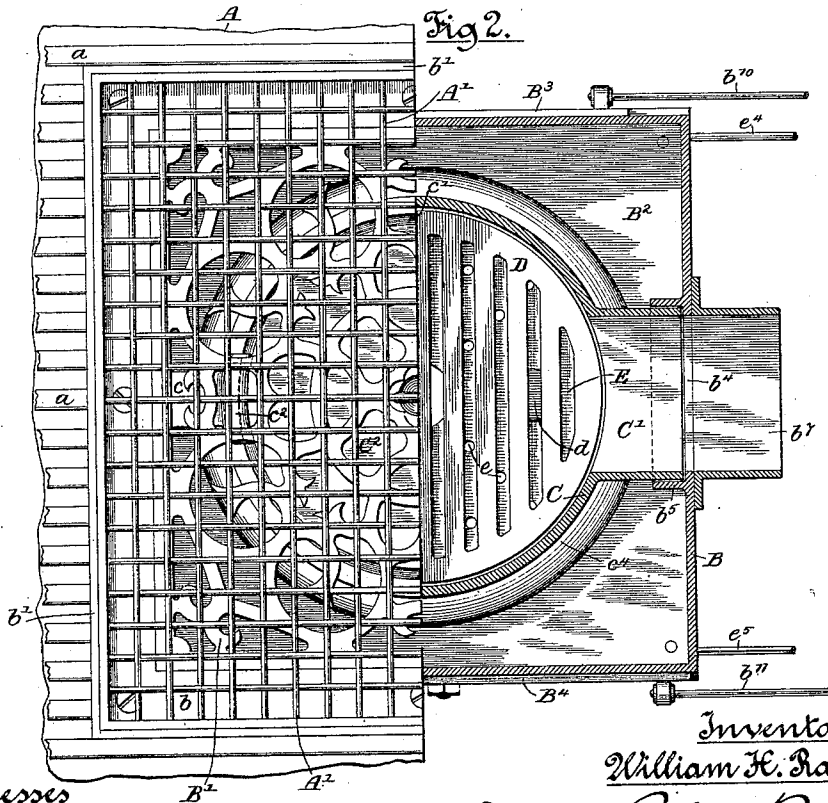
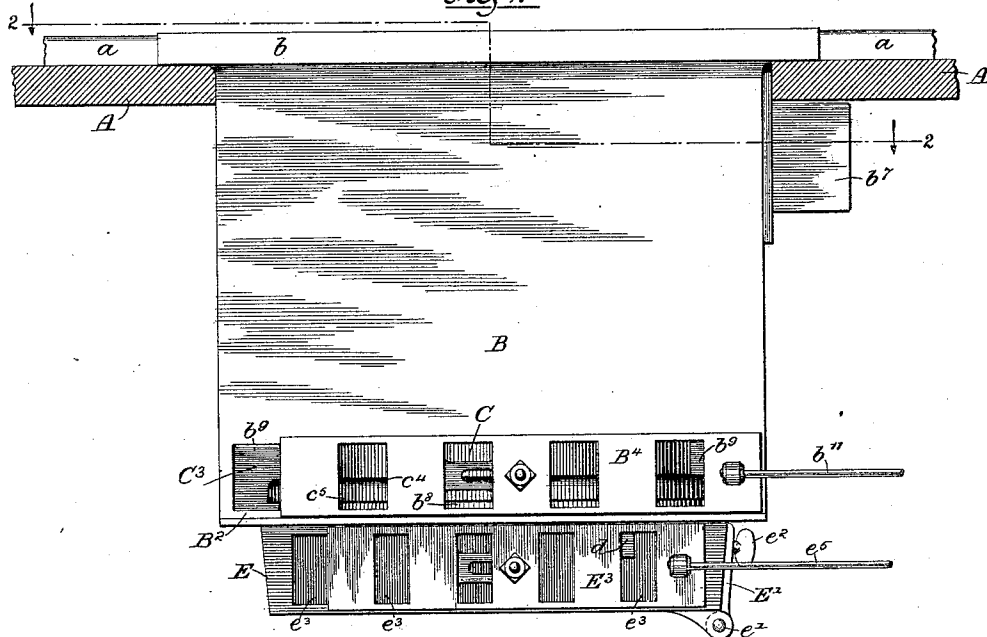


2 Sheets—Sheet 1.

No. 428,137.

