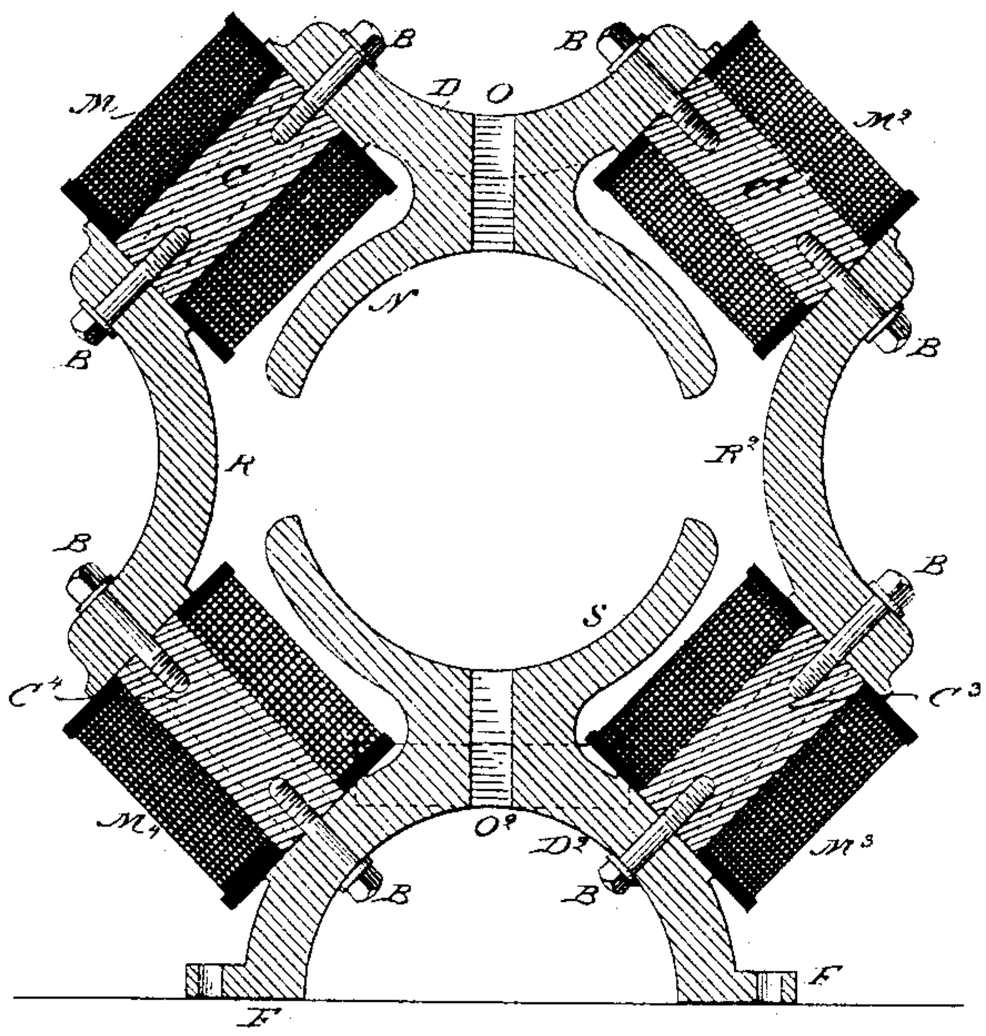

Fig. 2.

