

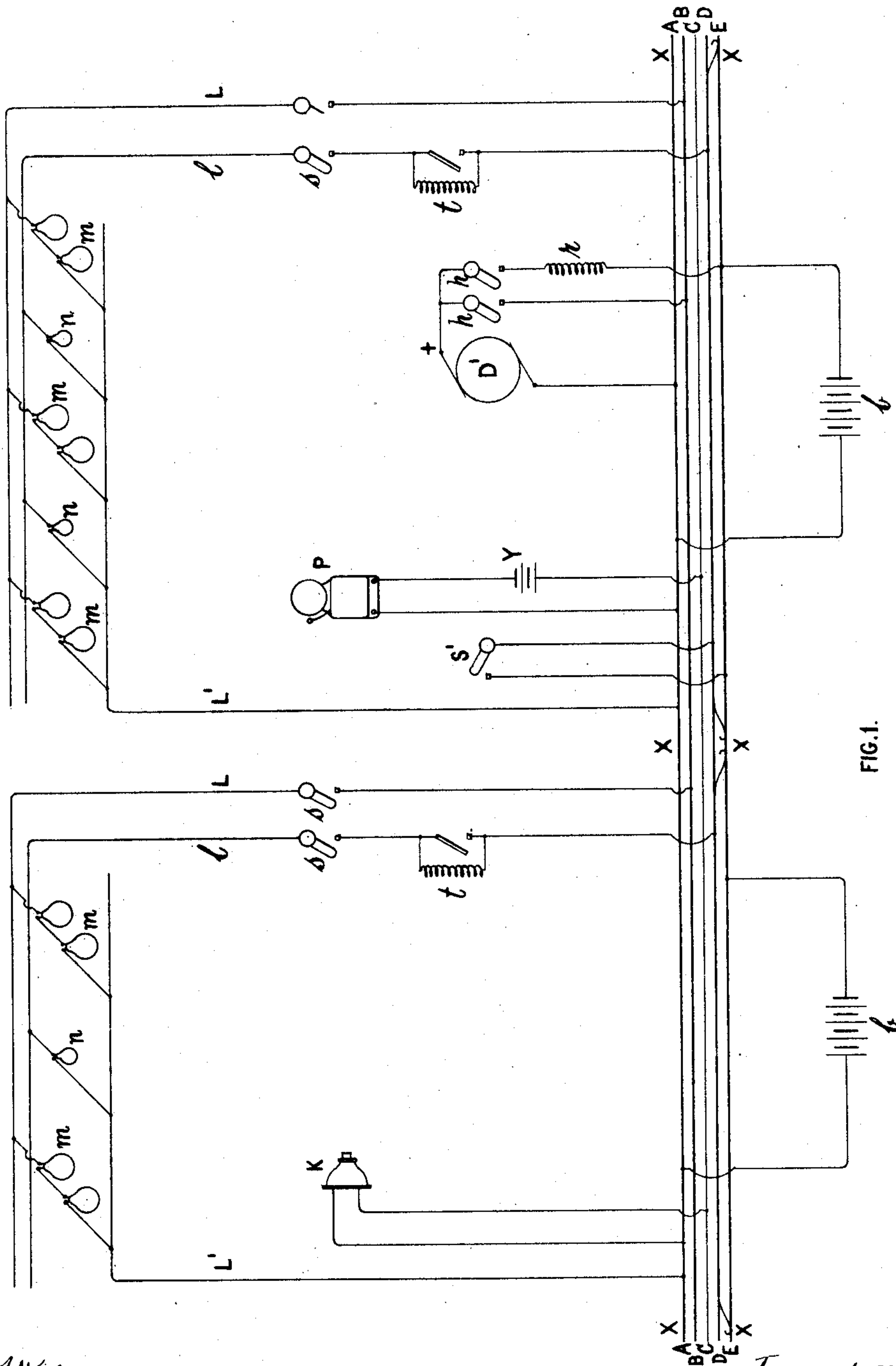
(No Model.)

2 Sheets—Sheet 1.

I. A. TIMMIS.  
ELECTRIC LIGHTING OF RAILWAY TRAINS.

No. 432,657.

Patented July 22, 1890.



Witnesses.  
C. R. Ferguson  
Wm. M. Jeff.

