(No Model.)

O. J. DEPP & S. J. MUNN.

ELECTRIC SIGNALING DEVICE FOR MOVING VEHICLES.

No. 443,074. Patented Dec. 16, 1890.

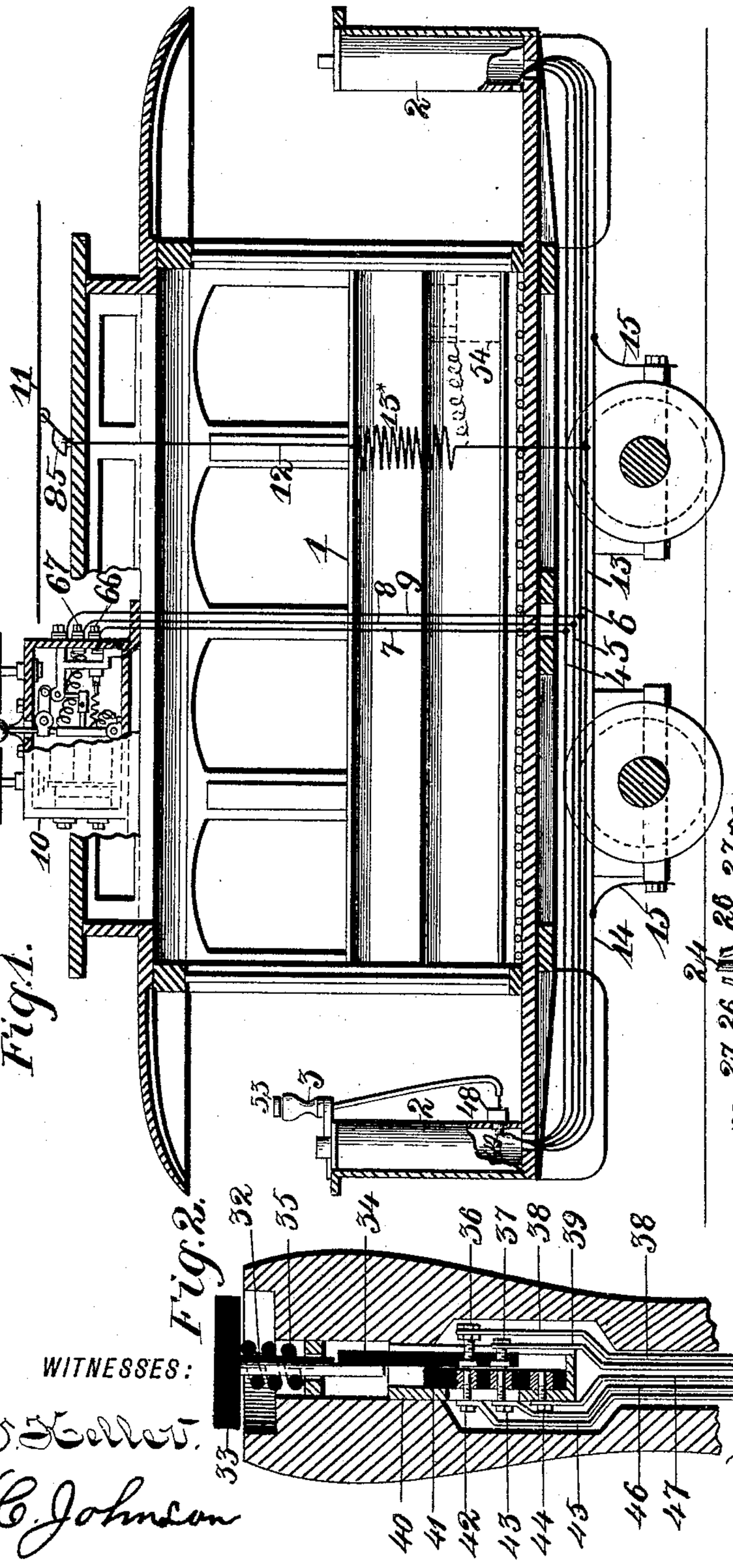

Fig. 1.

