(No Model.)

C. E. JONES.

ELECTRIC CAR BRAKE.

No. 324,774. Patented Aug. 18, 1885.

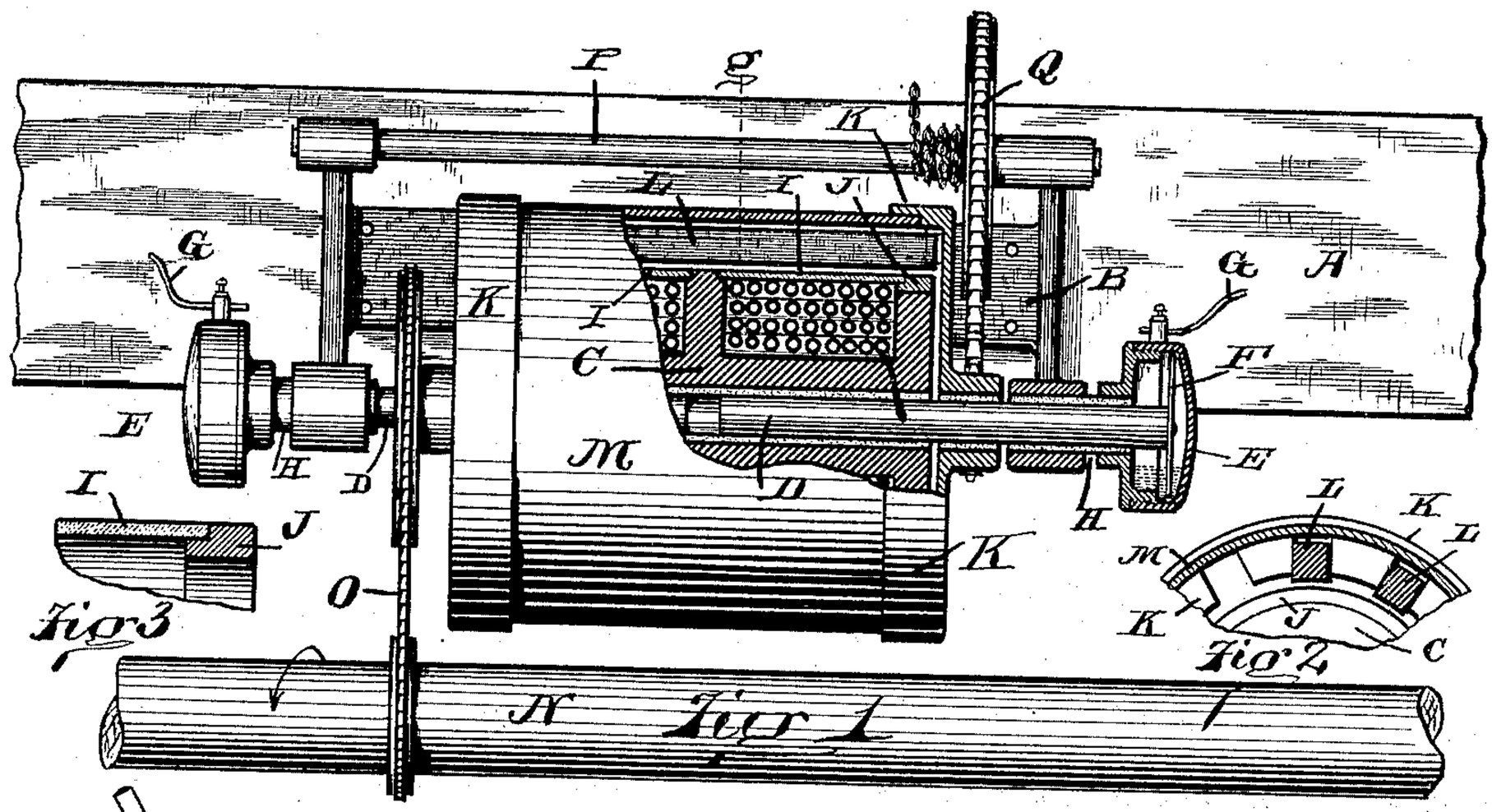

Fig 3

Fig 2

Fig 1

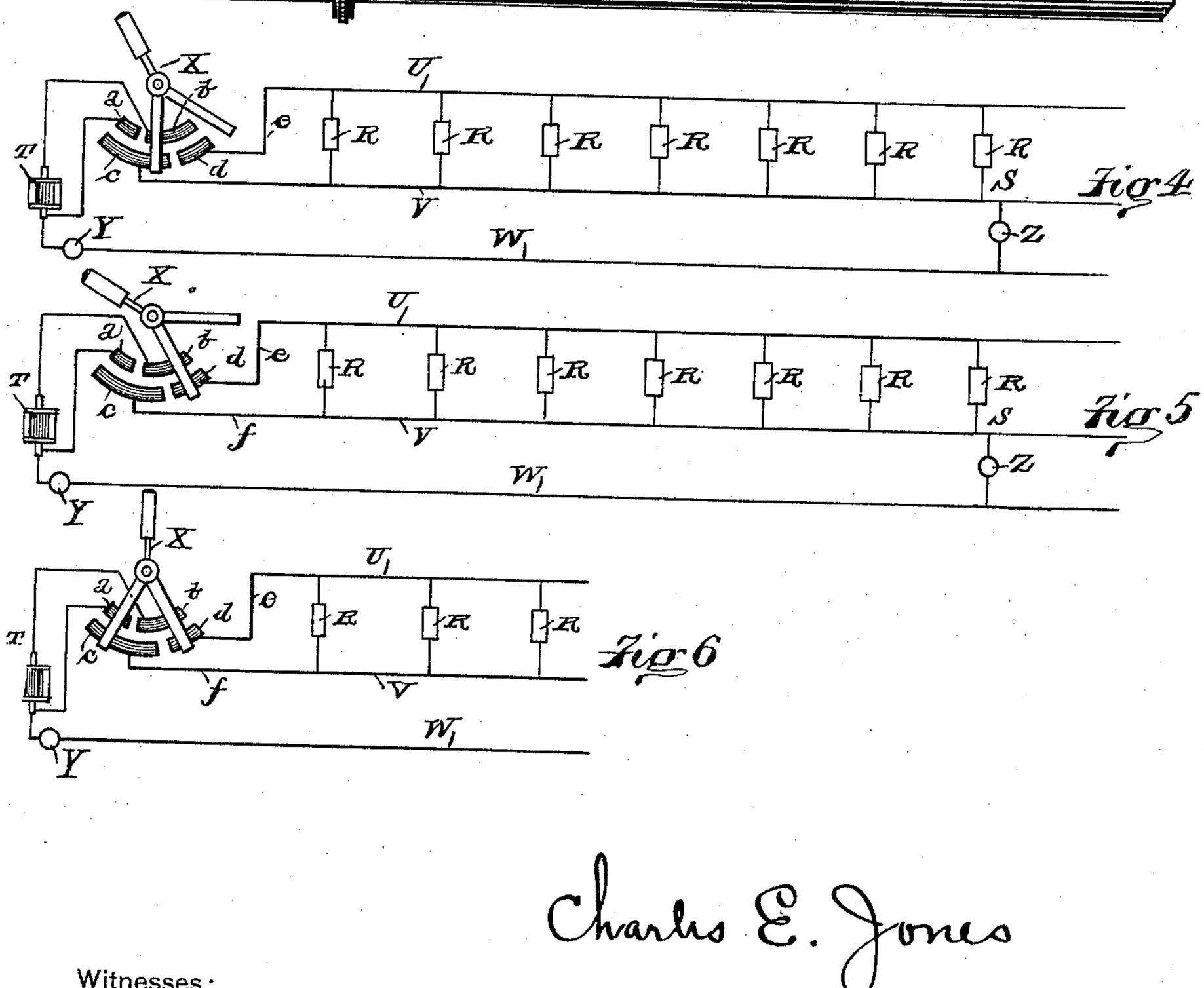

Fig 4

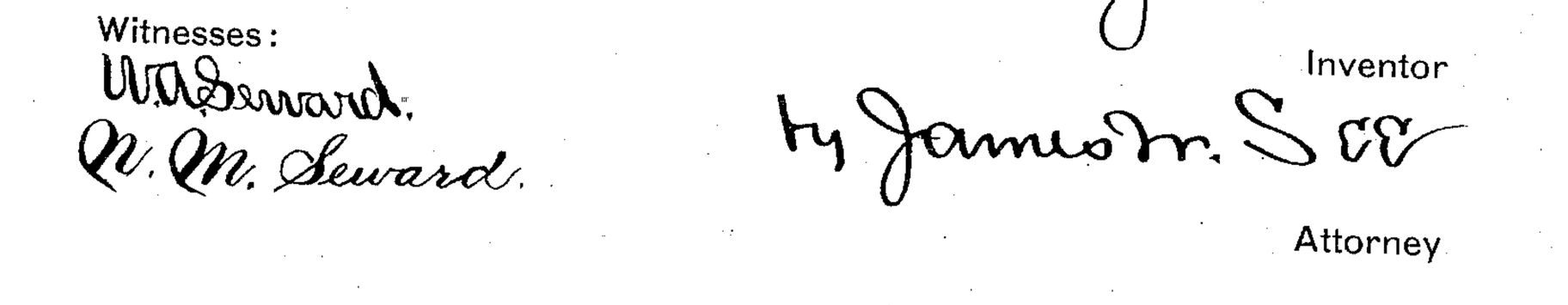

Fig 5

Fig 6

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UNITED STATES PATENT OFFICE.

CHARLES E. JONES, OF CINCINNATI, OHIO.

ELECTRIC CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 324,774, dated August 18, 1885.

Application filed February 28, 1885. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. JONES, of Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Electric Car-Brakes, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is an elevation, part section, of the electric winch as it appears looking at one end of the car to which it may be attached, A being one of the truck-timbers, and N one of the car-axles; Fig. 2, a transverse section, line *g*, of a portion of the outer jacket; Fig. 3, an enlarged section of pole-ring J; Fig. 4, a diagram illustrating the circuits, &c., in a train of seven cars when switched to "brakes off;" Fig. 5, the same circuits when switched to "brakes on;" and Fig. 6, a similar diagram showing brakes switched on to the three front cars of a train broken in two.

In the drawings, A represents one of the usual truck-timbers of a car; B, a housing secured thereto, and carrying bearings for the electric brake-winch; C, an iron electro-magnet core provided with a central flange, and with two end flanges, thus forming a double spool of iron, the same being properly wound to form an electro-magnet; D, shafts tightly inserted in each end of the spool, but insulated therefrom by a bushing of vulcanized fiber, or the like, the