

No. 825,298.

PATENTED JULY 10, 1906.

H. W. BUCK.  
ELECTRIC CAR HEATER.  
APPLICATION FILED DEC. 8, 1900.

Fig. 1

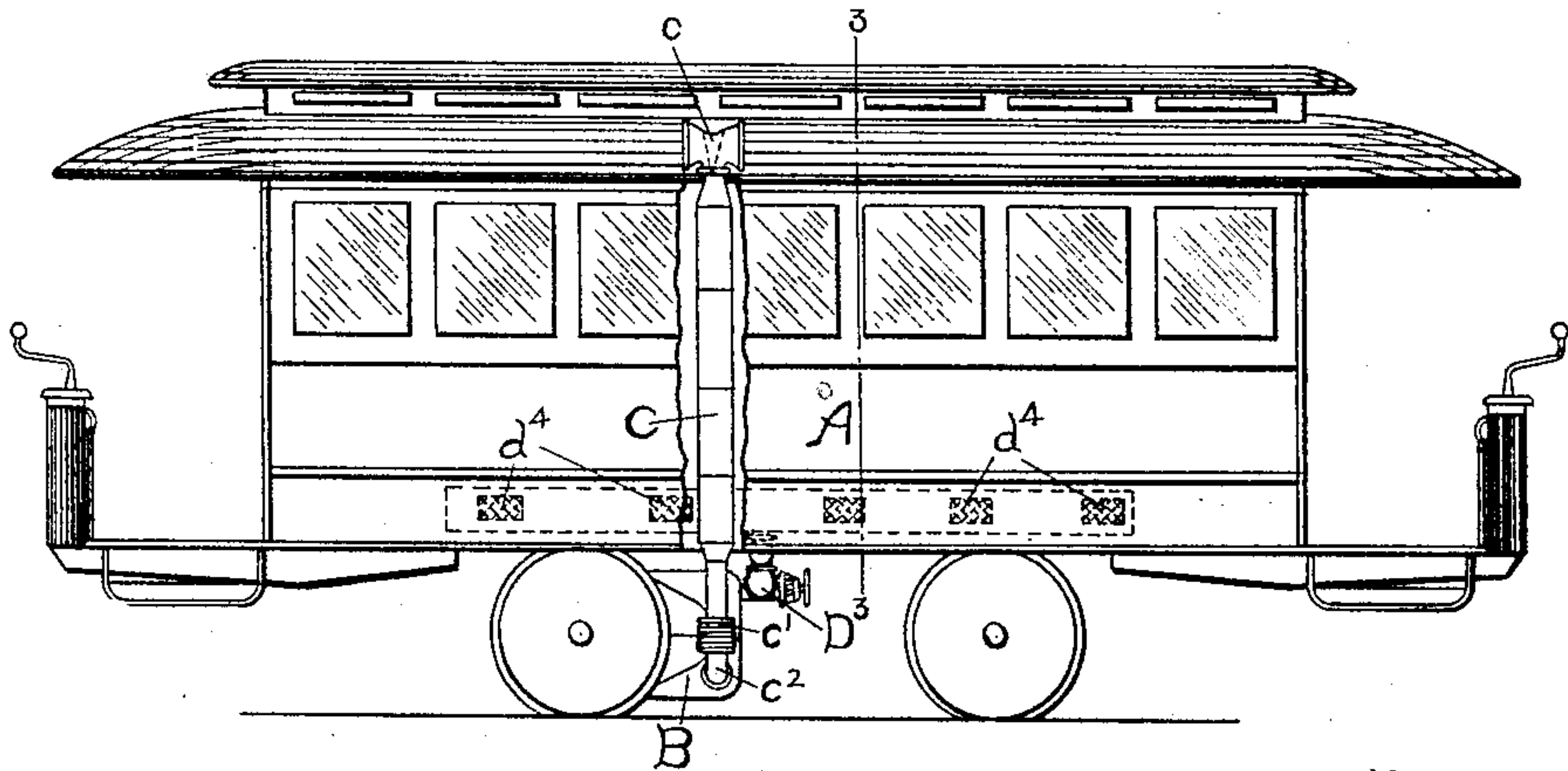


Fig. 2

