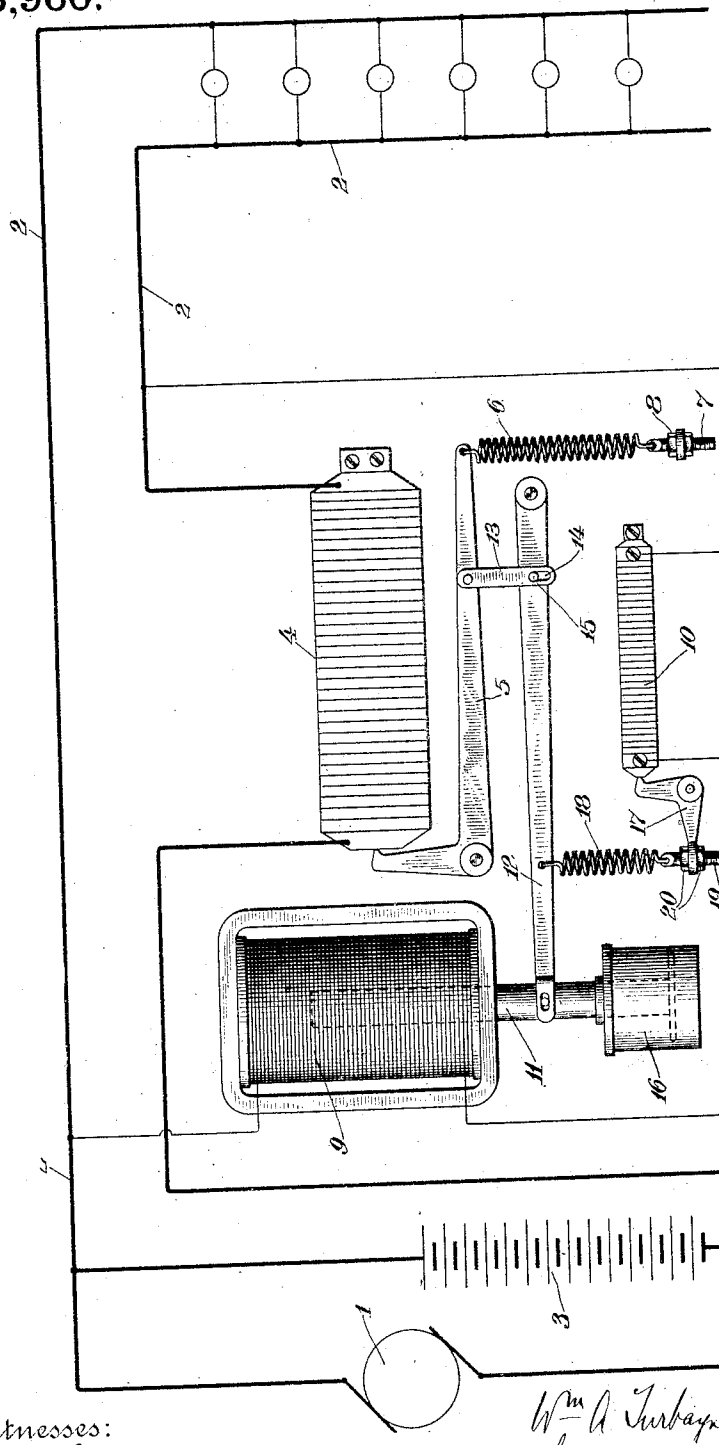
W. A. TURBAYNE.

ELECTRICAL SYSTEM OF DISTRIBUTION

APPLICATION FILED NOV. 24, 1908.

1,163,960. Patented Dec. 14, 1915.



Witnesses:
John O. Gempler
T. E. Raftery

Wm A Turbayne Inventor
By his Attorneys Kenyon & Kenyon

UNITED STATES PATENT OFFICE.

WILLIAM A. TURBAYNE, OF LANCASTER, NEW YORK, ASSIGNOR TO GOULD COUPLER COMPANY, A CORPORATION OF NEW YORK.

ELECTRICAL SYSTEM OF DISTRIBUTION.

1,163,960. Specification of Letters Patent. Patented Dec. 14, 1915.

Application filed November 24, 1908. Serial No. 464,221.

To all whom it may concern:

Be it known that I, WILLIAM A. TURBAYNE, a citizen of the United States, and a resident of Lancaster, county of Erie and State of New York, have invented certain new and useful Improvements in Electrical Systems of Distribution, of which the following is a specification.

My invention relates to electrical systems of distribution and apparatus therefor and is more especially designed for use in systems in which a storage battery is connected to supply a consumption circuit at times when the main source of electrical energy is inoperative.

I have specifically designed my improvements with relation to train lighting systems in which it is desired that the battery feed the lighting or consumption circuit when the main generator is not working, and in which it is desirous to maintain the voltage of the consumption or work circuit substantially constant although the potential of the battery may vary greatly between charge and discharge.

One object of my invention is to provide an arrangement and apparatus whereby the above desideratum may be accomplished effectively and efficiently, and in general to provide an arrangement which is efficient and economical in operation and construction.

Further objects, features and advantages will more clearly appear from the detailed description given below taken in connection with the accompanying drawing which diagrammatically represents a system embodying one form of my improvements.

