

No. 725,079.

PATENTED APR. 14, 1903.

G. C. HAWKINS.
ELECTRIC CAR.

APPLICATION FILED SEPT. 25, 1901.

NO MODEL.

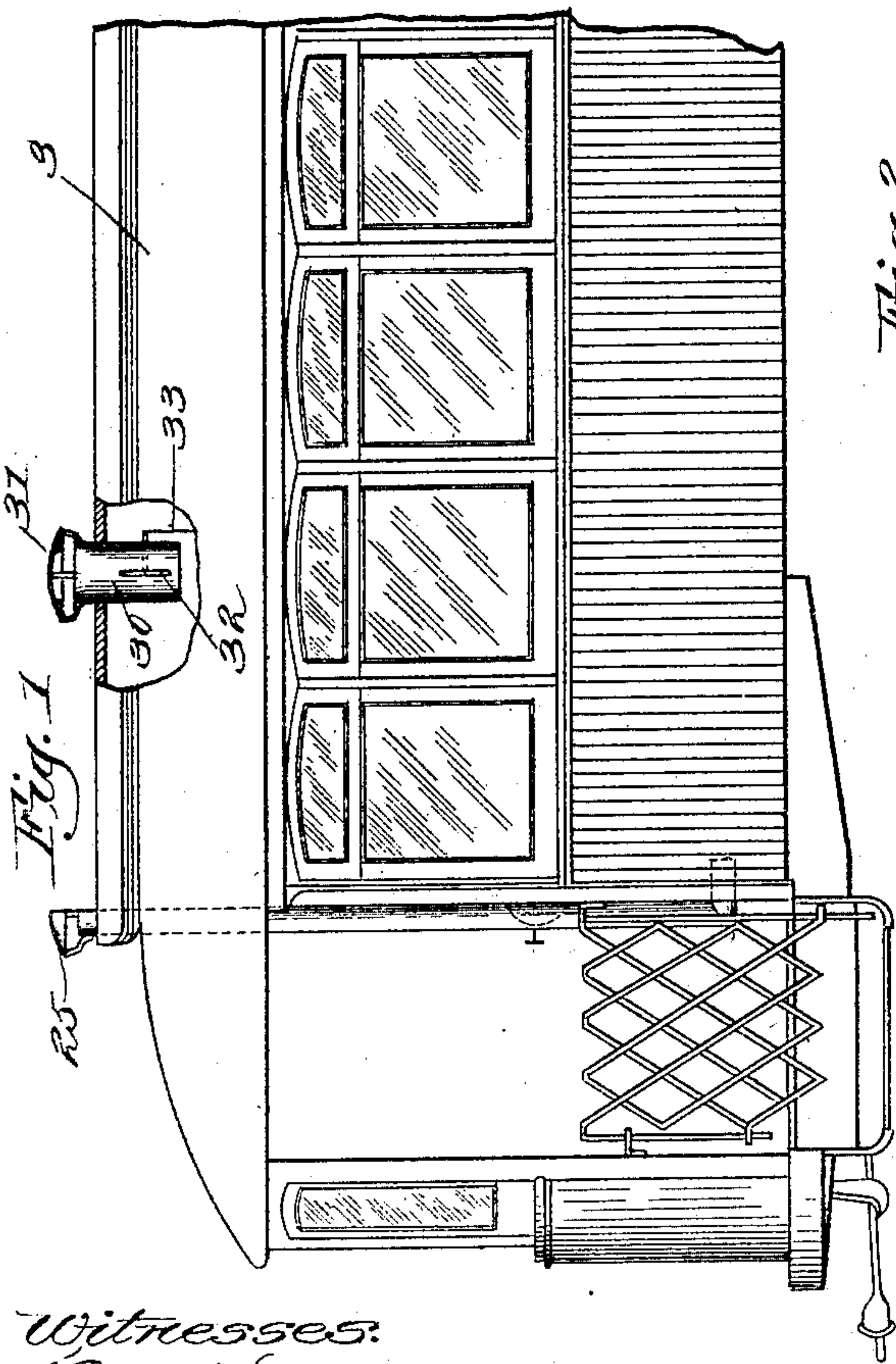
