(No Model.)

B. G. LAMME.

DYNAMO ELECTRIC GENERATOR.

No. 561,593. Patented June 9, 1896.

Fig. 1.

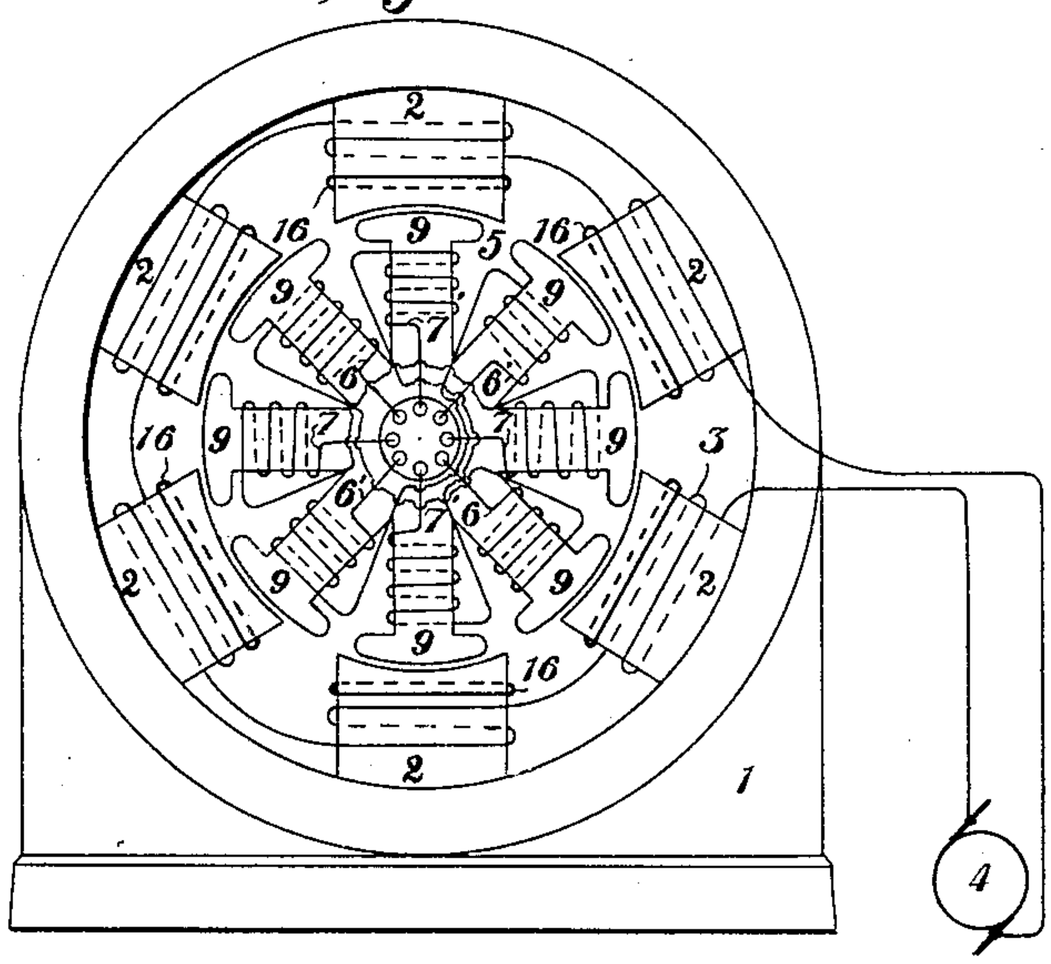
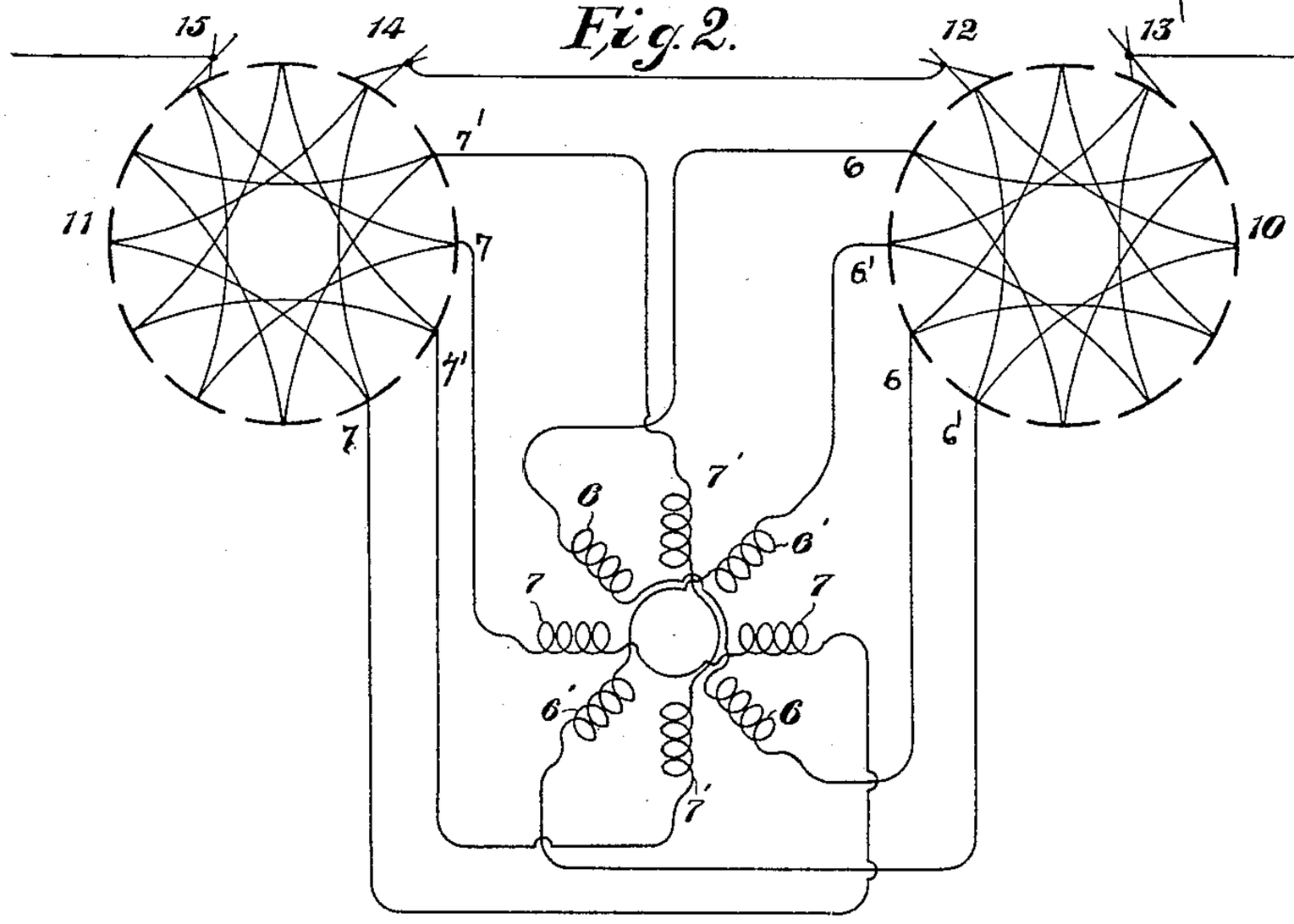