In the drawing 1 represents a main generator feeding the work or consumption circuit 2, 2 of lamps or other translating devices. Across the terminals of the generator is connected a storage battery 3. Between the generator 1 and the consumption circuit 2 and in series therewith is a carbon pile resistance 4. This carbon pile resistance may be varied by pressure thereupon, exerted by a lever 5 under the action of a spring 6. The spring 6 may be adjusted by screw 7 and nuts 8. Connected across the consumption circuit 2, 2, is a solenoid 9 and in series therewith is a second carbon pile resistance 10. The solenoid 9 is arranged to act upon and operate a core 11, which in turn operates a lever 12. The lever 12 is mechanically connected with the lever 5 by a link 13, and the link 13 is loosely connected with a lever 12 by means of a slot 14 and pin 15. This arrangement is such that the lever 12 may have some movement during a certain part of its operation without causing any movement of the lever 5. A dash pot 16 is arranged at the lower end of the core 11 to prevent injurious results due to jarring, etc. The carbon pile resistance 10 is operated by means of a bell crank lever 17 which compresses the pile 10 under the action of a spring 18 connected to the lever 12 as shown. The tension of the spring 18 may be adjusted by means of screw 19 and nuts 20.

In operation when the generator 1 is idle or is not producing sufficient voltage for the work circuit the battery 3 feeds the work circuit at substantially its normal discharge voltage. However, when the generator is feeding the system, in order to cause the battery to charge, it is necessary that the generator voltage be greater than the discharge voltage of the battery. In order to prevent this excess voltage from falling upon the translating devices of the work circuit the variable resistance 4 is so operated that the potential drop therethrough is greatly increased in order to bring the voltage applied to the work circuit to its normal value. This is done by the action of the solenoid 9 which as the potential across the work circuit 2, 2 increases, thereby has its strength increased so that the lever 12 is raised, causing the long arm of the lever 5 to be raised against the action of spring 6, thereby decreasing the pressure of the blocks of the carbon pile 4 so that its resistance is greatly increased. This increase of resistance of the carbon pile 4 causes a greater drop of potential therethrough and tends to bring the voltage applied to the work circuit back to its normal value. In order to increase or magnify this action the carbon pile resistance 10 is operated in the circuit in series with the solenoid 9. As the lever 12 is raised under the action of the solenoid, 9, the tension exerted by the spring 18 upon lever 17 is increased thereby increasing the pressure upon the carbon pile 10 to decrease the resistance of the solenoid circuit thereby increasing the strength of the current therethrough and increasing or magnifying its action upon the carbon pile resistance 4.

When the voltage of the main generator drops or the generator is cut out of operation for any reason, the action of the solenoid 9 is weakened, thereby allowing the spring 6 to compress the carbon pile 4 to decrease the resistance in series with the work circuit 2 to cut down the voltage drop between the battery and the work circuit. This tends to bring the voltage of the work circuit back to its normal value. Also under these opposite conditions the carbon pile 10 acts in the opposite way, the tension of the spring 18 being decreased so that the carbon pile resistance 10 is increased thereby further weakening the solenoid 9. It will be noticed that whenever the resistance of the carbon pile 4 is increased the resistance of the carbon pile 10 is decreased and vice versa.

From the above it will be clear that I have provided very efficient and economical means for varying the voltage applied to the work circuit responsive to voltage changes therein and that I have also provided means for increasing or magnifying the action thereof responsive to fluctuations in said first mentioned means.

Although I have clearly described my invention with great detail and have shown one specific arrangement, I do not desire to be limited to such details, but

Having fully and clearly shown and described my improvements what I claim and desire to secure by Letters Patent is:—

1. The combination of a main generator, a work circuit fed thereby, a coil and carbon pile rheostat for regulating the condition of said circuit responsive to voltage fluctuations of the system and a carbon pile rheostat for increasing the action of said coil responsive to fluctuations in the operation thereof.

2. The combination of a work circuit, a coil and rheostatic device for regulating the voltage applied to said circuit responsive to variations in the electrical condition thereof, and a rheostat for controlling said coil to vary its action responsive to fluctuations in the operation thereof.

3. The combination of a circuit to be regulated, a carbon pile in series in said circuit, a coil connected across said circuit and controlling said carbon pile, a second carbon pile in series with said coil and operated thereby.

4. The combination of a rheostatic device, a solenoid operating the same to increase or decrease the resistance thereof, and a second rheostatic device in series with said solenoid and controlled thereby to increase its resistance when the resistance of the first mentioned rheostatic device is decreased, and vice versa.

5. The combination of a circuit, a carbon pile rheostat in series in said circuit, a solenoid connected across said circuit to be responsive to voltage changes thereof, a lever arranged to resiliently compress said carbon pile and controlled by said solenoid, a second carbon pile rheostat in series with said solenoid and operatively connected with said lever to be resiliently compressed thereby.

6. The combination of a carbon pile, a spring pressed lever for compressing the same, a second lever for releasing the pressure on said pile, a second carbon pile for varying the action of said second lever, and a third lever for operating said second carbon pile responsive to fluctuations in the operation of said second mentioned lever.

7. In an electrical system of distribution, a source of variable electro-motive force, a work circuit supplied thereby, a variable resistance in series with the work circuit, a coil for controlling said resistance responsive to voltage variations and a second variable resistance controlled by said coil and arranged to vary its action.

8. The combination of a circuit, a variable resistance governing said circuit, a coil for varying said variable resistance and a second variable resistance controlled by said coil and arranged to magnify its action.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WILLIAM A. TURBAYNE.

Witnesses:
RAYMOND A. HUMMELL,
W. H. PATTENDEN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."