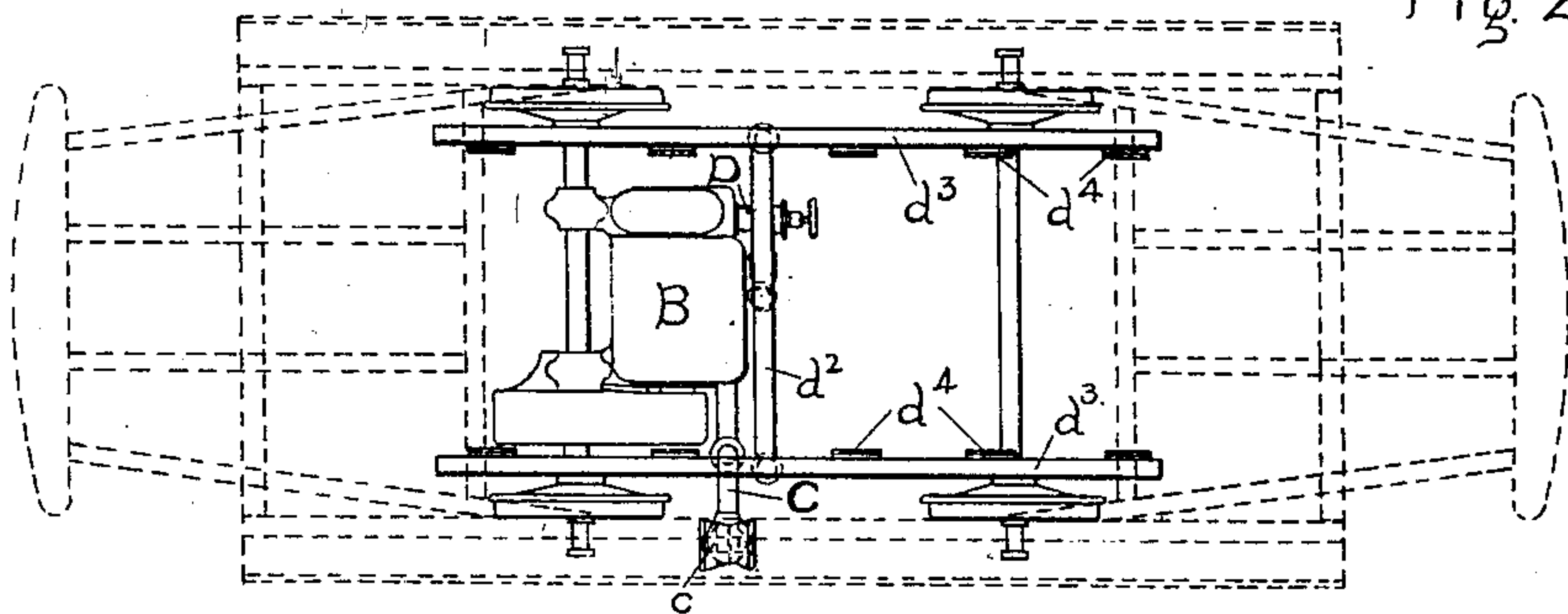


Fig. 4

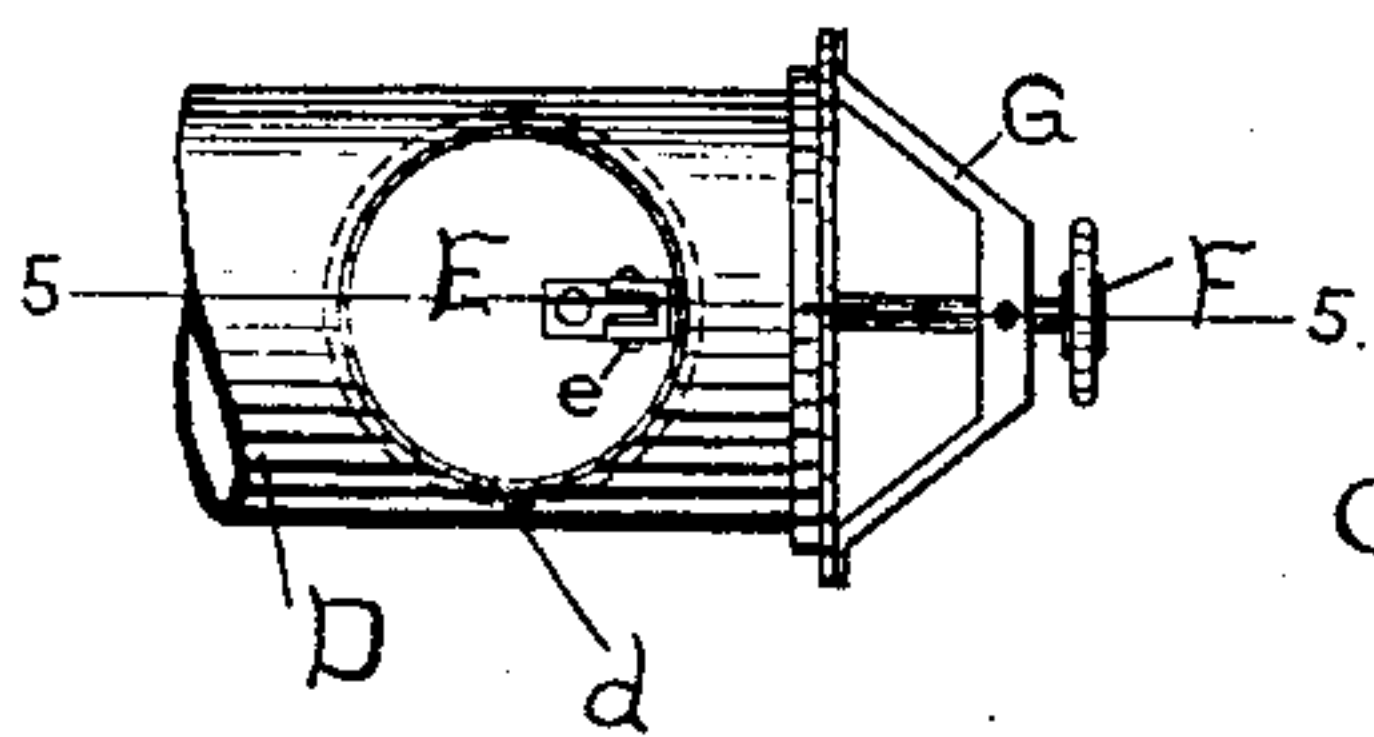