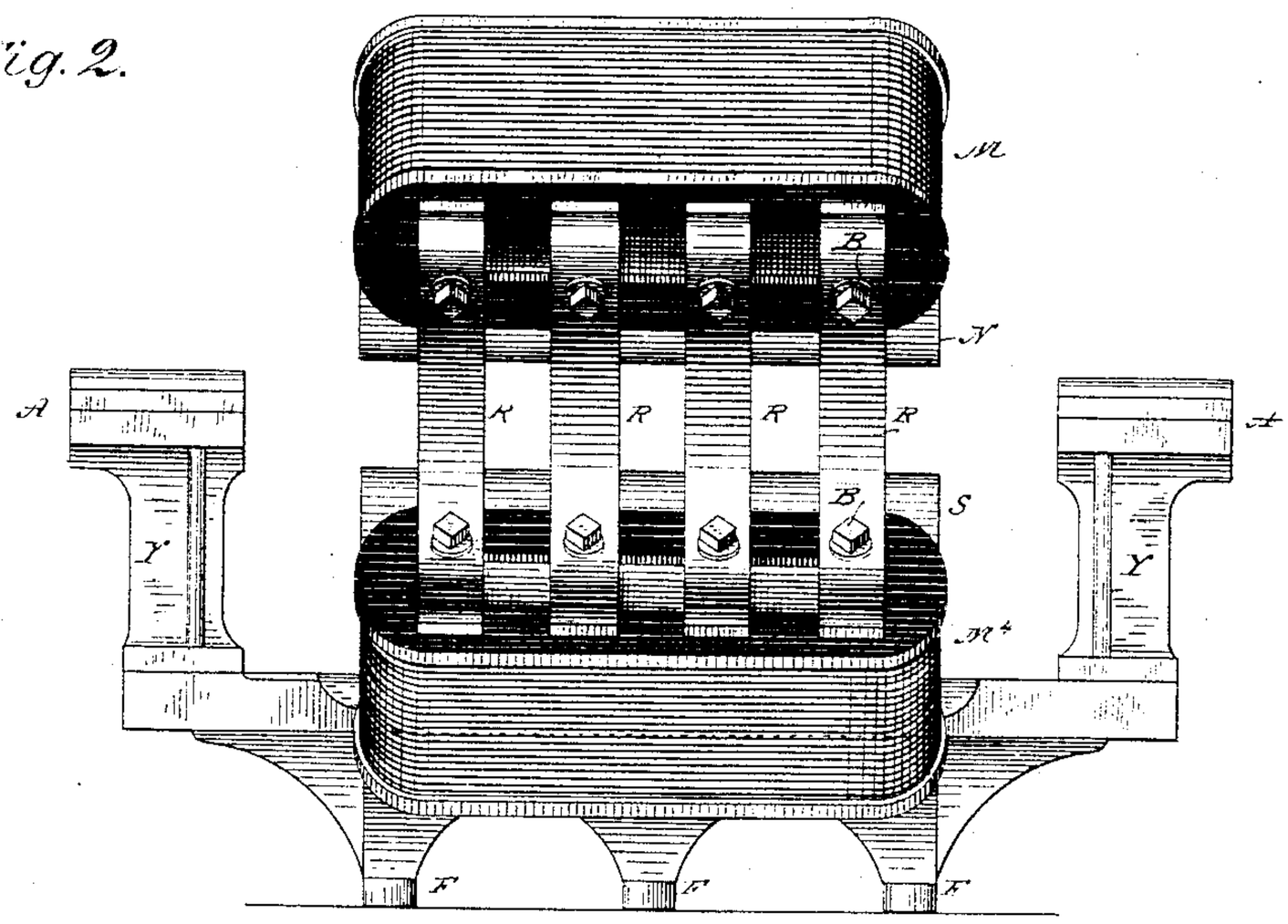

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Fig. 3.