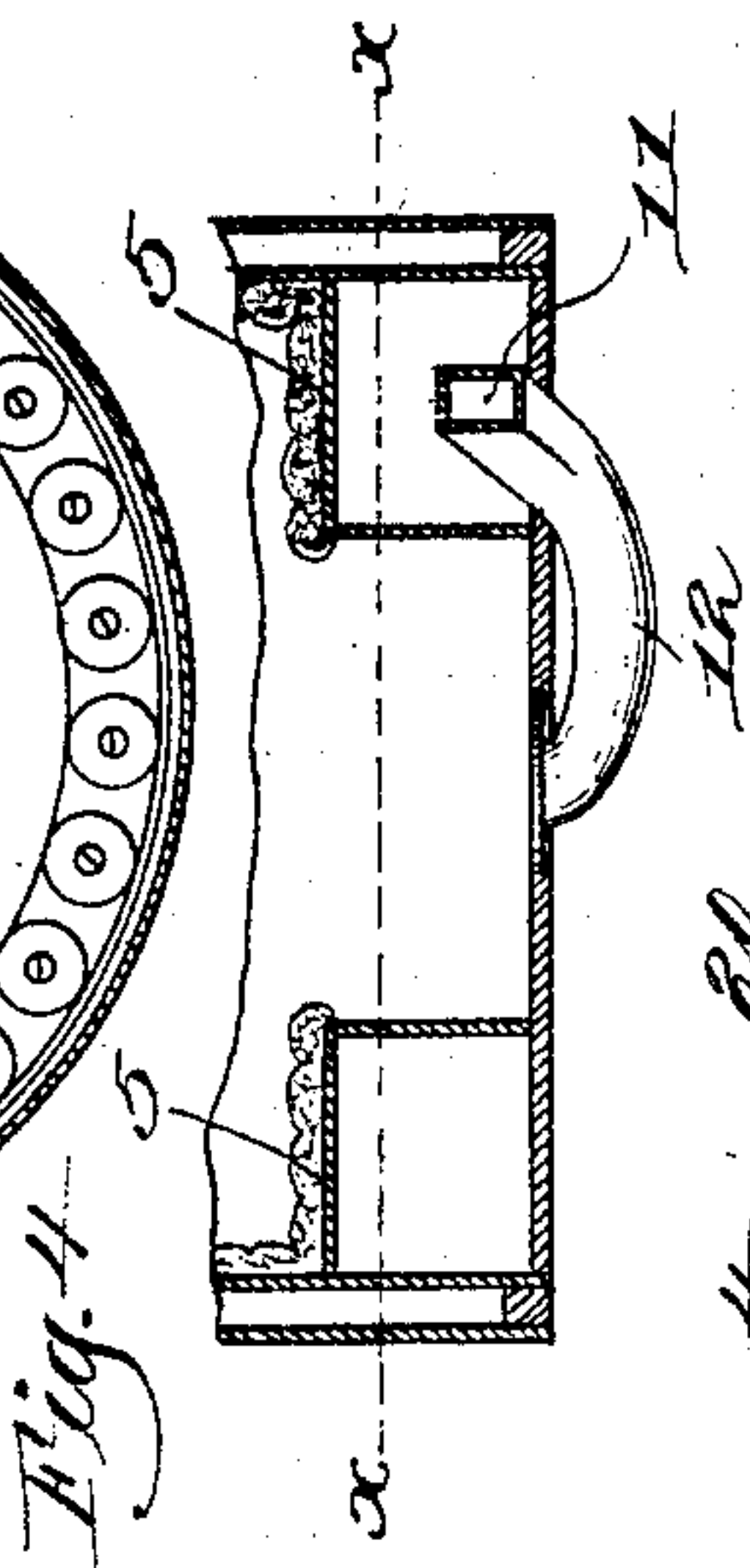