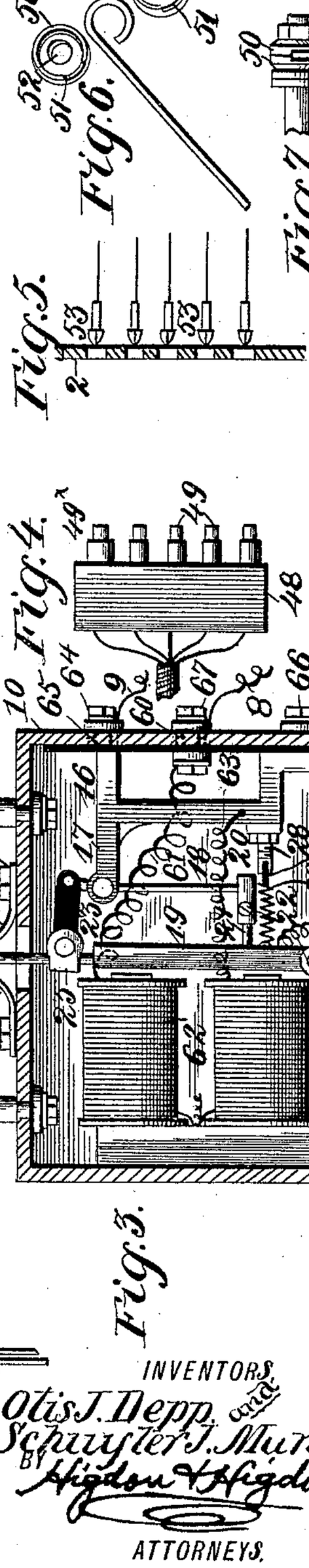

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

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ELECTRIC SIGNALING DEVICE FOR MOVING VEHICLES.

SPECIFICATION forming part of Letters Patent No. 443,074, dated December 16, 1890.

Application filed August 4, 1890. Serial No. 360,947. (No model.)

To all whom it may concern:

Be it known that we, OTIS J. DEPP and SCHUYLER J. MUNN, both of the city of St. Louis, in the State of Missouri, have invented certain new and useful Improvements in Electric Signaling Devices for Moving Vehicles, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

Our invention relates to certain new and useful improvements in electric signaling devices for moving vehicles; and it consists in the novel combination and arrangement of parts, as will be hereinafter fully described, and designated in the claims.

In the drawings, Figure 1 is a vertical longitudinal section of an electric car having our device applied thereto. Fig. 2 is a vertical longitudinal section of a switch-handle commonly employed on electric cars, within which is placed the device for making and breaking the circuit. Fig. 3 is a vertical section of the electric bell employed for this purpose. Fig. 4 is a top plan view of the detachable connecting-block containing the electrical wires, or terminals thereof. Fig. 5 is a top plan view of a series of plugs attached to the terminal ends of the wires located below the floor of the vehicle, to which the block containing the wires is electrically connected. Fig. 6 is a perspective view of a terminal end of a wire and cups used in connection therewith for forming a flexible connection to the electric bell, and Fig. 7 is a side elevation of the same attached or forming an electrical connection.

The object of our invention is to attach to the ordinary electrical cars now in use a brake or other handle carrying a push-button, an electrical attachment or device which is simple in construction, the electrical wires of which lead to the switch-box located upon each end of the car, terminating at that point, but adapted to be electrically connected to a second set of wires carried by the switch-handle.

The electricity is supplied to the device from the main current or trolley wire, or other suitable source, and by a push-button and proper devices located within the switch or brake handle the current of electricity is controlled at the will of the operator and within easy reach of him, making and breaking the said current of electricity through an electric alarm located at any convenient position on the car.

Referring to the drawings, 1 represents a railway-car having our improvements applied thereto.

2 2 are two switch-boxes, and 3 the switch-handle commonly employed for controlling or reversing the current on the car.

Below the floor of the vehicle are arranged five wires or conductors, the ends of which terminate at the switch-boxes 2, located at each end of the said vehicle, and to said ends are attached any well-known mechanical connection, such as plugs 53, for the purpose of forming an electrical connection with the wires carried by the switch-handle.

