(No Model.)

J. H. ELWARD.

CAR HEATER.

No. 383,115. Patented May 22, 1888.

Fig. 1

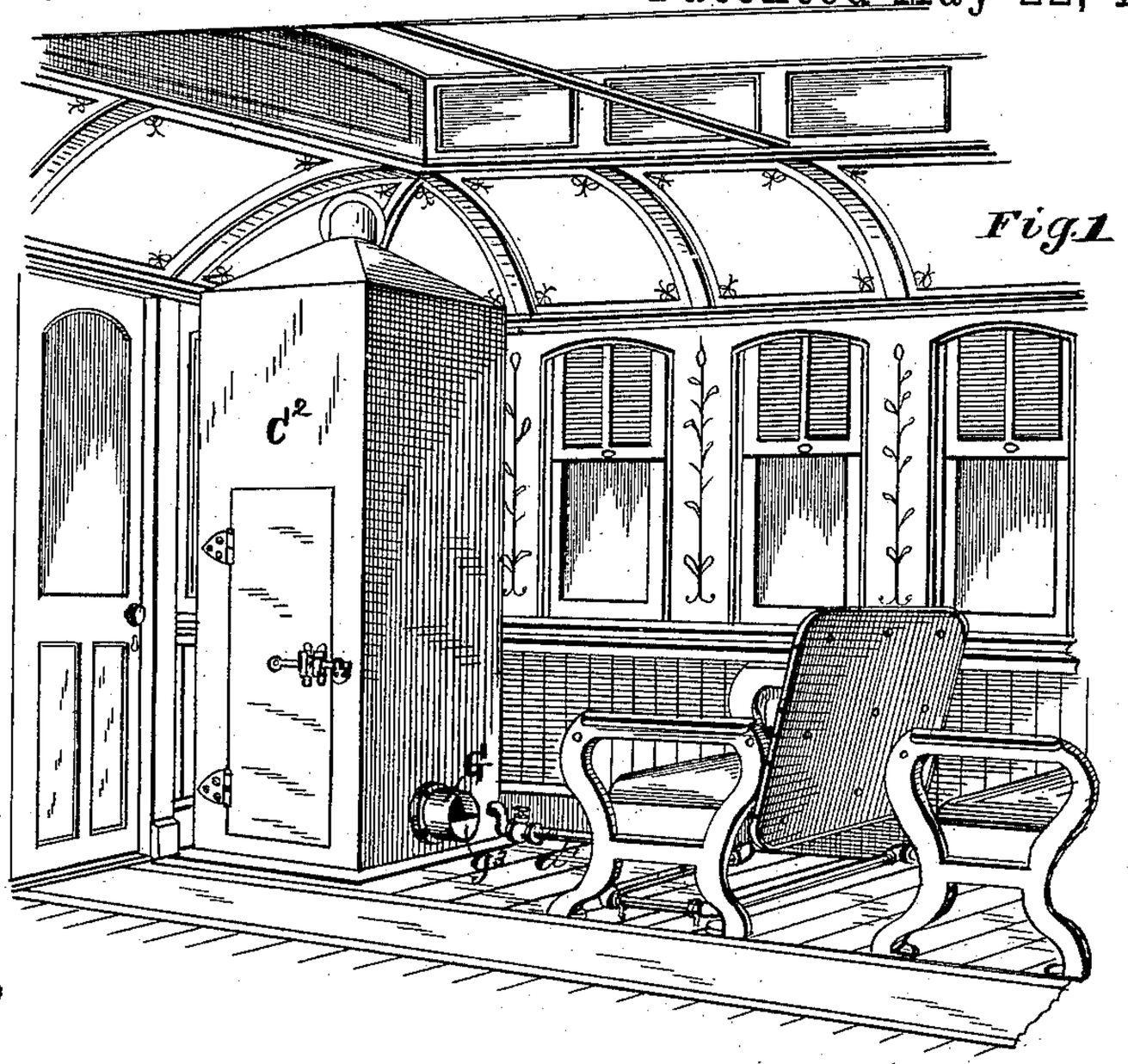


Fig. 6

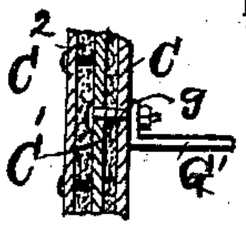


