(No Model.)

A. S. ATWATER.

ARMATURE.

No. 411,950. Patented Oct. 1, 1889.

Fig. 1.

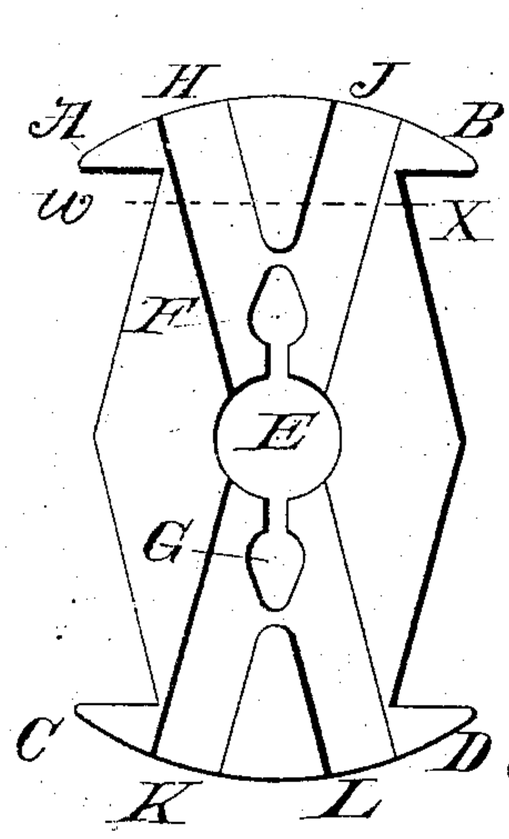

Fig. 3.

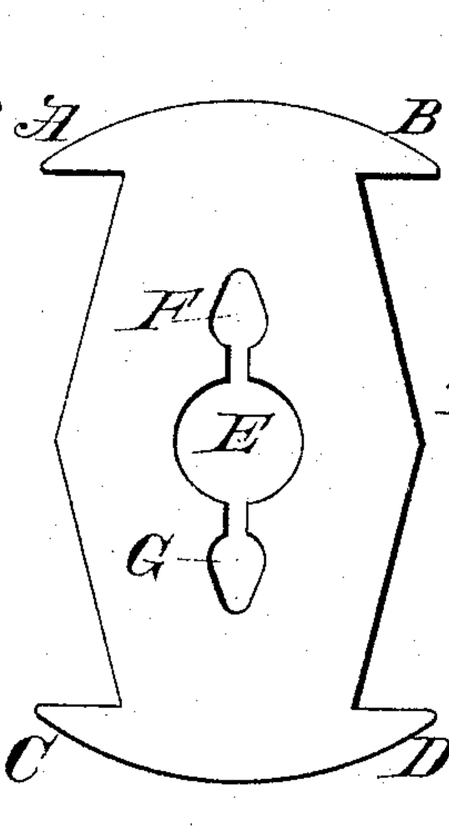

Fig. 4.

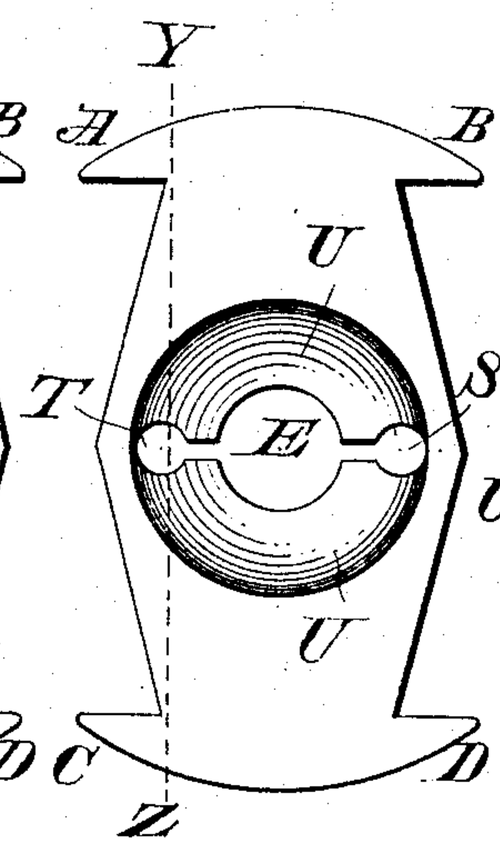

Fig. 5.