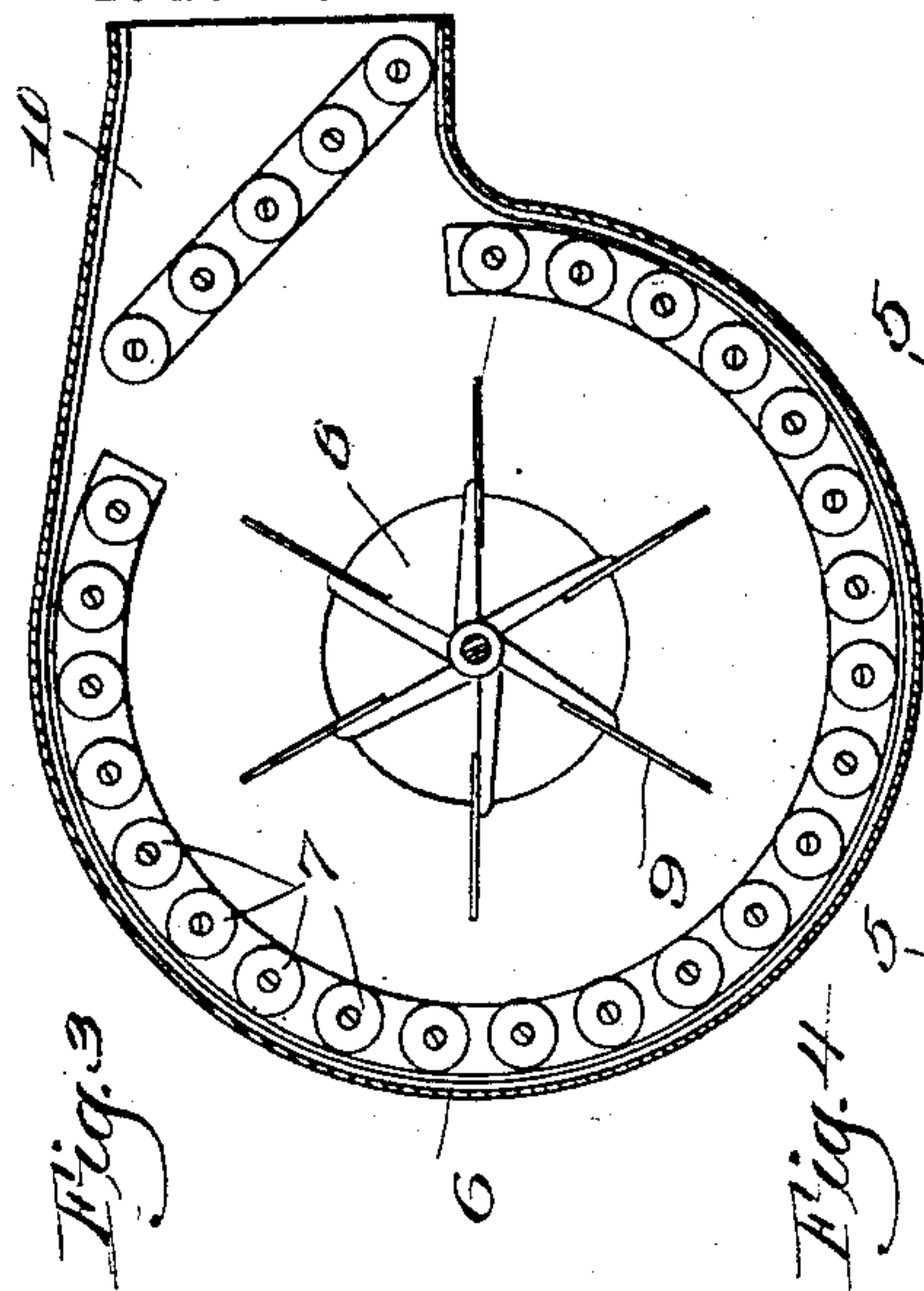
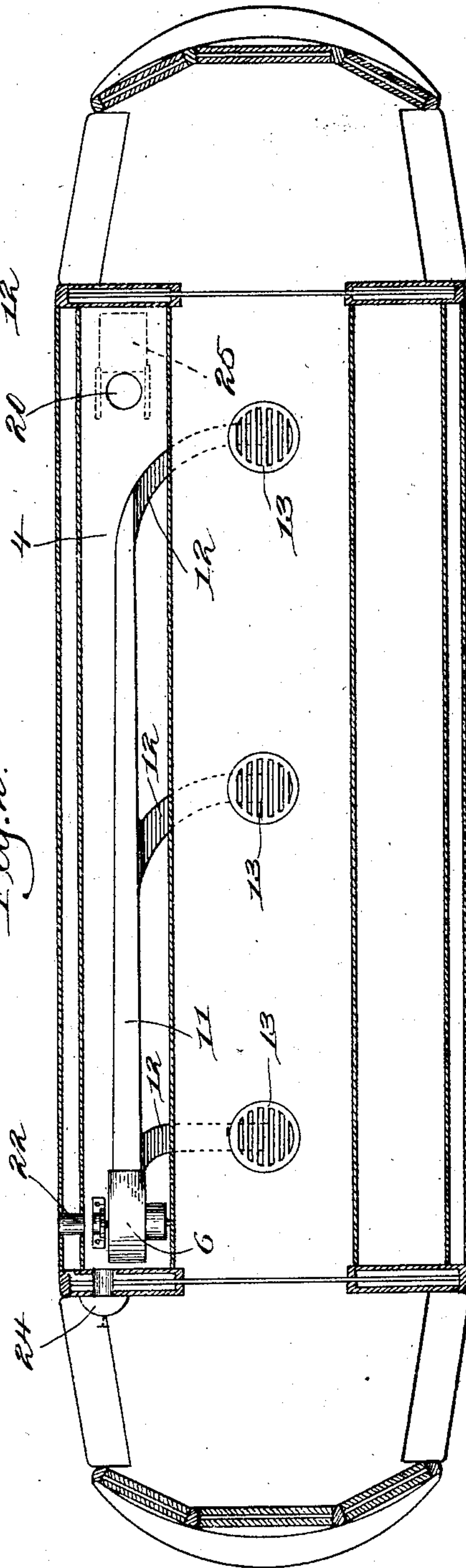


