(No Model.)

4 Sheets—Sheet 1.

G. W. BEARDSLEE.

DYNAMO ELECTRIC MACHINE.

No. 264,229. Patented Sept. 12, 1882.

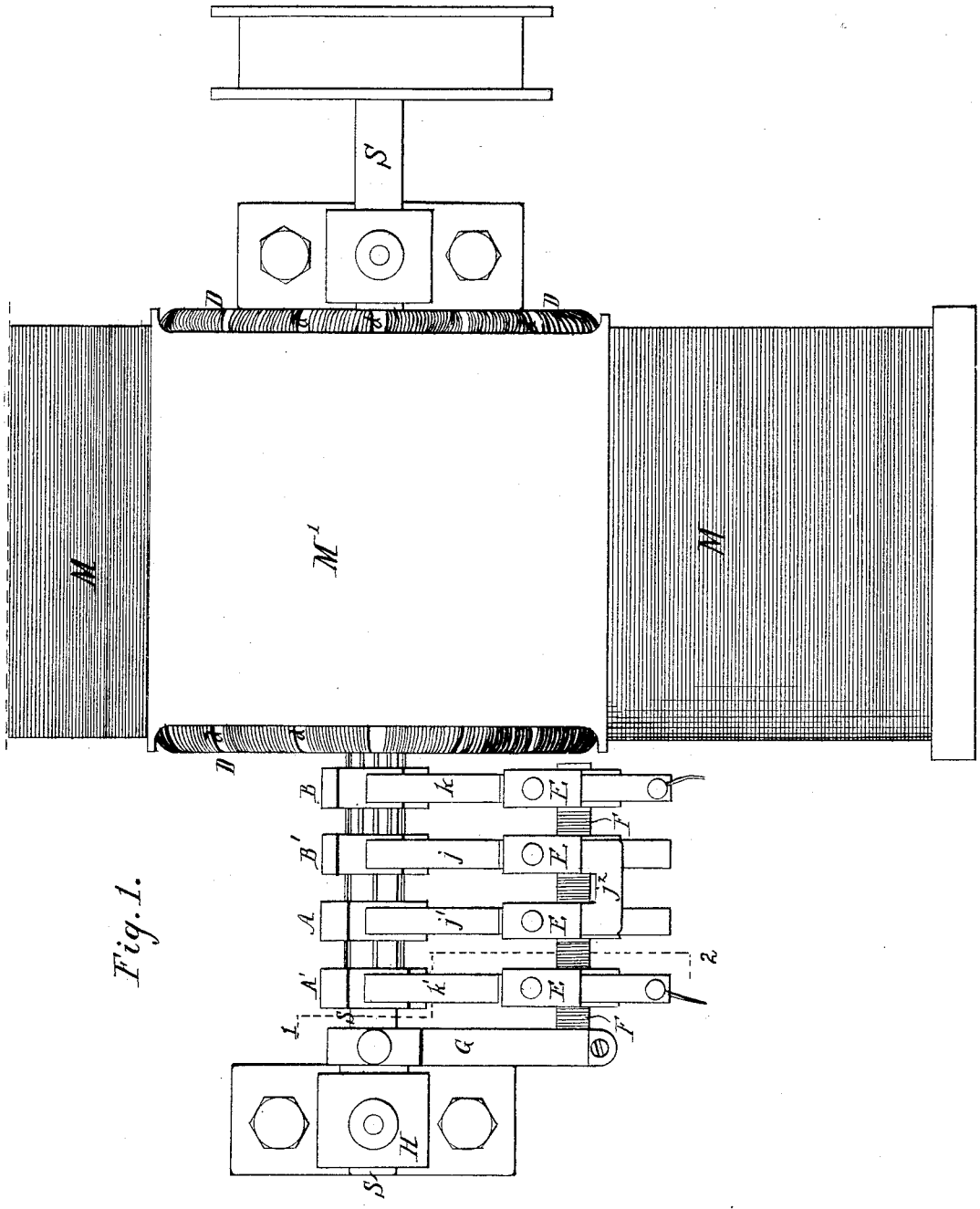

Fig. 1.

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(No Model.)