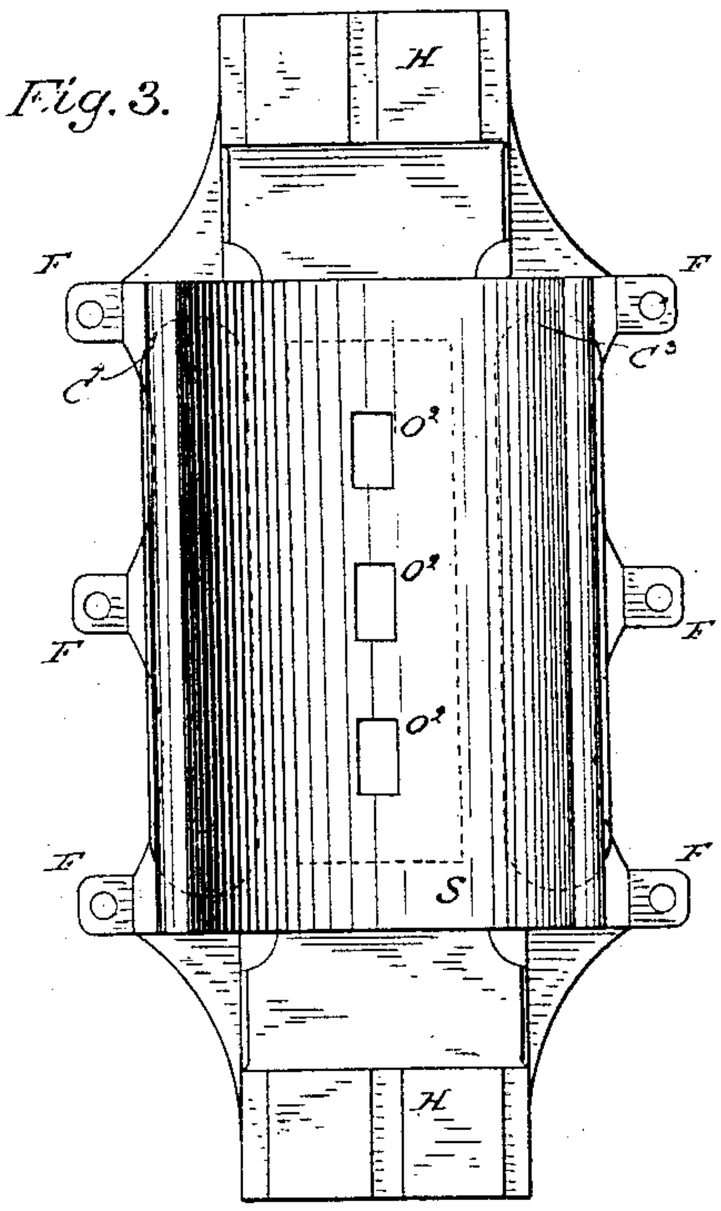


Fig. 4.

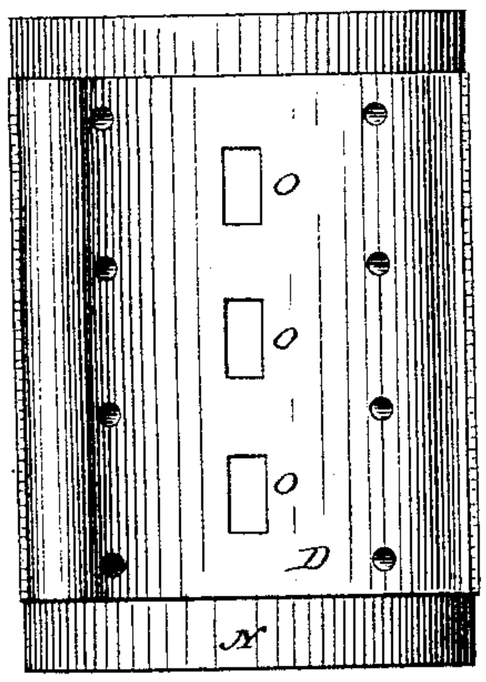


Fig. 5.

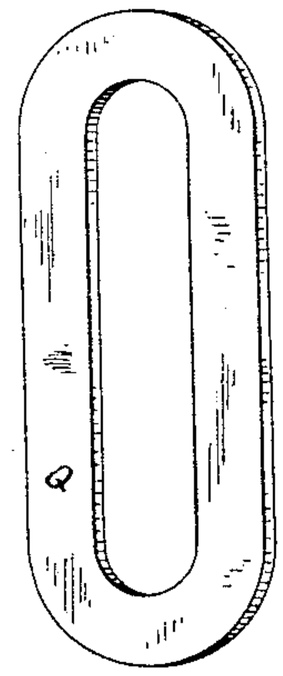


Fig. 6.