Fig. 3

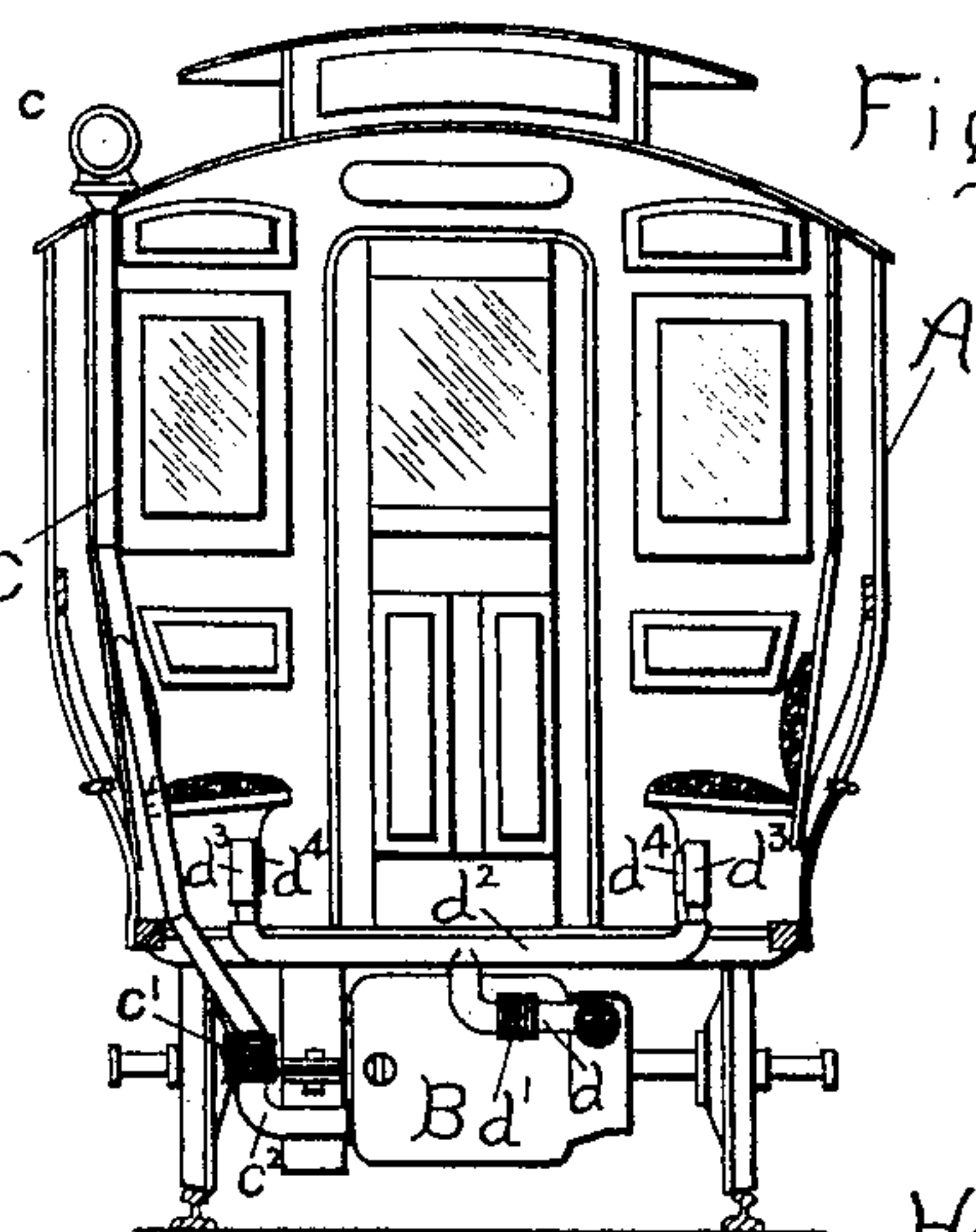
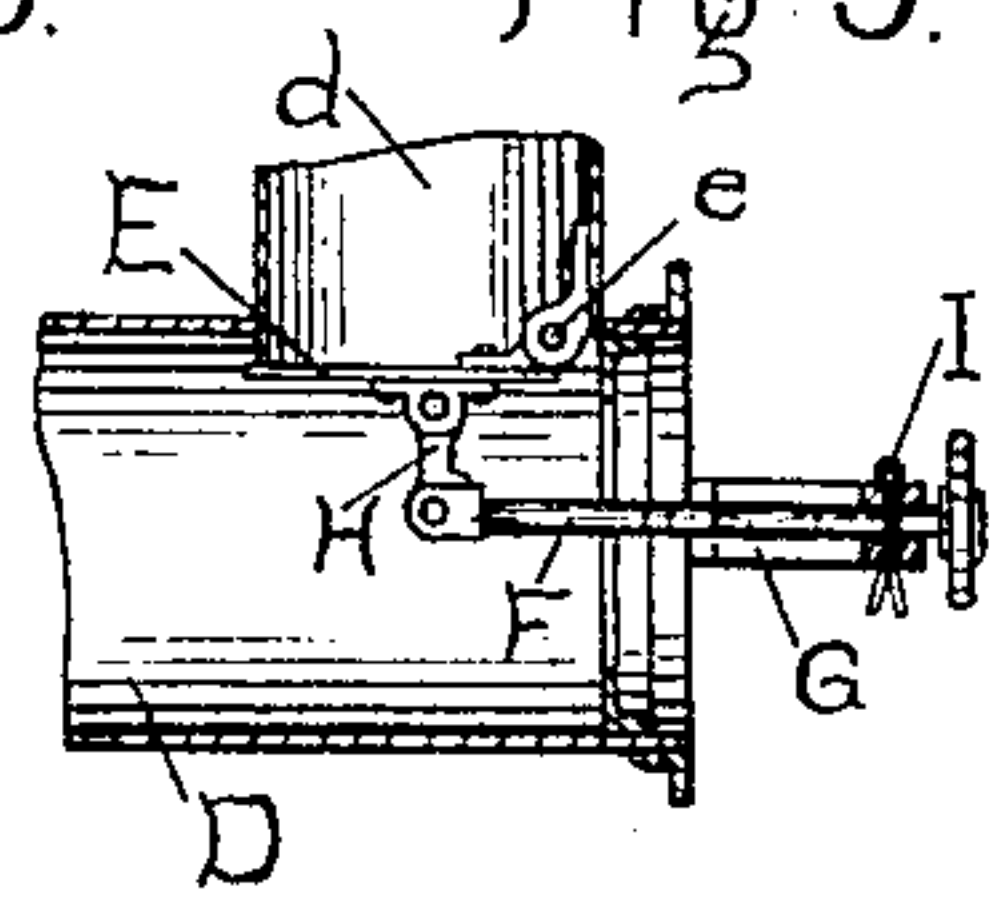