4, 5, and 6 represent three circuit-wires located below the floor of the car, having branch wires 7, 8, and 9 leading upward through the roof of the said car and connected to an electric alarm 10, located on the said roof and in contact with the open air.

11 represents the line or main wire for supplying electricity to the car for all purposes necessary, and to this wire is connected, by means of an ordinary trolley 85 or otherwise, a branch wire 12, leading downward and connected to one of the five wires located below the floor of the car and designated 13, which supplies the current of electricity to the device. The current supplied by the wire 12 for operating the bell is entirely independent of that used by the motors for driving the vehicle.

Any well-known resistance $13^{\times}$, such as a rheostat-shunt or any suitable number of lamp-circuits, may be connected to the branch wire 12 in order to reduce the intensity of the current, which if not employed would burn out the delicate parts of the device.

14 represents the ground-wire, also located below the floor of the car and connected to the trucks of the same by branch wires 15, which conduct the electricity and carry the same into the ground.

In this device we use a three-line circuit, and by such use an electric bell of well-known

construction will not answer the purpose, and consequently a bell constructed as hereinafter described is absolutely necessary to carry out the desired effect.

The bell 10 is provided with the ordinary gongs, electro-magnets, armature, and clapper, all of which are common in electric bells, proper operative insulations and connections being provided. The improvement in the electric bell consists of a bracket 16, having a projecting arm 17, which forms a bearing for the short vibrating lever 18, which operates in conjunction with the armature 19. By this construction the movement of the armature causes a corresponding but increased movement of the contact-breaker. The lever 18 is provided at its lower end with a cap 20, and within said cap is removably and adjustably secured a point 21, of suitable material, by means of a set-screw 22, the upper end of said lever extending above the projecting arm 17, and being connected at that point to a link 23, of non-conducting material, which forms a connection with the vibrating armature. To the vibrating armature or stem thereof 24 is secured a clip 25, to which the link 23 is attached, connecting the said vibrating lever to the said armature and thereby forming what we may term a "compound-lever" circuit-breaker. Two flat springs 26 26, of silica-bronze, are secured to the top of the bell-casing by means of nuts 27, by which means the clapper is normally held out of contact with either of the gongs, and permits said gongs to sound in a clearer manner than they would if said clapper rested in contact with them, which is understood. An adjusting-screw 28 is fastened to the lower end of bracket 16 for adjusting the tension of the armature-spring 29, the same spring being insulated from said screw by non-conducting material 30. The material used for the contact-point 21 is preferably of silica-bronze, which we have found by experiment to be best suited for this purpose, the "hammering" action on the armature being quite heavy owing to the long stroke of the point.

The switch-handle 3 (or it may be an ordinary brake-handle) is provided with a suitable vertical centrally-located bore to receive the push-button connections, which consist of a button located at the extreme upper end of said handle, and such connections that when the button is in an elevated adjustment, as shown, no vibration of the bell-armature will occur.

32 indicates a vertical rod, the upper end of which carries the button 33, which when pressed down will be on a plane with the upper end of the handle. To the lower end of rod 32 is attached a bar of insulating material 34, which is adapted to be slid up and down by the said rod, and so operated by the coil-spring 35, encircling the said vertical rod and interposed between the button and a seat formed in the said handle, as to normally rest at the limit of its upward movement.

36 and 37 represent two contact-screws located at the lower end of the non-conducting bar 34, extending through the same, the faces of which are in alignment with the inner surface of the non-conducting material, the outer or projecting ends of which are provided with nuts by means of which the electrical wires 38 and 39 are clamped firmly and electrically connected therewith.

A copper box 40 is firmly secured within the bore formed in the switch-handle 3, and within the same is fastened a bar of non-conducting material 41, of sufficient length to receive the remaining wires. Within the non-conducting piece of material 41 is secured three screws 42, 43, and 44, and to the said screws are fastened in the well-known manner three wires 45, 46, and 47, the screw 44, carrying the wire 47, passing also through the box 40, constructed of copper or other conducting material.

