W. E. SAWYER.

Electric Engineering and Lighting System.

No. 196,834. Patented Nov. 6, 1877.

Fig. 1.

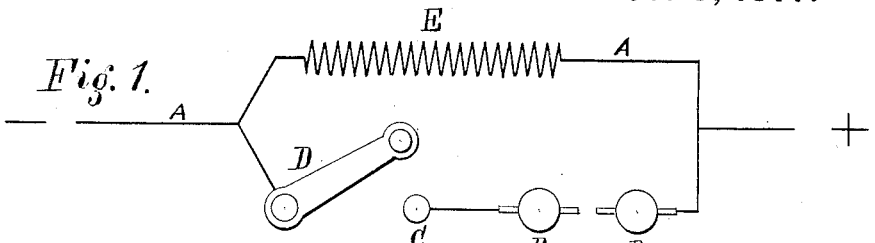


Fig. 2.

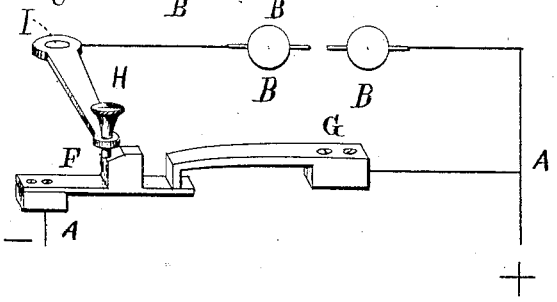


Fig. 3.

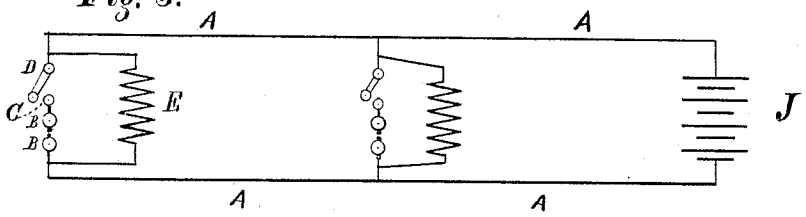


Fig. 4.

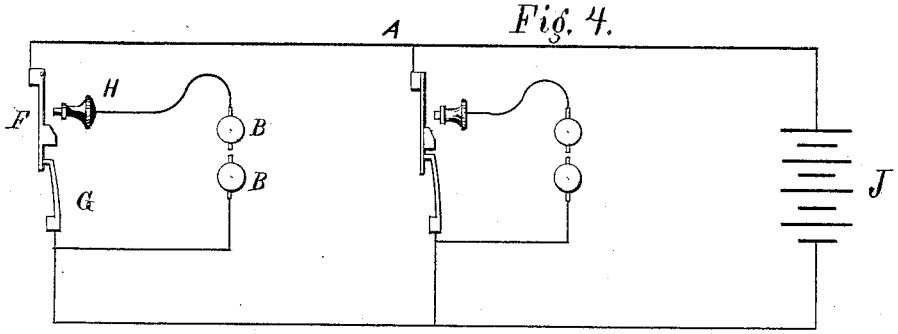
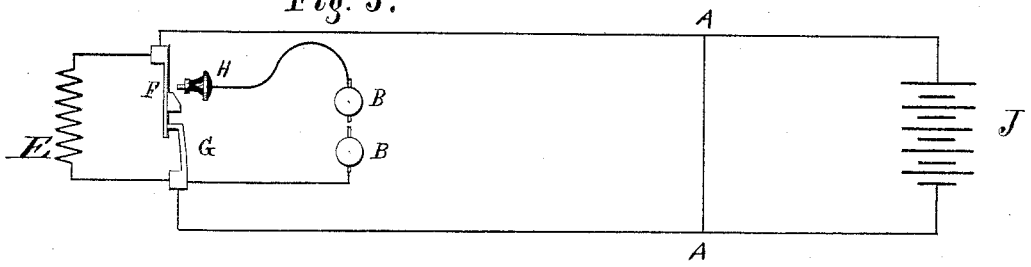


Fig. 5.



Witnesses;
H. S. Maxim.
J. B. White

Inventor;-
William Edward Sawyer.

UNITED STATES PATENT OFFICE.

WILLIAM E. SAWYER, OF NEW YORK, N. Y.

IMPROVEMENT IN ELECTRIC ENGINEERING AND LIGHTING SYSTEMS.

Specification forming part of Letters Patent No. **196,834**, dated November 6, 1877; application filed August 10, 1877.

To all whom it may concern:

Be it known that I, WILLIAM EDWARD SAWYER, of the city, county, and State of New York, have invented certain new and useful Improvements in Electric Engineering and Lighting Systems, of which the following is a full, clear, and exact description.

My invention relates to electrical arrangements whereby a number of electric lamps or electric engines may be placed in the circuit of a single conductor, or operated from a generator common to all of them, with facility, in a practical manner, and without interference one with another.

In Letters Patent heretofore granted to me, I have described the general features of my electric engineering and lighting system.