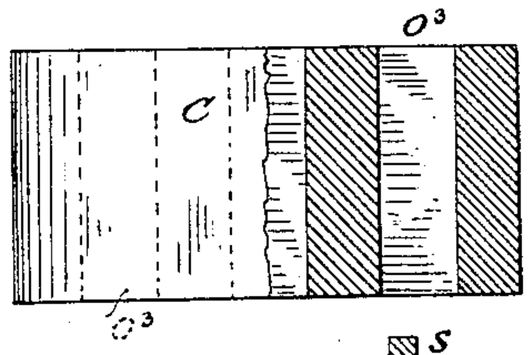


Fig. 8.

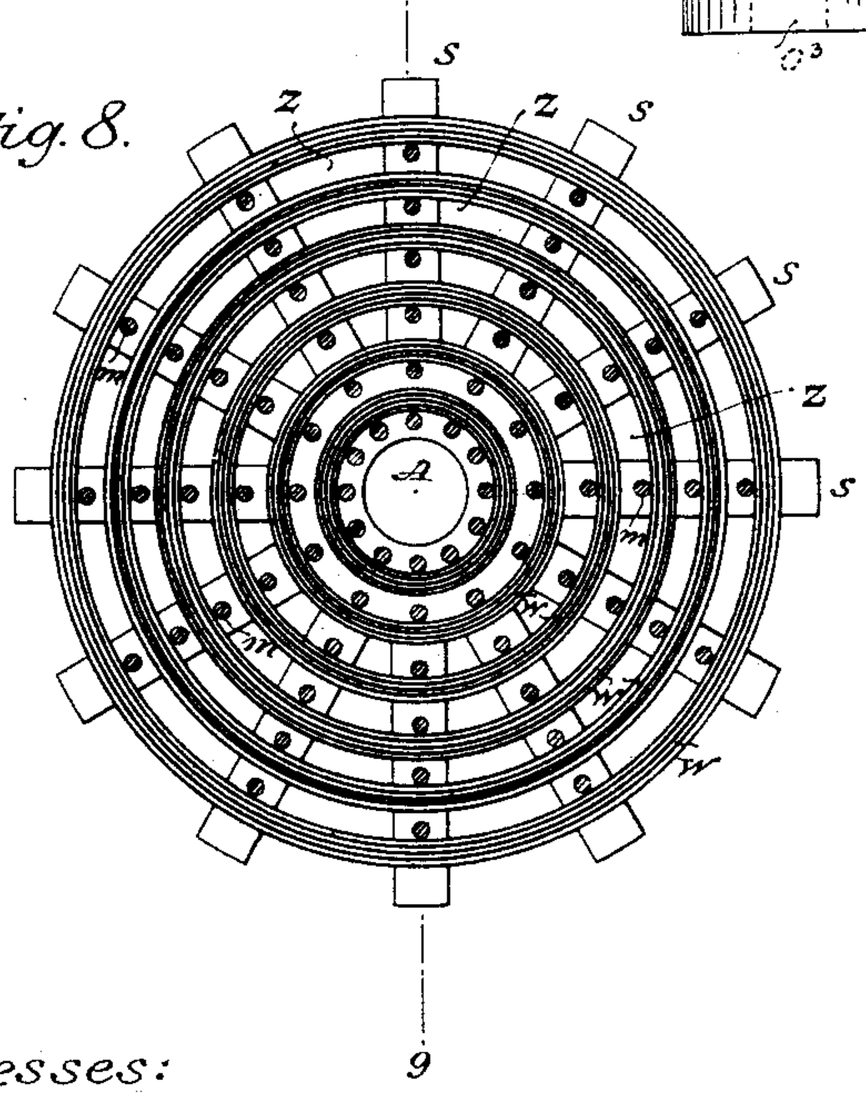
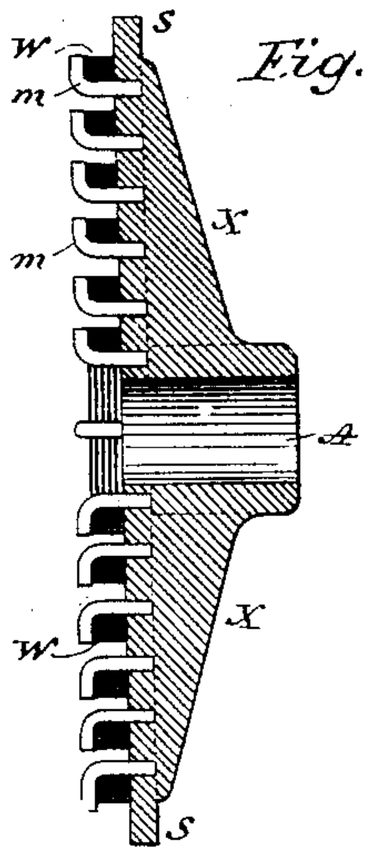