The five wires 38, 39, 45, 46, and 47, connected to the circuit-controlling device, lead downward from the same and through the switch-handle, the opposite ends of which terminate in a block 48, constructed of non-conducting material, separating the same at that point and insulating them from one another.

The block 48 of non-conducting material is sufficiently bored to receive five thimbles 49, corresponding to the number of wires, the said wires terminating at that point and electrically connected therewith. The thimbles 49 are so constructed that they will receive the plugs 53, attached to the terminal ends of the wires arranged below the floor of the car, and when united, as shown in Fig. 1, an electrical connection is formed. (See also right-hand end.) One of the thimbles $49^{\times}$ is made somewhat larger than the others, as shown in Fig. 4, for the purpose of enabling the operator to reattach the wires in the same manner or order as before, in case it should have been necessary to detach them.

When the circuit-controlling device is properly connected to the wires located under the floor of the car, the wires leading from the said circuit-controlling device will be connected, as below described. The three circuit-wires 4, 5, and 6 will be connected to the wires 45, 46, and 47, the main wire 13 will be connected to the wire 39, and the ground-wire 14 electrically connected to the wire 38, leading from the switch-handle 3. The two wires located within the switch-handle and connected to the circuit-controlling device and numbered 38 and 39 may be coiled within the switch-handle, by means of which the same will give sufficiently when the section 34 of the said device is moved in making and breaking the current of electricity.

It has been found desirable to form a hinged connection at the terminal ends of the wires 7, 8, and 9, where they are attached to the electric bell, owing to the movement of the car and the continual vibration of the same, causing the said wires to break at that point

and thereby cause more or less delay. Our improvement in this respect consists in bending the wires at their terminal ends and inserting the said bends in two cups 50 50, each of which is provided with recesses 51 51 for the admission of the said wires. Holes 52 52 are formed in the center of the cups 50, by means of which the said cups may be fastened to the projecting bolts leading from the bell-frame. This device is best illustrated in Fig. 7.

When the push-button is in its normal position, as shown in Fig. 2, the wire 47 is cut out of the circuit and the electricity directed to the ground through the wires 38 and 14 without having operated the bell, as hereinafter more particularly described. When the push-button 33 is pushed in, the current of electricity is completed, cutting out the wires 9 and 45, causing the circuit-breaker located in the electric bell to move backward and forward by alternately attracting and releasing the armature, and causing the clapper to vibrate and beat against the gongs.

Having fully described our invention in detail we will now proceed to trace the current through the electric bell in both positions of the push-button 33. When the button 33 is in its normal position, as shown in Fig. 2, the current from the ordinary trolley-wire 11 will pass from the same by the wire 12 to the horizontal wire 13, located below the floor of the vehicle, and thence through proper electrical connections (which have previously been described) to the wire 39, carried by the switch-handle. The current then passes through the wire 46 to another horizontal wire 5, as shown in Fig. 1, then to the branch wire 8, then to the binding-post 67, attached to the frame, but insulated therefrom by proper insulation 60, thence through a coil-wire 61, which is connected to the magnet 62, through which the current passes, and thence to the coil of wire 63, the end of which is soldered or otherwise electrically connected to the bracket 16. Thence the current is carried to the uppermost binding-post 64, which is also insulated from the frame or casing 10 by suitable insulation 65. To this binding-post, upon the exterior of the casing, is attached a wire 9, leading downward and connected to the horizontal wire 6, through which wire the current is conducted to the wire 45, located within the switch-handle, thence to wire 38, also located within the same, to the horizontal wire 14 and its branches 15 to earth by way of the car-wheels, in the well-known manner. In the normal position of the push-button 33 the wires 7, 4, and 47 are cut entirely out of circuit, as will be fully seen by the inspection of the drawings. When the push-button 33 is depressed, the current from the trolley-wire 11 will pass from the same by the wire 12 to the horizontal wire 13, located below the floor of the vehicle, then through proper electrical connections 53 and 49 to wire 39, located within the switch-handle, and by means of the binding-post 37 is conducted to the binding-post 44, thence to wire 47, thence to the horizontal wire located below the floor of the vehicle, thence to the branch wire 7, and thence to the binding-post 66, which post is in electrical contact with the casing 10, which casing serves to conduct the current. The current then passes from the casing through the coil of wire 70 to the armature 19, then to the silica-bronze point 21, thence to the contact device 18, and thence to the bracket 16, thence to the coil or wire 63, which is connected to the magnet 62, and thence is carried by the wire 61 to the binding-post 67, which is, as previously described, insulated from the casing 10. The current is conducted from said post 67 by the wire 8 to the horizontal wire 5, located below the floor of the vehicle, thence to the wire 46, thence to binding-post 43 in the handle, which post is now in electrical contact with the binding-post 36, and the current passes through both posts, thence to vertical wire 38. From thence the current passes to horizontal wire 14, (which is commonly called the "ground-wire,") thence to branches 15, and thence is conducted to earth through the trucks and wheels of the vehicle. When the button 33 is depressed, the wires 9, 6, and 45 are cut out.

