J. L. CREVELING.

ELECTRIC REGULATION.

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1,166,441.

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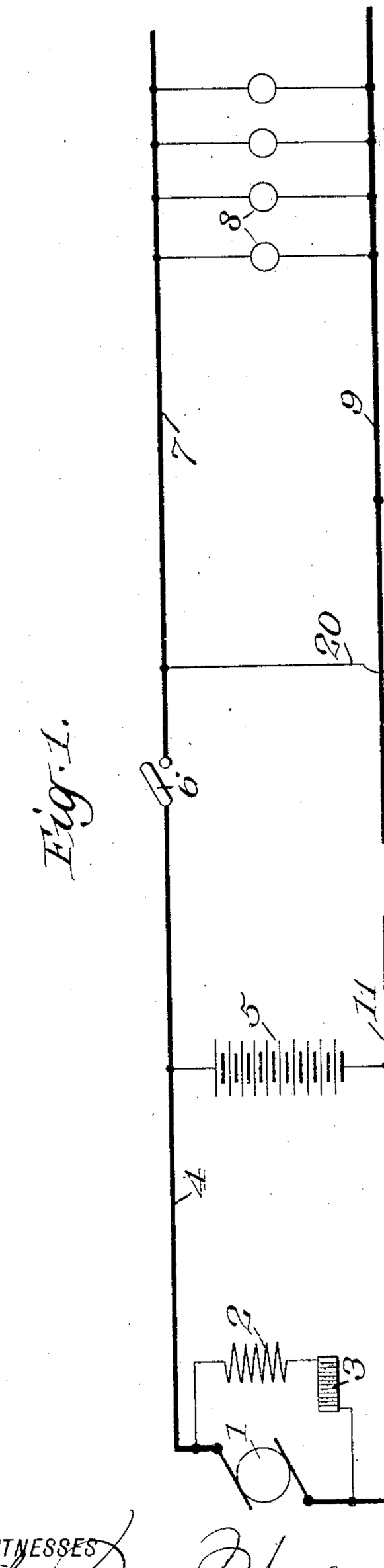

Fig. 1.

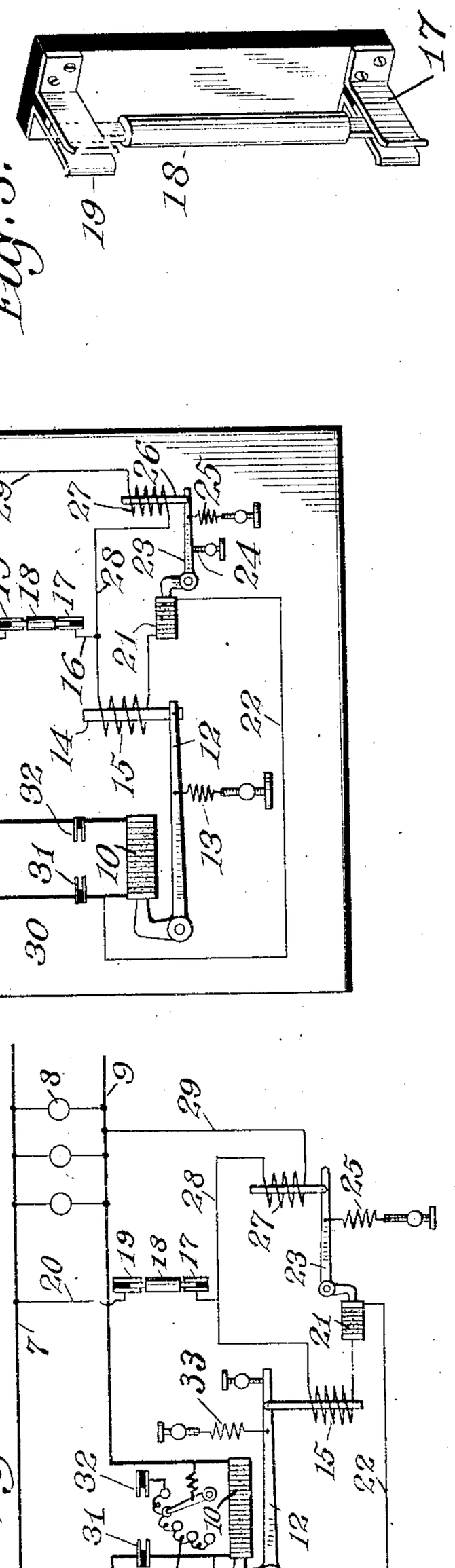

Fig. 3.

