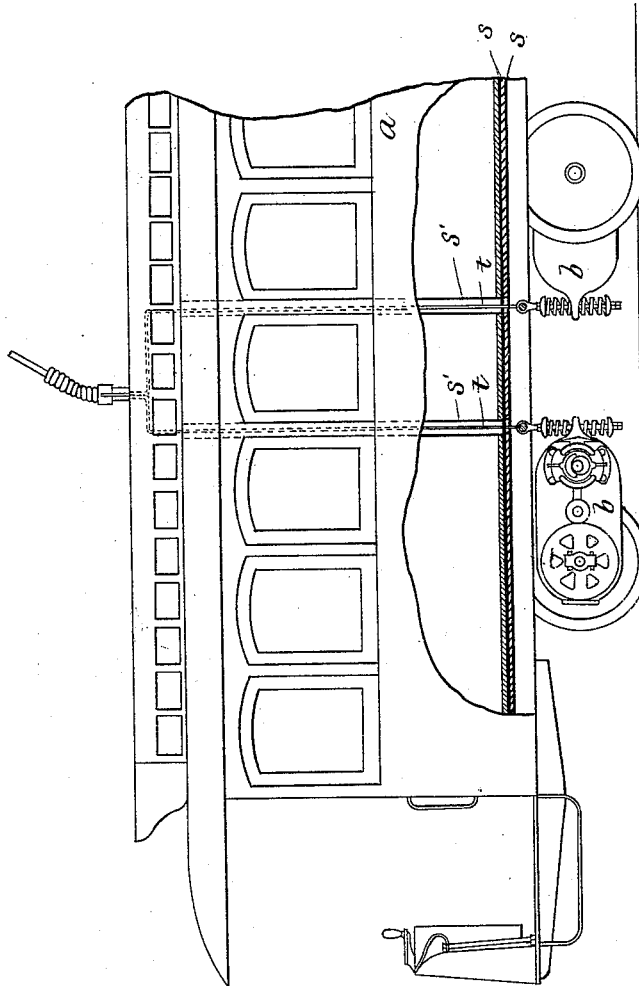


(No Model.)

I. H. FARNHAM.
ELECTRIC MOTOR CAR.

No. 422,339.

Patented Feb. 25, 1890.



WITNESSES.
A. D. Harrison
W. B. Ramsay.

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UNITED STATES PATENT OFFICE.

ISAIAH H. FARNHAM, OF MALDEN, ASSIGNOR OF TWO-THIRDS TO GEO. WILLIS PIERCE, OF BOSTON, AND ALBERT P. SAWYER, OF NEWBURY-PORT, MASSACHUSETTS.

ELECTRIC-MOTOR CAR.

SPECIFICATION forming part of Letters Patent No. 422,339, dated February 25, 1890.

Application filed April 5, 1889. Serial No. 306,113. (No model.)

To all whom it may concern:

Be it known that I, ISAIAH H. FARNHAM, of Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Electric-Motor Cars, of which the following is a specification.

This invention has for its object the protection of watches carried by passengers on cars which are impelled by electric motors.

It is well known that in electric-car systems now in use each car has one or more electric motors—usually two—located below the floor of the car and within a short distance—say thirty-six to forty inches—from the location of a watch on the person of a passenger sitting over the motor. The balance and hair-spring of the watch are therefore brought into a strong magnetic field, and when the hair-spring is made of steel and the balance wholly or in part of steel, as in the great majority of watches now in use, said parts become magnetized to such extent as to seriously affect the time-keeping properties of the watches thus exposed. Much complaint has been caused among the patrons of electric-motor cars by this disturbance of time-pieces, and many are obliged to go to the expense of having non-magnetic balances and hair-springs applied to their watches.

My invention has for its object to obviate this objection by so deflecting the lines of force radiating from the electric motor or motors and from the conductors connecting said motors with overhead wires that watches carried by passengers within the car will be screened and protected from such lines of force.

To this end my invention consists in the combination, with a car and an electric motor, of a shield of magnetic metal interposed between the motor and the portions of the interior of the car which would otherwise be within the magnetic field of said motor, said shield deflecting the lines of force from the motor toward said portions of the interior of the car, and preventing the described injurious action on watches located therein, as I will now proceed to describe.

The accompanying drawing, forming a part of this specification, represents a side eleva-

tion and partial longitudinal section of a car provided with my improvement.

In the drawing, *a* represents the body of a street-car, and *b b* represent two electric motors of any suitable construction located under the car and suitably geared to the axles of the wheels thereof. The type of motor here shown is known as the "Sprague motor;" but it is obvious that my improvement may be employed with any other motor which is capable of being used for this purpose.

In carrying out my invention I interpose between the motor and the interior of the car a shield *s*, composed of a suitable magnetic metal, as wrought-iron. Said shield may be made of one or more sheets or layers of metal attached to any suitable part of the car. I have here shown the shield as composed of two sheets, one attached to the bottom of the car and the other between the top and bottom layers of the floor of the car.

The thickness of the sheet or sheets of iron and the area of extension of the same lengthwise and crosswise of the car may depend on the construction and location of the motor. I recommend a sheet of about one-sixteenth of an inch in thickness, but do not, of course, limit myself in this particular.

I consider it advisable to give the shield sufficient area to interpose it between the motor or motors and all parts of the interior of the car, which, without said shield, would be within the magnetic field or fields of the motor or motors. In some cases when two motors are employed an independent shield may be employed for each motor.

In cars in which the motor is placed above the floor of the car the shield should be in the form of a box or casing arranged to deflect or prevent the radiation of the lines of force extending laterally or horizontally, as well as upwardly, from the motor, or in any other suitable way to constitute a barrier to the lines of force between the motor and any part of the car where a passenger's watch may be located.

I include under the term "motor" the conductors *t*, which connect the motor proper with overhead wires through trolleys, and in cars which are thus connected the said con-

ductors *t*, or those portions thereof which are within or in close proximity to the interior of the car, should have shields *s'* of magnetic metal. Said shields may be tubes of sheet-iron, or sheet-iron tapes wound spirally about the conductors, or of any other suitable form and construction. I have shown a portion of but one of said conductors *t* in the drawing, and a shield *s'* of tubular form surrounding the same, said shield being extended down to the upper plate *s*, above referred to.

I claim—

1. In a car or other vehicle, the combination of an electric motor applied thereto, conductors extending from said motor upwardly through the body of the car for connecting said motor with the generator-circuit, a flat shield or shields of magnetic metal completely interposed between the passenger por-

tion or portions of the car and said motor, and a tubular shield or shields interposed between the passenger portion of the car and said conductors, as set forth.

2. In a car or other vehicle, the combination of an electric motor applied thereto below the car, with one or more sheets or plates of magnetic metal interposed between the electric motor and the car-floor, all substantially as shown, and for the purpose described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 30th day of March, A. D. 1889.

ISAIAH H. FARNHAM.

Witnesses:

GEO. WILLIS PIERCE,
A. D. HARRISON.