Fig 1.

Patented May 20, 1890.



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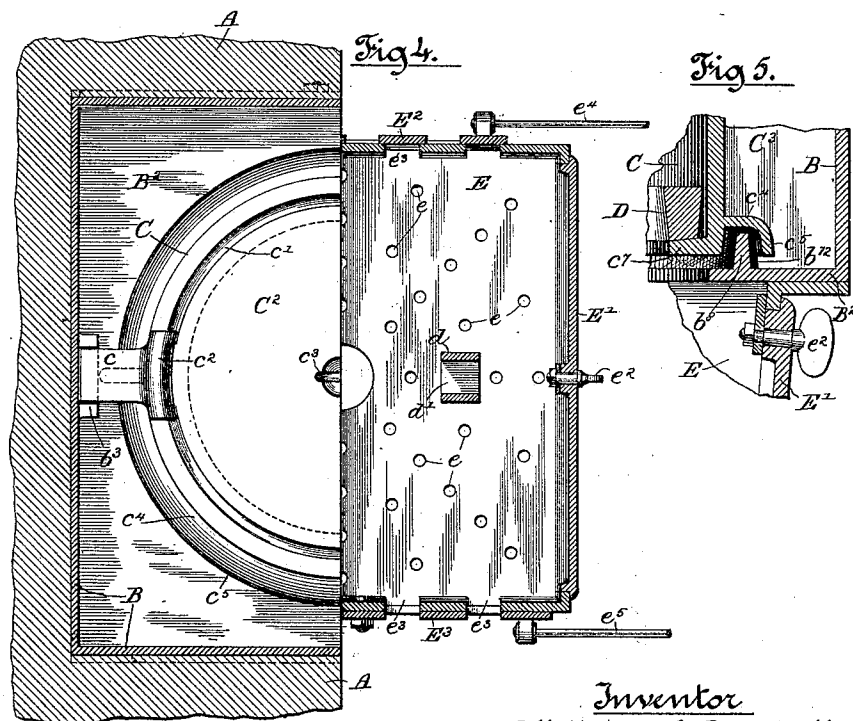
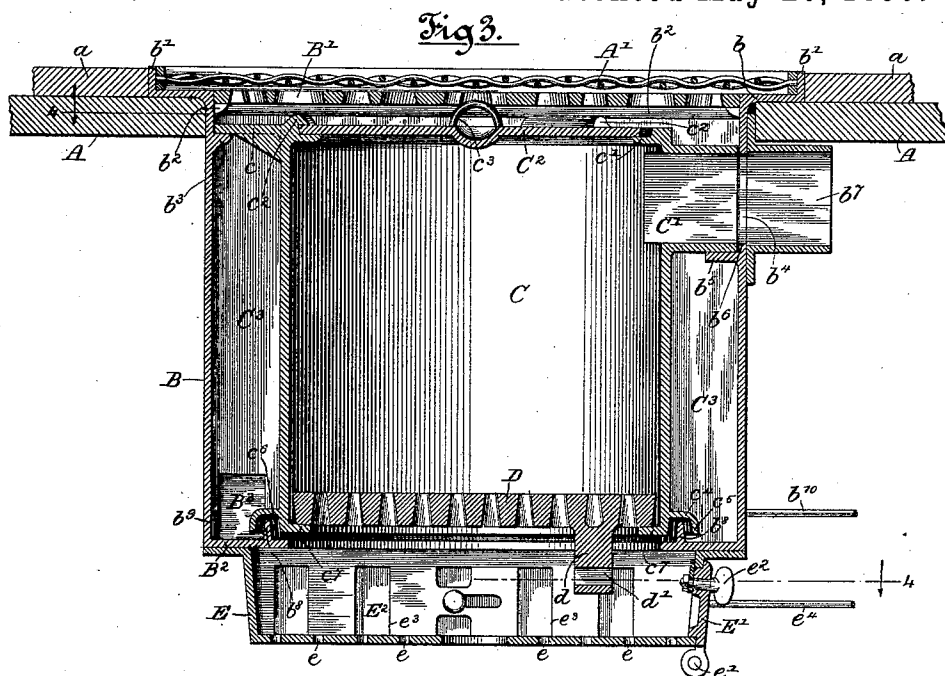
(No Model.)

