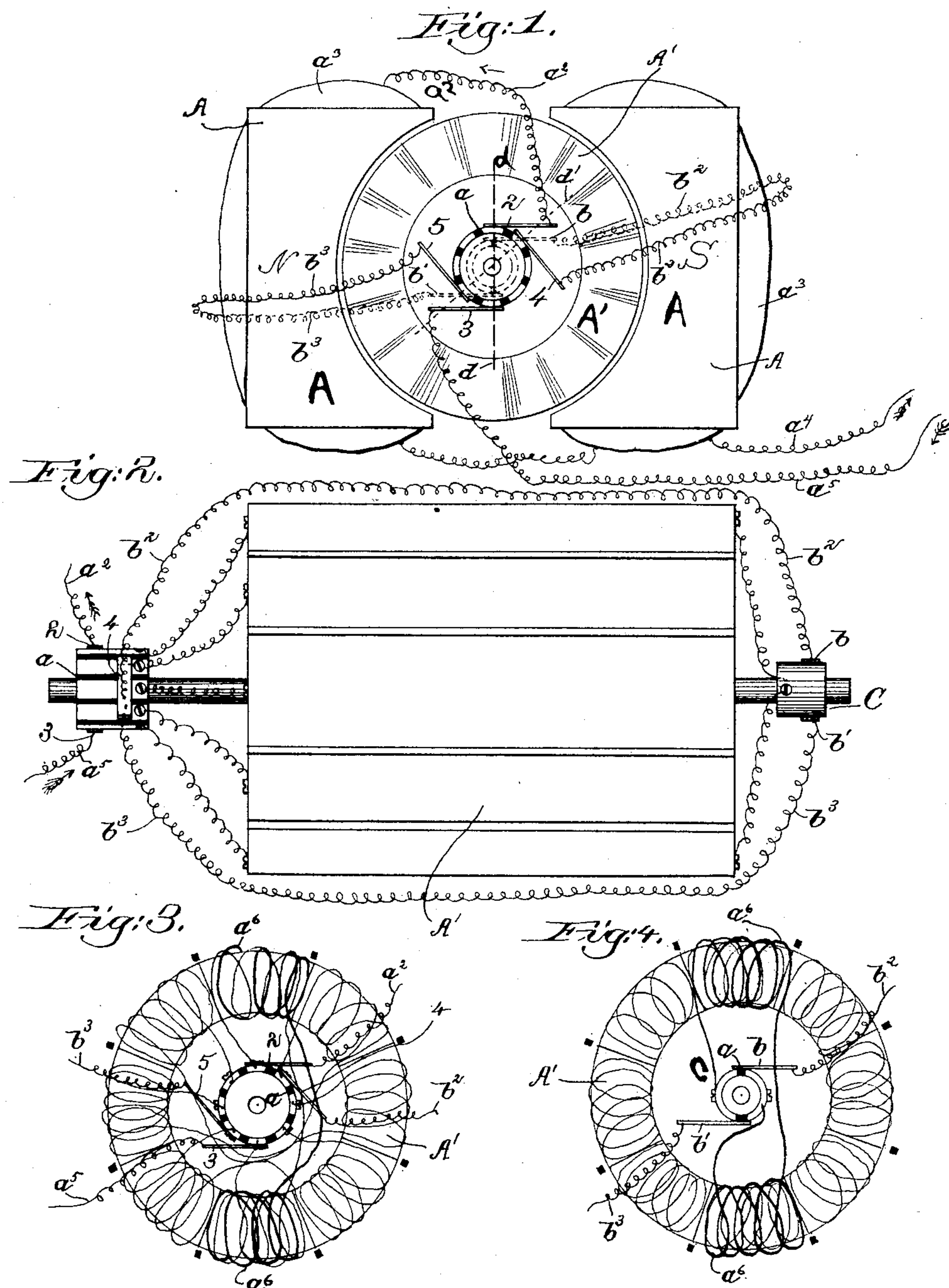


(No Model.)

H. W. COOLEY.
REGULATOR FOR DYNAMOS.

No. 423,909.

Patented Mar. 25, 1890.



Witnesses:
Howard F. Eaton.
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UNITED STATES PATENT OFFICE.

HENRY W. COOLEY, OF BOSTON, MASSACHUSETTS.

REGULATOR FOR DYNAMOS.

SPECIFICATION forming part of Letters Patent No. 423,909, dated March 25, 1890.

Application filed June 12, 1889. Serial No. 314,030. (No model.)

To all whom it may concern:

Be it known that I, HENRY W. COOLEY, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Automatic Regulators for Dynamo-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

10 This invention relates to the automatic regulation of dynamo-machines, and is especially adapted for regulating series-wound machines employed on arc-light circuits. It is a well-known fact that the best results are obtained when the commutator-brushes are in contact with those segments of the commutator through which passes the line of commutation—that is, the segments having the highest positive and negative potential. The line of commutation referred to varies according to the speed of motion of the armature and the resistance interposed in the line or outside circuit.

25 Prior to my invention I am aware that an automatic regulation has been effected by moving the commutator-brushes to follow the change of position of the line of commutation.

My invention has for its object to effect the automatic regulation without moving the commutator-brushes, and I accomplish my object by providing the armature of the machine with an auxiliary coil connected to an independent commutator, from which the current generated in the coil is taken and conducted, as will be described, into the main coil of the armature, whereby the current generated in the main armature-coil is opposed by the current generated in the auxiliary armature-coil.