Fig. 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

GARDNER C. HAWKINS, OF BOSTON, MASSACHUSETTS.

ELECTRIC CAR.

SPECIFICATION forming part of Letters Patent No. 725,079, dated April 14, 1903.

Application filed September 25, 1901. Serial No. 76,556. (No model.)

To all whom it may concern:

Be it known that I, GARDNER C. HAWKINS, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Electric Cars, of which the following description, in connection with the accompanying drawings, is a specification, like figures on the drawings representing like parts.

10 It is the object of my invention to provide a simple, inexpensive, and economical way of heating and ventilating cars, especially electric cars.

15 In the ordinary form of electric cars a series of electric heaters are used, the said heaters being generally placed at various points under the seat and the heat from said heaters passing through a grating in the front of the seat in the car. This form of
20 heating apparatus, however, requires a great amount of wiring, which renders it expensive, and the apparatus is generally so arranged that the full benefit of the electric heaters is not obtained.

25 In my improved apparatus for heating cars I provide a heater which is inclosed in a casing, the said casing having an inlet adapted to admit fresh air into the casing, preferably from some point outside of the car, and a discharge pipe or pipes adapted to deliver the
30 air which has been admitted to the casing and which has been heated by passing over the heater to the car, the said air preferably being delivered through the bottom or floor of the car. Some suitable mechanism is employed in the casing to establish a current of
35 air over the heater and through the discharge pipes, whereby pure air is drawn in from the exterior of the casing, heated by being forced over the heating device, and is then delivered in comparatively large volume into the car. It will be seen that pure air which has been
40 previously heated is constantly being forced into the car, and where the car makes frequent stops it will be found that the opening of the doors to let in and out the passengers will provide ample means for the escape of the impure air, so that with my apparatus the
45 air in the car is not only heated, but is maintained pure. In case the car makes comparatively few stops I may provide a venti-

lator in the roof of the car, which when opened allows the impure air to escape. Preferably my casing which incloses the heater will be situated in a suitable dry settling-chamber of
55 comparatively large dimensions, one convenient place for the said settling-chamber being underneath the seats which run along the side of the car. The settling-chamber has an inlet or port to admit fresh air from the
60 outside of the car to the chamber, and the air in the chamber passes into the casing containing the heater, as above described, to be heated and delivered to the car. By admitting the air first to a settling-chamber and
65 then from the settling-chamber to the casing for heating it I provide means whereby even though the air which is admitted to the settling-chamber has dust therein the settling-chamber provides means for allowing the
70 dust to become settled before the air is delivered to the heater.

In the drawings, Figure 1 shows a partial side elevation of a portion of an electric car embodying my invention. Fig. 2 is a horizontal
75 section of a car on the line *x x*, Fig. 4. Fig. 3 shows one form of heater which may be used, and Fig. 4 is a detail hereinafter referred to.

The car illustrated is designated generally
80 by 3, and it may be of any suitable or usual construction and is provided with an enlarged dry settling-chamber 4, in which the heater, hereinafter described, is situated and from
85 which the air is taken, which is heated and delivered to the car. The settling-chamber 4 may be situated in any convenient position, and where the car is of the type having seats
90 running lengthwise thereof at the sides to leave a central aisle I preferably employ the space under one of the seats 5 as a settling-chamber, as shown in Figs. 2 and 4. Situated
95 in the settling-chamber at one end, and preferably at the end of the car where the wiring is taken from the trolley-pole to the motor, is a suitable heater, the said heater preferably
100 being of the construction shown and described in my copending application, Serial No. 72,089, filed August 15, 1901, to which reference may be had.

Fig. 3 is a section of the heater and shows in a general way the construction. Referring

to said figure, 6 is a suitable casing, which incloses the resistance-coils 7, said coils being of any suitable material and being supported in any suitable way in the casing. The casing is provided with an inlet-opening 8, as in my application above referred to, and incloses a suitable fan 9, the said fan operating to draw air through the inlet-opening 8 to force the same over the heating or resistance coils 7 and out through the neck or discharge-opening 10. The fan 9 is operated by any suitable motor, as in my above-referred-to application, and by placing the heater at that end of the car through which the wiring from the trolley-pole to the motor passes it will be obvious that the heating-coils and the motor for driving the fan may be readily connected to the said wires without necessitating any amount of special wiring. Connected to the discharge-opening 10 is a suitable pipe 11, which is connected to a suitable register, preferably in the floor of the car, whereby the heated air is delivered from the casing through the said discharge-pipe 11 and up through the floor of the car.

In order to distribute the heated air evenly throughout the car, I preferably provide the discharge-pipe 11 with a series of branches 12, each branch opening directly underneath a suitable register 13 in the floor of the car, said registers being preferably situated in the central line of the car, as in Fig. 2.

I preferably make the discharge-pipe 11 square in cross-section, as shown in Fig. 4, and connect the branches 12 to the under side of said pipe, said branches passing down through the floor of the car, underneath the seat, and being curved, as shown in Fig. 4, the end thereof having the register 13 connected thereto. Preferably the pipe 11 will taper toward the end thereof, as seen in Fig. 2, the cross-sectional area of the pipe being reduced to compensate for the air which is delivered through the branches 12 nearest the heater.