Fig. 9.



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E. J. HOUSTON.

DYNAMO ELECTRIC MACHINE.

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Fig. 7.

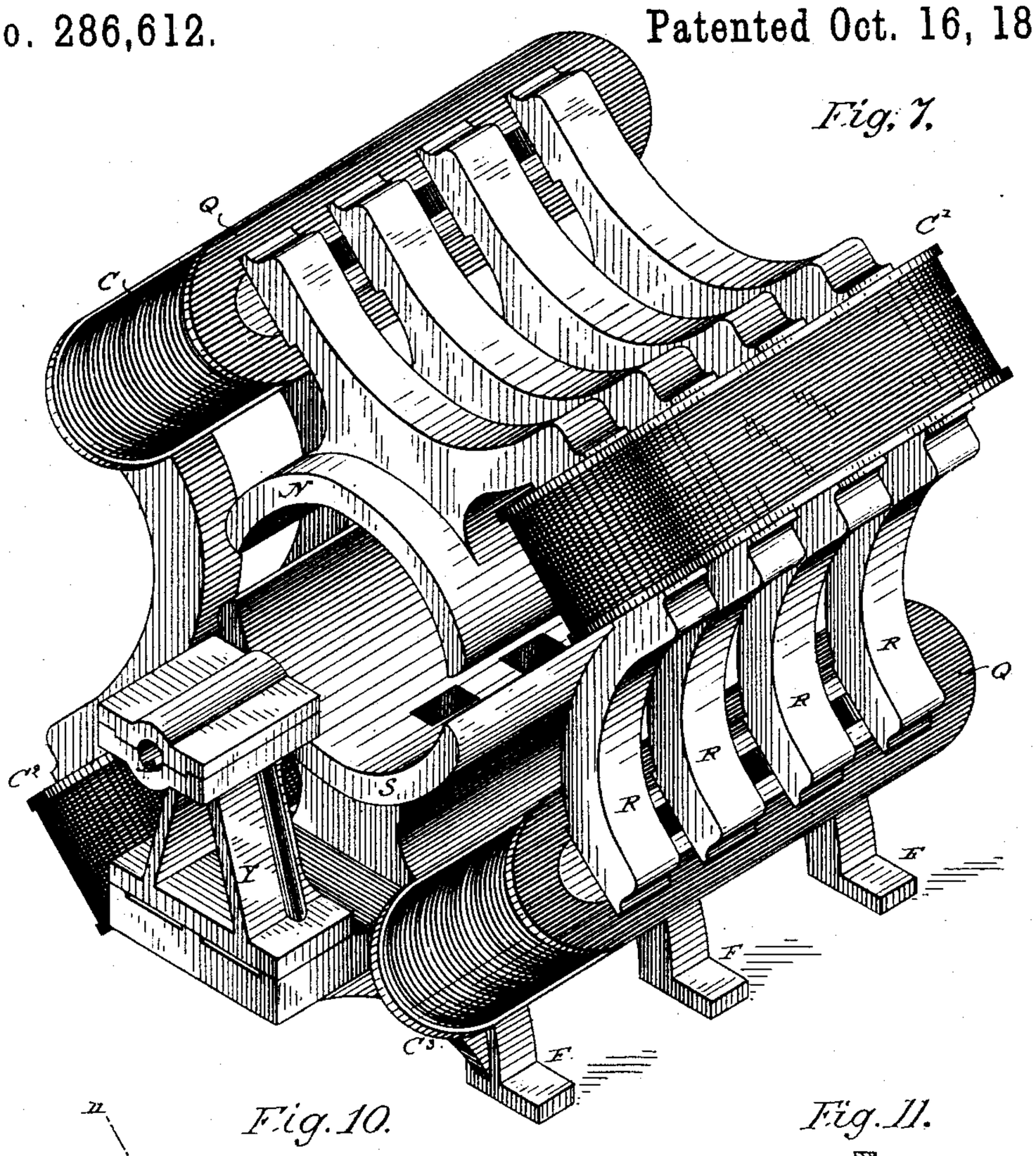


Fig. 10.

