(No Model.)

W. E. & W. SAWYER.

Automatic Regulator for Electric Currents.

No. 236,460. **Patented Jan. 11, 1881.**

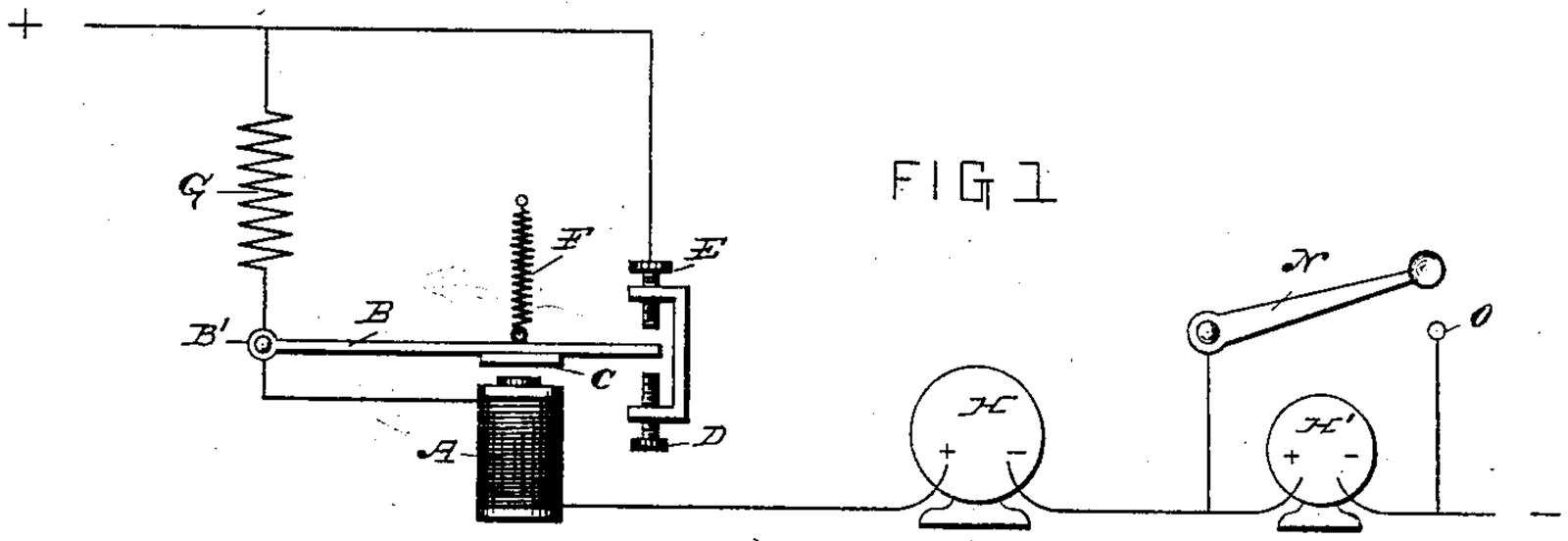
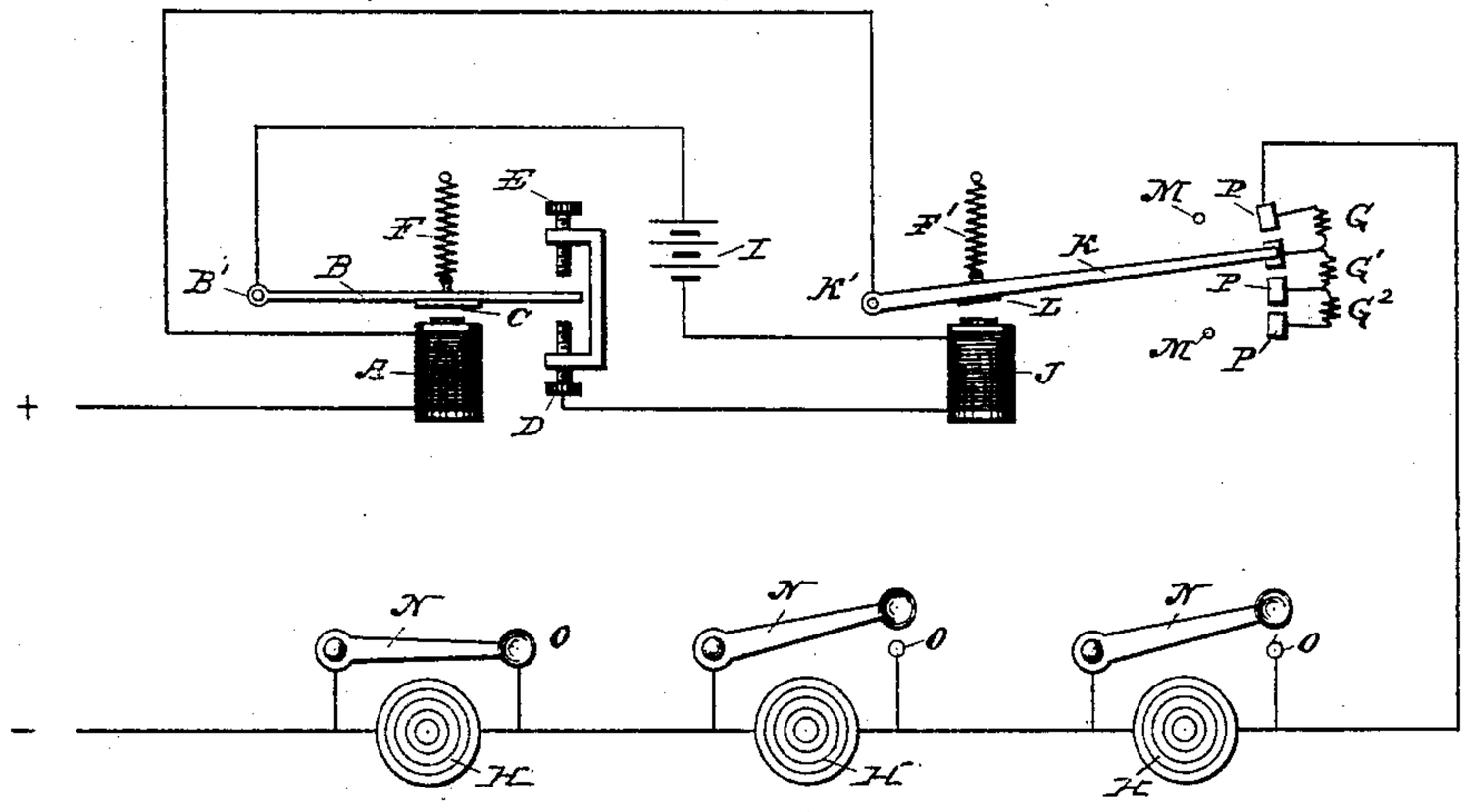