It is clear that we may use either the main circuit (the current of which drives the motors on an electric car) or we may, as we here show, use a shunt-circuit for the purpose of operating the bell.

Our invention (at least the switch or brake handle provided with an electric push-button) may be applied to ordinary horse-cars or to cable cars for the purpose of sounding an alarm without the driver letting go his controlling-handle. This, also, should be clear, because we may locate an ordinary cell-battery 54 at any place on the car and use the same wires that we here show for the connections, (but differently arranged.)

Having fully described our invention, what we claim is—

1. An electric signaling device for moving vehicles, consisting of a circuit-controlling device located within the brake or switch handle of a car, an electric bell located on the said vehicle, a three-line circuit connecting the said bell with the said circuit-controlling device, and means whereby electricity is supplied to the said wires from the trolley or main line, substantially as described.

2. An electric signaling device for moving vehicles, consisting of a circuit-controlling device located within the switch-handle of an electric car, an electric bell carried upon said car and provided with a bracket, a circuit-breaker hung in the said bracket and having a contact-point, a link of non-conducting material connected to the upper end of the said circuit-breaker and to the armature, and suitable conductors connecting the said electric bell with the said circuit-controlling device, substantially as described.

3. An electric signaling device for moving vehicles, consisting of an electric bell located

upon the said vehicle, three circuit-wires attached to the said bell, a wire for supplying electricity to the same, a circuit-controlling device located within the switch-handle, to which the wires are connected, and an additional or ground wire, also attached to the said circuit-controlling device and connected to any suitable portion of the car for conducting the current to earth, substantially as described.

4. In an electric bell, an electro-magnet and its armature, in combination with a pivoted lever constituting a circuit-breaker adjacent to said armature, means for connecting the short arm of said lever to the armature, a contact-point carried by the long arm of the lever and normally bearing against the armature, and electrical connections between said magnet, armature, and lever, substantially as described, for the purpose specified.

5. In an electric bell, an electro-magnet and its armature, in combination with a pivoted lever carrying a contact-piece and constituting a circuit-breaker, said lever having one arm of greater length than the other, and means for connecting said circuit-breaker and armature, whereby the vibratory movement of the latter will cause a corresponding but increased movement of the former at the point carrying the contact-piece, substantially as described.

6. In an electric bell, an electro-magnet and its armature, in combination with a pivoted lever constituting a circuit-breaker, an insulating link-connection between the armature and the short arm of the lever, an adjustable contact-piece of silica-bronze carried by the long arm of the lever and normally bearing against the armature, and electrical connections between said magnet, armature, and lever, substantially as described.

7. In an electric bell, an electro-magnet and its armature, a bracket 16, adjacent thereto, a lever constituting a circuit-breaker pivoted at a point removed from its center to the said bracket and electrically connected therewith, a link of non-conducting material connecting the short arm of said lever with a clip secured to the armature, and an adjustable contact-piece carried by the long arm of said lever and normally having electrical connection with the armature, in combination with a main circuit, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

OTIS J. DEPP.
SCHUYLER J. MUNN.

Witnesses:
C. P. KEELER,
C. K. JONES.