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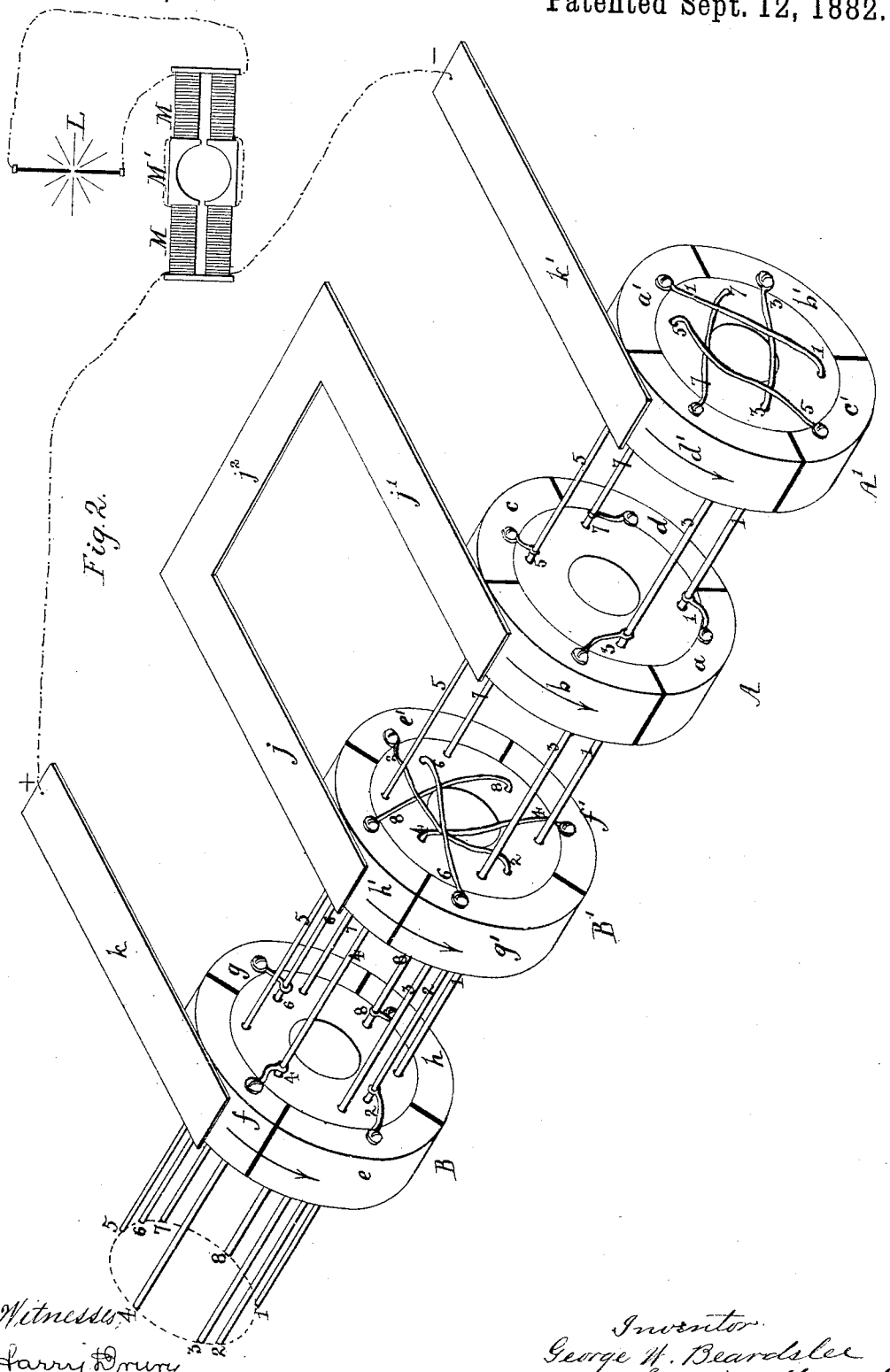

Fig. 2.

