

B. B. HERRON.
STEP OPERATED CIRCUIT BREAKER FOR ELECTRIC CARS.
APPLICATION FILED MAY 3, 1909.

932,018.

Patented Aug. 24, 1909.
2 SHEETS—SHEET 1.

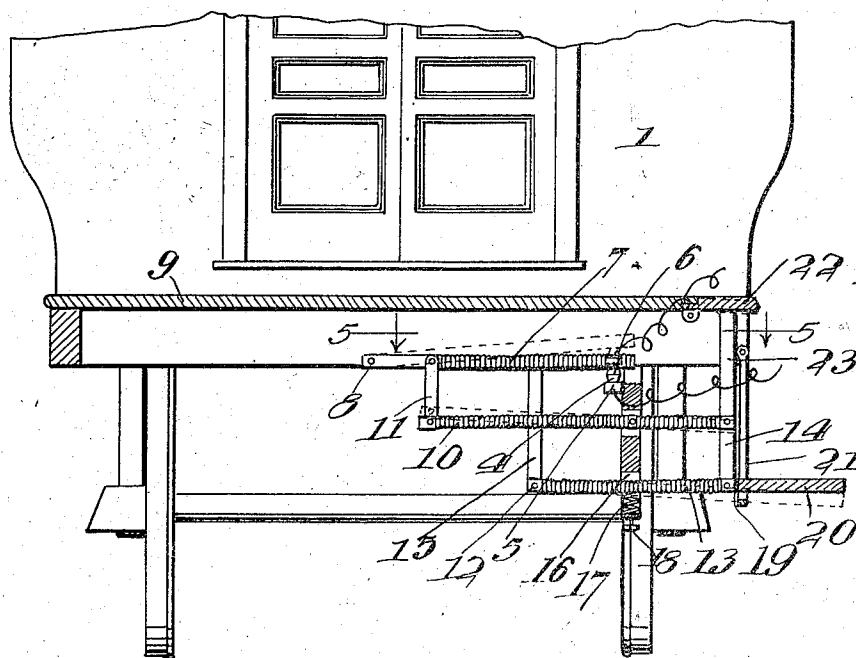
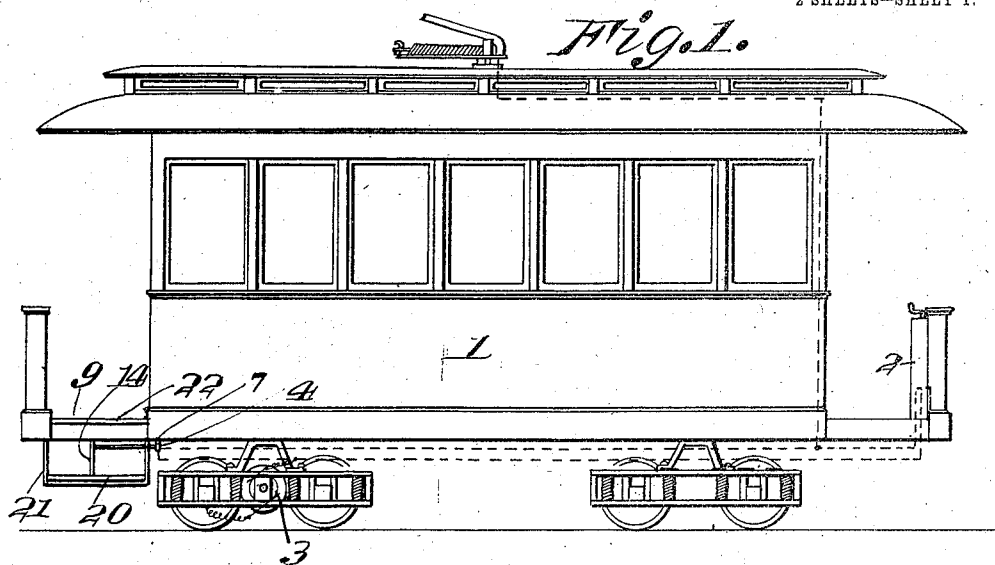


Fig. 2.