Fig. 4

Fig. 2

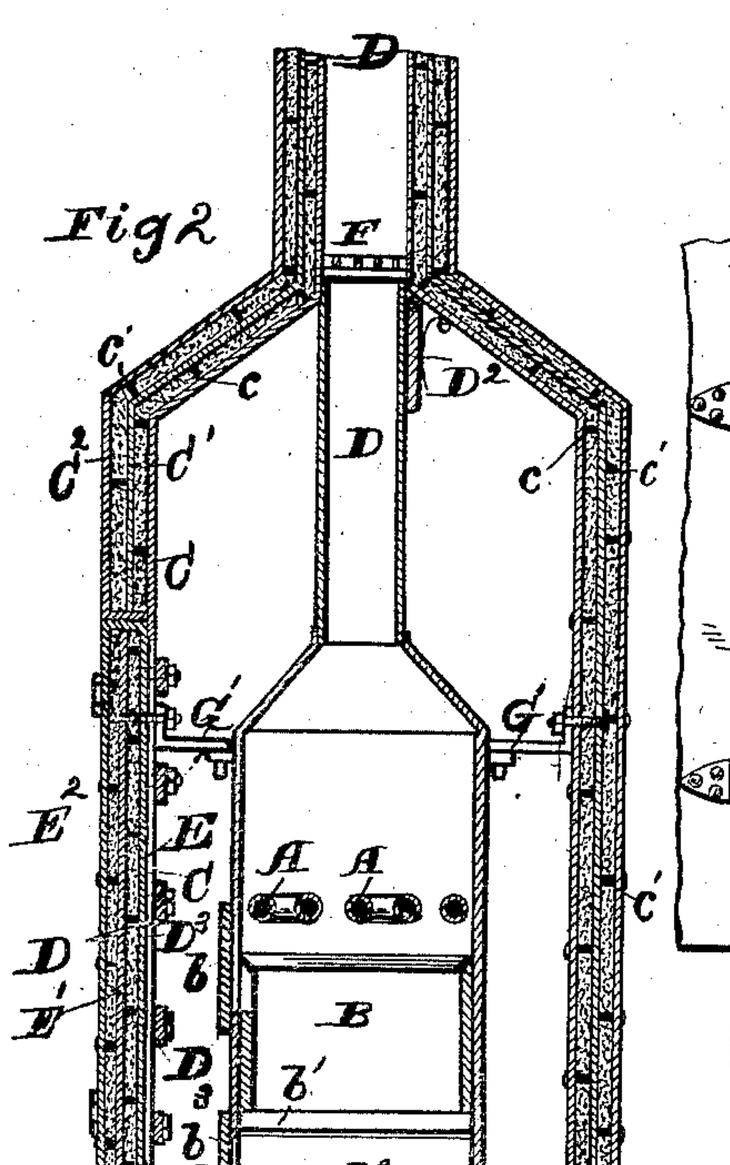


Fig. 5

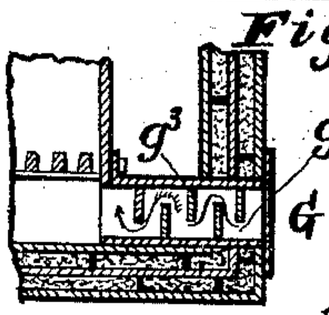
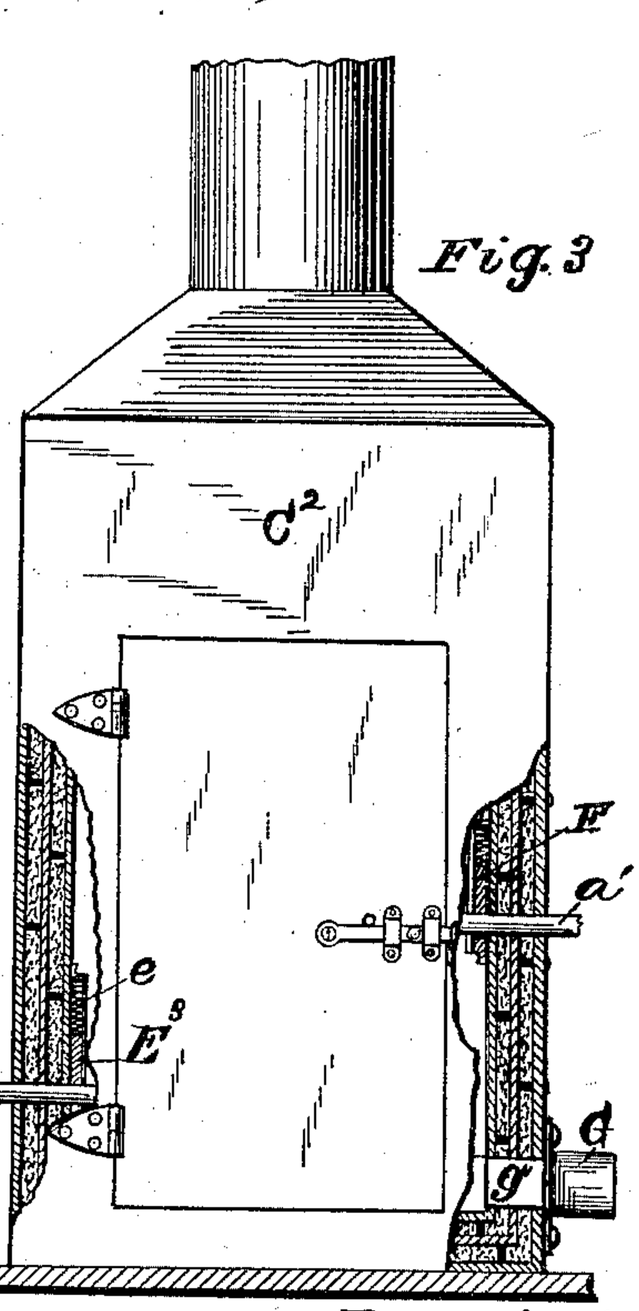


