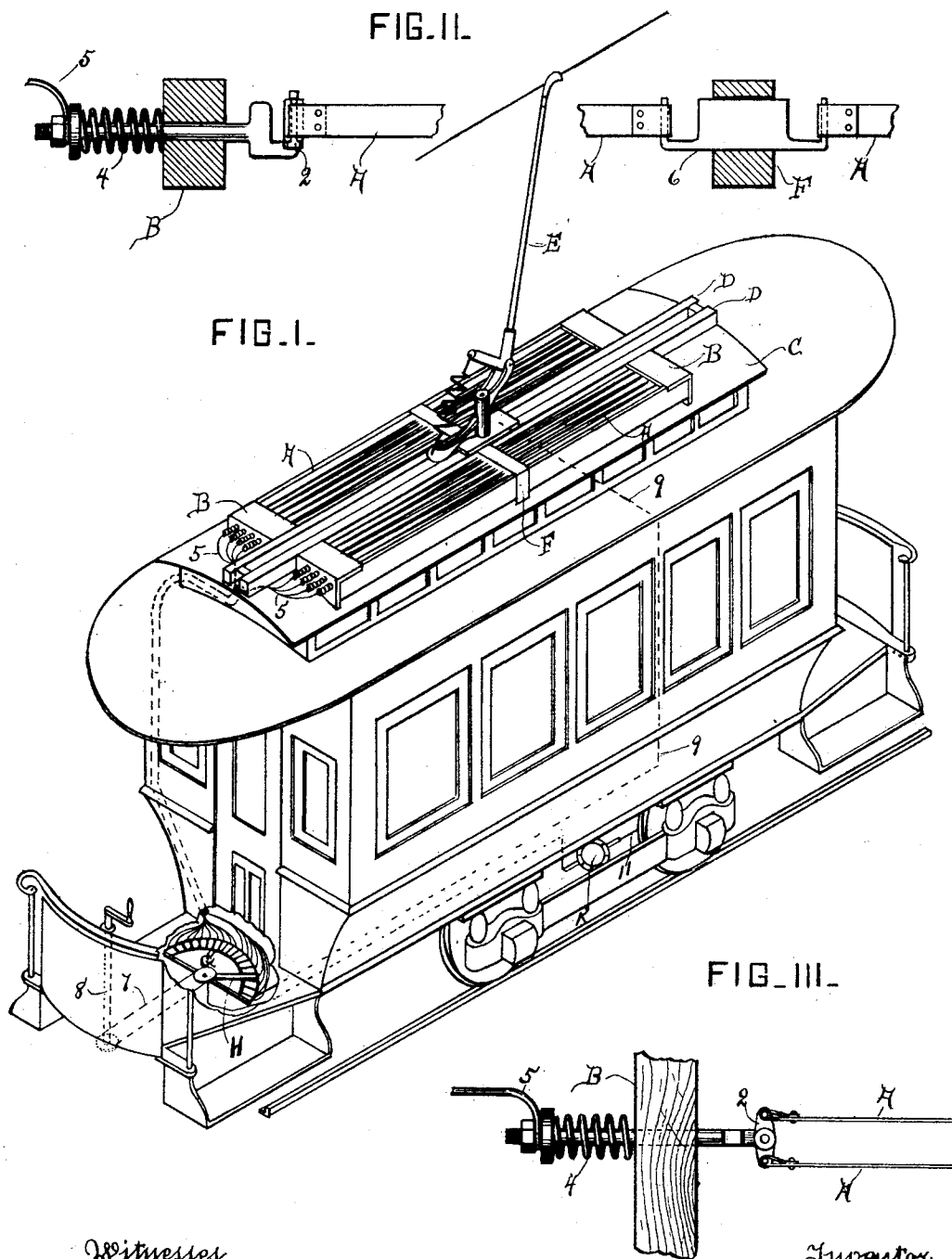


(No Model.)

S. H. SHORT.
RHEOSTAT FOR ELECTRIC MOTOR CARS.

No. 459,690.

Patented Sept. 15, 1891.