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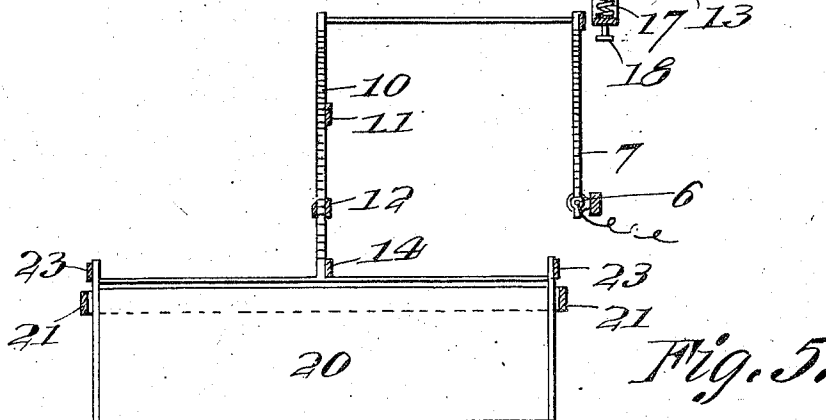
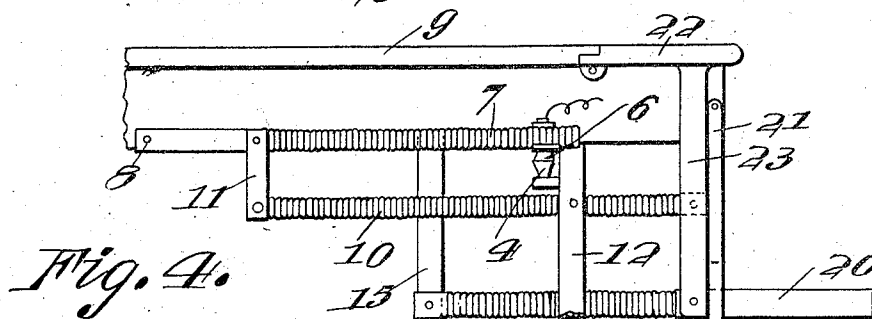
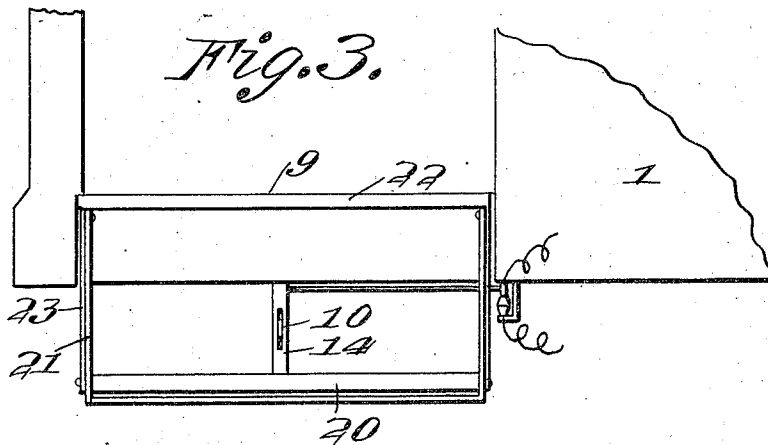
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UNITED STATES PATENT OFFICE.

BENJAMIN B. HERRON, OF TOLEDO, OHIO.

STEP-OPERATED CIRCUIT-BREAKER FOR ELECTRIC CARS.

932,018.

Specification of Letters Patent. Patented Aug. 24, 1909.

Application filed May 3, 1909. Serial No. 493,646.

To all whom it may concern:

Be it known that I, BENJAMIN B. HERRON, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Step-Operated Circuit-Breakers for Electric Cars; and I do 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 improvements in step operated circuit breakers for electric cars.

15. The object of the invention is to prevent the premature starting of an electrically propelled car while a passenger is boarding or alighting from the car and the invention consists in the arrangement of the electric conducting wires and the provision of a switch or circuit breaker arranged therein and operated by pressure on the car steps whereby the power will be cut off from the motor while a passenger is on the steps.

20. With this and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a diagrammatic view of the side of a car showing the invention applied thereto; Fig. 2 is an end view of a car illustrating the arrangement of the circuit breaker and the means for operatively connecting the same with the steps of the car and showing in full lines the closed position of the parts and in dotted lines the position of the parts when operated to break the circuit; Fig. 3 is a side view of a portion of the rear end of the car showing the manner of supporting the steps; Fig. 4 is a vertical cross-sectional view of the steps at one side of the car and the adjacent portion of the platform; and Fig. 5 is a horizontal sectional view on the line 5-5 of Fig. 2.

Referring more particularly to the drawings, 1 indicates a car, 2 indicates the controller and 3 indicates the motor. These parts may be of the usual or any desired construction and do not form a part of the present invention.

In carrying out my invention, the circuit conducting wires between the trolley and

the controller and motor are arranged as indicated in Fig. 1, and arranged in the circuit wires adjacent to the rear end of the car is my improved circuit breaker or switch, 4, the circuit wires being extended back to the end of the car for connection with the terminals of the switch as shown. One terminal, 5, of the circuit breaker 4, is stationary and is secured to and suitably insulated from a fixed part of the car frame as shown.