Fig. 2.



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UNITED STATES PATENT OFFICE.

BENJAMIN G. LAMME, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE ELECTRIC AND MANUFACTURING COMPANY, OF SAME PLACE.

DYNAMO-ELECTRIC GENERATOR.

SPECIFICATION forming part of Letters Patent No. 561,593, dated June 9, 1896.

Application filed September 4, 1895. Serial No. 561,409. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN G. LAMME, a citizen of the United States, residing in Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Dynamo-Electric Generators, (Case No. 665,) of which the following is a specification.

My invention relates to dynamo-electric generators, and more particularly to that class of generators which is employed for supplying constant current to arc-light circuits.

The object of my invention is to provide a machine of this class which shall readily accommodate itself to varying loads and operate efficiently without any shifting of the commutator-brushes or the employment of other external means of regulation.

My invention is illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation of the dynamo, and Fig. 2 is a diagram of the armature and commutator-circuits.

Referring to the drawings in detail, 1 is the field-magnet frame, provided with six radially-arranged pole-pieces 2, wound with energizing-coils 3, which receive current from a separate exciter 4. The armature 5 is provided with two sets of coils 6 6′ and 7 7′, wound upon radial pole-pieces 8, which are provided with enlarged heads or ends 9 at their outer extremities. The armature-coils are arranged in pairs, as is clearly shown in Fig. 2, the two coils of each pair being wound upon diametrically opposite poles and connected in series. The pairs 6 6 and 6′ 6′ are arranged at right angles to each other and connected to the segments of the commutator-cylinder 10, and the pairs 7 7 and 7′ 7′ are arranged in the same manner and alternating with the first set and connected to the segments of the commutator-cylinder 11. Each of the commutator-cylinders 10 and 11 is provided with twice as many segments as the field-magnet has poles, the number in the present instance being twelve. The commutator-cylinder 10 is provided with brushes 12 and 13 and the cylinder 11 with a corresponding pair of brushes 14 and 15, the brushes 12 and 14 being connected as shown, so that the two sets of armature-coils are connected together in series. The commutator-brushes have sufficient surface contact with reference to the spaces between the commutator-segments to throw the two pairs of armature-coils in each set in parallel before the pair approaching zero electromotive force is commutated. This arrangement is such as to permit the pair of coils having a rising electromotive force to drive back through the one having a falling electromotive force, and thus overcome the discharge and assist materially in the commutation. The ampere-turns on the armature of a machine of this character are necessarily very great as compared with the true magnetizing power of the field, and as a consequence the large armature reaction results in the production of a lead which is at all times very nearly ninety degrees. Such being the case, a change of ordinary amount in the load cannot materially change the lead. Consequently the point of commutation does not shift to any considerable extent, and automatic shifting of the brushes is unnecessary. By reason of the fact that the lead is very nearly ninety degrees, as has already been stated, the armature-coils exert a very strong reaction against the field. Such being the case, irregularities or pulsations in the armature-coils are liable to affect the field magnetization and cause interaction between the circuits. In order to remedy this defect, I propose to provide the field-magnet pole-pieces with closed circuits 16 of definite resistance. These closed circuits carry secondary currents, the phase relations of which are fixed to a considerable extent by their resistance. It is necessary, therefore, in constructing the machine to adjust the resistance of these closed circuits until the secondary currents have such phase relations as to diminish the armature reactions to the maximum practica ble degree.

While I have described a machine having a field-magnet and armature provided with a specific number of coils, I desire it to be understood that the invention is not limited to this number or to the exact form and arrangement of the various parts.

I claim as my invention—

1. A dynamo-electric machine having a separately-excited field-magnet provided with auxiliary closed circuits, in combination with an armature having four pairs of coils arranged in two sets, the two pairs of each set being arranged at right angles to each other, a commutator for each set of armature-coils having twice as many segments as the machine has field-magnet poles, said commutators serving to connect the two sets of armature-coils in series.

2. In a direct-current arc-light dynamo, two commutators and two sets of armature-coils arranged in pairs, the pairs of each set being at right angles to each other, and the two sets being connected in series through the commutators.

3. In an arc-light dynamo, the combination with a separately-excited multipolar field-magnet and two commutators, of a radial-pole armature provided with two sets of coils arranged in pairs, those of one set being respectively connected in series with those of the other set through the two commutators, and the pairs of each set being connected in parallel when the one approaching zero electromotive force is commutated.

4. In an arc-light dynamo, the combination with a multipolar separately-excited field-magnet and two commutators the cylinders of which have twice as many segments as the field-magnet has poles and the brushes of which bridge adjacent segments, of an armature having two alternately-arranged sets of coils, those of one set being respectively connected in series with the other through the two commutators.

5. In an arc-light dynamo, the combination with a six-pole field-magnet, of two commutators each having twelve segments, and a radial-pole armature having four pairs of coils in two alternately-arranged sets, the pairs of each set being respectively connected in series with those of the other through the commutators.

6. In an arc-light dynamo, the combination with a separately-excited field-magnet provided with regulating closed circuits, of two commutators and an armature provided with two sets of coils, those of one set being respectively connected in series with those of the other through the two commutators.

7. In a direct-current dynamo, the combination with two commutators, of two sets of armature-coils of substantially the same resistance alternating in position and permanently connected in series through the commutators.

8. A direct-current dynamo having an armature provided with a plurality of sets of coils of substantially equal resistance alternating in position and permanently connected in series with the external circuit.

9. A direct-current dynamo having an armature provided with coils differing in number from the field-magnet poles and all of substantially the same resistance, said coils being arranged in sets alternating in position and permanently connected in series with the external circuit.

10. A direct-current dynamo having an armature provided with a greater number of coils than the field-magnet has poles and all of substantially the same resistance, said coils being connected in alternately-arranged parts to form a plurality of sets, and said sets being permanently connected to the external circuit in series.

In testimony whereof I have hereunto subscribed my name this 31st day of August, A. D. 1895.

BENJ. G. LAMME.

Witnesses:
WESLEY G. CARR,
HUBERT C. TONER.