From the above description it will be seen that the fan 9, which is operated by any suitable motor, as in my application above referred to, operates to draw air from the settling-chamber 4 and deliver it to the car, the air being heated in its passage over the resistance-coil 7, and to provide means for admitting air into the settling-chamber as fast as it is delivered therefrom the said settling-chamber is provided with one or more inlets through which air may enter from the outside. I have herein illustrated three such inlets to the settling-chamber, any one or all of which may be used, as circumstances require. One of said inlets is designated by 20 and comprises an aperture made in the bottom of the settling-chamber 4 through the floor in the car and at the opposite end of said settling-chamber from the heater.

Preferably the area of the opening 20 will be greater than that of the discharge-pipe 11,

so that as the air is drawn into the casing through the settling-chamber a partial vacuum is created in said settling-chamber, and a current of air will enter the inlet 20; but owing to the size of the inlet the said current will move slowly in comparison with the column of air in the discharge-pipe 11. As soon as the column of fresh air enters the settling-chamber through the inlet 20 it moves at a greatly-reduced speed toward the casing 6, owing to the larger size of the settling-chamber, and during this comparatively slow movement any dust or solid matter contained in the air has a chance to settle before the air is forced over the heating-coils. With this arrangement, therefore, even though the air is drawn from beneath the car it has a chance to purify itself before it is forced into the car.

In some instances it may be undesirable to take the air from underneath the car, and in such cases I provide the side of the car with the inlet-opening 22, said inlet-opening being in the form of a pipe extending through the walls of the car and into the said settling-chamber. As illustrated in the drawings, the said inlet-pipe 22 is situated opposite the inlet-opening 8 in the casing 6, so that the air entering the said inlet-pipes 22 is delivered directly to the casing. If, however, it is desired to allow any dust which may be in the air to settle before it is taken into the casing 6, the outlet-pipe 22 may be placed in any suitable position in the side of the car other than that illustrated.

My invention also contemplates the taking of the air into the settling-chamber from above the car, and I therefore provide the inlet-pipe 24, which extends upward through the roof of the car, as seen in Fig. 1, and has a suitable hood 25 on the upper end thereof to prevent rain or snow from entering the pipe, the said inlet-pipe opening at its lower end into the settling-chamber 4.

In the class of cars wherein a partition extends across the car back of the front platform the inlet-pipe 24 may be conveniently placed either in or adjacent to said partition, as in Figs. 1 and 2, although I would consider it within my invention if the said vertical-extending inlet-pipe 24 were placed in any suitable position on the car.

Preferably a suitable slide or cover will be provided for covering the inlet-port 20 when it is desired to take air exclusively through either of the other inlets, and similarly the pipes 22 and 24 will each be provided with any suitable valve, either of the butterfly or slide type, whereby the entrance of air through the said pipes may be controlled.

With my invention, therefore, it is possible to take the air through any one of the three inlets or through all of them simultaneously, as desired.

In the ordinary construction of an electric car embodying my invention, wherein a current of fresh heated air is being constantly

delivered into the car, the constant opening and closing of the doors for the entrance and exit of the passengers will afford ample means for the discharge of the impure air from the car. When the conditions are such, however, that the car runs long distances between stops, it may be desirable to employ a suitable ventilator in the roof of the car, whereby the impure air, which is constantly rising to the top of the car, may have a free means of escape. Accordingly in Fig. 1 the car, as shown, is provided with a ventilating-pipe 30, extending through the roof, said pipe being covered by any suitable hood 31 and preferably having therein a suitable valve 32, shown as a butterfly-valve, and which may be controlled by a suitable lever 33 within convenient reach of an operator in the car.

