(No Model.)

E. W. RICE, Jr.

DYNAMO ELECTRIC MACHINE.

No. 328,253. Patented Oct. 13, 1885.

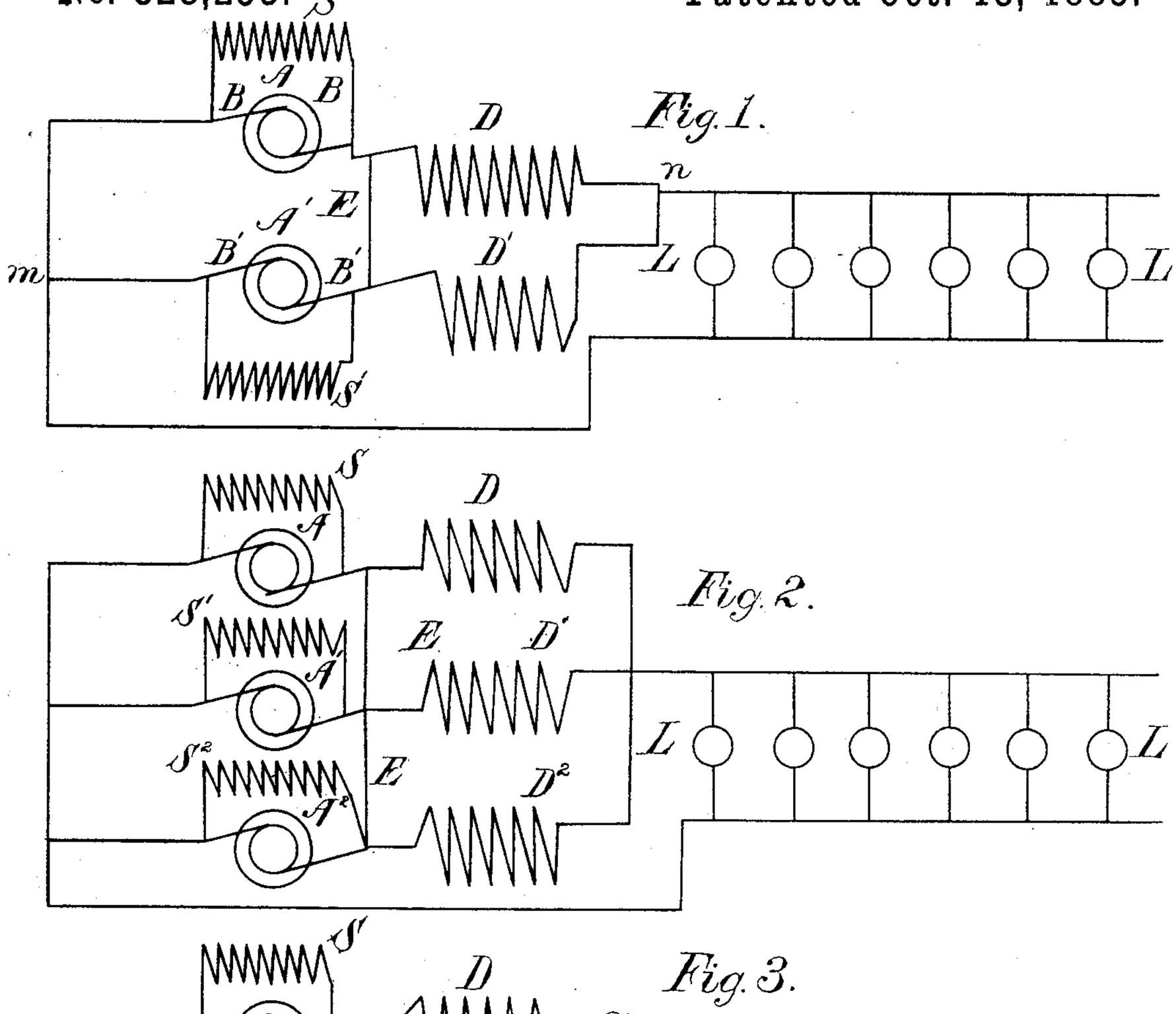


Fig. 1.

Fig. 2.