Inventor.  
Illius Augustus Timmis,  
by his Attorney  
Edwin H. Brown

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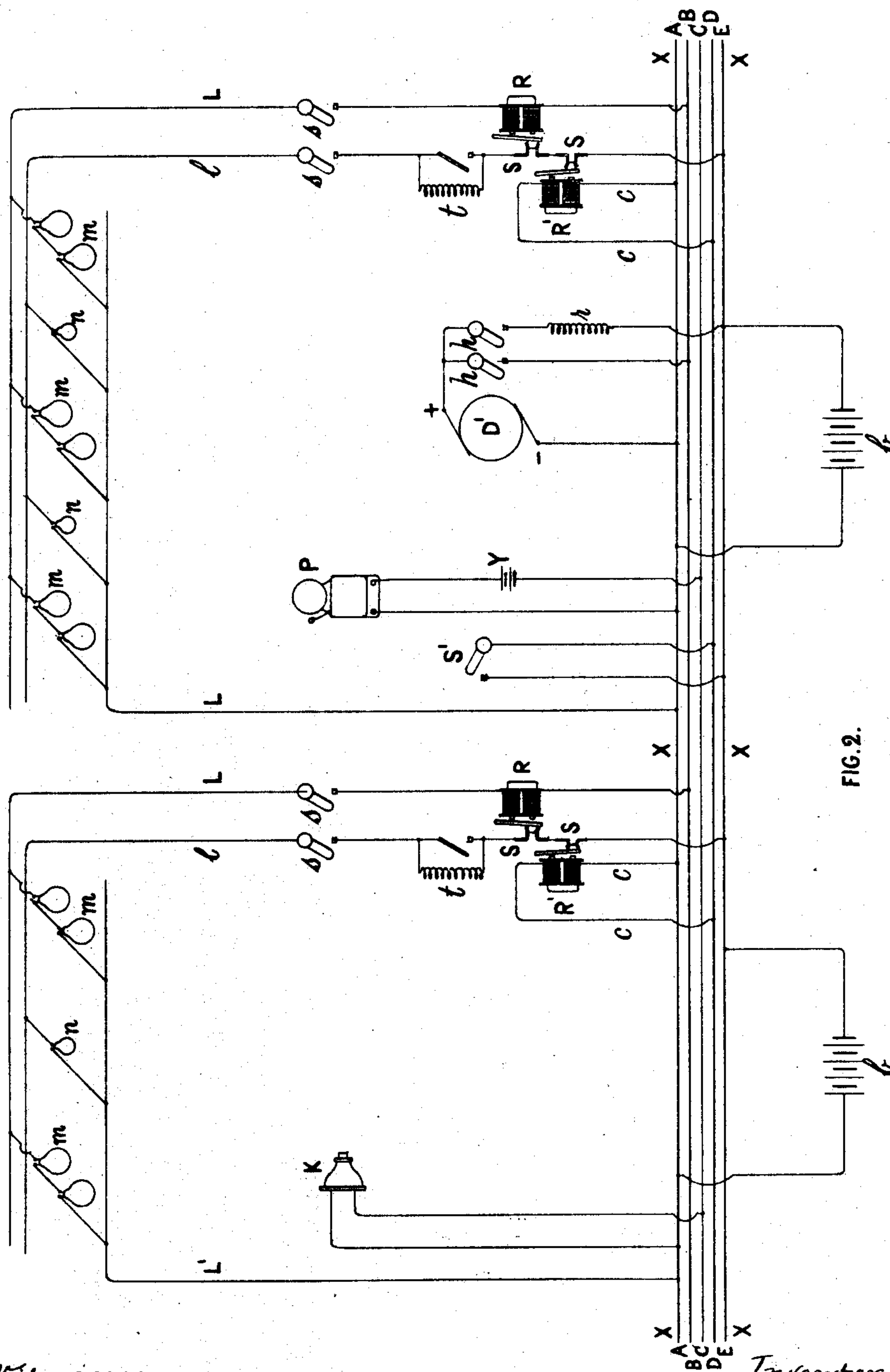
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**FIG. 2.**

Witnesses.  
C. H. Ferguson  
Wm. M. Jeff.

A  
 B C  
 D E  
 Inventor.  
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 by his Attorney  
 Edwin H. Brown



# UNITED STATES PATENT OFFICE.

ILLIUS AUGUSTUS TIMMIS, OF LONDON, COUNTY OF MIDDLESEX, ENGLAND.

## ELECTRIC LIGHTING OF RAILWAY-TRAINS.

SPECIFICATION forming part of Letters Patent No. 432,657, dated July 22, 1890.

Application filed December 26, 1889. Serial No. 334,947. (No model.)

