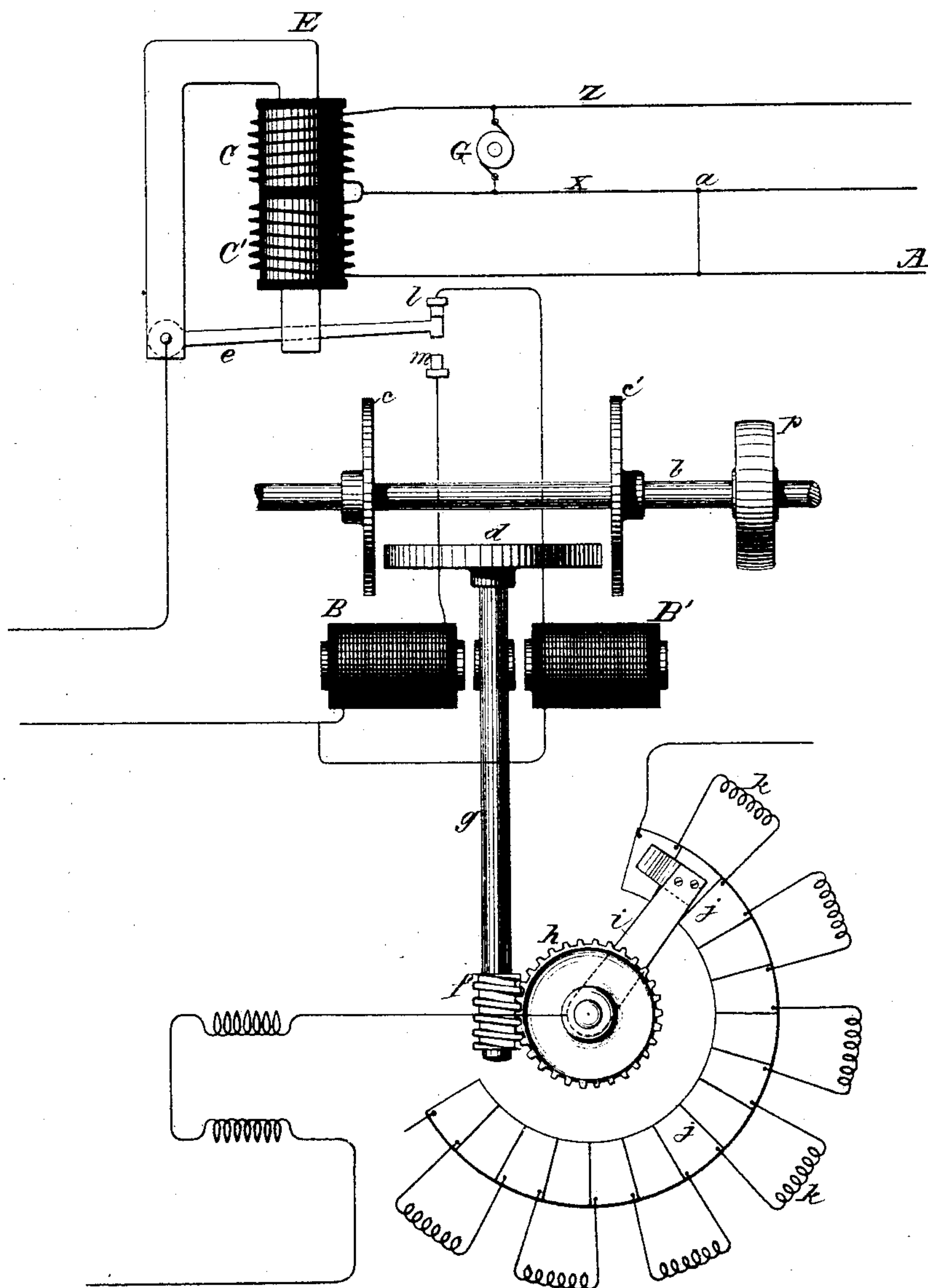


(No Model.)

W. STANLEY, Jr.  
POTENTIAL CONTROLLING DEVICE.

No. 426,573.

Patented Apr. 29, 1890.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

WILLIAM STANLEY, JR., OF GREAT BARRINGTON, MASSACHUSETTS.

## POTENTIAL-CONTROLLING DEVICE.

SPECIFICATION forming part of Letters Patent No. 426,573, dated April 29, 1890.

Application filed July 3, 1888. Serial No. 278,966. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM STANLEY, JR., a citizen of the United States, residing at Great Barrington, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in Potential-Controlling Devices for Electric Circuits, of which the following is a full and exact specification.

10 In another application filed by me, Serial No. 279,576, I have described devices by means of which a number of electromotors connected in parallel may be made to run at the same speed when under the same load and at a constant speed under the same conditions, when a constant difference of potential is maintained between the mains leading from the generator at predetermined points thereof.

