(No Model.)

G. B. PENNOCK.

AUTOMATIC SWITCH FOR REGULATING THE POWER OF ELECTRIC BATTERIES.

No. 422,438. Patented Mar. 4, 1890.

Fig. 1.

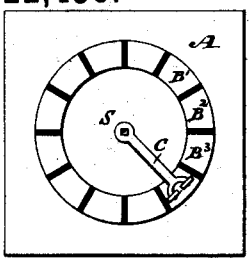


Fig. 3.

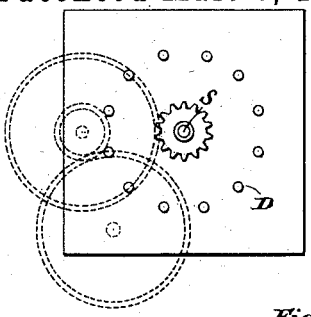


Fig. 2.

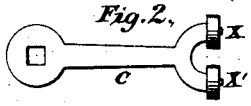


Fig. 4.

Fig. 5.

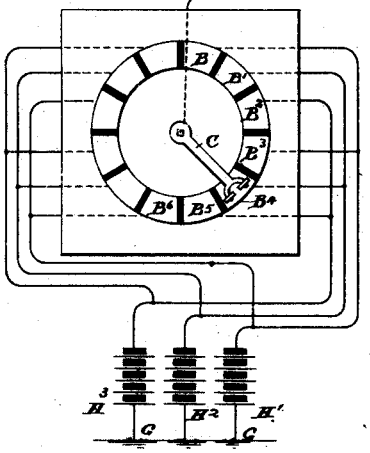


Fig. 7.

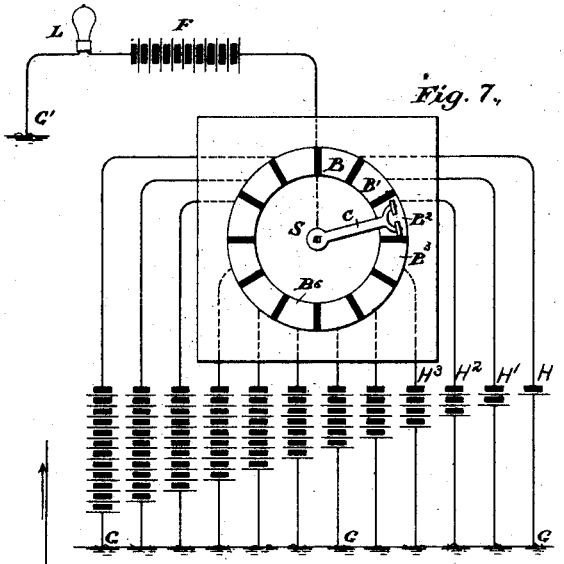
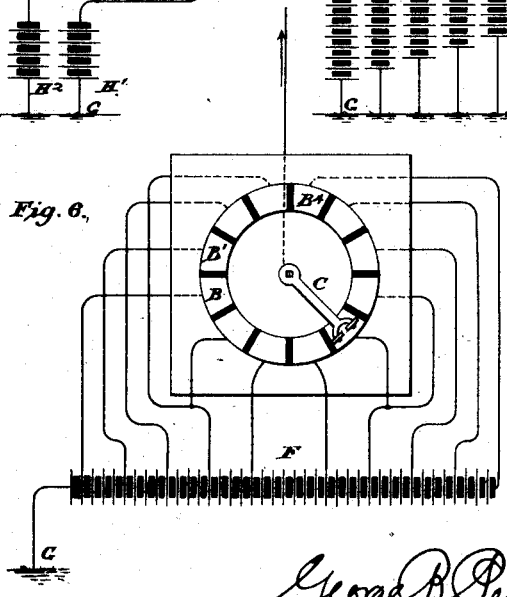


Fig. 6.



Witnesses
Geo. W. Breck.
Edward Thorpe.

George B. Pennock Inventor
By his Attorney
J. B. Sabine

UNITED STATES PATENT OFFICE.

GEORGE B. PENNOCK, OF BROOKLYN, NEW YORK.

AUTOMATIC SWITCH FOR REGULATING THE POWER OF ELECTRIC BATTERIES.

SPECIFICATION forming part of Letters Patent No. 422,438, dated March 4, 1890.

Application filed May 16, 1887. Serial No. 238,441. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. PENNOCK, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Regulating the Power of Electric Batteries, of which the following is a specification.

My invention relates to improvements in operating electric batteries, whereby I am enabled to automatically feed or increase or decrease the power of such batteries, or alternate or combine cells in the same, or substitute new cells in any circuit or circuits, or substitute one circuit for another. I attain these objects by the device illustrated in the accompanying drawings, in which—

Figure 1 represents the face of a dial with a disk formed of a series of metallic plates insulated from each other, together with the commutator-arm; Fig. 2, the commutator-arm; Fig. 3, the back of the dial with clock-work attachment; Fig. 4, the binding-post inserted in the dial and connected to each plate for connecting the conducting-wires; Fig. 5, the dial and the diagram of a circuit for alternating batteries; Fig. 6, the diagram of a circuit for progressively increasing or decreasing battery; and Fig. 7, the diagram of a circuit where cells are added to or subtracted from a given battery.

Similar letters refer to similar parts throughout the several views.

Referring now to Fig. 1, A represents a dial composed of wood or some non-electrical-conducting material.

