

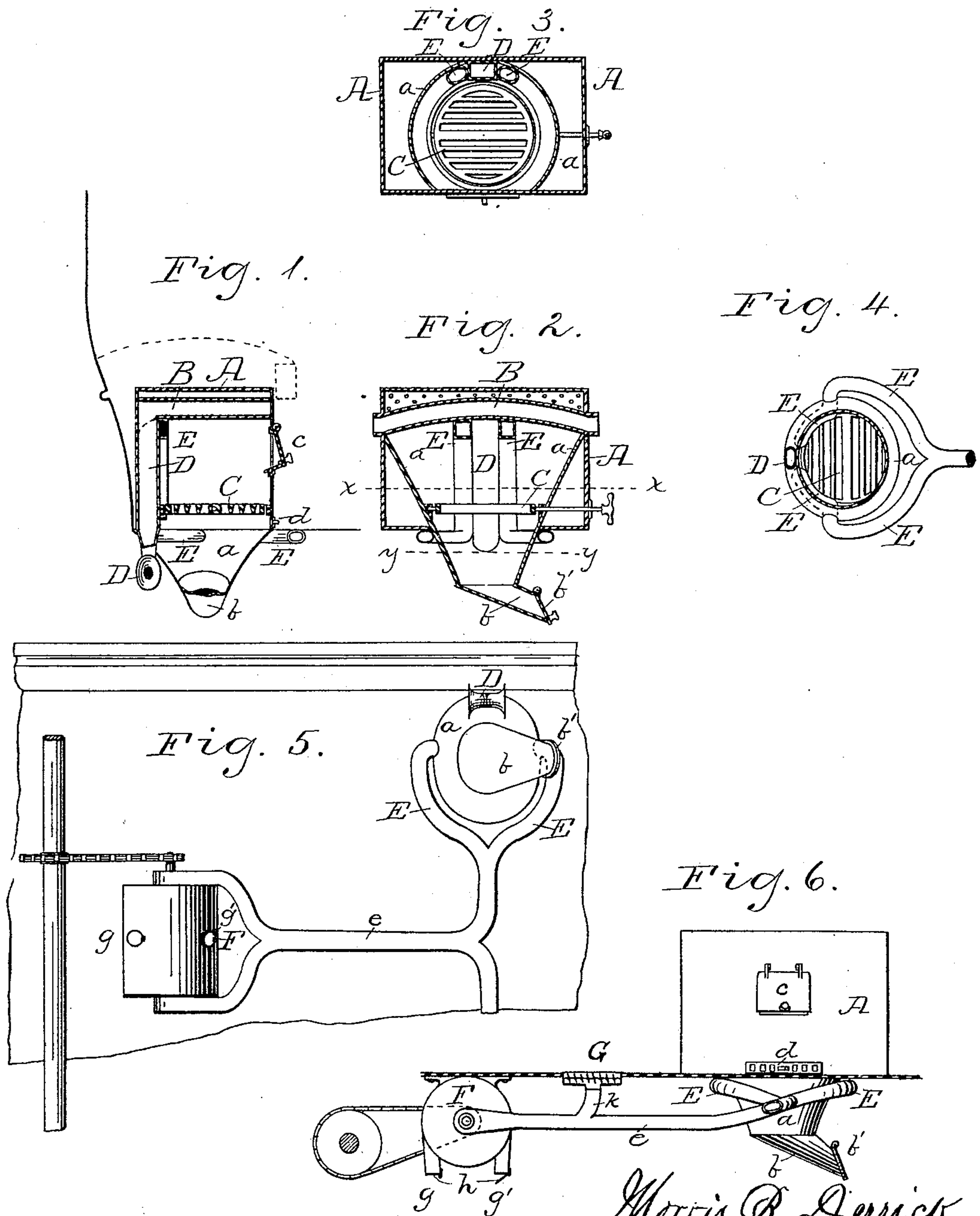
(No Model.)

M. B. DERRICK.

CAR HEATER.

No. 370,049.

Patented Sept. 20, 1887.