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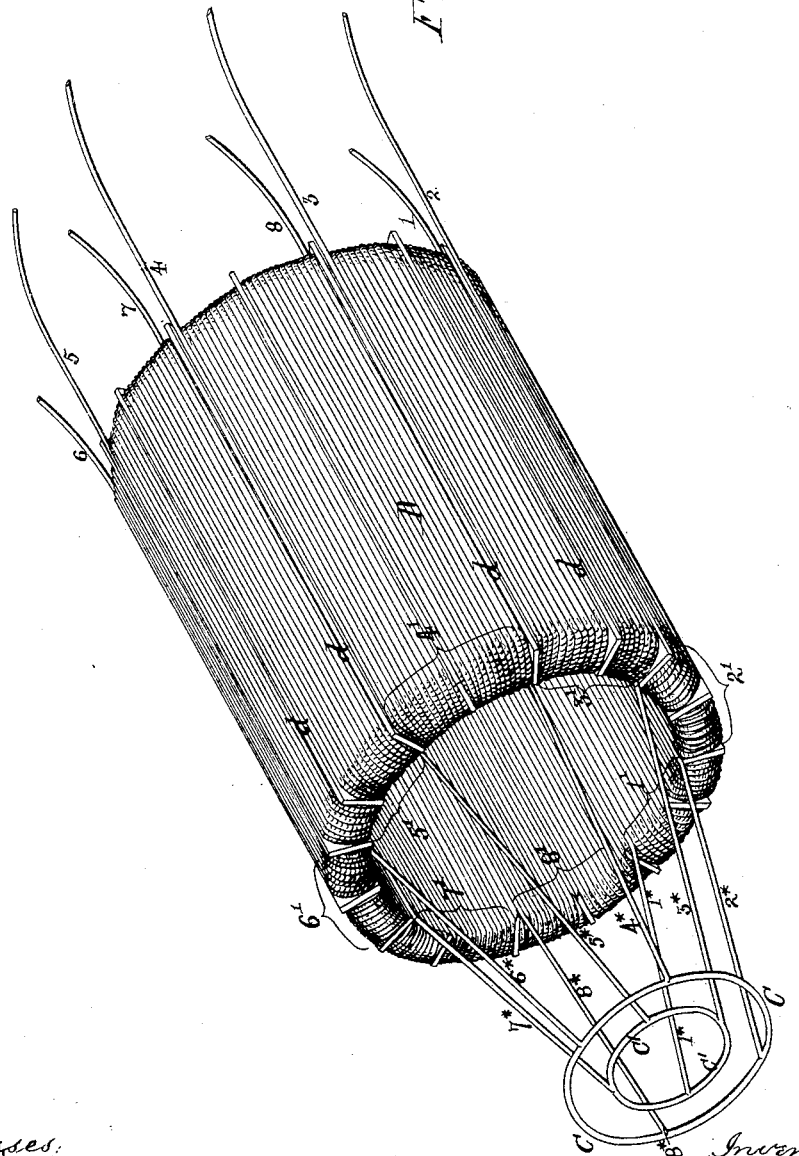
FIG. 3.



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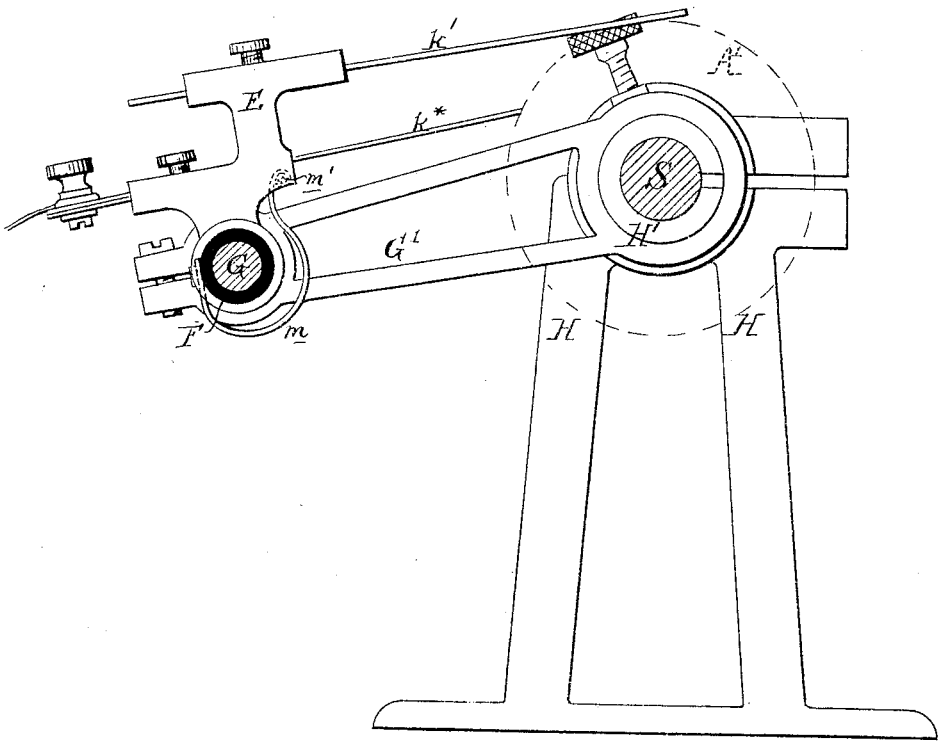
DYNAMO ELECTRIC MACHINE.