20 The object of my present invention is to regulate the electro-motive force of the current supplied by the generator in proportion to changes in the drop in potential upon the line between the generator and a predetermined point upon the line, so as to maintain a constant difference of potential between the mains at that point of the line, or, in other words, between a predetermined point upon one of the mains and a corresponding point upon the other main. This I accomplish in the following manner: To one of the mains at that part of the line where it is desired to maintain a constant difference of potential between the mains there is attached a third wire running parallel with the main. It is evident that owing to the drop in potential upon the line there will be a difference of potential between the third wire and the main to which it is attached at all points between the point of attachment and the generator, and consequently there will be a flow of current between the main and the third wire when connection is made between the two, the amount of which will vary with variations in the drop in potential upon the line between the generator and the point of attachment, or, in other words, with variations in the difference of potential between the mains at that part of the line where the third wire is connected to the main. At the generator is placed a differential electro-magnet, one coil of which is in circuit between the mains and the other between the

third wire and that main to which the third wire is connected. The differential magnet has a pivoted armature, which as it rises and falls puts in operation regulating devices for controlling the electro-motive force developed by the generator. So long as there is no change in the drop in potential upon the line between the generator and the point of attachment of the third wire and no change in the difference of potential between that point and a corresponding point on the other main the armature of the differential magnet will be so held that the regulating devices actuated thereby will remain inactive. If there is a tendency to variation in the drop in potential upon the line between the generator and the point of attachment, as upon the addition or withdrawal of translating devices, and a consequent variation in the difference of potential between the mains at that part of the line, there will be an increase or diminution in the amount of current flowing from the main to the third wire, and hence through that coil of the magnet which is connected between the two the attractive power of the magnet-core will be varied and the pivoted armature of the magnet will rise or fall, as the case may be, and thereby set in operation the regulating device proper, by which the electro-motive force developed by the generator will be varied until the difference of potential between the mains at the points specified is again normal.

The invention is illustrated in the drawing, in which—

G indicates a generator of electricity, and  $xz$  mains leading therefrom. At the point  $a$  on the main  $x$  (which may be at any point of the line at which it is desired to maintain a constant difference of potential between the mains) is connected a third wire A, running parallel with the main. Between the mains  $xz$  at the generator is connected one of the coils C of a differential electro-magnet E, the other coil of which C' is connected between the main  $x$  and the third wire A. The electro-magnet E has a pivoted armature  $e$ , the motion of which sets in operation a device for regulating the potential of the current supplied by the generator. Various forms of regulating devices may be employed for this purpose. A convenient



form is illustrated in the drawing, in which a shaft *b* is caused to revolve by means of a belt upon the pulley *p*. Upon the shaft *b* are carried two friction-wheels *c c'*, between which is a third wheel mounted upon a shaft *g* at right angles to the shaft *b*. The shaft *g* is provided with an endless screw *f*, which engages with a toothed wheel *h*, carrying the arm *i*, which bears upon the contact-plates *j j*. The contact-plates are connected to resistance-coils *k k k* in series with the field-coils of the generator *G*.

*BB'* are two electro-magnets, which are connected in circuit between the mains *x z*, one of them through the contact-point *l* and the other through the contact-point *m*. The coils upon the differential magnet *E* are so adjusted that when the difference of potential between the point *a* of the main *x* and a corresponding point of the main *z* is normal the armature *e* will lie between the contact-points *l m*. Upon a decrease in the drop or loss of potential upon the line between the generator and the point *a*, and a consequent increase in the difference of potential between the mains, there will be a less difference of potential between the main *x* and the wire *A* at the generator, and consequently less current will pass from the main *x* to the wire *A*, and hence through the coil *C'*. The pivoted armature *e* will be brought in contact with the contact-point *l*, the magnet *B'* will be put in circuit, and the shaft *g* drawn over until the wheel *d* is brought into contact with the wheel *c'*, thus revolving the shaft *g* and wheel *h* and moving the arm *i*, so as to cut additional resistance into the field-circuit of the generator and reduce the potential developed at the generator until the difference of potential between the mains is again normal. In case of decrease in the difference of potential between the mains the converse of this operation takes place, the armature *e* making contact with the contact-point *m*, throwing into

circuit the magnet *B*, and causing the arm *i* to move in the opposite direction, so as to reduce the resistance in the field.

I do not limit my invention to the particular form of device herein shown and described for varying the potential, as the movement of the armature *e* may be utilized to actuate various forms of apparatus to effect this result—*e. g.*, to change the position of the brushes of the generator; nor do I claim herein the method of operation described, but have made the same the subject of a separate application for Letters Patent.

What I do claim as new, and desire to secure by Letters Patent, is—

1. The combination of a generator of electricity, mains leading therefrom, a third wire connected to one of the mains, a differential magnet having one of its coils in circuit between the mains and the other in circuit between the third wire and the main to which it is connected, and a potential-controlling device actuated by said magnet, substantially as set forth, and for the purposes indicated.

2. As a means for maintaining a constant difference of potential between predetermined points upon mains leading from a generator of electricity, the combination, substantially as set forth, of a third wire electrically connected to one of the mains at one of said points, a differential magnet having one of its coils in circuit between the mains and the other between said third wire and the main to which it is connected, and a potential-controlling device actuated by said magnet and connected to the generator.

In testimony whereof I have hereunto subscribed my name this 29th day of June, A. D. 1888.

WILLIAM STANLEY, JR.

Witnesses:

FREDCK. N. DELAND,  
CHARLES H. BOOTH.