2 Sheets—Sheet 1.

L. F. J. LEMEUNIER & E. GERARD.

Apparatus for Heating Railway-Carriages, &c.

No. 207,289. Patented Aug. 20, 1878.

Fig. 1.

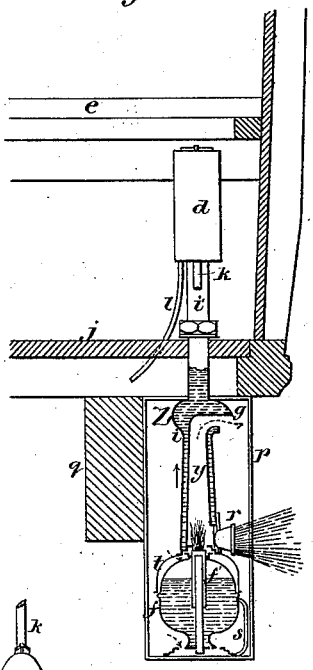

Fig. 2.

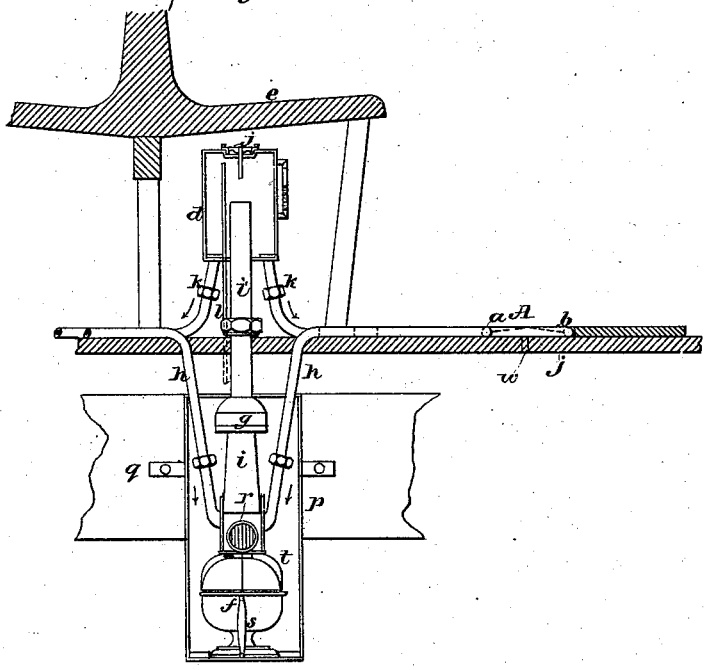

Fig. 3.

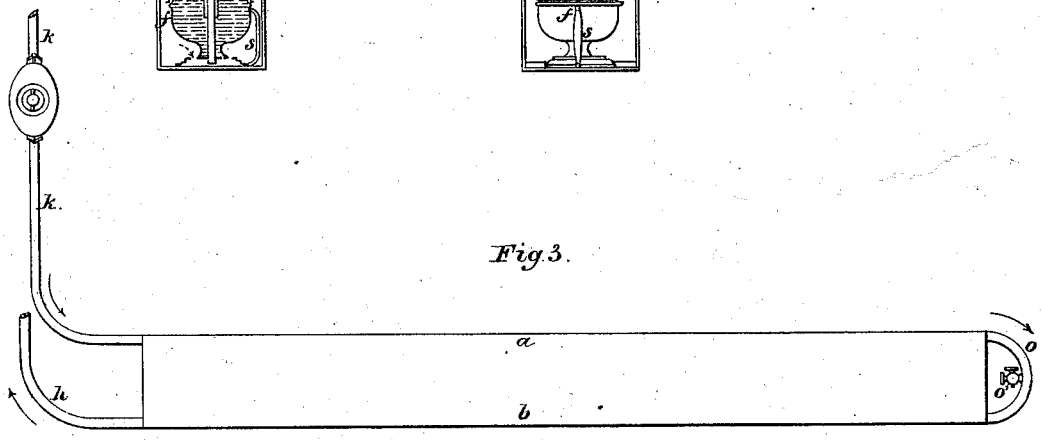

Fig. 4.

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2 Sheets—Sheet 2.

L. F. J. LEMEUNIER & E. GERARD.

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Fig. 5.

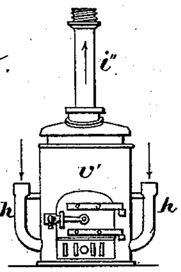


Fig. 6.

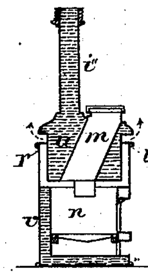


Fig. 7.