Fig. 3



Witnesses:
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H. F. Sommers.

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by Dickerson & Brisco atty.

UNITED STATES PATENT OFFICE.

JOHN H. ELWARD, OF WHITEWATER, WISCONSIN, ASSIGNOR OF ONE-HALF TO J. F. MITCHELL AND J. A. PARTRIDGE, OF SAME PLACE.

CAR-HEATER.

SPECIFICATION forming part of Letters Patent No. 383,115, dated May 22, 1888.

Application filed March 30, 1887. Serial No. 233,037. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. ELWARD, a citizen of the United States, residing at Whitewater, in the county of Walworth and State of Wisconsin, have invented certain new and useful Improvements in Car-Heaters, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a fire-proof stove-room adapted to be employed in railway-cars.

The object is to prevent the danger of conflagration from the heating apparatus in case it should be overturned or displaced by accident and at the same time provide ample facilities for effecting the heating of the car under ordinary circumstances.

Figure 1 is a perspective view of a portion of a car, showing the manner of applying thereto a heater-chamber constructed in accordance with my invention. Fig. 2 is a cross-section of the same. Fig. 3 is a front elevation. Fig. 4 is a front view of the doorway, the door being opened. Fig. 5 is a sectional view of one form of passage for admitting air to the stove. Fig. 6 is a partial view of one of the brace-bars for fastening the stove to the shell or outer wall, showing the manner of securing said bar.

In the drawings, A A represent the pipes of a coil or nest, wherein the water is heated which is utilized for heating the car, it being supplied to the pipes through the duct *a*, communicating with any suitable reservoir and passing from the heating-pipes A through the pipes *a'* to the different parts of the car.

B represents the fire-box of the stove or furnace, in which the combustion is maintained by which the water is heated. In many respects this can be of any preferred form. That shown has a door, *b*, for supplying fuel, grates at *b'*, an ash-chamber at b^2, and a door at b^3 for the removal of the ashes.

Around the water-pipes and around the stove or heater I arrange a peculiarly-constructed chamber, having sheet-metal walls so constructed and arranged as to prevent the outside portion from becoming heated under any circumstances, and the openings through which are adapted to be closed in such way that neither fire nor burning material can escape from the chamber in whatever position it may be placed.

I form a triple-walled shell, the several walls being indicated by C C' C^2. These may be so shaped as to provide a cylindrical chamber, or one which is square or angular in section. That shown is square in section, with a slightly-flaring top. The side pieces of each wall may be integral from top to bottom, or may be formed of several pieces secured together, they being preferably made of sheets of tank-iron. The wall C is secured to the next exterior wall, C', by means of stud-bolts or other devices capable of both fastening them securely together and at the same time spacing them—that is, holding them apart a suitable distance. Around the wall C' there is built a third wall, C^2, similar in character and of similar material. It is also secured to the wall C' by means of fastening and spacing devices, such as said bolts, as shown at *c'*, the interior stud-bolts being indicated by *c*. The bolts *c* and *c'* are so situated that they do not coincide longitudinally, and, as a result, the conduction of heat from the interior is effectually broken. The double-walled shells heretofore in use have had incident to them such an outward conduction of heat from the interior that there was still danger in using them, even if they were sufficiently strong to attain the other ends aimed at in their use. I pack the spaces between the walls with asbestus or other similar non-conducting material, and thus provide a shell surrounding the heating devices, which is not only sufficiently strong to resist fracture, but also which shall prevent the conducting of heat to the exterior surface to such extent as to make the metal dangerous to surrounding objects. The shell, being made in the way and of the material described, is adapted to bend, so that it will yield inwardly to a considerable extent before it will fracture or be torn to pieces.