Fig. 5



Witnesses:  
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Inventor:  
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by *Alvin B. Davis*  
Atty.



# UNITED STATES PATENT OFFICE.

HAROLD W. BUCK, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO  
GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## ELECTRIC-CAR HEATER.

No. 825,298.

Specification of Letters Patent.

Patented July 10, 1906.

Application filed December 8, 1900. Serial No. 39,139.

*To all whom it may concern:*

Be it known that I, HAROLD W. BUCK, a citizen of the United States, residing at Niagara Falls, county of Niagara, State of New York, have invented certain new and useful Improvements in Electric-Car Heaters, of which the following is a specification.

My invention relates to electric railways; and its object is to provide means whereby an electric-railway car can be heated by utilizing the energy otherwise lost in heating the motor-windings.

Heretofore it has been customary to heat an electric-railway car by means of resistance-coils located under the seats or at any other convenient point in the car. In cold weather the amount of energy required to operate these heaters is frequently as much as fifty per cent. of that required to drive the car. The load on the generators is therefore very greatly increased when the heaters are used, and any device which enables a part of this load to be removed is of great practical value.

In the operation of an electric motor considerable heat is generated in the motor-windings—so much that the problem of keeping the motor cool has engaged the attention of many engineers and inventors. My invention aims to utilize this heat for warming the car and at the same time prevent the motor from getting overheated.

To this end my invention consists in certain devices hereinafter described whereby the heat generated in the motor-windings is conveyed into the car, preferably by a current of air, a supply of fresh cool air being constantly supplied to the motor-casing and the heated air conducted away to registers in the car. Means are also provided whereby the hot air can escape into the outside air without entering the car in case the weather is so mild as to make the heating of the car unnecessary.

In the accompanying drawings, Figure 1 is a side elevation of an electric-railway car partly broken away and equipped with my improved heating attachment. Fig. 2 is a plan view of the car frame and truck, showing the location of the air-pipes. Fig. 3 is a vertical cross-section of the car on the line 3 3, Fig. 1. Fig. 4 is a detail view of the by-pass and damper on an enlarged scale. Fig. 5 is a horizontal bottom plan section of the same on the line 5 5, Fig. 4.

The car A is shown as provided with a single motor B, though it will be understood that my invention can be applied to cars having any number of motors. The motor shown is of the well-known railway type, in which the magnet-frame serves as a casing to inclose the field-coils and armature.

The car is provided with a pipe C, preferably rather flat to project as little into the car as possible. The pipe runs from a point adjacent to the pinion end of the motor up through the car-body to a point above the roof, where it is provided with a cowl c, facing toward both ends of the car in order that the motion of the car in either direction shall cause a current of air to flow into the pipe. By arranging the intake at the top of the car the air is fresh and free from dust. Any other suitable device whether stationary or dynamic may be used to promote a flow of fresh clean air down through the pipe. The lower end of the pipe is connected with the motor-casing, preferably by means of a short flexible hose c' and an elbow c'', projecting from the casing. The flexible hose allows for the vertical movement of the car-body on its springs.

