

(No Model.)

T. B. HOWE.  
CAR HEATING APPARATUS.

No. 386,322

Patented July 17, 1888.

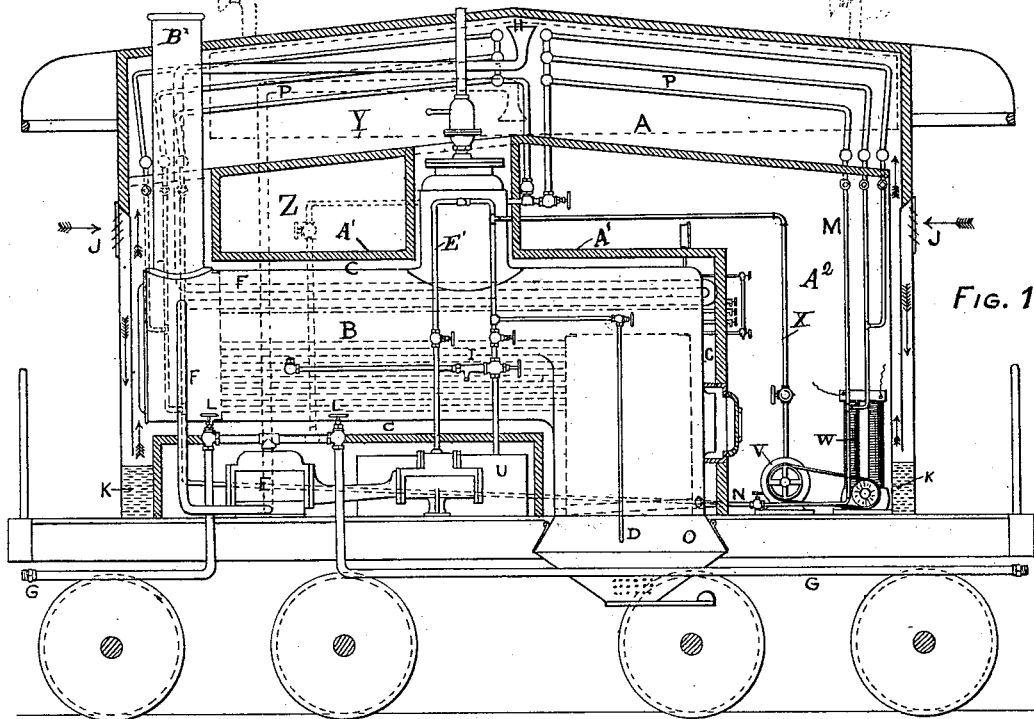


FIG. 1

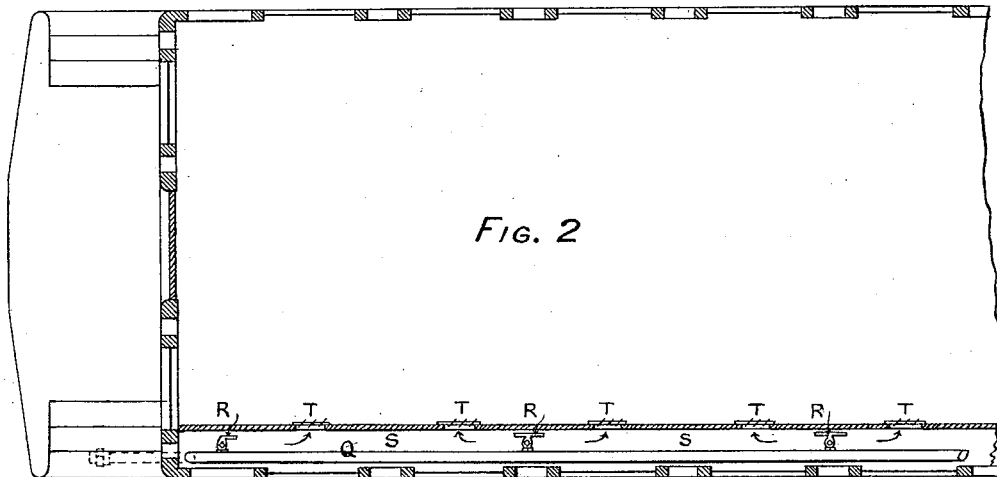


FIG. 2

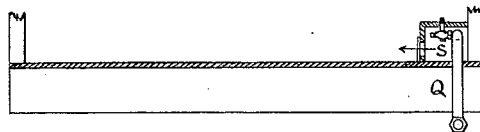


FIG. 3

WITNESSES.