By employing the intermediate wall, C', I not only attain the end above spoken of—to wit, that of preventing the conduction of the heat outwardly—but also greatly increase the strength of the shell, considered as a whole, it being desirable to have it capable of resisting not only outward strains brought to bear by

the furnace in case of a fall of the latter, but also inward thrusts from exterior bodies in case the shell should fall upon them.

I know that stationary heaters have been provided with jackets, in each case consisting of a wall of non-conducting material inclosed between two walls of metal for the purpose of saving as much as possible of the heat of the furnace; but I do not know of any earlier construction adapted to the use for which the present one is intended—that is to say, one having, in combination with the furnace, a complete enveloping non-conducting shell of the character described, rigidly secured by bolts or otherwise to the furnace itself, so that both are virtually one structure. Again, in my construction the door is also formed as a non-conductor, so that it can be made large relatively to the shell and to the interior fire-box, a relative increase in size being necessary by reason of the presence of the re-enforcing bars across the doorway and of the small space available for the manipulations necessary in attending to the furnace. By constructing the body of the furnace in the way described it can be made as large as necessary without presenting a surface of metal at the exterior surface of the shell that can act as a conductor of heat.

D represents the pipe or flue through which pass the products of combustion from fire-box B. This at its upper end is surrounded by a part of the aforesaid triple-walled jacket. If the stove should be overturned and the pipe D knocked away from the jacket at its upper end, the pipe-aperture will be instantly closed by means of a spring-actuated valve, D^2, so constructed and arranged as to prevent anything from escaping from the interior, it being forced more tightly into place if struck by any of the contents of the chamber.

So long as the inlet-pipe *a* is in position in its aperture through the shell there is no serious danger of heated bodies escaping through said aperture; but if this pipe should be knocked away from the aperture, so that the latter is uncovered, a sliding valve, E^3, is instantly forced into place by means of a spring, *e*, to close it.

The outlet-pipe *a'* has combined with it also a sliding valve, F, adapted to close its aperture if the pipe should be removed.

The air for supporting combustion can be supplied in any suitable way. I prefer to provide apertures through the lower part of the stove through which air can pass from the interior of the shell, it entering into the interior either through apertures in the bottom of the car or through a passage-way shown at G. This passage G consists of a pipe or box flanged so that it can be tightly secured to the outer surface of the shell in coincidence with an opening at *g'*. To prevent ashes, cinders, or coals from escaping outward under all circumstances, I provide the pipe or box G with "staggered plates" g^3—that is to say, plates projecting into the passage g^2 through the pipe, and arranged alternately and so as to overlap each other, yet not completely closing the said passage.

The shell is formed with a doorway sufficiently large to permit the acts which are necessary in charging or feeding the stove and otherwise manipulating the apparatus. This door is indicated at E E' E^2, it also being made of sheets of tank-iron in a way substantially similar to that followed in making the walls, the sheets E E' E^2 being spaced and fastened by bolts and having a non-conducting packing between them. This door is upon the outside provided with strong hinges and a latch adapted to be locked in place. To still further insure against the door being broken open by the stove if the latter should fall toward it, I provide re-enforcing flanges D^3, which project across a part of the doorway, these being preferably formed by extending in the inner sheet, C, of the wall. Then I secure a series of strong iron bars across the doorway, as shown at D^4, there being open spaces between the bars sufficient to allow the aforesaid work to be done under ordinary circumstances; but the bars are so constructed and arranged as to entirely prevent the stove from coming in contact with the door or from imparting any serious blow thereto.