ends of the spool-wire going to these shafts; E and F, devices for enabling wires to be put into electrical connection with the shafts; G, wires connected to these devices and serving to transmit to the electric winch its motive current of electricity; H, non-conducting bushings for the bearings on which the spool-shafts run; I, the spool-jacket of non-magnetic metal, as brass; J, pole-rings of iron encircling the end flanges of the spool; K, cylinder-heads at each end of the spool, fitted to revolve freely upon or to remain motionless upon the spool-shaft; L, a series of longitudinal iron armatures arranged stave-like in a peripheral series around the spool- and seating with their ends loosely in pockets in the inner faces of the cylinder-heads; M, an outer jacket secured to and uniting the two cylinder-heads and inclosing the spool and armatures; N, one of the car-axles; O, a driving-chain transmitting motion from a chain-wheel upon the car-axle to a chain-wheel fast upon the spool-shaft; P, a winding-shaft for the brake-chain, and Q a driving-chain transmitting motion from a chain-wheel upon the hub of one of the cylinder-heads to the chain-wheel upon the winding-shaft.

Note particularly that the drive-chain O communicates motion to the spool-shaft, and not to the cylinder-heads, which are loose upon that shaft.

The operation is as follows: As the car moves, the axle revolves, causing the spool-shaft and spool to revolve, the cylinder-heads and armatures remaining idle, the armatures rubbing lightly upon the periphery of the spool-jacket. When current is passed through the spool, the armatures are drawn radially into forcible contact with the periphery of the spool, and thereupon the cylinder-heads and outer