By placing the registers 13 in the central line of the car, as illustrated, it will be impossible for any person or persons when seated to cover the same to prevent the free ingress of the heated air, as is the case where the outlet-openings for the heated air are in the front of the seat, as is usually the case. Furthermore, by means of my apparatus the car is not only supplied with heated air, but may also be supplied with a sufficient amount of pure air, so that even though the car is crowded the air therein is prevented from becoming impure.

It will be obvious that various changes may be made in the construction of the devices without departing in any way from the scope of my invention as expressed in the appended claims.

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

1. In an electric car, a settling-chamber, a heater, and a delivery-conduit to deliver the heated air from the heater into the car, said conduit being located in the settling-chamber.

2. An electric car having a settling-chamber provided with an inlet to admit air therefrom to the outside of the car, a heater, and a delivery-conduit in the chamber and operating to deliver the heated air from the heater to the interior of the car, and means to draw fresh air into the chamber, pass the same over the heater to heat it, and deliver the heated air into the conduit.

3. In an electric car, a settling-chamber, a heater situated in said settling-chamber, a delivery-conduit also situated in said settling-chamber and operating to deliver the heated air from the heater into the car.

4. In an electric car, a settling-chamber, an inlet to admit fresh air to said chamber from outside of the car, a casing in said chamber, a fan inclosed therein, means in the casing to heat the air, and a delivery-pipe for conducting the heated air from the casing to the interior of the car, the settling-chamber being of such a size with reference to the delivery-pipe that the body of air in the settling-

chamber moves slowly in its passage from the inlet to the fan.

5. An electric car provided with seats, the space under one of said seats being inclosed and constituting a settling-chamber, an inlet-opening to admit air from the exterior of the car to said chamber, a heater, means to take the air from the chamber, force it over the heater to heat it, and deliver the heated air to the interior of the car.

6. In an electric car, a settling-chamber having an inlet to admit fresh air to said chamber from the outside of the car, a heater, a delivery-pipe extending therefrom for conducting the heated air from the casing to the interior of the car, and means to take air from the chamber, force it over the heater and deliver the heated air to the delivery-pipe, the settling-chamber being of such a size with reference to the delivery-pipe that the body of air in the chamber moves slowly in its passage from the inlet to the heater.

7. An electric car provided with side seats, the space under one of said seats being inclosed and constituting a settling-chamber, an inlet-opening to admit fresh air from the exterior of the car to said chamber, a casing in said chamber, a heater in said casing, and means to take air from said chamber, force the same over the heater to heat the air, and deliver the heated air to the interior of the car.

8. An electric car provided with side seats, the space under one of said seats being inclosed and constituting a settling-chamber, an inlet-opening to admit fresh air from the exterior of the car to said chamber, a casing in said chamber, a heater in said casing, a discharge-pipe connected to the casing and having branches leading to openings in the central line of the car-floor, and means in said casing to draw air from said chamber, force it over the heater and deliver the heated air to said discharge-pipe.

9. In an electric car, a settling-chamber, a heater, a delivery-conduit, in said settling-chamber for delivering the heated air from the heater to the interior of the car, combined with a valved ventilator in the roof of the car.

10. An electric car provided with side seats, the space under one of said seats being inclosed and constituting a settling-chamber, an inlet-opening to admit fresh air from the exterior of the car to said chamber, a casing in said chamber, a heater in said casing, a discharge-pipe connected to the casing and having branches leading to openings in the central line of the car-floor, and means in said casing to draw air from said chamber, force it over the heater and deliver the heated air to said discharge-pipe, combined with a valved ventilator in the roof of the car.

11. In an electric car provided with seats, the space under one of said seats being inclosed and constituting a settling-chamber,

an inlet-opening to admit air from the exterior of the car to said chamber, a heater in said chamber, means to take the air from said chamber, force it over the heater to heat it and deliver the heated air to the interior of the car.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

GARDNER C. HAWKINS.

Witnesses:

LOUIS C. SMITH,
GEO. W. GREGORY.