I am aware that car-heaters have been heretofore employed, wherein use was made of a non-conducting wall inclosed by a sheet of metal and a sheet of wood, this wall in some cases being upon one side only of the stove or furnace, and in all others that I know of it extends only part way round the same, being in all cases used merely to protect the woodwork immediately adjacent from the heat ordinarily escaping from the stove. In my case the construction is materially different, so far as the surrounding non-conducting walls are concerned, and as they are intended to accomplish another purpose. Not only do I protect the woodwork of the car which is immediately adjacent to the stove or furnace when the latter is in its normal position, but I prevent it from sending heat to the exterior under all circumstances, whether it be thrown to one side or the other of the chamber or remain stationary, and also whether the inclosing-shell itself be torn loose or remain in proper position. Not only do the non-conducting walls extend entirely around the fire-box of the stove on all sides horizontally, but they extend to points above it and surround more or less of the pipe or duct for the passage of the smoke. When the parts are thus constructed and arranged, I provide a way for thoroughly insuring that the burning or heated materials shall not escape from the non-conducting shell, even if the fire-box proper should be completely inverted. When turned over, one of the first results of the movement is to loosen and detach the pipe D, so that the valve D^2 is permitted to fit tightly to its seat. If the fire-

box proper should extend to the top of the outer shell, the operation of the shut-off devices would not be as readily attainable.

I am also aware that devices differing from that herein somewhat as to purpose—to wit, refrigerators—have been constructed with two walls containing a layer of non-conducting material between them, and that in some instances these have been surrounded by a wooden wall with an air-space inside, and I do not claim such device as my invention; but I am not aware that even such articles have been constructed with three sheets, all of metal, so arranged as to form two substantially continuous chambers, with both or either of them packed with non-conducting material to attain the purposes at which I aim, the outer metal sheet being secured to the intermediate one by devices on transverse lines different from those of the devices which fasten the intermediate to the inner wall. The third or outer sheet of metal is a matter of considerable importance when used in conjunction with the two inner ones, for it is practically impossible to secure the inner ones together otherwise than by metallic fastening devices adapted to conduct heat rapidly from the interior to the exterior. When the third outer wall is employed in conjunction with the others, the conducting out of the heat is effectually broken. The three-walled shell below the stove and also that which converges to and extends more or less up around the smoke-duct not only act to protect the wood-work when the parts are in their normal position, but offer an additional assurance that heat shall not be conducted to the exterior in case of accident. The braces G′, by which the stove is held in place, are themselves secured in such way that the heat is thereby conducted to the outside, as their fastening devices are attached only to the inner metal wall and to the intermediate one.

What I claim is—

1. In an apparatus for heating cars, the combination, with the stove or furnace, of the surrounding shell, rigidly secured by bolts to the said furnace, which has upon all sides of the stove walls of non-conducting material and walls of sheet metal, which inclose the said non-conducting material, a doorway formed in said shell, and a door situated in the said doorway, also formed of sheets of metal and non-conducting material inclosed thereby, substantially as set forth.

2. In an apparatus for heating cars, the combination, with the stove or furnace and the pipes which convey heat from the furnace to the car, of the surrounding shell, which has two walls of non-conducting material extending entirely around the stove horizontally, and the three metal walls inclosing the said non-conducting walls, and the non-conducting door in the said shell, substantially as set forth.

3. In an apparatus for heating cars, the combination, with the stove, of the surrounding three-walled shell which extends horizontally entirely around the stove, the walls of which are formed of sheets of metal secured together and spaced apart by rivets, the rivets which secure the first and second walls being arranged on transverse lines other than those which secure together the first and second walls, substantially as set forth.

4. In an apparatus for heating cars, the combination, with the stove, of the surrounding three-walled shell, formed with the vertical part which surrounds the stove proper, the inwardly-tapering part above the said vertical part, and a supplemental vertical part above the tapering part and surrounding the smoke-exit, substantially as set forth.

5. In an apparatus for heating cars, the combination of the stove, the surrounding shell of non-conducting walls with inclosing sheets of metal, the door constructed of similar walls and metal sheets, and the cross-bars D^4, fastened independently of the door to the said walls inside of the doorway, substantially as described.

6. In an apparatus for heating cars, the combination, with the stove, of the surrounding shell, the escape-duct for smoke, the automatic valve which closes the said duct, the duct for supplying air to the furnace, the zig-zag or staggered plates for preventing the ashes and cinders from escaping through said duct, the pipes *a a′* for conveying heat from the stove to the car, and the spring-actuated valves E^3 and F, substantially as set forth.

7. The combination, with the stove, of the non-conducting shell having two or more sheets of metal spaced apart and the doorway formed therein, and with the inner sheet of metal extended toward the middle of the doorway to form a flange, and the door having its edges outside and adjacent to said flange, as set forth.

8. The combination, with the stove, of the surrounding shell having several parallel separate metal walls with non-conducting chambers between them, and the braces G′ for the stove secured to the shell independently of the outer metal wall thereof, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN H. ELWARD.

Witnesses:

J. A. PARTRIDGE,

L. E. BARNES.