In the drawings accompanying and forming a part of this specification, Figure 1 is a view of the ordinary form of switch in combination with an electric lamp or engine in a shunt around a resistance in the circuit. Fig. 2 is a view of my circuit-continuity-preserving switch in a simple combination with a lamp or engine. Fig. 3 shows the ordinary form of switch, as in Fig. 1, applied to branch circuits. Fig. 4 shows a like application of my circuit-continuity-preserving switch in the simple combination shown in Fig. 2; and Fig. 5 shows the entire combination in a branch circuit of my circuit-continuity-preserving switch, as shown in Fig. 2, and the resistance around the lamp or engine, as shown in Fig. 1.

A A in all the figures represent the main conductors from the generator. In Fig. 1, E is a resistance, plain or adjustable, whereby the circuit of A A is made continuous. B B represent the poles or electrodes of the lamp, engine, or other apparatus. D is a switch of the ordinary form, and C its stud.

When it is desired to operate the apparatus B B, the switch D is thrown onto its stud C, and a portion of the flow in the main conductor proportionate to the resistance of E is diverted through the apparatus.

In place of the ordinary switch, I prefer to employ the device shown in Fig. 2, where F is a spring-piece, which, when the apparatus B B is not in operation, makes contact with the fixed piece G. To place the apparatus B B in circuit, switch H, pivoted at I, is thrown upon spring-piece F, with which it makes connection at the instant that the connection between F and G is broken by switch H depressing the spring-piece F.

In Fig. 5 I have shown the combination in a branch circuit with my circuit-continuity-preserving switch of the electric lamp or engine B B and the resistance E, which regulates the flow through B B. This resistance may be simple or adjustable. By this means the flow is shifted to and from the apparatus B B without disturbance to other apparatus in circuit.

In the system of branch circuits shown in Fig. 3, (the arrangement of which I do not claim as any part of my invention, excepting in combination with my circuit-continuity-preserving devices,) whereby the current flowing through the branches is locally changed from a non-working to a working course without disturbance of the branch or main circuit, I have shown an application of the devices shown in Fig. 1.

In Letters Patent No. 194,111, dated August 14, 1877, granted to me, are shown and described circuit-continuity-preserving devices in a single conductor running from a central station, like a railroad taking in many places between its termini. The same are also described and claimed in two or more conductors running from a central station, like two such railroads taking in many places between their termini.

For the proper performance of the work devolving upon an electric-lighting system, the quantity of current required being so great, it is impracticable to employ the earth for the return-circuit. It is therefore necessary, in running two such electric conduits, as the two railroads instanced, to run return-conduits for each, and where many such are needed the expense is very considerable.

It is apparent, further, that to insure the requisite conductivity for the great volume of current required, the main conductors must be very large, and as a single conductor traversing a territory (Letters Patent No. 194,111) is forced to take many devious paths, passing into and out of houses, or into and out of

rooms, to and from lamps or engines, in all of which deviations the large size of the conductor must be maintained, the expense of construction is very great. By placing my circuit-continuity-preserving devices, however, in branch circuits, the branches alone pursuing the devious paths mentioned in running across from the two large mains or conductors, the branch conductors may be small, for if I wish to divide the current flowing in the two main conductors, and thence through the branches among, say, fifty branches, the wire forming the branches need be only one-fiftieth the mass of that forming the two main conductors; hence, instead of running a single very large and expensive conductor into and from houses, to and from each lamp or engine, I have only to run two main conductors, and by small and inexpensive branches reach the lamps or engines. The current is evenly distributed throughout all of the branches, and my circuit-continuity-preserving devices, whether those of my present invention or those of Letters Patent No. 194,111, or any others of like function, enable me to light or put out any one or more of the lamps, or start or stop any one or more of the engines operated by the current common to all, without decreasing or increasing the flow in the other branches.

In Fig. 4, composed of like branch circuits, I have shown an application of my circuit-continuity-preserving switch described in referring to Fig. 2.

The operation of my invention will be readily comprehended from the drawings, the current from the generator J having a constant flow through each of the branches, whether the apparatus in that branch is or is not operating, so that a single generator may be used to operate any number of apparatuses without the interference of one apparatus with another.

Having thus described my invention, what I claim as such, and desire to secure by Letters Patent, is—

1. In an electric engineering or lighting system in which two or more electric lamps or electric engines are supplied with electricity from a generator common to both or all of them, the combination, with an electric lamp or an electric engine, of a secondary circuit the switch for which destroys the continuity of the secondary circuit at the instant that it directs the flow of current through the lamp or engine, and destroys the continuity of the circuit through the lamp or engine at the instant that it completes the secondary circuit, with or without a resistance, plain or adjustable, around such lamp or engine, substantially as shown and described.

2. In an electric engineering or lighting system in which two or more electric lamps or electric engines are supplied with electricity from a generator common to both or all of them, the combination, with two main conductors leading one from each pole of the generator in a course preferably parallel, of branches connecting the two main conductors at the requisite intervals, in which branches are placed electric lamps or electric engines provided with circuit-continuity-preserving apparatuses, so that the flow through any branch may never be broken whether the lamp or engine in that branch is or is not in operation.

WILLIAM EDWARD SAWYER.

Witnesses:

JAMES G. SMITH,

HIRAM S. MAXIM.