Witnesses:
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UNITED STATES PATENT OFFICE.

SIDNEY H. SHORT, OF CLEVELAND, OHIO.

RHEOSTAT FOR ELECTRIC-MOTOR CARS.

SPECIFICATION forming part of Letters Patent No. 459,690, dated September 15, 1891.

Application filed March 18, 1891. Serial No. 385,550. (No model.)

To all whom it may concern:

Be it known that I, SIDNEY H. SHORT, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Rheostats or Resistances for Electric-Motor Cars; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the construction and arrangement on the car of the rheostat or resistances, of which more or less is brought into circuit through the instrumentality of a contact-board for regulating the intensity of the current supplied to the propelling motor or motors.

Heretofore it has been customary to place the rheostat with the contact-board under the car. It has also been customary to make it compact. In accordance with the present invention the resistances are placed in or on the roof of the car, where the same are not only out of the way, but where they may be extended, so as to have all parts most thoroughly exposed to the cooling influence of the air. They may be protected by a covering, if desired, without preventing the access of air for cooling. The contact-board is made separate from the resistances and is advantageously placed under the car-body, although it might be placed in or on the roof or in other suitable positions. A series of conductors lead from the contact-board under the car to the resistances on the roof. The resistances may be made in various forms and still be within the invention; but the latter also covers special improvements in resistances, as herein-after set forth, for any use to which they may be adapted, including the use on the car-roof of an electric-motor car.

In the accompanying drawings, which form part of this specification, Figure I is a perspective view of an electric-motor car provided with a rheostat or resistances in accordance with the invention, and Figs. II and III are detail views.

The resistances are composed of iron strips A, which run lengthwise of the car and are stretched between end blocks B of non-conducting materials, as wood, arranged on the

roof C of the car on opposite sides of the rails D, which uphold the trolley E. The best form of strip is a flat ribbon placed edgewise, as this gives stiffness in a vertical plane and at the same time exposes a large surface in comparison with the cross-section. The word "strip" is intended as used herein to cover, generally, ribbons, wires, or the like of whatever form in cross-section, and other forms of strip may be used as well as the flat ribbon placed edgewise. It is a further improvement to support each strip at one or more intermediate points, as at F. As shown in Figs. II and III, each strip A terminates at one end in a fastener 2, which is pivoted on a hook whose shank plays in one of the end blocks B and is acted upon by the spiral compression-spring 4, the wire 5 from the contact-board G being connected with the said shank. In the intermediate support F (which is of non-conducting material, as wood) there may be a connector 6, which is free to move endwise in said support F and is attached at each end to a section of the strip A, so that the force of the spring 4 is transmitted throughout the strip A. The strips A are exposed to the air, so as to be cooled thereby.

The contact-board G comprises a series of contacts which are connected with the strips A by the wires 5, and a switching-arm H, which is shown as operated through a chain 7 from the crank-rod 8 on the dash-board. It is supported under the car-body in any ordinary or suitable way. The supply-circuit from the trolley E includes, as shown, the wire 9, leading to the first contact of the contact-board, the wire 10, leading from the contact-arm H to the motor K, the wire 11, leading to the ground, and the arm H, being in an intermediate position—that is, neither on the first contact to cut out the resistances nor clear of the contacts to break the circuit. Said circuit also includes two of the wires 5 and a part of the strips A. By shifting the arm H more or less of these strips are included in circuit, thus varying the strength of the current supplied to the motor K. The heat which is generated in the strips A by the electric current is dissipated by the exposed exterior surface of said strip sufficiently to prevent its becoming excessive.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with an electric-motor
5 car, a rheostat composed of exposed strips of low conductivity mounted and extending upon the roof of the car, a switch-board, electrical connections between the same and the rheostat, and operating mechanism for the
10 switch-board within convenient reach of the motor-man, substantially as described.
2. In an electric-motor car, the resistances

composed of the strips, the springs at one end of said strips, and one or more intermediate supports in which said strips are movable, 15 substantially as described.

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

S. H. SHORT.

Witnesses:

E. H. MORRISON,
A. B. CALHOUN.