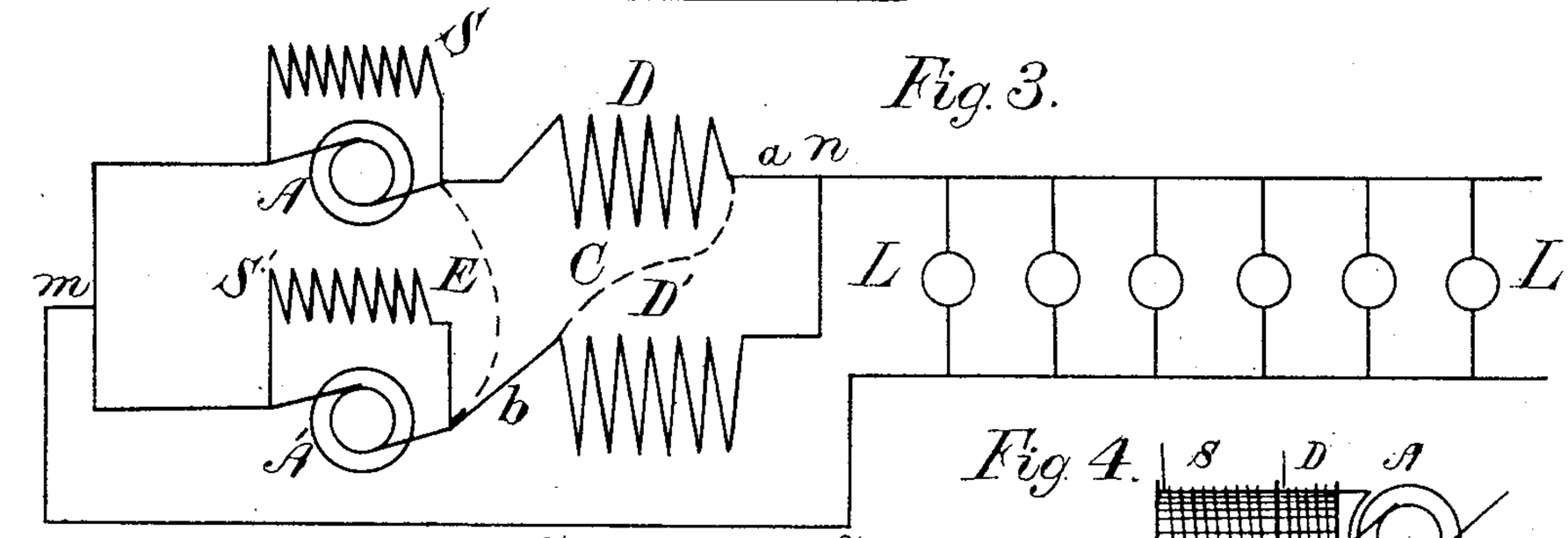


Fig. 3.

Fig. 4.

Fig. 6.

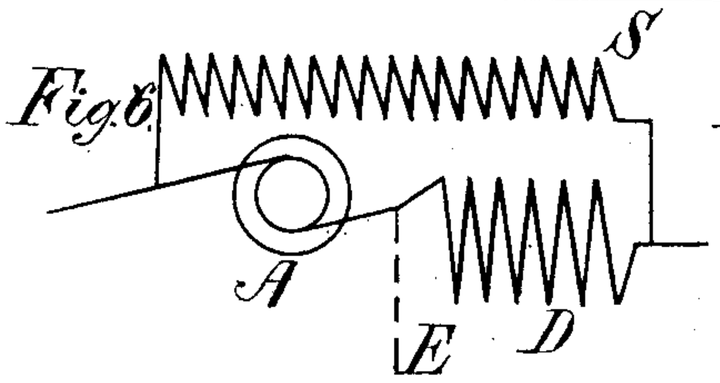
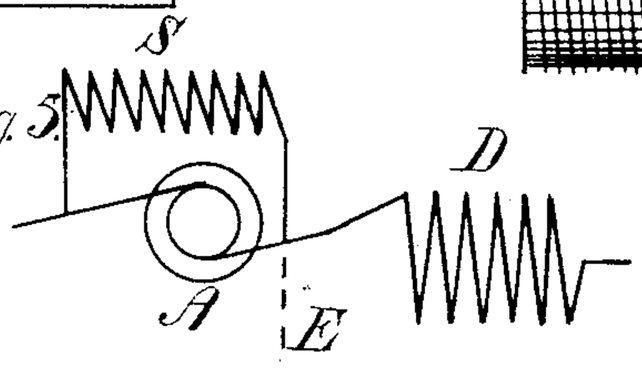


Fig. 5.



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DYNAMO-ELECTRIC MACHINE.

SPECIFICATION forming part of Letters Patent No. 328,253, dated October 13, 1885.

Application filed August 6, 1885. Serial No. 173,733. (No model.)

To all whom it may concern:

Be it known that I, EDWIN WILBUR RICE, Jr., a citizen of the United States, and a resident of Lynn, in the county of Essex and State of Massachusetts, have invented a certain new and useful Improvement in Coupling Compound-Wound Dynamos, of which the following is a specification.

My invention relates to a means whereby two or more compound-wound dynamos of constant potential may be coupled together and run in multiple arc for feeding a set of mains. Hitherto difficulties have been experienced in coupling such dynamos because of the fact that they can never be made of exactly equal potential or electro-motive force and the stronger machine is apt to overcome the force of the weaker. By my present invention, however, all such difficulty is avoided.

My invention consists, briefly, in making an equalizing connection between two or more machines at that part of the machine-circuit between the armature-circuit and the direct field-magnet circuit or field-coil in direct connection as distinguished from derived connection with the feeding-mains.

My invention is applied to dynamo-electric machines known as "compound wound," or machines in which part of the field magnetism is obtained by means of a current flowing in a constantly-closed or shunt circuit to the work, and the other part of the field magnetism is obtained by the current flowing in a coil traversed by the main current in series with the work. Various types of such machines are now constructed.