The movable contact or terminal, 6, of the circuit breaker is secured to and suitably insulated from a switch lever, 7, which is pivotally mounted in a suitable bracket, 8, on the underside of the platform, 9, of the car. The switch lever, 7, is connected adjacent to its pivoted end to an operating lever, 10, by means of a connecting rod, 11, and the lever, 10, is pivotally mounted on a hanger bar, 12, projecting downwardly from the underside of the platform, 9, as shown. The forward end of the lever, 10, is operatively connected with a step engaging lever, 13, by means of a connecting rod, 14, and the lever, 13, is pivotally mounted at its inner end on the lower end of a hanger bar, 15, also projecting from the underside of the car platform as shown.

The lever, 13, projects through a slot, 16, formed in the lower end of the hanger bar, 12, and rests upon the upper end of a coiled supporting and operating spring, 17, which is arranged in the lower portion of the slot, 16, as shown. The tension of the spring is regulated by an adjusting screw 18, arranged in the lower end of the bar, 12, Fig. 4. The outer portion of the lever, 13, is bifurcated and the bifurcated ends are connected by a cross bar, 19, to which the lower end of the connecting rod or bar, 14, is secured. The bifurcated outer end of the lever, 13, projects beneath and is secured to the underside of the lower step, 20, of the car, thus forming a yielding support for the step.

The downward movement of the step, 20, and the outer end of the lever, 13, is limited by a bail-shaped hanger, 21, the upper ends of which are secured to the platform in any suitable manner. By thus supporting the step, 20, the latter will be permitted to yield or move downwardly to a limited extent when engaged by a passenger in boarding or alighting from the car and in thus

moving down the lever, 13, will be lowered or swung downwardly against the pressure of the spring, 17, and will rock the lever, 10, through the connecting rod, 14, thus swinging the inner end of the lever, 10, upwardly which will, by means of the connecting rod, 11, actuate the switch lever, 7, to disengage the switch terminal, 6, from the terminal, 4, of the circuit breaker thereby breaking the electric circuit and preventing the passage of the current to the motor.

In addition to the yieldably mounted step, 20, I also preferably provide an additional yielding step piece, 22, which is arranged along the outer edge of the platform and is of sufficient width to be engaged by the foot of the passenger in stepping from the step, 20, onto the platform. The step piece, 22, may be loosely supported in any suitable manner and is operatively connected to the upper end of a lever actuating bar, 23, which extends downwardly and is connected to the outer end of the operating lever, 10, whereby when pressure is applied to the step piece, 22, the switch operating mechanism will be actuated in the same manner as described in connection with the step, 20, so that the circuit closure will be held open until the passenger is in a safe position on the platform of the car. After the pressure has been removed from the steps, 20 and 22, the spring 17 will restore the operating mechanism to its normal position and will bring the terminal, 6, of the circuit breaker into engagement with the terminal, 4, thus completing the circuit and permitting the motorman to operate the car through the controller. By regulating the tension of the spring, 17, the parts may be adjusted for operation by any desired weight on the steps.

While the invention is herein shown and described as applied to only one side of the platform at one end of the car, it is obvious that the arrangement may be repeated and connected with the steps on both sides and at each end of the car. The step, 20 and step piece 22, are preferably formed from metal having a plurality of upwardly projecting studs around which is arranged a filling of rubber or similar material. The operating levers and rods are preferably formed of annularly curved or corrugated wooden bars, said bars being corrugated to prevent the transmission of an electric current when the bars are wet.

From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the inven-

tion will be readily understood without requiring a more extended explanation.

Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described my invention, what I claim is:—

1. In a device for preventing the premature starting of an electric car, electric conducting wires, a circuit closing switch connected to said wires, a switch lever connected to one member of said switch, an operating lever connected with said switch lever, a step lever connected with said operating lever, a step arranged on said step lever, whereby when pressure is applied to the step the switch will be opened and the circuit broken, and means to restore and hold said step and switch operating mechanism in normal position, and the switch closed when pressure is removed from the step.

2. In a step operated circuit breaker for electric cars, electric conducting wires arranged as herein shown and described, a circuit closing switch arranged in said wires, a series of switch operating levers, a lower step secured to one of said levers, an upper step piece operatively connected to the levers whereby when pressure is applied to either of said steps the said levers will be actuated to open said switch, a spring to close the switch when pressure is removed from the steps, means to regulate the tension of said spring, and means to limit the downward movement of said lower step.

3. In a step operated circuit breaker for electric cars, electric conducting wires arranged as herein shown and described, a circuit breaking switch arranged in said wires, a series of corrugated levers and connecting rods operatively connected with said switch whereby when pressure is applied to the levers the switch will be opened, a spring to restore said levers to their normal position and close said switch when pressure is removed therefrom, and means whereby the car steps are operatively connected with said levers to actuate the same when pressure is applied to the steps.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

BENJAMIN B. HERRON.

Witnesses:

LOUISA M. MOSBACH,
LOUISA CLARK.