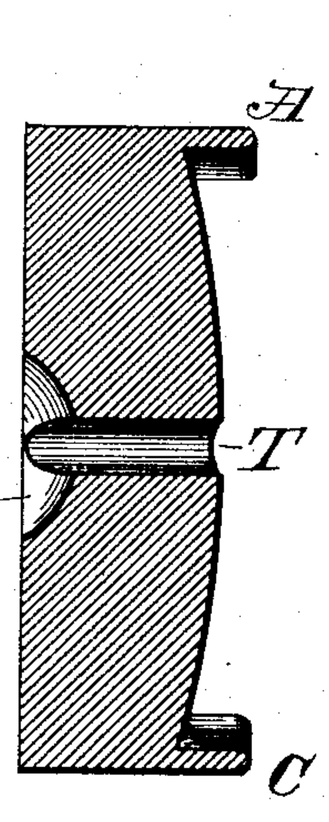

Fig. 6.

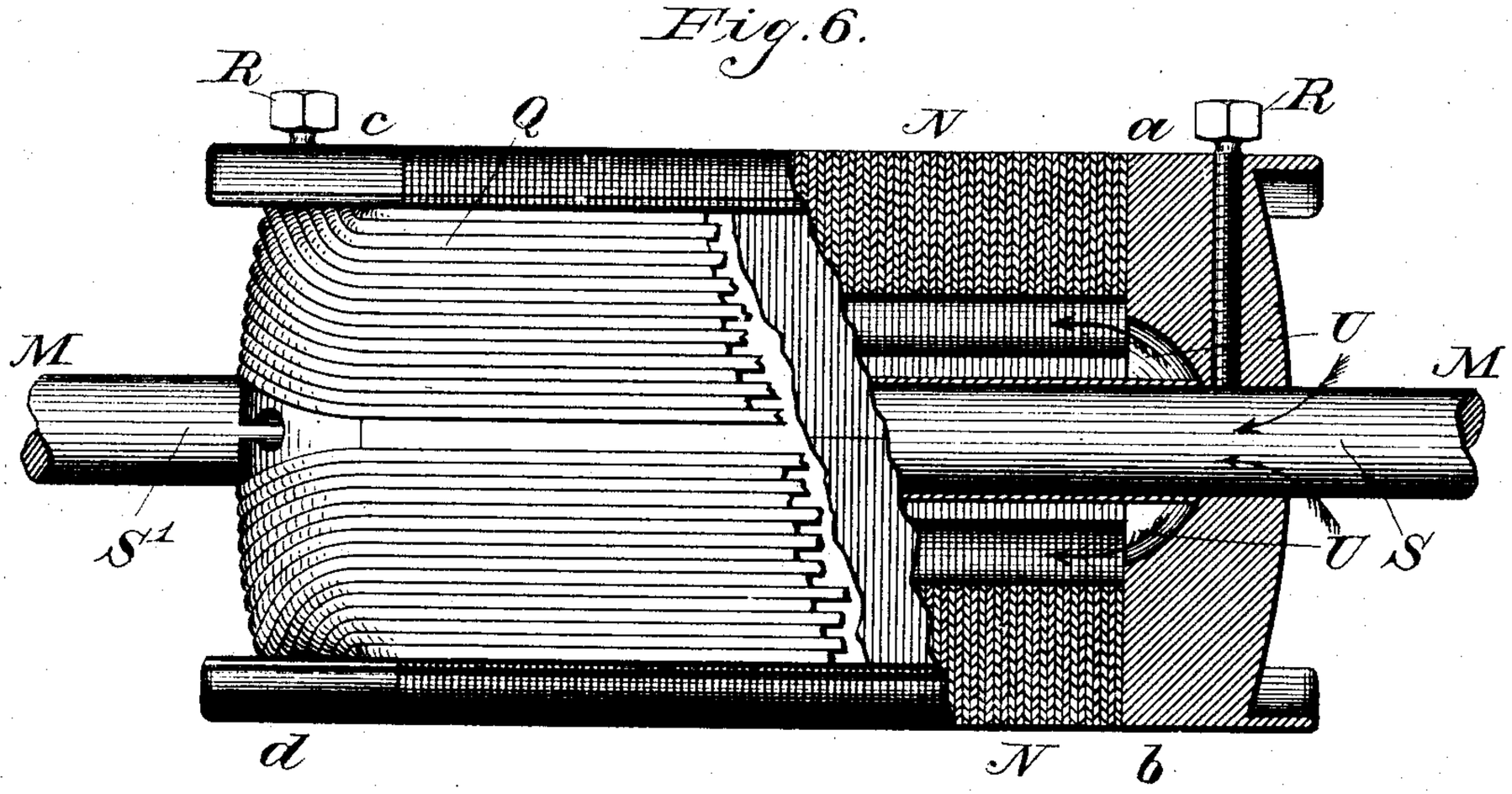

Fig. 2.