In the accompanying drawings, Figure 1 shows a diagram of two machine-circuits coupled in accordance with my invention. Fig. 2 indicates how three machines can be so coupled. Fig. 3 is a repetition of Fig. 1, in which the coupling connection is indicated in dotted lines only. Fig. 4 indicates diagrammatically the type of machine used. Fig. 5 indicates separately one of the modes of connection of the machine-circuit within itself; Fig. 6, another mode of compound connection sometimes used.

Referring to Fig. 1, A A′ indicate the armatures of two compound-wound dynamos respectively, B B B′ B′ their brushes bearing on the commutator S S′ respectively, their derived circuit field-coils connected, as shown, with the brushes respectively.

D D′ indicate respectively the field-magnet coils in the main circuit.

The corresponding terminals—positive and negative—of the machines are united, as at *m n*, so that the machines work in multiple arc to feed the mains leading to a number of incandescent lights or other resistances upon which a constant potential is to be maintained.

It is presumed that the machines are matched as to electro-motive forces produced at their terminals under their speeds of running as near as may be. Under such conditions, however, the circuits are by no means stable, as the more powerful machine is very apt to overcome its weaker neighbor and short-circuit itself through the latter.

My invention consists in providing a remedy against any such contingency, it being the addition of a connection of preferably very low resistance, applied as shown at E, and uniting that portion of the machine-circuits between the armatures A A′ and direct field-coils D D′, respectively.

The effect of this connection is virtually to render the strength of the direct field-coils D D′ almost completely independent of the generating forces of either armature considered by itself, and to make such action dependent upon the combined forces of the two armatures. At the same time the forces of the derived circuit field-coils S S′ are in like manner not dependent upon either armature alone, and I find that a condition of stable working results free from all the objections existing when the connection E is absent.

In Fig. 2 three machines, whose armatures are marked A A′ A^2, and whose derived field-coils are S S′ S^2, and whose direct field-coils are marked D D′ D^2, are shown coupled in multiple arc for feeding the mains supplying lights L L or equivalent resistances. The connection E E is, as before, applied to that portion of the circuit of each machine between the armature and the direct field-coils.

In Fig. 3 the same arrangement as in Fig. 1 is shown, with the exception that the connection E is shown only in dotted lines as connecting the right-hand brushes of each machine. Assuming such connection absent, it is easy to understand that should the machine

A S D be of superior energy, however slightly, to the machine A′ S′ D′, the current would flow from *n* to *m*, thereby causing a reversal of magnetism of D′ and reversal of the direction of the current in A′, and consequent failure of the second machine to maintain an electro-motive force anywhere near equality with its companion. These conditions, however, do not obtain when the connection, as shown in the dotted line, is employed, since in this case the direct field-coil D′ would not be subject to such reversal and would substantially be working in independent parallel with the coil D.

In Fig. 4 I have simply indicated by a diagram the coil D and the coil S, collectively forming the field-magnet coils of the dynamo of which A is the revolving armature. The mode of connection of these coils, however, may be somewhat varied, Fig. 5 showing that adopted in Figs. 1, 2, and 3, where S is connected simply around the armature itself, while D is traversed by the current passing to the line simply.

In Fig. 6, however, the coil S is connected around both A and B, so that the coil D is traversed by the total current generated by the armature. In either case the connection E in coupling the machines is made at the same point, or substantially at that point—that is, between the coil D or its major portion and the connections from the armature A—as hereinbefore set forth.

Modifications of my invention may be made, and some of them will readily suggest themselves. I will indicate one of them as an example.

Referring to Fig. 1, it will be evident that should the connection E be retained, and the direct coils D D′ be connected or wound so as to be capable of carrying the current developed in series with each other instead of in multiple arc, as shown, the arrangement will still be operative. In this case the current passing from the armatures A A′, combined by the connection E, may be first passed through the coil D, and afterward through the coil D′ and the connection at *n*.

Referring to Fig. 3, it will be seen that by rupturing the circuit at *a* and *b*, and instituting a connection, as shown in dotted lines at C, the arrangement just described will be provided. In this case it is only necessary that the coils D D′ be connected or wound so as to carry the combined current of the two machines in series through them.

What I claim as my invention is—

1. In a system of electric supply in which two or more compound-wound dynamos are connected in parallel to the feeding-mains, an electrical connection between those parts of the machine-circuits which constitute the junction between the armature coils or circuits and the direct field-magnet coils or circuits.

2. Two or more compound-wound dynamos connected in parallel at their terminals to a set of mains supplying incandescent lights or other translating devices, in combination with an equalizing connection, E, between them, said equalizing connection being attached to each machine-circuit at a point between the armature and direct field-circuits, substantially as described.

Signed at Lynn, in the county of Essex and State of Massachusetts, this 31st day of July, 1885.

E. WILBUR RICE, JR.

Witnesses:
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