FIG 1

FIG 2



Witnesses

William J. Johnston

Percy Hughes

Inventors

William E. Sawyer

William Sawyer

By J. H. McDonald

Atty.

UNITED STATES PATENT OFFICE.

WILLIAM E. SAWYER AND WILLIAM SAWYER, OF NEW YORK, N. Y., ASSIGNORS TO EASTERN ELECTRIC MANUFACTURING COMPANY, OF MIDDLETOWN, CONNECTICUT.

AUTOMATIC REGULATOR FOR ELECTRIC CURRENTS.

SPECIFICATION forming part of Letters Patent No. 236,460, dated January 11, 1881.

Application filed October 2, 1880. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM E. SAWYER and WILLIAM SAWYER, citizens of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Automatic Regulators for Electric Currents; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

Our invention relates to devices for automatically regulating the supply of electricity to a system of electric motors in which it is desired to obtain a uniform speed of rotation, as in autographic telegraph-instruments and other apparatus of precision; and it is obvious, of course, that it may with equal advantage be applied to the regulation of electric currents in any apparatus or for any purpose whatever of this or like nature.

The details of construction will be hereinafter more fully set forth in the specification and pointed out in the drawings, in which similar letters of reference refer to similar parts in the several figures.

Referring more particularly to the drawings, Figures 1 and 2 are plan views (partly in section) of the device and circuits.

A, Fig. 1, represents an electro-magnet, whose armature C is secured to lever B, pivoted at B′. A retractile spring, F, is attached to the lever B at one end, the opposite end being attached to any suitable holding device. D and E represent adjustable stop-screws; G, a resistance, and H H′ electric motors or other apparatus.

The armature-lever B is so adjusted by means of spring F that when both motors are in circuit the lever B is in contact with screw E, and the circuit is from the + point to screw E, lever B, coil of magnet A, motors H, and outward at the — point, the resistance G being short-circuited by way of lever B and contact E. Let us suppose, now, that motor H′ is cut out of circuit by being short-circuited by way of N O. The result is, that motor H gets too much current. At the same time the magnet A is rendered more powerful, and, drawing down lever B, throws resistance G into circuit, thus compensating for the resistance of motor H′ removed from the circuit, and motor H receives substantially the same current as before. It might be supposed that lever B would not remain away from screw E, but would vibrate rapidly to and from it; but such is not the case. Owing to the well-known laws of magnetic attraction, the same force which would not start the armature away from screw E will hold it away, once it is drawn closer to the magnet, the circuit through which is not destroyed by the motion of the lever, and the lever is delicately adjusted, so as to be nearly balanced in its contact with E when both motors are in circuit.

Fig. 2 shows the magnet A employed as a relay to open and close the circuit of a second and more powerful magnet, J, the local battery being connected through + to lever B and — to coil of magnet J, and thence to contact-screw D. The lever K, pivoted at K′ and fixed to armature L, is retracted by spring F′, the movement of the lever being limited by the stops M M. P P P are contact-plates with which the end of lever K makes connection, and G G′ G² are resistances, each equal to the resistance of a motor, H. The motors are thrown into and out of circuit by means of the switches N O. In this figure (2) two motors are shown in circuit, one being cut out. The main circuit is therefore from the + point to magnet A, lever K, resistance G, two of the motors H, and one of the switches N O to the — point, the spring F being so adjusted that lever B is constantly vibrating to and from contact D, and consequently lever K is constantly vibrating to cut out and introduce into the circuit the resistance G. The result is, of course, a slight change in the current supplied to the system of motors H; but when there is a large number of motors this is inappreciable. Cutting out two or more motors causes lever K to vibrate over corresponding plates P, so that any change in the resistance of the system of mo-

tors by cutting out or introducing the same is practically compensated for by the introducing or cutting out of the resistances G G′ G².

Having thus fully described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In an electric distributing system, the combination of a generator of electricity, a series of electric engines or other apparatus, a relay-magnet in the main line, and an electro-magnet in the local circuit provided with a current-regulating armature automatically operated, and actuating mechanism to introduce or cut out resistances in the main line, substantially as described, and for the purpose set forth.

2. In an electric distributing system, the combination of a generator of electricity, a series of electric engines or other apparatus, a relay-magnet in the main circuit operating a local circuit, and an electro-magnet in the local circuit provided with a current-regulating armature actuating a lever traversing a series of resistance-terminals in the main circuit, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

WILLIAM E. SAWYER.
WM. SAWYER.

Witnesses:
I. H. McDONALD,
ALBERT W. VAN WINKLE.