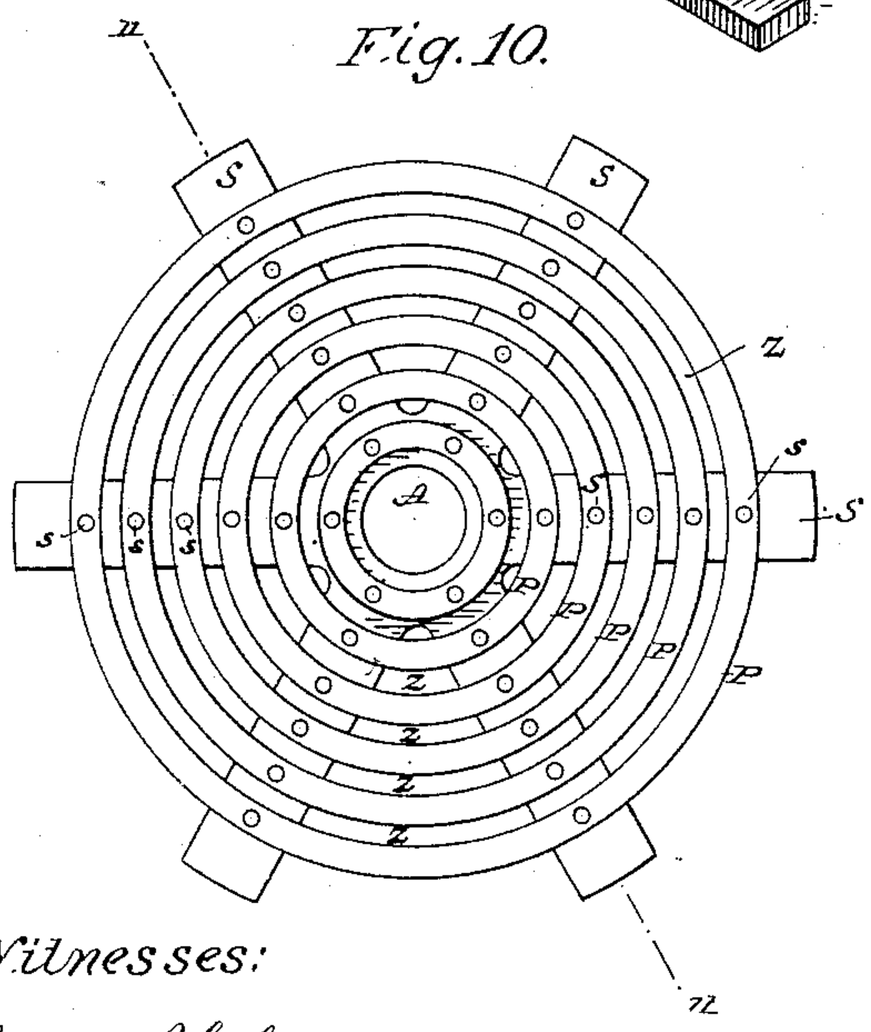
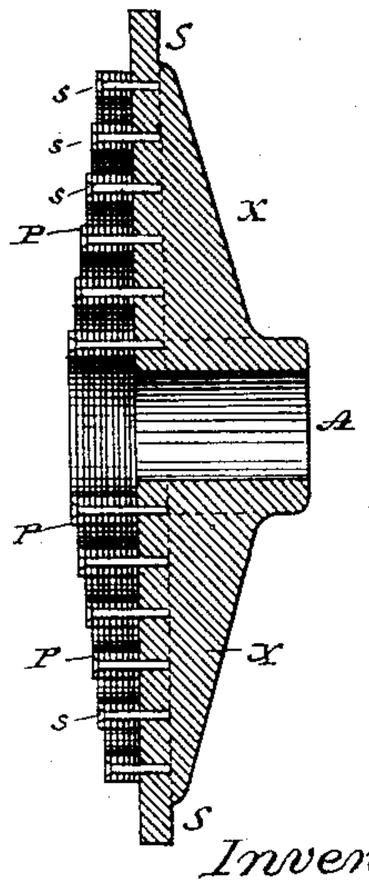