Witnesses:
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UNITED STATES PATENT OFFICE.

ARTHUR S. ATWATER, OF CLEVELAND, OHIO.

ARMATURE.

SPECIFICATION forming part of Letters Patent No. 411,950, dated October 1, 1889.

Application filed March 23, 1889. Serial No. 305,204. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR S. ATWATER, a citizen of the United States, and a resident of the city of Cleveland, in the State of Ohio, have invented a new and useful Improvement in Armatures, of which the following is a specification.

The object of my invention is the complete ventilation of an armature having only one coil of wire wound lengthwise of the axis, which is accomplished as follows:

In the accompanying drawings, Figures 1 and 3 are surfaces of plates of which the main part of the armature-core is formed. Fig. 2 is a cross-section of plate shown in Fig. 1 upon the line W X. Fig. 4 is the inner surface of an end piece to the core. Fig. 5 is a cross-section of piece shown in Fig. 4 upon the line Y Z. Fig. 6 is the armature complete, partly in section.

Similar letters refer to similar parts throughout the several views.

A more particular description of my invention, together with its uses, is as follows:

Fig. 1 is an oblong plate of sheet-iron, with ends formed of segments of a circle having the center at E, and having projections at A, B, C, and D, and depressions upon one surface and corresponding elevations upon the opposite surface between the parallel lines H E, J E, K E, and L E, as shown in Fig. 2 by a cross-section upon the line W X. In this cross-sectional view these depressions and elevations are represented for perspicuity as greater than they are practically made, as hereinafter set forth.

The plate shown in Fig. 3 differs from that shown in Fig. 1 only in that said depressions and corresponding elevations are omitted.

Fig. 4 is a piece of soft iron or other suitable material to form a piece for each end of the core, having the surface shown in the figure, the outline of which will coincide with that of said plates, the opposite surface being rounded to receive the wires, as hereinafter set forth. The surface shown in said figure is depressed in the circle surrounding U U, as shown in cross-section upon the line Y Z in Fig. 5. There is a hole through the center E, as shown by dotted lines in Fig. 4, corresponding in size and position to that in said plates, having projections at S and T, the latter being shown by cross-section in Fig. 5.

The shaft M M, Fig. 6, is constructed in cylindrical form of any suitable material, magnetic being unnecessary, of proper length for the proposed armature and bearings, and covered, except the bearings, with paper or other thin insulating material P, the shaft thus covered being of the circumference of the hole E, Figs. 1, 3, and 4. Said plates and end pieces are completely covered by dipping or otherwise with a coat of coach-varnish or other suitable insulating substance.

The core of the armature from the line *a b* to the line *c d*, Fig. 6, is composed of a pile of the plates shown in Fig. 1 and those shown in Fig. 3 placed alternately upon the insulated shaft M M through the center holes E, and said end pieces, one at each end of the core, are placed in a similar manner, the surface shown in Fig. 4 inward and keyed to the shaft by a set-screw in each, R, Fig. 6, or in some other suitable manner. Said plates and end pieces being caused to coincide face to face as to outlines, the wire is wound lengthwise of the shaft in the wide grooves formed on the one side by the coincidence of the projections A C and on the other those of B D of the plates and end pieces, leaving an open space next to the shaft at S and T, respectively, at each end of the armature, through which the air will enter, as at S, Fig. 6, and pass through the opening U into the continuous air-passages O O on each side of the shaft, formed by the coincidence of the holes F and G, respectively, in each plate, and pass out through the radial air-passages formed between the plates by the alternate depressions, elevations, and even surfaces coming together, before described. In armatures composed of plates and end pieces of the size shown in the drawings, Figs. 1, 3, and 4, and about six inches in length, said depressions should be about the depth of the thickness of ordinary writing-paper to be in proper ratio to the size of said other air-passages, and a corresponding ratio as to size between such air-passages should be observed in armatures of different sizes, though anything like a strict ratio in said respect is unnecessary.

When constructed substantially as set

forth, the armature, being revolved in its place in a dynamo-electric machine, will be fully ventilated and kept cool by currents of air entering and passing through, as above described and as shown by arrows in Fig. 6.

What I claim as my invention, and desire to secure Letters Patent for, is—

Laminæ consisting of wrought-iron plates cut out with the two passages and shaft-hole, and having the channels stamped nearly radially to afford air-escape, substantially as and for the purposes described.

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