2 Sheets—Sheet 2.

W. H. RANDALL.
HEATER.

No. 428,137

Patented May 20, 1890.



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UNITED STATES PATENT OFFICE.

WILLIAM H. RANDALL, OF CHICAGO, ILLINOIS, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO THE RANDALL CAR HEATER COMPANY, OF SAME PLACE.

HEATER.

SPECIFICATION forming part of Letters Patent No. 428,137, dated May 20, 1890.

Application filed April 19, 1889. Serial No. 307,741. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. RANDALL, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Heaters; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which

form a part of this specification. This invention relates to that class of heaters employed upon street-railway cars wherein the heater is suspended from the floor of the car and arranged to deliver the heated air to the interior thereof, but is not restricted to such use, as these heaters may be employed upon milk-wagons and other forms of vehicles.

The invention consists in the novel features of construction herein shown, described, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is an end view of my improved heater suspended from a car, showing a portion of the floor of the latter in cross-section. Fig. 2 is a plan view of the same, one-half being in section on the horizontal line 2 2 of Fig. 1. Fig. 3 is a central vertical sectional view of the heater. Fig. 4 is a horizontal sectional view of the heater, taken on two different planes, as shown by the line 4 4 of Fig. 3. Fig. 5 is an enlarged detail sectional view of the horizontal projection and downturned rim on the fire-pot and the flange on the housing.

In the drawings, A is a floor of the car, upon which the mat *a* is placed.

B is a rectangular metal housing or air-chamber provided at its upper end with a horizontally-projecting flange *b*, extending upon each of its four sides. This flange *b*, which is provided upon its outer margins with an upturned rim *b'*, forms a shoulder by which the heater is supported from said floor for the car when said heater is placed in and through the opening cut therein. Resting upon the upper surface of the flange *b* is a wire screen *A'*, which latter is of such thickness that its upper surface will lie flush with the upper edge of the rim *b'* and the face of

the mat *a*. At a short distance below the upper surface of the flange *b* a second flange or shoulder *b²* is formed upon the inner face of each of the four walls of the housing B. Upon this shoulder *b²* rests the usual perforated metal plate or register *B'*, the upper surface of which is flush with or slightly below the upper surface of the flange *b*. Another shoulder or flange *b³* is provided upon the inner face of one wall only of the housing B, the upper surface of which shoulder *b³* is slightly below the flange or shoulder *b²*. In the wall opposite that upon which the shoulder *b³* is formed I provide a hole or opening *b⁴*. Upon the inside of said wall, at a slight distance from the marginal edge of the opening *b⁴*, I provide the inwardly-projecting flange *b⁵*, which flange surrounds the said opening, except on its upper side—that is, it extends around three sides only of the opening. As shown in Fig. 2, this flange is so located with reference to the opening *b⁴* as to form a shoulder at *b⁶*. Bolted or otherwise secured to the outside of the housing B and surrounding the said opening *b⁴* is the thimble or collar *b⁷*, to which thimble a smoke-pipe or chimney (not shown in the drawings) may be secured in the usual manner and may be disposed in any direction desired.