Fig. 11.



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UNITED STATES PATENT OFFICE.

EDWIN J. HOUSTON, OF PHILADELPHIA, PA., ASSIGNOR TO THE THOMSON-HOUSTON ELECTRIC COMPANY, OF NEW BRITAIN, CONN.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 286,612, dated October 16, 1883.

Application filed July 26, 1883. (No model.)

To all whom it may concern:

Be it known that I, EDWIN J. HOUSTON, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Dynamo-Electric Machines, of which the following is a specification.

My invention relates to certain improvements in the construction of dynamo-electric machines, whereby greater efficiency and economy of operation are secured.

My invention consists in certain improvements in the form and construction of the field-magnet frame and of the armature core or carrier, which will be herein described in detail, and then specified in the claims.

In the accompanying drawings, Figure 1 is a vertical cross-section of a field-magnet frame constructed according to my invention. Fig. 2 is an end view of the frame. Fig. 3 is a plan view of the bed-plate and lower pole-piece. Fig. 4 is a top view of the upper connecting-plate and pole-piece. Fig. 5 is a side view of one of the flanges for holding the field-magnet coils in place. Fig. 6 is a plan, partly in section, of the core of a field-magnet. Fig. 7 is a perspective view of a modification of the field-magnet frame. Fig. 8 is an end view of the armature core or carrier, and Fig. 9 is a cross-section thereof on the line 9 9 of Fig. 8; and Figs. 10 and 11 are similar views of a modification.

In order to secure the greatest efficiency of action in the field-magnet, and at the same time to improve its compactness, I construct the magnet-frame as shown in Figs. 1 and 2. As there shown, the magnet-frame consists of an octagonal frame, four of the sides of which are formed by the field-magnets M′, M², M³, and M⁴, while the remaining four sides are formed by curved ribs R R² and top and bottom plates, D D², between which the cores C, C², C³, and C⁴ of the several field-magnets are secured by bolts B, as shown. Formed upon or attached to the top and bottom plates, D D², are the curved field-of-force pole-pieces N and S, between which the armature rotates. The coils wound upon the several cores C C² C³ C⁴ are, as usual, so connected that one of said pole-pieces—as, for instance, N—will have north polarity, while the other will have south polarity. The curved extensions of the pole-pieces are in close proximity to the wires of the field-magnets, as shown. The lower piece, D², is provided with feet F F, &c., by which it can be securely fastened to its foundation or support. Supports H H extend from said bed-plate, and bear standards Y Y, upon which are the bearings for the armature-shaft. In order to obtain the proper ventilation of the armature and the field-magnet, openings O and O² are provided, which extend through the pole-pieces N and S, as shown. The cores C, &c., of the field-magnets are also provided with openings O², extending through the same in a direction at right angles to the plane of winding of the coils, as indicated in Fig. 6, which openings assist in the ventilation and cooling of the machine. The curved ribs R and R² may be of any desired form and number, but are sufficient in number or size to form a good magnetic connection between the field-magnets M M², &c. I sometimes wrap these ribs with coils of insulated wire, so as to strengthen the magnetic polarity of the pole-pieces N and S. Instead of forming the top and bottom plates supporting the pole-pieces N and S each of one solid plate, I sometimes form them of a series of curved ribs, of substantially the same form as the ribs R R². The longitudinal spaces between the ribs are in this case continued vertically downward through the curved pole-pieces N and S, so as to more thoroughly provide for the ventilation of the armature. This form of the octagonal magnet-frame is illustrated in Fig. 7.