jacket partake of the spool's rotation, thus winding the brake-chain upon the winding-shaft and applying the brakes to the car. When the current is interrupted or taken off, the armatures are released from their contact with the spools, and the cylinder-heads and outer jacket are at liberty to revolve in an opposite direction under the influence of the brake-springs.

This general structure is not of my invention, my present improvements relating simply to details of construction and circuit-connections, as will be hereinafter distinctly pointed out and claimed.

One feature of my invention relates to the pole-rings J. The spool-jacket I is of non-magnetic metal, and if it be fitted over the spool-flanges it would prevent an intimate contact between the spool-flanges and armatures and would, therefore, lessen the magnetic result. It therefore becomes desirable to have the spool-jackets shorter than the spools, so that the spool-flanges may present their peripheries directly to the armatures. The spool-jackets seat in peripheral rabbets in the spool-flanges, and in order to get the spool-jacket into place it has been usual to make the outer spool-flanges separable from the spool-core, the jacket being put in place and

followed by the flanges. This separable feature of the end flanges was not in itself a serious objection in new work, though it involved a very careful winding of the spool in order that the winding might not become disorganized when the flange was not in position. When, however, the spool-flanges and spool-jackets became badly worn by use, it became necessary to remove the end flanges and replace them by new ones, together with new jackets, at the same time endangering the stability of the winding.