B' B^2 B^3, &c., are metallic plates inlaid in the dial, the faces of which are flush with the surface of said dial, all insulated from each other, forming the battery-disk.

C represents the commutator-arm and hand or feeder, one extremity of which is pinioned to the main shaft or arbor S of the clock-work mechanism or other motor to be located behind the dial, and the other extremity contains the milled wheels or brushes X and X'. (Shown in Fig. 2.) This arm is made of springy steel or other metal, so that it bends and presses against the battery-disk, the milled wheels or brushes contacting with said disk as the arm passes around the dial. Each plate B B', &c., is metallically connected with a binding-post D. (See Figs. 3 and 4.) The clock-work or other motor is attached to the back of the dial and may be set so that the arm C makes the revolution of the disk in any required time. I prefer the mechanism of an eight-day clock. With this automatic electric-battery feeder I may change one battery for another battery, or add as the time of work passes additional cells to a fixed electric battery, and thus increase its strength, or by supplying new cups compensate for loss of power in such fixed battery, or if required cut off cups and diminish the power of the fixed battery.

This device will come more frequently into service in connection with batteries that are used for supplying electric lights, as in this service the drain on the battery-power is greater than in any other and the changes of the power required in a fixed battery more sudden.

If a certain number of lights are to be kept in use for a certain number of hours, the loss sustained by the fixed battery is compensated for by adding at certain intervals of time new cells by means of this device. On the other hand, if the number of lights required is diminished as time elapses, and the fixed battery would be too strong for the diminished number in a given circuit, my device may be so set as to cut off cells from the battery. To illustrate, referring to Fig. 6, let F represent the fixed battery. Now, if it is found that the loss during work is equivalent to one cell per hour, my device is then so set that the arm C, passing from one plate to another plate in a given time, adds fresh cells as it comes in contact with each successive plate from plate B to plate B^4, then dropping out or cutting off cells as arm C moves forward from plate B^4 to plate B, when the battery is almost entirely cut out, the circuit being always complete from G through a certain portion of battery F, one of the plates or segments of the metal disk, arm C, to line, thus keeping up the supply required through the whole period of five, ten, or twenty-four hours, or such other period of time, as the case may be.

It is obvious that I may place separate batteries on each plate or in combination with a switch alternate, or combine batteries

and throw off or add battery at any certain time.

Let Fig. 7 represent one condition of the switch. Then if it is found that in a certain circuit having a fixed battery I lose the power of one cell per hour the added batteries can be so arranged on the disk that by placing one cell H on plate B, two cells H′ on plate B′, three cells H^3 on plate B^2, and so on until the last plate in the disk is reached, the arm C being regulated to pass from one plate to another each hour, the full power required will be constantly kept up until the service on the circuit has ended or a new fixed battery is placed in circuit.

In Fig. 5 it will be observed that the circuit is so arranged that the arm C, in passing over plates B, B^3, and B^6 and so on, will lead to the line-current from battery H′, while in traversing plates B′, B^4, and B^7 and so on the current will proceed from battery H^2, and H^3 supplies B^2 B^5, &c. These batteries evenly balanced are relieved by alternation at each change of the arm from one plate to another.

In Fig. 6 the idea sought to be conveyed is the possibility of placing batteries of various sizes automatically upon the line, each successive contact of the feeder adding or decreasing the current in the circuit, as may be desired.

With my device I solve the problem of lighting by electricity from a primary battery. The great expense heretofore met in using a primary battery to exhaustion is avoided by my system of alternating battery-cells.

It is obvious that all the plates on the dial are of the same polarity to meet the opposite pole of the fixed battery.

Metallic brushes may be used in connection with the arm C at X X′, Fig. 2, as in a dynamo; but I prefer milled wheels, for the reason that friction is then greatly lessened and there is less danger of sparking. By terminating the arm C in the shape of a fork and revolving a milled wheel on each tine as its axis one of the wheels reaches a new plate a moment before the other wheel leaves the last plate, thus preventing the formation of an arc.

This automatic electric-battery compensator is especially adapted to service in lighting railway-cars by electricity, as it cheapens the battery expenditure and also relieves the car-attendants from any duty on their part during a trip of the train.

It is well known by electricians that the great strain on the electrodes of a battery required for electric lighting occurs when the battery is drawn on in actual service. The zincs are then constantly diminishing. Now by using this device and alternating batteries they are relieved of this strain and exhaustion by bringing into play during the hours of labor the relieving-cells automatically. It is obvious that by placing two of these regulators in the main circuit and having them set in unison and synchronized I can at any given time bring into or cut out of the circuit a section having lamps or other resistances in the same—that is to say, I can shorten or extend the circuit without regard to changes of batteries or dynamos.

That which I claim as my invention, and desire to secure by Letters Patent, is—

In an electric circuit, an automatic feeder or switch consisting of metallic segments insulated from each other and forming a disk, having separate batteries attached to each segment, a metallic arm or brush, to which the main line is connected, and to one end of which is attached metallic wheels arranged to press against the segments of the disk in succession, in combination with a clock-work motor arranged to operate the same for the purpose of increasing or decreasing the strength of the current in the circuit at certain periods of time irrespective of the strength of current in said circuit, all substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 18th day of April, A. D. 1887.

GEORGE B. PENNOCK.

Witnesses:
EDW. W. WILSON,
W. S. WILLIAMS.