No. 264,229. Patented Sept. 12, 1882.

Fig. 4.



Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE W. BEARDSLEE, OF BROOKLYN, NEW YORK, ASSIGNOR TO WILLIAM F. JOBBINS, OF EAST ORANGE, NEW JERSEY.

DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 264,229, dated September 12, 1882.

Application filed May 19, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. BEARDSLEE, a citizen of the United States, and a resident of Brooklyn, New York, have invented an Improvement in Dynamo-Electric Machines, of which the following is a specification.

My invention relates to certain improvements in the construction of circuits of dynamo-electric machines, as more fully described hereinafter.

In the accompanying drawings, Figure 1 is a plan view of a machine to which my invention may be applied. Fig. 2 is a perspective diagram, showing my improved arrangement of the circuits and circuit-connections with the commutator-wheels; Fig. 3, a corresponding perspective view of the rotary armature and circuit-connections for the coils thereof; and Fig. 4, a section on the line 1 2, Fig. 1, drawn to an enlarged scale, showing the construction of the holders for the commutator-brushes.

The particular construction of the field-magnets and armature of my machine will vary with the machine to which my invention may be applied, for it will be understood that it is applicable to various constructions of dynamo-electric machines. In the drawings I have shown one of the well-known constructions of machines, in which M M are the field-magnets, with poles M′, between which revolves the rotary armature D. This in the present instance is shown as being in the form of a cylinder mounted on the shaft S, and having pole-pieces *d*, with intermediate wire wrapping, forming a series of spools—sixteen in the present instance—the coils being connected up, as hereinafter described.

On the axle of the commutator are fixed four insulated wheels, B B′ A A′, each having four commutator plates or segments insulated from each other, as shown in Fig. 2. The wheels B B′ are arranged on the shaft S, so that the segments or plates of the two wheels will be in line or coincide with each other, and the plates of the wheels A A′ in the same way coincide with each other. The segments of the wheels A A′, however, do not coincide with those of the wheels B B′, as illustrated in the perspective diagram Fig. 2, from which the shaft S is, for the sake of clearness, omitted. The shaft is also omitted from the corresponding view, Fig. 3, for the same reason. On the upper peripheries of these wheels bear the ends of the commutator-brushes *k j j′ k′*, the outer ends of the brushes *j j′* being directly connected at j^2, as indicated in Figs. 1 and 2. These brushes are fixed by suitable screws in holders E, each of which is provided with two slots for two brushes—*k k**, Fig. 4, for instance—bearing on the commutator-wheels at different points, so as to bridge the breaks between the segments and avoid as much as possible the formation of sparks. Each of these holders E is mounted on an insulating-sleeve, F, on a rod, G, carried by a bracket, G′, secured to a sleeve, H′, on the standard H, which carries the bearings for one end of the rotating shaft S. These several holders are also carefully insulated from each other, but are free to turn on the sleeve F. A coiled spring, *m*, however, connected at its inner end to the sleeve F, and bearing at its outer end on a pin, *m′*, on the holder, so acts on each holder E as to press the ends of its brushes into contact with the commutator-plates.