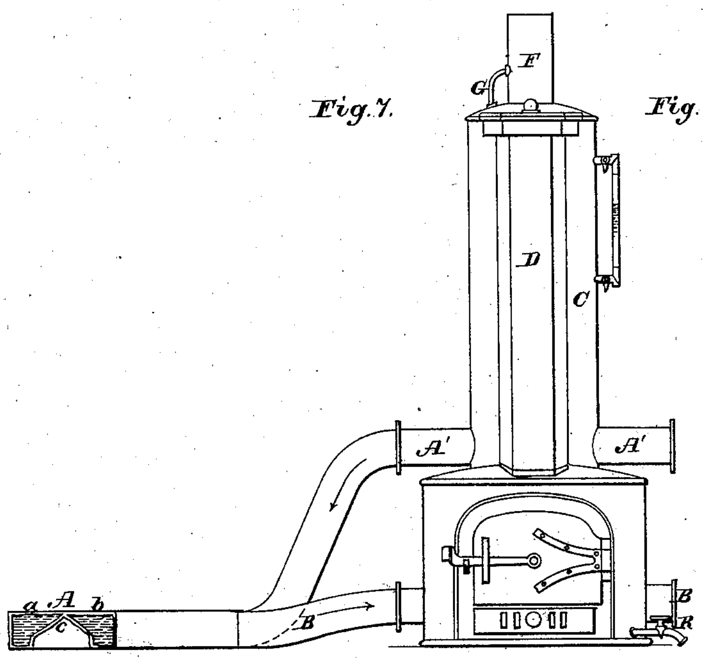


Fig. 8.

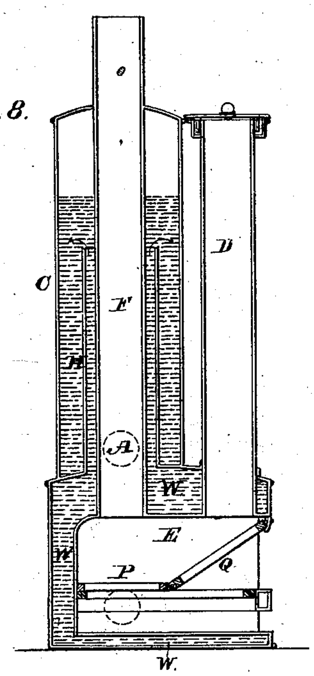
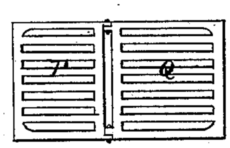


Fig. 9.



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UNITED STATES PATENT OFFICE.

LOUIS F. J. LEMEUNIER AND EMILE GERARD, OF PARIS, FRANCE.

IMPROVEMENT IN APPARATUS FOR HEATING RAILWAY-CARRIAGES, &c.

Specification forming part of Letters Patent No. **207,289**, dated August 20, 1878; application filed October 2, 1876.

To all whom it may concern:

Be it known that we, LOUIS FRANÇOIS JEAN LEMEUNIER and EMILE GERARD, of the city of Paris and Republic of France, have invented a new and useful Improvement in Apparatus for Heating Railway-Cars and other Structures, which improvement is fully set forth in the following specification and accompanying drawing, in which—

Figure 1 represents a transverse section of a portion of a railway-car, and shows in connection therewith a view, partly in side elevation and partly in vertical section, of our invention. Fig. 2 represents a longitudinal section of a railway-car, showing also a view, partly in front elevation and partly in section, of our invention. Fig. 3 is a plan view of the radiator and water-circulating devices. Fig. 4 is a transverse section of the radiator and water-circulating compartments, and shows also the air-heating chamber. Fig. 5 is a front elevation, and Fig. 6 a vertical transverse section of a modified form of heating apparatus. Figs. 7 and 8 show the application of one radiator to a device for heating houses.

The object of our invention is the warming of railway-cars and stationary buildings by means of radiated heat and warm-air currents; and consists in the combination of a suitably-arranged furnace, boiler, distributing-reservoir, and water-circulating compartments, which partly inclose an air-heating chamber.

In applying our invention to the heating of railway-cars, each car is provided with one or more boilers arranged beneath its floor and heated by a suitable furnace, the boiler connecting, by means of a pipe, with a distributing reservoir arranged above the floor, and preferably beneath one of the seats of the car. From this reservoir the hot water is circulated through pipes and water-compartments on the car-floor.

In Fig. 1, *p* indicates a box or casing secured to a longitudinal beam beneath a railway-car. Within this casing is arranged a vertical boiler, *i*, having an enlarged top portion, *z*. A vertical flue, *y*, is arranged in this boiler, terminating in a horizontal flue, *g*, passing outward under the enlarged portion *z* of the boiler. At the base of the boiler *i* is swung a suitable-sized lamp, in such position that its flame extends into the flue *y*.

