No. 825,222. PATENTED JULY 3, 1906.

M. C. A. LATOUR.

DYNAMO ELECTRIC MACHINE.

APPLICATION FILED NOV. 21, 1902.

Fig. 1.

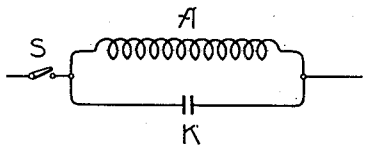


Fig. 2.

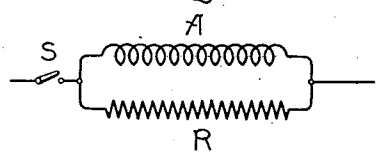


Fig. 3.

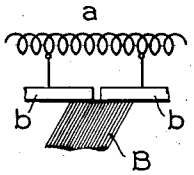
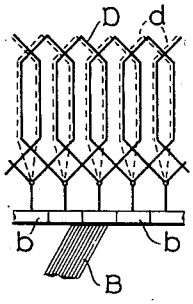


Fig. 5.



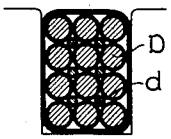
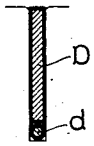


Fig. 6.



Witnesses.

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UNITED STATES PATENT OFFICE.

MARIUS CHARLES ARTHUR LATOUR, OF SÈVRES, FRANCE, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

DYNAMO-ELECTRIC MACHINE.

No. 825,222. Specification of Letters Patent. Patented July 3, 1906.

Application filed November 21, 1902. Serial No. 132,200.

To all whom it may concern:

Be it known that I, MARIUS CHARLES ARTHUR LATOUR, a citizen of France, residing at Sèvres, department of Seine-et-Oise, France, have invented certain new and useful Improvements in Dynamo-Electric Machines, of which the following is a specification.

My invention relates to opening electric circuits possessing induction, and has especial reference to the armature-coil circuits of dynamo-electric machines of the commutator type; and its object is to prevent sparking at the commutator when the circuit of a coil is broken in passing under a brush.

It is well known that when an electric circuit possessing self-induction is opened extra currents are produced and that the effect of these currents is to raise abnormally the voltage of the circuit and to produce sparking at the point where the circuit is opened. When the circuit of an armature-coil which is carrying current is opened by its commutator-segment leaving the commutator-brush, arcing is produced by the voltage induced thereby. By my invention I prevent undue rise of voltage, and consequently eliminate detrimental arcing.

My invention will best be understood by reference to the accompanying drawings, in which—

Figures 1 and 2 are explanatory diagrams. Fig. 3 is an explanatory diagram. Fig. 4 is a development of an armature of a dynamo-electric machine to which my invention is applied, and Figs. 5 and 6 are detail cross-sectional views of two forms of armature-coils.

Referring first to Fig. 1, A represents a coil or circuit possessing self-induction. If the circuit of this coil should be opened, as by switch S, the voltage across the terminals of the coil will tend to rise, producing arcing at the switch. This may be prevented by shunting the coil with the condenser K. This means of absorbing the extra voltage is well known in the art. In place of condenser K a resistance R may be employed, as shown in Fig. 2, the extra currents induced in coil A by opening the circuit being absorbed in heating the resistance.

My invention consists in substituting for either the capacity or the resistance a shunt-circuit which is itself self-inductive and in so disposing the shunt or auxiliary circuit with reference to the main circuit that the electromotive force induced in the auxiliary circuit upon breaking the main circuit will increase the tendency of the extra current to flow from the main winding through the auxiliary winding.

My invention consists in applying the principle above explained to the armature-coils of dynamo-electric machines.

In Fig. 3, *a* represents an armature-coil connected to the commutator-segments *b b*, on which bears the brush B. The circuit of the armature-coil *a* possesses self-inductance, and consequently if it is carrying current at the instant one of the commutator-segments *b* leaves the brush B extra currents will be induced in the armature-coil, resulting in sparking at the commutator-brush. Fig. 4 shows the development of an armature arranged in accordance with my invention. Each turn of the armature-winding D is connected at its ends to the commutator-segments *b*. There is also provided the auxiliary winding *d*, which forms a series of coils each connected in shunt to the coils formed by the main winding and wound oppositely to the coils of the main winding. When the circuit of a coil of the main winding D is broken by the segment to which it is connected, leaving a commutator-brush, the extra current induced in the main coil by the change in flux, due to the change in current of the coil, will be absorbed by the high-resistance auxiliary coil *d*, connected in shunt to it. Moreover, since the main auxiliary coils are oppositely wound the extra current induced in the two by the change in flux will be in opposite directions. Consequently the induced voltage in the auxiliary coils will assist the flow of extra current from the main coils through the auxiliary coils.

If the armature is subject to rapid changes of magnetic flux, the currents induced in the main coils would heat the auxiliary coils too much for practical use. This is the case in the armature of direct-current dynamo-electric machines. In the rotor of many alternating-current machines of the commutator type, however, the rotor-winding runs almost in synchronism with the field induced by the other member of the motor, and consequently the above objection need not be considered in this case.

Figs. 5 and 6 show two constructions of ar-

mature-coils adapted to my invention. In Fig. 5 the main coils D are formed of round wire, and the auxiliary coils *d* are placed in the interstices between the turns of the main winding. In Fig. 6 the main winding is shown as formed of a flat bar. The auxiliary winding *d* is placed at the bottom of the slot and the two taped together to form an integral coil.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In dynamo-electric machines provided with a commutator in combination with the main armature-coils an auxiliary circuit connected between the commutator-bars and wound in a way opposite to the winding of the corresponding main coil of the armature.

2. In a dynamo-electric machine, main armature-coils, and auxiliary armature-coils in inductive relation to said main coils and connected across the commutator-segments, said auxiliary coils being of higher resistance and oppositely wound with reference to said main coils.

3. In a dynamo-electric machine, main armature-coils carried in slots in the armature-body, and auxiliary armature-coils in the same slots with the main armature-coils and connected across the commutator-segments, said auxiliary coils being of higher resistance and oppositely wound with reference to said main coil.

In testimony whereof I have hereto signed my name in presence of two subscribing witnesses.

MARIUS CHARLES ARTHUR LATOUR.

Witnesses:
EDWARD P. MACLEAN,
MATTHEW DINGOE.