*To all whom it may concern:*

Be it known that I, ILLIUS AUGUSTUS TIMMIS, a subject of the Queen of Great Britain, residing at 2 Great George Street, Westminster, London, S. W., in the county of Middlesex, England, have invented certain new and useful Improvements in the Electric Lighting of Railway-Trains; and I do hereby declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, which form part of this specification.

The objects of my invention are to lessen the weight of the apparatus, especially of the batteries, to economize the electric current and lessen the expense and increase the light. With these objects in view and referring to the drawings herewith as explanatory of the following description—

Figures 1 and 2 are diagrams illustrating electrical apparatus embodying my improvement and adapted for two cars of a railway-train. The apparatus illustrated by these two figures are so similar that I can readily describe them together with mention of their special features, as may be necessary.

D' designates a dynamo-electric machine, which may be arranged upon any suitable part of the train—as, for instance, in the guard's van of such a train as is common in Europe, on the locomotive or in its tender, or in the baggage-car of an American train. It is intended to be driven by means of a special engine, which is supplied with steam either from a special boiler or from the locomotive. Main positive leads B and negative leads A are fitted to extend under each car. Those of the forward car are connected with the positive and negative leads of the dynamo, and these negative and positive leads A B of the several cars are intended to be coupled together.

E designates a positive lead for charging batteries which are used, as will hereinafter be explained.

From the through leads A and B, I fit main lighting-circuits L and L' in each vehicle with the necessary lamps *m m*. The lamps are shown in series of pairs and all the pairs in parallel. They may be placed in any convenient way. These leads A B E and other through leads I join or carry through from

vehicle to vehicle by means of special couplers of any available kind. Thus I light the main lamps directly from the dynamo, which enables me to use a high-voltage current and get more light and insure economy, and I require no batteries for the main lighting; but as vehicles may be taken or break loose from the dynamo-circuit, and in day-time it may be advisable not to work the dynamo—say, for instance, in going through a tunnel, and yet lights are needed—I place a small lamp *n n* of low voltage in each vehicle. It will be seen that these lamps are arranged between special or auxiliary circuit-wires *ll* and the circuit-wires L', and that the circuit thus formed is in communication with secondary battery *bb*, placed in any suitable position in each vehicle. The return-lead from both the lighting-circuits is shown at L' L', but separate leads may be used. Local switches *s s* are shown in both the lighting-leads. When the local switches in the auxiliary circuits are closed, the lamps are lighted in Fig. 2. I fit another or relay switch S, Fig. 2, in these auxiliary circuits, which works as follows: In each of the main lighting-circuits I place a relay R in each vehicle, which actuates the relay-switch S and breaks the auxiliary circuits when the dynamo is running, so that when the main lamps are lighted the auxiliary lamps are not lighted, but if any vehicles are separated from the dynamo circuit the auxiliary lamps automatically light up.

The auxiliary lamps of each car will be extinguished whenever the main leads of that car shall be again coupled in the train.

Instead of putting the relay R in the main lighting-circuit I may put it in a separate or controlling-circuit *c*, as at R', Fig. 2. This controlling-circuit is joined to the through controlling-lead D and the general negative lead A, and when it is required to be worked the two leads D and E are joined by the switch S', (see Fig. 2;) or, instead of using a controlling-lead D, as in Fig. 2, I use an auxiliary lead D, (see Fig. 1,) to which I join the auxiliary lighting-leads *l*, and by joining the lead D to the lead E by switch S', Fig. 1, the auxiliary lamps are lighted.

Where a communication system is used between the guard or other attendant and passengers, I put in a communication circuit-wire



or conductor *c*, together with bell *P*, and pull or push knob *K* in any position or positions required, and when the knob *K* is actuated it establishes a circuit and the bell *P* is rung.

5 A special battery *Y* may be used or the battery *b*.

The couplers are made so that when any vehicle is taken or becomes detached from the train the circuits *D* and *E* or any circuits that may be required to be joined automatically make junction. Such couplers may be located at the points *x x*.

There is a special resistance *r* in the dynamo-circuit to the batteries, and there are resistances *t*, where required, in the auxiliary lighting-circuits, and also, but not shown, in the main lighting-circuits, if required. There are switches *h h* in each of the dynamo-circuits.

20 Although I have used the term and described a dynamo for generating the electrical current, it is to be understood that I do not limit myself thereto, as I may employ other main source of electricity without departing from the spirit of my invention.

