No. 855,450. PATENTED JUNE 4, 1907.

J. H. DUNCAN.

POTENTIAL REGULATOR.

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Fig. 1.

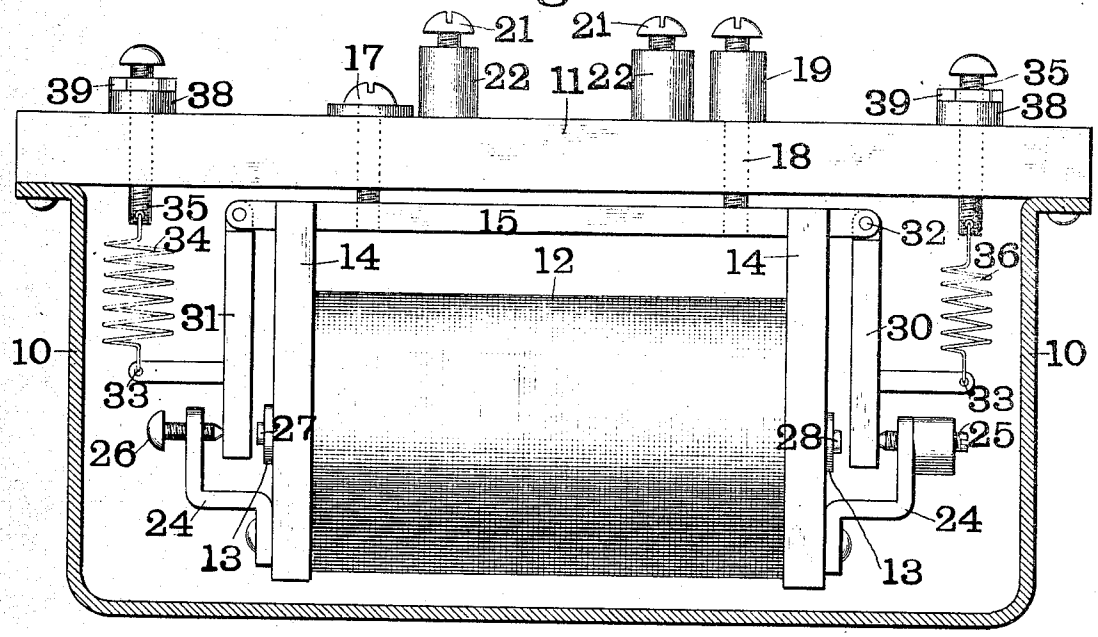
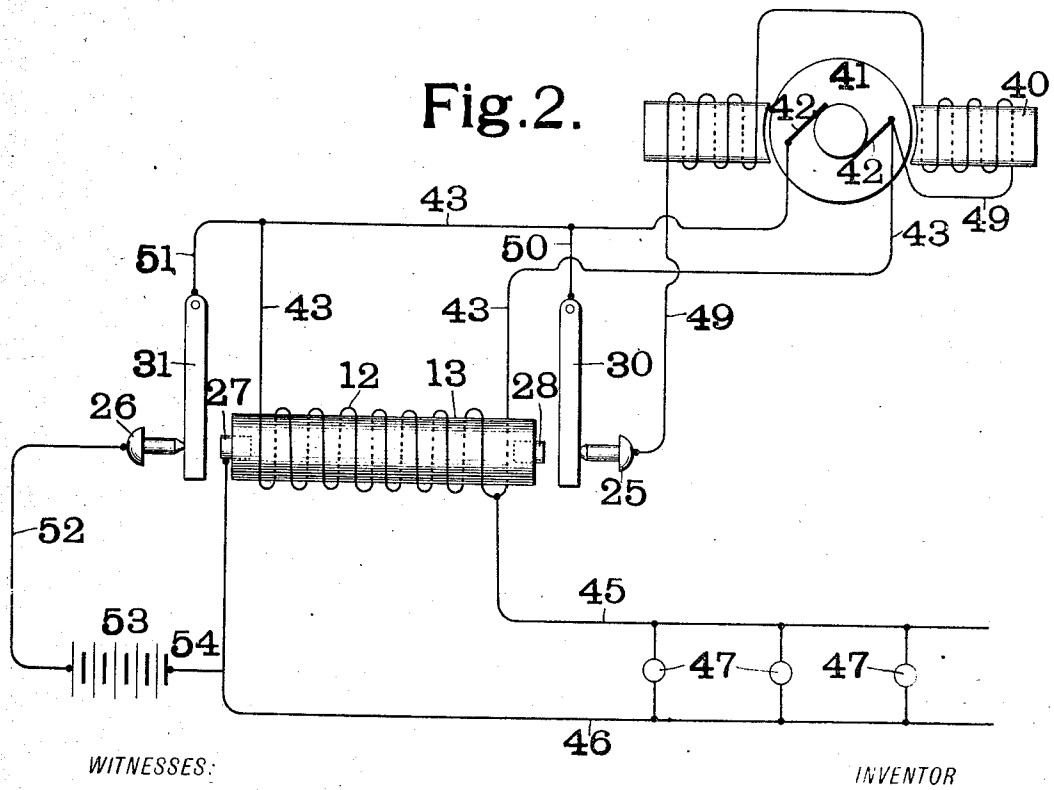


Fig. 2.