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# UNITED STATES PATENT OFFICE.

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## CAR-HEATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 386,322, dated July 17, 1888.

Application filed March 4, 1887. Serial No. 229,733. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS B. HOWE, of Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain  
5 new and useful Improvements in Car-Heating Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this  
10 specification, and to the figures and letters of reference marked thereon.

My present invention relates to that class of car-heating devices wherein a separate fire-proof car or vehicle is employed in which the  
15 heating apparatus is located, and then by means of suitable pipes or conduits the heated air is distributed throughout the train, and it differs from others of its class in that the air passed to the cars of the train is rendered  
20 purer and is more thoroughly heated before being delivered into the car than heretofore.

In the drawings, Figure 1 is a sectional view of a car containing the various instrumentalities employed for carrying out my invention;  
25 Fig. 2, a horizontal sectional view of a portion of a passenger-car, showing the hot-air-diffusing apparatus; Fig. 3, a vertical cross-sectional view of the same.

Similar letters of reference in the several  
30 figures indicate the same parts.

The car shown in Fig. 1 is constructed of fire-proof material, preferably iron, is somewhat smaller than an ordinary car, and adapted to be coupled on a train of passenger-cars, in  
35 the ordinary manner, either directly in rear of the engine or at the rear of the train, as may be desired. Within this car is arranged a steam-boiler, B, preferably surrounded by a casing or partition, A', dividing the car into  
40 two parts, the one A a hot-air chamber containing the steam-boiler and suitable steam-pipes, to be described, and the other, A<sup>2</sup>, into which the feed-door of the furnace opens, and which the attendant occupies. This chamber  
45 contains, also, a small rotary engine, V, receiving steam from the boiler through a pipe, X, and a dynamo-electric machine connected therewith, so as to be operated to light the train, operate brakes, or for any other purpose.

50 The steam-boiler B is of any desired pattern,

provided with a stack, B<sup>x</sup>, an ash-pit, O, closed tightly by a suitable casing, a steam-dome, water and steam gages, and all the other appurtenances of a boiler.

As one of the objects of the invention is to  
55 provide a heating apparatus that is not liable to communicate fire to the cars of the train in case of accident, there is no direct opening to the air from the fire-box or ash-pit of the furnace, but combustion is supported by means  
60 of a steam-jet-forcing apparatus, D, located below the grate and receiving steam directly from the boiler; the small amount of air necessary to support combustion when employing this form of apparatus readily finding an en-  
65 trance through minute perforations too small to prevent the outward passage of fire or coals, but permitting the ready entrance of air. The water for the boiler is supplied from a small water-tank, U, by means of an injector, 70  
I, of any approved type.

The larger portion of the chamber A, in which the boiler is contained, is located at the top of the car, and in this portion of the chamber are provided steam-radiator coils P P,  
75 connected with the steam-dome of the boiler, so as to receive dry steam therefrom, and provided with drip-pipes M M, connected through return-pipe N with the base of the boiler, so as to permit the water condensed in the pipes 80  
to return to the boiler, as will readily be understood.

At the ends of the car are provided suitable openings for the external air, controlled by dampers or registers J and communicating  
85 with passages leading over tanks of water, K, to the interior of the chamber A. This water, K, serves to catch and hold all the dust in the air and render the same pure when delivered within the chamber. The surface, being kept  
90 agitated by the motion of the car, will serve the more effectually to cause the dust and cinders to sink to the bottom and leave a clean surface at the top all the time. Any other suitable air-filtering device may be employed—  
95 such as one composed of wire-gauze, hair, and wool, as described in Letters Patent granted me September 8, 1885, and probably this would be the preferred construction; or, if desired,  
100 the filters might be located at the top of the

cars and provided with suitable deflecting devices for directing the air through them, as shown in dotted lines at W, Fig. 1.

F F represent a hot-air pipe extending from the top of the chamber A, where it is provided with a bell-mouth, H, horizontally to the smoke-stack, into and down the latter to the top of the boiler, thence into the steam-space, where it extends back and forth in any desired number of coils, and from thence to a pump, E, the steam-cylinder of which receives steam from the boiler through the pipe E', a suitable valve being provided therein. Instead of passing the pipe down the smoke-stack, it may be passed directly through the steam-space of the boiler.