The arrangement of the field-magnets and connecting-bars, &c., forming the octagonal magnet-frame just described, secures a number of important advantages, some of which are as follows: First, the massive character of the pole-pieces serves to maintain a uniformity in the strength of the magnetic field that increases the regularity of running and avoids injurious flashing at the commutator; second, the open spaces between the ribs and the openings in the core and pole-pieces provide thoroughly for the ventilation of the armature and the field-magnet; third, the position of the

magnet-coil with relation to the pole-pieces and the armature, which coils are for their whole extent parallel and in close proximity to the revolving wire on the armature, results in a strengthening of the currents produced in said armature during revolution; fourth, the octagonal form of magnet-frames secures a much greater degree of compactness than is possible with the ordinary form.

The peculiarities of the armature core or carrier which I employ are illustrated in Figs. 8 and 9. When the end pieces or spiders of cylindrical armature cores or carriers in machines producing powerful currents are formed of massive pieces of metal, the induction-currents set up therein tend to produce excessive and injurious heating and a lessening of the effective current. To avoid these defects, I construct the heads or end pieces of radial arms S S, &c., which are made of iron, brass, wood, or any suitable material securely fixed to the hub X, mounted on the armature-shaft A, upon which arms are wound circumferential coils of soft-iron wire W, arranged concentric to the axis or shaft A, and held in place by means of the pins or hooks *m m*, &c., or by any other suitable device. As these coils are for the most part at right angles to the coils of insulated armature-wire that cross the end of the cylindrical armature, the induced currents produced therein are inappreciable. The spaces at *Z Z*, &c., between successive coils W, provide for a thorough ventilation of the armature core or carrier.

Instead of coils of wire, plates or rings of thin sheet-iron piled one upon the other may be employed. This construction is shown in Figs. 10 and 11, where P P, &c., indicate the plates or rings of iron, and *s s*, &c., screws by means of which they are secured in place. In this instance, as before, openings Z Z, &c., are left for ventilation. This form of construction of the ends or spiders of cylindrical armatures not only prevents excessive heating, but, as already described, assists very materially in the ventilation of the machine.

What I claim as my invention is—

1. A field-magnet frame, constructed as described, of four field-magnets forming four sides of an octagon, connecting ribs or plates forming two other sides thereof, and connecting-plates having curved pole-pieces forming the remaining sides.

2. A field-magnet frame composed of four field-magnets forming four sides of an octagon, the series of connecting-ribs R R^2, having spaces between them, forming two other sides, and the plates D D^2, having the curved pole-pieces N S curved in close proximity to the coils of the field-magnet.

3. A field-magnet frame composed of four field-magnets forming four sides of an octagon, curved ribs R R^2, forming two other sides, and plates D D^2, carrying the curved pole-pieces N S, and provided with ventilating-openings O O^2.

4. A field-magnet frame composed of the four field-magnets M, M^2, M^3, and M^4, having the straight cores C C^2 C^3 C^4, curved plates or ribs R and R^2, of any desired number, plates D D^2, provided with pole-pieces N S, and bolts B, securing the cores to the ribs.

5. The combination of the four field-magnets, the curved connecting-ribs, connecting-plate D, and connecting-plate D^2, having feet or supports F F, and supports H H, for the journal-bearings of the armature.

6. The octagonal field-magnet frame composed of the four field-magnets, whose cores are perforated, as described, and the intermediate connecting-ribs, R R^2, and plates D D^2, perforated and carrying the curved pole-pieces.

7. In a cylindrical armature-carrier for a dynamo-electric machine, a spider-frame wound with a series of coils or plates concentric with the armature-shaft, as and for the purpose described.

8. In a cylindrical armature, an end piece or spider having radial arms upon which are secured the circular coils or plates concentric with the armature-shaft, as and for the purpose described.

Signed at Philadelphia, in the county of Philadelphia and State of Pennsylvania, this 29th day of June, A. D. 1883.

EDWIN J. HOUSTON.

Witnesses:
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BENJN. DANIELS.