C is a circular metal fire-chamber provided at its upper end with an outwardly-projecting flange *c*, adapted to rest upon the inturned flange or shoulder *b³*. Diametrically opposite the flange *c* is the right-angular projecting flue *c'*, made or formed preferably integral with the fire-chamber C, and adapted to set within the inturned flange *b⁵*, as illustrated in Figs. 2 and 3.

It will be readily understood that the fire-chamber C will be suspended within the housing B and supported therein from the lug *b³* and the flange *b⁵*. The latter, being open at its top, permits the vertical removal of the said fire-chamber C from the housing B, as will be readily understood.

C² is a lid for closing or covering the top of the fire-chamber C. It rests upon the lugs *c'*, which project inwardly from the walls of the fire-chamber C, and is retained in this position by engagement with inwardly-projecting

lugs c^2 on the top of the fire-chamber C. There are preferably three of said lugs c^2 . A portion of the marginal rim of the lid C^2 is cut away at three several places, leaving projections or lugs (unlettered in the drawings) on the said rim, so that when said lid is turned with its cut-away portions opposite to the lugs c^2 the lid may be freely raised from the fire-chamber C. After replacing the lid upon the fire-chamber the lid is turned slightly upon the lugs c^2 , so that other portions or lugs of the margin of this said lid, as shown in dotted line in Fig. 2 beneath the lug c^2 , will be under the said lugs c^2 .

c^3 is a handle attached to the lid C^2 and by which the latter may be removed, and by which the entire fire-chamber may be bodily lifted out of the housing or air-chamber B. This construction will be readily understood by reference to the drawings by those skilled in the art, and is not herein claimed as a specific improvement.

The bottom B^2 of the housing B is provided with a central opening for the passage of ashes from the grate above and for the passage of air from the space below, which opening is surrounded by a vertical or upturned projection or flange b^8 . The fire-chamber C is provided upon its lower end with an annular horizontal projection c^4 , having upon its outer edge a downturned rim c^5 . A space c^6 is formed between said downturned rim c^5 and the bottom of the fire-chamber for the reception of the annular flange or rim b^8 . When the fire-chamber C is hung in the housing B from the flanges b^3 and b^5 , said flange b^8 will project into the space c^6 , and thus secure said fire-chamber C from movement at its lower end. The space c^6 is made somewhat larger than is necessary, simply to accommodate the flange or rim b^8 , in order to allow for the proper expansion of the metal when the fire-chamber C is heated by the fire therein.

Within the chamber C, and resting upon the inturned flange or bottom c^7 thereof, is a grate D, provided with a downwardly-projecting rim or lug d , through the bottom of which lug is formed a hole or opening d' for the insertion of a shaking-rod. Ashes on the grate D may be removed by revolving the said grate in a familiar manner by means of the lug d , the grate rotating upon the flange c^7 .

Secured to and below the bottom B^2 of the housing B by bolts or otherwise is an ash-box E, provided with a plurality of small holes or openings e in its bottom, through which the ashes may sift out by the ordinary motion or jar of the car to which the heater is attached.

E' is a door of ordinary construction, hinged at e' to one side of the ash-box, so as to open downwardly when the thumb-latch e^2 is turned or opened. Upon two ends of the ash-box E and opposite to each other are the sliding dampers E^2 E^3 , of the usual construction, secured to said ash-box ends so as to alternately open and close spaces or holes e^3 in said ash-box. The dampers E^2 E^3 are respectively con-

nected with the operating-rods e^4 e^5 , the ends of which lead to the interior of the car within convenient access of the operator. Upon corresponding ends of the housing B and above the dampers E^2 E^3 are a second set of sliding dampers B^3 B^4 , which latter are adapted to close and open spaces b^9 in the said housing B. The dampers B^3 B^4 are operated by the rods b^{10} b^{11} , respectively, in a manner similar to the operation of the dampers E^2 E^3 by the rods e^4 e^5 .