By my improvement I reduce the diameter of the end flanges somewhat, and I make up for this reduction by the encircling pole-rings J, which fit neatly upon the spool-flanges. This permits of the ready removal of the rings and the jackets and the ready placing of new ones without interfering in any manner with the supports of the winding.

In practice I cast the spool-jacket I of brass upon the pole-rings J, thus making the parts integral; but little fitting is required, it being only necessary to bore the ring portion, to bore a trifle of the end of the jacket where it fits in the rabbet of the central flange, and to turn the outside of the ring and jacket.

One of these electric winches is placed upon each car. The engine carries a dynamo or other generator of electricity and an engineer's switch for the control of the brake, and the entire train, including the engine, is connected up by three wires arranged to couple between cars in the usual manner. The circuits will be understood from the diagrams Figs. 4 and 5, in which—

R represents the electric brake-winches of the separate cars of the train; S, the caboose or rear car of the train, having some special connections; T, the dynamo upon the engine; U, one of the wires running from the engine through the train; V, a second similar wire, the electric winches being arranged in multiple arc in circuit U V; W, a third train-wire running from the dynamo through the train and connected in the caboose with the wire V; X, a double lever-switch in the engine, by which the engineer controls the brakes; Y, an electric bell on the engine; Z, a similar bell in the caboose; *a*, a contact-plate of the switch connected to the same terminal of the dynamo as the train-wire W; *b*, a similar plate in connection with the other terminal of the dynamo; *c*, a similar plate connected with train-wire V, and *d* a similar plate connected with train-wire U. The bells Y and Z need hardly be referred to as they are not essential, and are simply inserted because they are usually applied.

Normally the switch is in position shown in Fig. 4, the brake-circuit being open at *d*, the current all going from *b* to *c*, thence to V, Z, W, and Y. The only office of the current under these conditions is to hold up the armatures of the bells Y Z if such bells are used. When the brakes are to be applied, the switch is turned in the position indicated in Fig. 5, where it will be seen that the current goes from *b* to *d*, thence by U and V through all of the brakes equally and uniformly, thence through Z, W, and Y.

The brake of the first car can receive no preference of current, as there is no short return-path through it.

In case the train should break in two, as indicated in Fig. 6, the effect just described would be destroyed, owing to the absence of the direct connection between the wires W and V, which connection was established only in the last car of the train. When this breaking of train occurs, the switch being as in Fig. 5, the brakes will receive no current whatever, and the relay-armatures in the engine and caboose would fall. The rear section of the broken train is now beyond the control of the electric brake, and the engineer can no longer apply the current uniformly and equally to the cars of the front section. He can, however, throw his switch to the position indicated in Fig. 6, and throw the current to the brakes of his portion of the train, the front car of such section receiving the most, the proportion of current received by each car being governed by the usual law that the electro-motive force is inversely as the resistance; hence the brakes to the rear of the first car will receive an amount of current which the resistance of the first car prevents, being short-circuited through that car.

As most of the matter herein shown and described is not original with me, I wish it distinctly understood that I disclaim as original with me all the matter not hereinafter specifically claimed.

The devices through which the wires G are put into electrical connection with the spool-shafts are somewhat peculiar in construction; but I avoid particular description of them here, as I contemplate making them the subject-matter of another patent.

I claim as my invention—

1. The combination of the spool C, formed with metallic end flanges, pole-rings J, encircling the same, and the spool-jacket I, formed of non-magnetic metal, substantially as and for the purpose set forth.

2. The combination of the metallic spool C, provided with metallic end flanges and a central metallic flange, the pole-rings J, encircling the end flanges of the spool, and the spool-jackets I, of brass, secured to the pole-rings by being cast thereto and engaging separately the central flange of the spool, substantially as and for the purpose set forth.

3. In an electric train-brake, the combination, substantially as set forth, of wires U and V, from the engine throughout the train, electric car-brakes connected thereto in

multiple arc, a dynamo-machine or other generator of electricity at the front of the train, wire W, connecting one terminal of the dynamo or generator with wire V at the rear of the train, and a controlling-switch at the front of the train arranged, substantially as set forth, to connect at will with the other terminal of the generator with wire V or with wire U, and at the same time connect wire V with the first terminal of the generator.

CHARLES E. JONES.

Witnesses:
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