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JAMES H. DUNCAN, OF ST. LOUIS, MISSOURI, ASSIGNOR OF ONE-HALF TO JAMES W. KAYE, OF ST. LOUIS, MISSOURI.

POTENTIAL-REGULATOR.

No. 855,450. Specification of Letters Patent. Patented June 4, 1907.

Application filed March 22, 1906. Serial No. 307,325.

To all whom it may concern:

Be it known that I, JAMES H. DUNCAN, a citizen of the United States, residing at the city of St. Louis, in the State of Missouri, have invented a certain new and useful Potential-Regulator, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates more particularly to an automatic mechanism for maintaining substantially constant pressure in a circuit supplied with current by a dynamo electric generator, or other similar source of electric current.

Referring to the drawings which show one form in which my invention may be embodied, Figure 1 is a side elevation of the device, the casing in which it is contained being represented in section; and Fig. 2 is a diagrammatic view of the electrical connections.

10 is the casing which may be filled with any suitable insulating fluid and is provided with a lid or plate 11 of insulating material.

12 is a coil of wire wound upon a magnetic core 13 and the whole supported on end pieces 14 attached to a conducting plate 15. The plate 15 is secured to the lid 11 by means of a screw 17, and also by means of a screw 18, which latter is provided with a pillar 19 and acts as a binding screw for one of the terminals of the device. 21 are additional binding screws also provided with pillars 22, for attaching the various conductors to the device as hereinafter described. The end pieces 14 are provided with brackets 24 suitably secured thereto and each having a set screw 25 and 26. These end pieces also carry contact plates 27 and 28 opposite the set screws 26 and 25 respectively. Between the inner ends of the screws 25 and 26 and the contacts 27 and 28 project the ends of armatures 30 and 31 hinged at 32 to the plate 15. These armatures are of course of magnetic material and capable of being attracted by the core 13. Each of them is provided with a lateral arm 33. To the arm 33 on the armature 31 is connected a relatively weak coil spring 34, the opposite end of which is fastened to the lower end of a set screw 35 in the lid 11. In similar manner a relatively stronger spring 36 is connected to the arm 33 of the armature 30 and the opposite end of this spring is carried by another set screw 35. Both of the set screws 35 are made adjustable in the lid 11 by means of adjusting collars 38 and lock nuts 39.

In Fig. 2, 40 indicates the field poles of an electric generator and 41 its armature. From the brushes 42 of this armature extends the armature circuit 43. This circuit is connected with the coil 12 of the magnet at both ends of said coil. From one end of the coil 12 extends the conductor 45, between which and the conductor 46 are connected in multiple lamps 47, or other translating devices. One end of the wire 46 is connected with the contact 27. The field coil of the generator is composed of a conductor 49 extending from one of the brushes 42 around the field poles 40 and thence to the set screw 25, thus placing the field of the motor in series with the motor armature, the circuit being completed through the magnet armature 30 connected with the armature circuit 43 by means of a conductor 50. 51 is a conductor connecting one end of the magnet armature 31 with the circuit 43. The opposite end of the magnet armature 31 is normally in contact with the inner end of the set screw 26, the opposite end of which screw is connected by a conductor 52 with one side of a battery 53, the opposite side of which is connected by a conductor 54 with the conductor 46.

In the operation of my device when the parts are in the position shown in the drawings and the armature 41 is stationary, current will pass from the battery 53 through the conductors 54 and 46, lamps 47, conductors 45 and 43, to the right hand brush 42 of the armature 41, thence out of the left hand brush 42 of the armature along the conductors 43 and 51, magnet armature 31, set screw 26 and conductor 52, back to the opposite side of the battery 53. A portion of the current when it reaches the coil 12 will also pass through said coil and by means of the conductors 43 and 51, magnet armature 31, set screw 26 and conductor 52 also back to the opposite side of the battery. If now the generator armature is rotated a current will be generated therein owing to the fact that the circuit through the field is closed by means of the conductor 49 connected to the