In one side of the base of the boiler may be an opening provided with a reflector, *r*. The flame of the lamp and the heated products of combustion, passing through flues *y* and *g*, heat the water in the boiler, from which a pipe, *i'*, leads upward into and about half-way through a distributing-reservoir, *d*, arranged beneath the car-seat *e*. From the bottom of this reservoir pipes *k k* lead downward and in opposite directions, each connecting with one end of a compartment, *a*, of a radiator, A, arranged transversely upon the floor of the car. This compartment *a* is connected at its other end by a pipe, *o*, with one end of a parallel compartment, *b*, from the other end of which a pipe, *h*, leads through the car-floor to the base of the boiler *i*.

The radiator A has a flat top, which covers both the compartments *a b;* but the inner walls of these compartments are inclined, so as to meet against the longitudinal center of the top wall, and thus between said inclined walls and the floor of the car is formed a chamber, *c*, which is left open at both ends. One or more openings, *w*, may be made in car-floor, for the purpose of admitting fresh air to the chamber *c*. A vapor-pipe, *l*, leads below the car-floor from a point above the water-level in the reservoir *d*.

The operation of the devices just described is as follows: Water is introduced through the top opening or valve, *j*, of the reservoir *d*, and flows through pipes *k k*, compartments *a*, pipes *o*, compartments *b*, and pipes *h* to the boiler *i*, until it rises in pipe *i'*, and overflows into reservoir *d* until said reservoir has a stationary water-level about half-way between its top and the top of pipe *i'*, the supply of water being then cut off and the reservoir closed. Instead of introducing the water in this manner, it may be forced in through a cock, *o' m*, and pipe *o*, which also may serve for drawing off water when connected with a pipe or hose leading outside the car. The apparatus having been supplied with water, the lamp should be lighted, when, as will be readily understood, the heated water in the boiler will rise through the pipe and flow into the reservoir, being replaced by cold

water flowing into the boiler through pipes *h*. Soon hot water begins to flow from the reservoir through pipes *k* and compartments *a*, becoming cooler as it circulates farther through pipes *o* and compartment *b*, until it again reaches the boiler through pipes *h*. In practice, we have found that the water cools so rapidly that we call the compartment *a* the "hot-water compartment," and the compartment *b* the "cold-water compartment," though the water is not thoroughly cooled even when it reaches the boiler, but sufficiently so to keep up the circulation. Through the opening or openings *w* in the floor of the car air enters the chamber *c*, and, becoming heated by contact with the walls of the compartments *a* and *b*, flows out through the open ends of the chamber, and while assisting in warming the car establishes a current that supplies fresh air.

By Figs. 5 and 6 is shown a form of furnace and boiler which may be substituted for the lamp *f* and boiler *i* when solid fuel is used, such as coal or charcoal. The furnace *n* is arranged in a water-jacket, *v*, which forms its bottom and three of its vertical sides. This jacket communicates, by pipes *h'* *h'*, with an upper boiler-compartment, *u*, arranged within the single-walled upper part of the furnace, and having an upward-extending pipe, *i''*, which may communicate with the reservoir *d*. Through the upper boiler, *u*, a fuel-passage, *m* leads to the furnace, and should be provided with a suitable lid.

In Figs. 7 and 8 is shown a form of water-heating apparatus which may be used upon the same floor with the compartments *a* and *b*, forming the radiator and air-chamber. E is the furnace; P Q, its grate; W, the boiler, to the bottom of which leads pipe from compartment *b* of the radiator; and C is the reservoir, into which hot water flows through pipe H, which surrounds the flue F. From the reservoir C a pipe, A', leads to compartment *a* of the radiator. This modification is intended for use chiefly in public buildings.

Having now fully described and explained the operation of our invention, we claim—

1. The combination of a boiler and suitable furnace arranged under a car or chamber floor, a pipe extending upward and into a distributing-reservoir arranged above said floor, and a pipe or pipes leading from said reservoir to a circulating-radiator, constructed substantially as described, inclosing an air-chamber, and arranged upon the floor, substantially as set forth.

2. The combination of boiler *i*, having central flue, *y*, lamp *f*, pipe *i'*, distributing-reservoir *d*, pipes *k*, circulating-radiator A, and pipes *h*, substantially as set forth.

3. The hot-water-circulating compartments *a b*, arranged side by side upon a floor, and having between their inner sides, and beneath their connected inward projections, the air-heating passage *c*, substantially as set forth.

4. The lamp *f*, hung in a suitable case beneath a car-floor, in combination with water-jacket boiler *i*, having an enlargement, *z*, and flue *g* thereunder, substantially as and for the purpose set forth.

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Witnesses:
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L. LANVIER.