WITNESSES:

Edward W. Schirach  
Chas. F. Meyer

Morris B. Derrick.  
INVENTOR

BY James H. Coyne.  
ATTORNEY

# UNITED STATES PATENT OFFICE.

MORRIS B. DERRICK, OF CHICAGO, ILLINOIS.

## CAR-HEATER.

SPECIFICATION forming part of Letters Patent No. 370,049, dated September 20, 1887.

Application filed February 4, 1886. Serial No. 190,776. (No model.)

*To all whom it may concern:*

Be it known that I, MORRIS B. DERRICK, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Car-Heaters; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

Heretofore great difficulty has been experienced in getting a car-heater which would heat the car, ventilate it, and, while possessing sufficient draft, dispense with the objectionable chimney. I overcome these difficulties by a heater which heats both by a current of hot air and by radiation, which exhausts the dampness and cold air contiguous to the floor of the car, and the smoke of which is discharged under the car, substantially as hereinafter more fully described, and as illustrated in the drawings, in which—

Figure 1 is a transverse vertical section. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is a horizontal transverse section thereof, taken on line *x x*, Fig. 2. Fig. 4 shows a section of the device, looking from below. Fig. 5 shows a plan view of the underneath of a car with my improved heater and attachments applied thereto; and Fig. 6 is a side elevation of my invention and attachments, showing part of the floor in section.

Reference being had to the drawings, A represents a rectangular case resting on the floor, preferably about the center of length of the car, and, if in a street-car, under the seats. In the upper part of this case A, placed horizontally, is a hollow diaphragm, B, which divides the case into an upper and lower compartment, is open at the ends of the case, and has flanges projecting from said openings for the connection thereto of hot-air pipes, if desired.

The upper compartment is perforated, so that the heat accumulating therein may escape. In the compartment under diaphragm B is the fire-chamber. The side walls, *a a*, of this fire-chamber start from points immediately under the diaphragm, and, like an inverted trun-

cated cone, converge toward each other as they pass downward through the bottom of said case, through and to a point not more than twelve inches below the floor of the car. At the lower ends of these walls *a a* is connected a chute, *b*, pursuing a longitudinal course toward one or the other end of said car, and closed by a suitable door, *b'*.

Above the plane of the bottom of case A, a suitable distance, is the grate C. This grate may be of any suitable design; but in the drawings I have shown it to be circular with longitudinal bars pivoted on studs journaled in bearings in the side walls, *a*, or in an annulus secured thereto. The grate is manipulated by a rod, which is an extension of one of the pivotal studs and has a hand-grasp on the end outside of said case.

In the side of case A, a suitable distance above the plane of the grate, is a door, *c*, hinged or sliding, as desired, through which the fuel is fed to the fire; and just below the horizontal plane of the grate, in the same side as and immediately below the said door, is a damper, *d*. It will be noticed that this damper will exhaust the air contiguous to the floor, thus contributing to carry off the dampness and cold air and render the lower stratas of air proportionately dry.

In order to supply the hollow diaphragm with a constant supply of fresh air, I run a vertical pipe, D, down from said diaphragm beside the grate, down through the inclined walls *a*, (forming the sides of the fire-chamber above the grate, and the walls of the ash-chamber below.) The inlet of this pipe D may be double-mouthed, in which event I turn the mouths toward the front and rear of the car, respectively. Thus, whether the car is traveling in one or in the opposite direction, the fresh air will rush into said pipe and be conveyed to the diaphragm. Opening into the fire-chamber, immediately under said diaphragm and on either side of pipe D, are the smoke-pipes E. These pipes travel vertically downward on either side of the air-pipe D to a point below the plane of the floor. They then travel laterally, following the curvature of the adjacent walls, and, arriving at corresponding points just a little to the adjacent side of the vertical plane of the pivotal point of the grate,



pass outward through the walls *a* in diametrically opposite directions. They then, as shown in Figs. 5 and 6, pass around the ash-chamber—below the floor—and merge into one pipe, which leads to a central longitudinal pipe, *e*. This pipe *e* leads to an exhaust-fan, *F*, the case of which is secured to the under surface of the floor of the car, and is operated by means of belts and pulleys, or sprockets and chains, or suitable gearing connecting it to the axle of the car-wheels.