G G represent the main air-pipes, connected to the discharge of the pump E and extending throughout the length of the train, suitable valves, L L, being provided for regulating the supply of air to them, and suitable connections, preferably similar to those employed for the air-brake, being provided between the cars, as will be readily understood.

From the above description the operation of the various devices will be understood. The air entering the car at the ends (the quantity being regulated by the registers J) passes through the filtering devices—in the present instance the water-chambers—and is cleared of all dust and impurities and ready, when properly heated, to be introduced into the cars of the train from the chamber A. This air circulating in the chamber A is thoroughly heated both by contact with the surface of the boiler and by the steam-coils P P, located therein; but it will be noted that the door to the fire-box of the furnace is not in this air-chamber; hence no gases or smoke can enter from the latter and be discharged into the cars. The steam-pump is now started by opening valve in pipe E', and the heated air from A is drawn through the pipe F (the end H being located at the highest part of the car, where the air is the hottest) to the steam-space of the boiler, where it is superheated to a very high degree by the dry steam therein; thence it passes through the pump and is discharged into the mains G, as will be readily understood, when it is distributed in the cars in a manner about to be described.

In Figs. 2 and 3 are shown the devices for distributing the heated air within the cars composing the train. In the lower corners of the passenger-cars are located boxes or chambers S, extending the length of the car and provided at suitable intervals, preferably between the seats in the cars, with registers T, arranged to be opened or closed, as desired.

The branches Q of the pipes G pass up through the floor of the car and along through the chamber S, and are provided at suitable intervals with jets or openings controlled by cocks R, for regulating the amount of hot air entering the box.

From the above it will be seen that the air, strained and heated, is passed into the cham-

bers in the car, where the force of the jets is taken off, and is admitted to the car in proximity to the passenger's seat as the occupant thereof desires.

The dynamo can be used for lighting the train, suitable electrical connections being furnished through the same pipe that conveys the heated air, if desired, so that this extra car may serve as a heating, ventilating, and lighting apparatus—a valuable adjunct to any railroad-train.

Instead of employing a reciprocating steam-pump, as shown, a rotary pump may be employed, or a fan to force cold air into the car during warm weather, ice or a suitable refrigerating material being placed in the chamber A, thus insuring a supply of clean cool air to the passengers.

In case of an accident or collision, resulting in the overturning of the car, it will be noted that this car, being fire-proof, cannot burn, and that the boiler and the other parts, being constructed of strong boiler-iron, are not readily smashed, and, further, that the chamber containing the fire is closed at all points except the few minute perforations in the bottom of the ash-pit for the entrance of the air necessary to support combustion.

Various modifications of the invention can be devised without departing from the spirit of my invention; hence I do not desire to be confined to the precise details of construction shown. For instance, the pipes F, instead of passing to the boiler, may pass directly to the pump-cylinder, as indicated in dotted lines, Fig. 1; also, if desired, the pipes G could be supplied with steam to heat the cars or dampen the air in them by means of the pipe Z', (shown in dotted lines, Fig. 1,) leading from the steam-dome to the pipe G above the pump, a suitable cock being provided therein, as shown.

The car containing the heating, lighting, and ventilating apparatus may be connected at either end of a train or in the middle, the pipes G extending from either end to permit this.

I claim as my invention—

1. In combination with the main air-passage extending throughout the train, the chamber in communication with the external air, heating devices—such as steam-radiator coils—located therein, a steam-boiler, a passage communicating with the chamber and passing through the steam-space of the boiler above the water-line, an air-forcing apparatus located in said passage, and connections between the passage mentioned and the passage extending throughout the train, whereby when the air-forcing apparatus is operated the air is drawn into the chamber and is there heated, whence it passes through the steam-space of the boiler and is heated to a higher degree, and from thence it is supplied to the main air-pipe and distributed to the cars as desired, substantially as described.

2. In a car-heating plant, the combination,

with a fire-proof car divided into compartments, a steam-boiler, and steam-radiator coils communicating therewith located in one of said compartments, and a communication between said compartment and the external air, of an air-pipe leading from the top of said compartment through the steam-space of the boiler to an air-forcing apparatus located in another compartment, from whence the air is distributed throughout the train, substantially as described.

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Witnesses:

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