40 My invention therefore consists, essentially, in the combination, with the main armature, of an independent auxiliary coil wound on said armature and electrically connected to the main commutator to form a cycle within the machine independent of the line-circuit, whereby the entire current generated in the main armature is opposed by the current generated in the auxiliary coil, and the line of commutation on the commutator is forced forward or backward, thereby varying the pro-

duction of the machine in direct proportion to the demands of the external circuit, substantially as will be described.

Figure 1 is a side elevation of a sufficient portion of a dynamo-machine embodying my invention to enable it to be understood; Fig. 2, an enlarged view of the armature removed; Fig. 3, a front end view of the armature shown in Fig. 2, and Fig. 4 a rear end view of the said armature.

Referring to Fig. 1, A represents the field-magnets of a dynamo-machine, which may be of any desired or usual construction, such as commonly used on arc-light circuits. The armature A' may be of any desired or usual construction, it being shown as composed of a series of eight coils connected in diametrically-opposite pairs, and having the opposite ends of one pair of coils connected to diametrically-opposite segments of a commutator B, there being eight such segments, separated from each other by suitable insulation *a*.

The commutator B has co-operating with it two sets or pairs of contact-brushes marked, respectively, 2 3 4 5. The commutator-brush 2 forms the positive brush and is connected by wire *a*² and field-magnet wires *a*³ to the positive line-wire *a*⁴, and the brush 3, constituting the negative brush, has joined to it the negative or return wire *a*⁵.

The armature A, in accordance with my invention, has wound about it an auxiliary coil *a*⁶, and the opposite ends of the said coil are connected to an auxiliary commutator C, herein shown for sake of clearness as fixed on the armature-shaft on the opposite end or side of the machine.

The commutator C has co-operating with it commutator-brushes *b b'*, connected by wires *b*² *b*³, respectively, to the brushes 4 5, as indicated in Fig. 1. As herein shown, the auxiliary coil is wound in the opposite direction to that in which the main armature-coil is wound, and in the operation of the machine the current generated in the main armature-coil is opposed by the current generated in the auxiliary armature-coil.

In practice the commutator-brushes are fixed and the brushes 2 3 are in contact with the segments of the main commutator having

the greatest positive and negative potential—that is, the line of commutation (represented in Fig. 1 by heavy dotted lines d) in the normal working of the machine runs through the segments with which the brushes 2 3 are in contact. If the current generated in the main armature-coil should be increased, as by cutting out one or more lights in the circuit, the line of commutation would ordinarily be changed—as, for instance, it might pass into the position indicated by light dotted line d' ; but by means of the auxiliary coil of the armature the line of commutation is maintained in a substantially fixed or constant position—namely, as indicated by the heavy dotted line d —for as the current in the main coil of the armature increases the current generated in the auxiliary coil increases in the same proportion or ratio, and the increased main current is opposed by an increased auxiliary current. So, also, if the current generated in the main coil of the armature is decreased, as by cutting in one or more lights, the current generated in the auxiliary coil is diminished in like proportion, so that the normal current flowing from the machine remains substantially constant and the line of commutation is maintained substantially fixed or stationary—namely, through the commutator-segments in contact with the brushes 2 3.

The circuit of the auxiliary coil may be traced as follows, viz: from the brush b by wire b^2 to the brush 4, through the main coil of the armature to brush 5, thence by wire b^3 to the brush b' of the auxiliary commutator, thence through the auxiliary coil to the brush b , thus forming a complete cycle within the machine independent of the line-circuit.

I have herein shown the auxiliary coil as wound around or over one section or coil of the main armature-coil; but I do not desire to limit myself to this construction, as it is evident the said auxiliary coil may form an independent or disconnected section of the main armature-coil—that is, the auxiliary coil may be wound directly upon the armature-frame. So, also, I do not desire to limit myself to any particular form or type of armature.

The auxiliary coil may extend over one or more of the armature-sections, according to

the amount of opposing current it is desired to generate.

I have herein shown the auxiliary commutator as located on one side of the machine and the main commutator on the other; but in practice they both will preferably be located on the same side of the machine.

I claim—

1. In a dynamo-machine, the combination, with the main armature, of an independent auxiliary coil wound on said armature and electrically connected to the main commutator to form a cycle within the machine independently of the line-circuit, whereby the entire current generated in the main armature is opposed by the current generated in the auxiliary coil, and the line of commutation on the commutator is forced forward or backward, thereby varying the production of the machine in direct proportion to the demands of the external circuit, substantially as described.

2. In a dynamo-machine, the combination, with the armature and its commutator, of an auxiliary coil on said armature, a commutator connected with said auxiliary coil, the segments of which are connected to main commutator by an auxiliary pair of brushes to form a cycle within the machine independent of the line-circuit, whereby the line of commutation on the main armature is carried forward or backward, according to variations of load, thereby keeping the line-current constant without movement of the brushes, substantially as described.

3. In a dynamo-machine, the combination, with the armature and its commutator and two sets of brushes co-operating therewith, of an auxiliary coil on said armature, an independent commutator to which the auxiliary coil is connected, and brushes co-operating with the said independent commutator connected to one set of brushes on the main commutator, substantially as described.

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

HENRY W. COOLEY.

Witnesses:

JAS. H. CHURCHILL,
GEO. W. GREGORY.