Any kind of an exhaust-fan will answer as well as that shown; but there is one thing that must be observed in this respect, and that is, the exhaust-fan must operate just as well when the car travels in one direction, thus revolving the fan a given way, and when traveling in the opposite direction, thus revolving the fan the other way. For this purpose two outlets, *g* and *g'*, are made in the case. One, *g*, is placed at a tangent to the periphery of the fan when it travels in a direction opposed to said outlet, and the other, *g'*, placed at a tangent to its periphery when traveling in the opposite direction. Both outlets *g* and *g'* are in such position that they discharge downward.

When the fan blows the products of combustion exhausted from the heater out of one outlet, say, *g*, it will suck the air in through the outlet *g'*. In order to avoid this, I put a small leather or metal valve, *h*, over their mouths. Thus, whichever outlet is blown through, the other will automatically close.

*G* represents a register made in the floor of the car, located between the heater and exhaust-fan. Leading from this register, and near its point of connection, curved toward said fan and opening into pipe *e*, is pipe *k*. Thus, in addition to the damper of the heater, this register can be utilized to exhaust the cold and moist lower strata of air in the car. This register, however, may be placed in the ceiling of the car or any other desirable place, the only change necessary being the lengthening of pipe *k*, so as to reach said register. This register and connecting pipe *k* may, if desired, be dispensed with altogether, although I prefer their use.

The fire being built in the heater, the diaphragm becomes heated, and the air therein, becoming heated, is expelled therefrom, preferably through a series of pipes connected to the flanged mouths of the diaphragm, which generally travel under the seats, and reaches to both ends or travels entirely around the car. The air is fed to the diaphragm through the pipe *D*, and as this latter is exposed to the fire chamber helps heat the air as it is drawn into said diaphragm. To supply the fire with oxygen, the damper is opened. The jolting of the car will automatically shake the ashes

through the grate, and these will gravitate into and to the mouth of the chute, where they are confined until such times as it is convenient to open the door or trap and remove them.

While I much prefer to use the exhaust-fan in combination with my heater, yet I do not wish to be confined to such combination, as the heater could be used separately, the only difference of construction being in such case that I would prefer to run the smoke-pipes vertically upward instead of downward. The fire-chamber and heater may be modified in construction. It is thought, however, they operate better as shown.

What I claim as new is—

1. In a car-heater, the combination, with case *A*, divided by a grate into an ash-pit or chute which extends below the floor of the car, of a fire-chamber above said grate within the car, the top of which has openings at both ends, and a smoke-pipe opening into and leading down from said fire-chamber to below the floor of the car, as set forth.

2. In a car-heater, the combination, with case *A*, divided by a grate into an ash-chute which extends below the floor of the car, of a fire-chamber above the grate located within said car, the top of which is formed by a hollow diaphragm, which latter has openings at both ends, smoke-pipe opening into and leading down from the fire-chamber to below the floor of the car, and fresh-air pipes having their inlet below the floor of the car, passing up through the said heater next to said smoke-pipe and opening into the diaphragm, as and for the purpose set forth.

3. In a car-heater, the combination, with case *A*, formed into an ash-pit below the floor of the car, and a funnel-shaped frame above the grate which serves as the sides of a fire-chamber and forms a hot-air chamber between it and the perforated enveloping-case *A*, through which the heated air escapes, of a diaphragm, as described, forming the top of the fire-chamber, and a hot-air space above said diaphragm, from which the heat may escape through the perforations in case *A*, substantially as set forth.

4. The combination, with a car, a heater placed therein, and a ventilating-register, of an exhaust-fan, and pipes leading from the fire-chamber of said heater and from the ventilating-register, as set forth.

In testimony that I claim the foregoing as my own I hereunto affix my signature in presence of two witnesses.

MORRIS B. DERRICK.

Witnesses:

JAMES H. COYNE,

FRANK D. THOMASON.