At the commutator end of the motor-casing a pipe D projects, from which a branch pipe d leads through a flexible hose d' to a T-shaped pipe d'', extending across the car under the floor and communicating at each end with a heater-pipe d'', running under the seats a and provided at intervals with registers d'', opening into the car. The junction of the pipe D with the branch pipe d is controlled by a damper E, hinged at e and provided with suitable means for operating it. I have shown a reciprocating rod F, mounted in a bridge G across the open end of the pipe D and connected by a link H with the damper. A split pin I, passing through a hole in the bridge and the rod, serves to lock the rod and the damper in any desired position. The open pipe D serves as a by-pass, and by manipulating the damper the hot air can be all sent up into the car or all allowed to escape through the by-pass, or part through the by-pass and part into the car, as the temperature of the car may determine. The flow of air through the motor-casing may be caused by the motion of the car or by some mechanical device—such, for instance, as the armature of the motor, which has a blower



action when rotating. Some railway-motors are especially constructed to take in air near the armature-shaft and deliver it at the periphery of the armature. In any event  
 5 the constant flow of air through the motor-casing tends to keep the motor cool, and thereby increase its efficiency.

The usual electric heaters may be resorted to in extremely cold weather or when  
 10 the car has to stand for any length of time at a station or on a siding; but my invention relieves the generators of a portion of the load otherwise imposed on them in cold weather, utilizes the energy heretofore lost  
 15 in heating the motor-windings, insures a good ventilation of the car, and reduces the temperature of the motor when running.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

20 1. The combination with a railway-car of an inclosed electric motor arranged beneath the floor of said car, an intake-pipe extending from above the roof to said motor, and connections for delivering the heated air to the  
 25 interior of the car.

2. The combination with a railway-car of a heater mounted upon the trucks of said car, means for supplying air to said heater, and pipes provided with elastic sections for  
 30 delivering the air from said heater to the interior of the car.

3. The combination with a railway-car of a heater mounted upon the trucks of said car, a stationary pipe extending from above the roof of the car to said heater and a second stationary pipe extending from the  
 35 heater to the interior of the car, and flexible sections located in each of said pipes to permit of free movement of the car relatively  
 40 to said trucks.

4. The combination with an electric-railway car, of an air-supply pipe extending from the roof of the car to the motor-casing, and air-delivery pipes extending from the motor-  
 45 casing into the car.

5. The combination with an electric-rail-

way car, of a pipe for conveying heated air from the motor-casing into the car, and a by-pass for permitting the air to escape without entering the car.

6. The combination with an electric-railway car, of a pipe for conveying heated air from the motor-casing into the car, a by-pass opening to the outer air, and a damper controlling the flow of air into the car and out of  
 55 the by-pass.

7. The combination of a railway-car, an electric motor thereon, pipes leading from a source of air to the motor and pipes from the motor to the interior of said car.

8. The combination with a railway-car and an electric motor thereon, of means for passing air over said motor, and a passage for the air thus heated from the motor to the interior of the car.

9. The combination with a railway-car and an electric motor thereon, of means for passing air through said motor and the passage between the motor and the inside of the car.

10. In electric cars the combination of a chamber, a heat-generating element of the electrical equipment of said car contained in said chamber, means for causing a current of air at substantially atmospheric pressure to flow through said chamber and for conveying the air thus heated to the interior of  
 75 the car.

11. In electric cars, the combination of a chamber beneath the floor of the car, a heat-generating element of the electrical motive  
 80 power equipment of said car contained in said chamber, means for causing a current of air at substantially atmospheric pressure to flow through said chamber and for conveying the air thus heated to the interior of  
 85 the car.

In witness whereof I have hereunto set my hand this 3d day of December, 1900.

HAROLD W. BUCK.

Witnesses:

F. L. LOVELACE,  
 Wm. M. BLAIR.