The arrangement of circuits, which constitutes one of the principal features of my present invention, will be best understood on reference to Figs. 2 and 3, from which latter figure it will be seen that the sixteen bobbins or spools are wound in eight pairs, 1′ 2′ 3′ 4′ 5′ 6′ 7′ 8′, one of the terminal wires of each pair being carried to a pair of commutator-plates, as hereinafter described, while the other terminal wire of the same pair is connected to the terminals of every alternate pair of spools by a suitable conductor. For instance, the terminal wire 1* of the pair 1′ (in this instance the inner terminal) is connected to an insulated conductor, *c′*, in the form of a ring, and to this conductor *c′* are also connected the inner terminals, 3*, 5*, and 7*, of the pairs of coils 3′, 5′, and 7′. In the same way the inner terminals, 2*, 4*, 6*, and 8*, of the pairs 2′, 4′, 6′, and 8′ are connected with each other through the conductor C, as shown in the diagram Fig. 3. Each of the other terminals, 1, 2, 3, 4, 5, 6, 7, and 8, of the coils, as I have before said, is connected to a commutator plate or segment on each wheel of either the pair

A A′ or the pair B B′. Thus the terminal 1, Fig. 2, passes through holes in the insulated portions of all the wheels, is connected to the segment *a* of the wheel A, and then to the directly-opposite segment *a′* of the wheel A′. The next wire, 2, is in the same way connected to opposite segments of the other pair, B B′—that is, it passes through the insulated portions of the two wheels B B′, and is connected to the segment *e* of the wheel B, and to the directly-opposite segment *e′* of the wheel B′. The next wire, 3, goes to the wheels A A′, being connected to the segments *b b′*, the wire 4 to the segments *f f′* of the wheels B B′, the wire 5 to the segments *c c′* of the wheels A A′, the wire 6 to the segments *g g′* of the wheels B B′, the wire 7 to the segments *d d′* of the wheels A A′, and the wire 8 to the segments *h h′* of the wheels B B′. It will thus be seen that the terminals from the rotating armature are connected to the pair A A′ and the pair B B′ alternately, and each wire is connected to two segments, which are on two different wheels of a pair and opposite to each other. In this instance the even-numbered wires go to the wheels B B′, while the odd-numbered wires go to the wheels A A′.

When the shaft at a certain moment of its revolution has brought the commutator-wheels to positions in which the brush *k* is in contact with segment *f*, brush *j* with segment *h′*, brush *j′* with segment *b*, and brush *k′* with segment *d′*, as shown in Fig. 2, the circuit will be as follows: Supposing the current to be entering at the brush *k*, it will take the following course: segment *f*, wire 4 to the coils 4′ of the armature, terminal 4*, conductor C, terminal 8*, coils 8′, wire 8, segment *h′* of the wheel B′, brushes *j j² j′*, segment *b* of the wheel A, wire 3, back again to the armature, through the coils 3′, terminal 3*, conductor C′, terminal 7*, coils 7′, wire 7, plate *d′* of the wheel A′, and out through the brush *k′*, through the coils of the field-magnets M and lamp L or other place where the work is to be done, the field-magnets in this view being of course represented separately on a comparatively small scale.

It will thus be seen that by the construction described the current has a very extended circuit through the coils of the armature, passing through four out of the eight pairs of coils, the coils through which the current passes being those which at that moment are opposite the polar faces of the field-magnets.

By the use of a number of commutator-wheels for the armature, instead of one, the brushes can all be arranged on the top, where they can be most readily got at.

I claim as my invention—

1. The combination of the armature of a dynamo-electric machine with two pairs of separate commutator-wheels and brushes, the terminals of the armature-coils being connected to alternate pairs of wheels, and each terminal being connected to two opposite segments on the two wheels of its pair, all substantially as described.

2. In a dynamo-electric machine, the combination of four commutator-wheels with four brushes, two of which have their outer ends directly connected to form a direct electrical communication within the machine between two commutator-wheels, substantially as described.

3. The combination of an armature with commutator-wheels and brushes, one set of terminals of the coils being connected to the segments of the commutator-wheels, and the other terminals connected up alternately to conductors C C′, substantially as specified.

4. The combination of an armature having its coils wound in pairs, the terminals at one end being connected together in two alternating sets, and the terminals at the other end being connected alternately to two pairs of commutator-wheels, substantially as set forth.

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

GEO. W. BEARDSLEE.

Witnesses:
WALTER K. FREEMAN,
EUGENE F. BARNES.