The operation of my invention is as follows: A fire is built upon the grate D within the fire-chamber C. The smoke will pass out through the flue C' to the open air. If the car or other vehicle to which the heater is attached is going in one direction, the dampers B^3 and E^2 are closed, while the dampers B^4 and E^3 are open. Air is thus delivered through the openings e^3 into the ash-box E, and thence upwardly through the grate D and the fire, and at the same time pure air is also delivered to the interior of the housing B through the openings b^9 therein. The air in the space C^3 between the fire-chamber C and said housing becomes heated and passes upwardly through the grating B' to the screen A' to the interior of the car. When the direction of motion of the car is reversed, the dampers E^3 B^4 are closed over the spaces e^3 b^9 and the dampers E^2 and B^3 are open. It will thus be seen that, first, air is fed to the combustion-chamber, and is also supplied to the heating-chamber when the car is going in either direction.

It will be observed that my improved heater is very simple in its construction, cheap in its manufacture therefore, and possesses no complicated parts which render it difficult to operate. The removable fire-chamber C permits the operator to build a fire therein when the latter is disconnected from the housing B—a feature of utility which will be readily recognized by street-car men who have heretofore suffered from the danger of leaving fires over night in cars in a barn, and from the smoke in the barn in the morning when the fires are started.

In using my invention on street-railway cars it will be found convenient to remove all the fire-chambers C to a suitable room having a plurality of chimney-flues, building the fires in the said chambers C when the latter are in said room, and after the several fires have ceased to throw off the gases and heavy smoke usual when first built to severally replace the chambers C in the housings B as each car starts out of the barn on its first trip.

Upon reference to Fig. 5 it will be noted that the flange b^8 on the housing is provided with a covering b^{12} , of asbestos or similar material that is a poor conductor of heat. The said covering b^{12} is formed thick enough to fill up the space between the downturned rim and the fire-pot, thus effectually preventing ashes and cinders from passing into the air-chamber from the ash-box, and at the same time, owing to the softness of the material, it will

yield and allow the proper expansion of the metal.

It will be observed from the construction above described that dust from the ashes in the fire-box or from the burning fire in the combustion-chamber C is not permitted to mingle with the heated air in the space C³, and thereby be delivered to the interior of the car, which evil is a serious objection existing in all heaters now in use. It is one of the main objects of my invention to cure this defect.

I claim as my invention—

1. The combination of the bottom of a street-railway car or other vehicle having a hole or opening therein, with a perforated register or plate covering said hole or opening, a housing or heating-chamber secured to and suspended from said car-bottom, provided with a hole or opening b⁴, and an inwardly-projecting flange b⁵, surrounding said hole or opening b⁴, except on its upper end, and an inwardly-projecting flange or shoulder b³, located about opposite said flange b⁵, and a fire-chamber located within the heating-chamber and being provided with an outwardly-projecting flue C', adapted to rest upon the flange b⁵ and to communicate with said opening b⁴, and having also an outwardly-projecting flange c,

adapted to rest upon the flange or shoulder b³, whereby the said fire-chamber is removably suspended within said housing, substantially as described.

2. In a heater, the combination, with a housing secured to and suspended from the bottom of the vehicle, said housing being provided at its lower end with an upturned projection or flange b³ and near its upper end with inturned flanges or shoulders, of a perforated register or plate over the top of said housing, a fire-chamber within said housing, resting removably upon the said flange or shoulders, and also provided with a horizontal projection c⁴ and a downturned rim c⁵, adapted to receive the upturned projection or flange b³, a filling of incombustible yielding material b', interposed between said projection b³ and projections c⁴ and rim c⁵, and an ash-box secured to the bottom of said heating-chamber, substantially as specified.

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

WILLIAM H. RANDALL.

Witnesses:

TAYLOR E. BROWN,
HARRY COBB KENNEDY.