Having now described the way in which my invention may or can be carried into effect, I desire it to be understood that what I claim is—

30 1. In an electrical-lighting apparatus for railway-trains, the combination of a main source of electricity, main, positive, and negative leads for a car communicating with said main source of electricity, a secondary battery for the car, a battery-charging lead, connections between said battery and one of the main leads and the battery-charging lead, a lamp for the car in electrical communication with the main leads and another lamp for the car in communication with that one of the main leads which is connected with the battery and in electrical communication with the battery-charging lead, and switch mechanism for the two lamp-circuits, substantially as specified.

45 2. In an electric-lighting apparatus for railway-trains, the combination of a main source of electricity, main, positive, and negative leads for a car communicating with said main source of electricity, a secondary battery for the car, a battery-charging lead, connections between said battery and one of the main leads and the battery-charging lead, a lamp for the car in electrical communication with the main leads and another lamp for the car in communication with that one of the main leads which is connected with the battery and in electrical communication with the battery-charging lead, a relay in one of the circuits, and a switch in the other circuit operated by the relay, substantially as specified.

65 3. In an electric-lighting apparatus for railway-trains, the combination of a main source of electricity, main, positive, and negative leads for a car communicating with said source of electricity, a principal lamp-circuit in communication with the positive and negative

leads of the car, a lamp in this circuit, a secondary or auxiliary circuit comprising a wire or conductor *L'*, connected with one of the main leads, a battery-charging lead, a wire *l* in electrical communication with the battery-charging lead, a lamp in the secondary or auxiliary circuit comprising the wires *L' l*, and a secondary battery in communication with one of said leads and the battery-charging lead, substantially as specified.

4. In an electric-lighting apparatus for railway-trains, the combination of a main source of electricity, main, positive, and negative leads for a car communicating with said main source of electricity, a secondary battery for the car, a principal lamp-circuit in communication with the negative and positive leads of the car, a lamp in this circuit, the said secondary battery in electrical communication with one of said main leads, a battery-charging lead in electrical communication with the secondary battery, a secondary or auxiliary circuit communicating with that one of the main leads which is in communication with the battery and comprising a wire or conductor *l*, which is in electrical communication with the battery-charging lead, a lamp in the secondary or auxiliary circuit, and switches in the principal circuit and secondary or auxiliary circuit, substantially as specified.

5. In an electric-lighting apparatus for railway-trains, the combination of a main source of electricity, main, positive, and negative leads for a car communicating with said main source of electricity, a principal lamp-circuit in the car in communication with the positive and negative leads of the car, a lamp in this circuit, a secondary battery in electrical communication with one of said main leads, a battery-charging lead in electrical communication with the secondary battery, a secondary or auxiliary circuit communicating with that one of the main leads which is in communication with the battery and comprising a wire or conductor *l*, which is in electrical communication with said battery-charging lead, a lamp in the secondary or auxiliary circuit, a switch in the secondary or auxiliary circuit, and a relay in the principal circuit controlling such switch, substantially as specified.

6. The combination of the main leads *A B E*, a dynamo or other main source of electricity connected with two of said leads, switches controlling the communication between the dynamo and leads, a secondary battery communicating with two of said leads, a conductor *L*, connected with one of the leads, a conductor *L'*, connected with another of said leads, a lamp connected with said conductors *L L'*, a wire *l*, a lamp connected with said wire *l* and with the conductor *L'*, and switches *s s* in said last-named wires or conductors, substantially as specified.

7. The combination of main leads *A B E*, a main source of electricity connected with the leads *B E*, switches controlling such connection, a secondary battery communicating with



the leads A E, a wire L, connected with the lead B, a wire L', connected with the lead A, a lamp in the circuit L L', a wire l, connected to the lead E, a lamp connected with wires l and L', switches in the wires L l, and a resistance in the wire l, substantially as specified.

8. The combination of the leads A B E, a dynamo communicating with the leads B E, switches controlling such communication, a secondary battery connected with the leads A E, a wire L, connected with the lead B, a wire L', connected with the lead A, a lamp in the circuit of said wires L L', a wire l, connecting with the lead E, a lamp connected with the wires l and L', switches in said wires, and a switch S' for connecting the lead E with a lead D, substantially as specified.

9. The combination of main leads A B E, a dynamo D', connecting with the leads B E,

switches controlling said connections, a secondary battery connected with the leads A E, a wire L, connected with the lead B, a wire L', connected with the lead A, a lamp connected with the wires L L', a wire l, connected with the lead E, a lamp connected with the wires l and L', switches for said wires, a switch or circuit-closer connected with the lead A and a lead C, and a signaling device connected to two of the leads, substantially as specified.

In testimony that I claim the foregoing I have hereunto set my hand this 15th day of November, 1889.

ILLIUS AUGUSTUS TIMMIS.

Witnesses:

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