Fig. 2.

WITNESSES

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ELECTRIC REGULATION.

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To all whom it may concern:

Be it known that I, JOHN L. CREVELING, a resident of the city, county, and State of New York, have invented certain new and useful Improvements in Electric Regulation, as set forth in the annexed specification and drawing, forming a part thereof.

My invention pertains to that class of electric regulation wherein an automatic regulator is employed and has for its object to provide means for properly connecting the regulator in operative relation to a system, and also means for cutting out the regulator when it is desired to cut out the same.

Figure 1 is a diagrammatic representation, of one type of system embodying my invention. Fig. 2 is a modified form of system embodying my invention. Fig. 3, is a perspective of one of the devices employed in the system of Figs. 1 and 2.

In Fig. 1, 1 represents a dynamo or generator which may be provided with the usual field coil 2 and any suitable regulator 3, in this case merely indicated as a carbon pile. 4 represents the positive lead of the generator which may be connected with the storage battery 5 and to one side of the lamp and translation circuit switch 6, the opposite side of which is connected with the translating circuit main 7 communicating with the lamps or other translating devices 8 which are also connected to the main 9 which is carried to one side of the regulating element 10, the opposite side of which is in connection with the negative generator lead 11, in connection with the storage battery 5. The regulating element 10 may be of any desired character capable of regulating the translation circuit, and in this instance is indicated as a carbon pile operated by the lever 12 normally drawn in a downward direction by adjustable spring 13 in such manner as to compact the carbons and lower the resistance thereof. The lever 12 is provided at one extremity with the core 14 surrounded by the solenoid 15 in such manner that excitation of the solenoid tends to raise the core and increase the resistance 10. One end of the solenoid 15 is connected with the wire 16 in communication with the clips or contact fingers 17 adapted to engage one terminal of the removable fuse 18 the other terminal of which may be pressed between the fingers 19 which are connected as by wire 20 with the main 7. The removable fuse and its engaging contact fingers are more clearly shown in Fig. 3. The opposite end of the solenoid 15 is connected with one end of the small carbon pile 21 the other end of which is connected as by wire 22 with the lead 11. 23 is a lever normally drawn in a downward direction against the adjustable screw 24 by means of adjustable spring 25 and is provided at one extremity with the core 26 surrounded by the solenoid 27 having one end connected with the wire 16 as by wire 28 and the opposite end connected with the main 9 as by wire 29. The entire regulator is preferably mounted upon a base indicated at 30 upon which I also mount the clips or fingers 31 and 32 adapted to engage the fuse 18 which may be readily removed from the fingers 17 and 19 and inserted between the fingers 31 and 32.

In Fig. 2 like numerals are used to indicate like parts of the system shown in Fig. 1. The only difference between the systems of the two figures being that spring 13 in Fig. 1 tends to compact the carbons 10 and reduce the resistance thereof, while in Fig. 2 the spring 33 normally tends to decrease the pressure upon the pile 10 and increase the resistance thereof. Therefore, the solenoid 27 in Fig. 2 is so arranged as to increase the resistance 21 upon a rise in voltage across the translation circuit and thus weaken the current in the coil 15 to cause an increase in the resistance 10 to hold the voltage upon the translation circuit constant. A further modification is shown in this system in that an adjustable resistance 34 is placed between contact fingers 32 and the lead 9, whereby manual regulation of the translation circuit may be accomplished when the automatic regulator is cut out.

The practical operation of my invention, referring particularly to Fig. 1, is substantially as follows:—If the generator be running and supplying current to the battery 5 and the switch 6 be open, no current will be consumed in the translation circuit or by the regulator itself. If the switch 6 be closed, current will flow from the generator through lead 4, switch 6, main 7, translating devices 8, main 9, carbon pile 10, and lead 11 to the generator and the translation circuit and may be governed by proper manipulation of the resistance 10. Current will also flow from the main 7 through the wire 20, fingers 19, fuse 18, fingers 17, wire