right hand brush 42 and forming the field coil of the motor, the opposite end of said conductor 49 being attached to the set screw 25 connected with the magnet armature 30, and by means of the conductor 50 with the opposite brush 42 of the armature through the conductor 43. The current passed through the coil 12 from the battery is of insufficient strength to operate the magnet armature 31 against the tension of the weaker spring 34, but as soon as the armature begins to rotate a current is passed from it through the coil 12 by means of the circuit or conductor 43 connecting the brushes of the armature to the opposite ends of said coil, this current is of sufficient strength to attract the magnet armature 31 into contact with the plate 27, and the current passing from the armature through the conductor 43 divides the greater part passing through the conductor 51, magnet armature 31, contact 27, conductor 46, lamps 47, conductor 45, to the right hand end of coil 12 and thence by the conductor 43 back to the generator armature. The movement of the magnet armature 31 to the contact 27 breaks its connection with the set screw 26, thus cutting the battery 53 out of the circuit as soon as the potential of the current from the generator armature becomes strong enough to attract the armature 31. In case upon an increase in speed or for other cause, the potential of the current through the circuit 43, and, consequently, through the circuit formed by the conductors 45 and 46 containing the translating devices 47 rises and becomes too great, the core 13 of the electro-magnet will attract to it the magnet armature 30, thus breaking the circuit through the conductor 49 constituting the field coil of the generator and causing a reduction in the potential of the current through the translating devices 47 and the coil 12. The spring 36 being stronger than the spring 34 will not operate until the potential of the current from the generator has increased over the potential sufficient to operate the magnet armature 31 against the tension of the weaker spring 34. Immediately upon the lowering of the potential through the coil 12 by the breaking of the field circuit of the generator, the spring 36 returns the magnet armature 30 to its contact with the set screw 25, thus again closing the circuit through the generator field coil. Should the rotation of the generator armature 41 be discontinued, the spring 34 will draw the magnet armature 31 away from the contact 27 and against the set screw 26, thus again closing the circuit from the battery 53 to the translating devices 47 and preserving a practically constant potential on the circuit.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is—

1. The combination with a generator armature, of a field circuit therefor, an armature circuit, a translating device adapted to be connected to said armature, a second source for supplying current to said translating device, and means controlled by the current in said armature circuit for governing the current in said field circuit and from said second source.

2. The combination with a generator armature, of a field circuit therefor, an armature circuit, a translating device adapted to be connected with said armature, a second source for supplying current to said translating device, means controlled by the current in said armature circuit for governing the current in said field circuit, and means also controlled by the current in said armature circuit for controlling the flow of current from said second source.

3. The combination with a generator armature, of a field in series circuit therewith, an armature circuit, translating devices adapted to be connected with said armature circuit, a second source for supplying current to said translating devices, and means controlled by the current in said armature circuit for governing the current in said field circuit and for governing the flow of current to said translating devices from said armature and from said second source.

4. The combination with a generator armature, of a field circuit therefor, an armature circuit, translating devices adapted to be connected to said armature, a governing device for the current in said field, a second source for supplying current to said translating devices, a governing device for simultaneously controlling the currents from said second source and armature, and means governed by the current in said armature circuit for actuating said governing devices.

5. The combination with a generator armature, of a field circuit therefor, an armature circuit, a translating device adapted to be connected with said armature, means actuated by a current of lower potential in said armature circuit for governing the supply of current to said translating devices, and means actuated by a current of higher potential in said armature circuit for governing the current in said field circuit.

6. The combination with a generator armature, of a field circuit therefor, an armature circuit, a translating device adapted to be connected with said armature, a second source for supplying current to said translating device, means actuated by one current in said armature circuit for governing the supply of current from said armature and second source to said translating devices, and means actuated by another current in said arma-

ture circuit for governing the current in said field.

7. The combination with a generator armature, of a field current therefor, an armature circuit, a translating device adapted to be energized from said armature circuit, a second source for supplying current to said translating device, an electro-magnet energized from said armature circuit, means controlled by said magnet for governing the current in said field circuit, and means also controlled by said magnet for governing the current in said armature circuit and from said second source.

8. The combination with a generator armature, of a field circuit therefor, an armature circuit of varying potential, a translating device adapted to be energized from said armature circuit, a second source supplying current to said translating device, an electro-magnet energized from said armature circuit, means controlled by said magnet and responsive to a given potential in said armature circuit for governing the current in said field circuit, and separate means also controlled by said magnet and responsive to a lower potential in said armature circuit for governing the current in said armature circuit and from said second source.

9. The combination with a generator armature, of a field circuit therefor, an armature circuit of varying potential, a translating device adapted to be energized from said armature circuit, a second source supplying current to said translating device, an electro-magnet energized from said armature circuit, means controlled by said electro-magnet and only responsive to a given potential of said armature circuit for governing the current in said field circuit, and separate means also controlled by said magnet and responsive to a lower potential in said armature circuit for simultaneously governing the current in said armature circuit and from said second source.

In testimony whereof, I have hereunto set my hand and affixed my seal in the presence of the two subscribing witnesses.

JAMES H. DUNCAN. [L. S.]

Witnesses:
JAMES H. BRYSON,
BENNETTE PIKE.