16, solenoid 15, carbon pile 21, and wire 22 to the lead 11 and by excitation of the coil 15 tend to raise the lever 12 and increase the resistance 10. Current will also flow from wire 16 through wire 28, solenoid 27, wire 29 to the main 9, and, I so adjust the springs 25 and 13 that the solenoid 27 will so regulate the carbon pile 21 and so govern the current in the coil 15, and the resistance of the pile 10, as to hold constant voltage across the mains 7 and 9 or upon the translating devices. If now for any reason it be desired to cut out the translation circuit regulator, as for example should the same operate improperly, I withdraw the fuse member 18 from the fingers 17 and 19 and insert the same between the fingers 31 and 32, the said fuse being heavy enough to carry the desired translation current. This short-circuits the carbon pile 10 and thus obviates any trouble that the same might be causing through improper action. The removal of the fuse 18 from the fingers 17 and 19 interrupts the current flowing from the wire 20 through the coils 15 and 27 and thus waste of current through the regulator mechanism is avoided and any improper working brought about through the action of the said coils is also suppressed. It will thus be obvious that the simple transferring of the member 18 renders the operating mechanism of the regulator inert and diverts the current around the regulating element 10 and protects the same from any injury that might occur due to improper performance of the regulator.

The operation of the system shown in Fig. 2 may readily be followed out from the above description of the operation of Fig. 1, it only being necessary to remember that increase in voltage across solenoid 27 tends to weaken the coil 15 and thus allow spring 33 to increase the resistance 10 and that decrease in voltage across coil 27 allows the spring 25 to decrease the resistance 21, increase the current in the coil 15, and thus decrease the resistance 10, and that when the fuse member 18 is removed from its contact fingers 17 and 19 and inserted between the fingers 31 and 32, the voltage upon the translation circuit may be regulated by hand by manipulation of the adjustable resistance 34. It will be noted that my invention is particularly applicable to systems of the character shown in Fig. 2, wherein cutting out of the automatic regulating mechanism coils causes an increase in the governing or controlling resistance 10 to the maximum.

This invention is especially useful in electric lighting systems employed upon railway cars where, if trouble develops in the regulator for the translation circuit, there is usually no one present to make the proper adjustments or look after the trouble and it is desired to have some means whereby an unskilled hand, as for example a porter, may easily cut out the entire regulating mechanism which is improperly performing, as for example should the regulator be "hunting" and causing a bad fluctuation in the lamps. This arrangement provides a simple means whereby such a hand could simply cut out the entire regulating mechanism until proper adjustments or repairs can be made.

I do not wish in any way to limit myself to the exact construction set forth in the drawing nor the exact mode of operation described in the specification of this application, for it will be obvious that variations may be made therein without departing from the spirit and scope of my invention which is as set forth in the following claims.

I claim—

1. The combination with an electric circuit having a regulator therein, means for operating the regulator, and means for controlling the operating means, of means for rendering the regulator substantially ineffective and the operating means and controlling means substantially inoperative, while at the same time maintaining the operative condition of the circuit.

2. The combination with an electric circuit having a regulator therein, means for operating the regulator, and means for controlling the operating means, of means for rendering the operating and controlling means substantially inert and shunting the regulator means while maintaining the operative condition of the circuit.

3. The combination with a circuit having a regulator therein, operating means for the regulator, and means for controlling the operating means, of means for cutting out said regulator and said operating means and said controlling means while at the same time maintaining the operative condition of the circuit.

4. The combination with a circuit containing a regulator, means in connection with the circuit for operating the regulator, and means for controlling said operating means, of means for disconnecting the operating and controlling means, and shunting out the regulator while maintaining the operative condition of the circuit.

5. The combination with an electric circuit containing a generator and a regulator, of means for operating the regulator, means for rendering the regulator and operating means substantially inoperative while maintaining connection between the circuit and the generator, and independent means for regulating said circuit only when the above-mentioned regulator and operating means are inoperative.

6. The combination with a circuit containing a generator and a regulator, of means

for operating the regulator, means for rendering the regulator and the operating means substantially inert while maintaining connection between the generator and the circuit, and means for independently regulating said circuit, said last named means being operative only when the regulator and operating means are inert.

7. The combination with an electric circuit containing a generator and a regulator, of means for operating the regulator, means for rendering the operating means substantially inert, and shunting the regulator while maintaining connection between the generator and the circuit, and means for varying the resistance of said shunting means.

8. The combination with a supply circuit and a work circuit, of means for regulating the work circuit including a regulating element between said circuits and automatic means for operating the same in response to voltage fluctuations in the work circuit, of a removable unit, means for engaging said unit in different operative positions whereby positions of said unit render the regulating member and the operating means operative or the regulating member and the operating means inoperative.

9. The combination with a circuit containing a regulator, of means for operating the same, a removable unit, and means for engaging said unit in different operative positions, whereby the unit may render the regulator and the operating means operative or substantially inoperative.

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