P. GRANDJEAN & J. B. D. CASSINELLI.

APPARATUS FOR WARMING RAILWAY CARRIAGES, &c.

No. 180,022. Patented July 18, 1876.

Fig. 1.

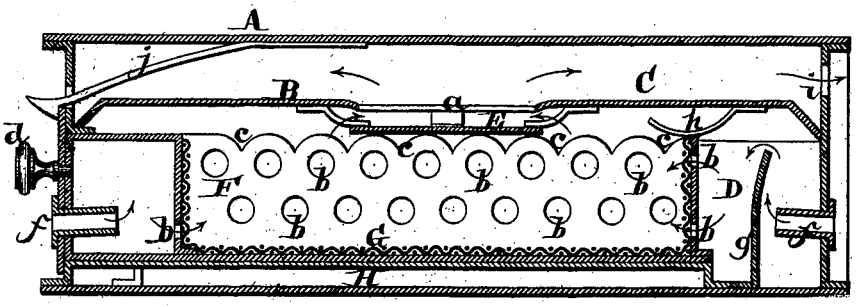
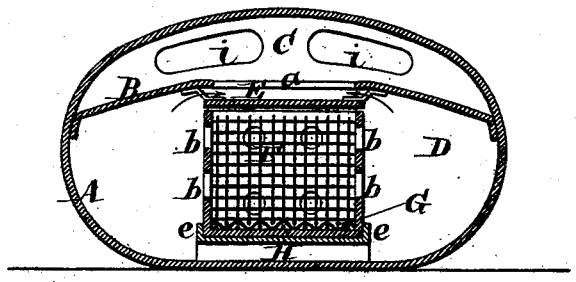


Fig. 2.



Witnesses.
Otto Hufeland.
Robt E. Miller.

Inventors.
Pierre Grandjean
Jean Baptiste David Cassinelli
by
Van Santvoord & Hauff
Attorneys

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

PIERRE GRANDJEAN AND JEAN B. D. CASSINELLI, OF PARIS, FRANCE.

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

Specification forming part of Letters Patent No. **180,022**, dated July 18, 1876; application filed June 22, 1876.

To all whom it may concern:

Be it known that we, PIERRE GRANDJEAN and JEAN B. D. CASSINELLI, of Paris, France, have invented a new and Improved Apparatus for Heating Railroad-Cars and other purposes, which invention is fully set forth in the following specification, reference being had to the accompanying drawing, in which—

Figure 1 represents a longitudinal vertical section of our apparatus. Fig. 2 is a vertical cross-section of the same.

Similar letters indicate corresponding parts.

This invention relates to an apparatus especially adapted to heating railroad-cars, but which may also be used as a foot-warmer, and for other like purposes.

It consists in a casing which is divided into two chambers, situated one over the other, the lower one of which chambers contains a fire-box, and is provided with an orifice at one or both its ends, for the admission of atmospheric air, whie the upper chamber communicates with the lower chamber, and also is provided with an orifice at one or both its ends for the escape of the air which is admitted to the lower chamber, and which air is heated in its passage through the said lower chamber when a fire is built in the fire-box. The fire-box is provided with holes in its sides for the admission of air to support combustion therein, and the bottom of the box is covered with a wire-work mat, so that the box is adapted to the burning of artificial fuel, as will be hereinafter set forth.

In the drawing, the letter A designates a casing, which is divided by a horizontal partition, B, into an upper chamber, C, and a lower chamber, D, the partition B being provided with an opening, *a*, through which the chambers C D communicate with each other. Beneath the opening *a* is suspended a plate, E, whose object will be hereinafter described. F is the fire-box, which, in the example shown, has a rectangular shape. On the bottom of this box is placed a mat, G, made of wire-gauze, and in its sides are formed holes *b*, for the circulation of air in and around the box. On the upper edges of the fire-box F are formed notches *c*. The fire-box is situated in the lower chamber D, and it is preferably made removable, to which end a suitable opening is formed in the front end of the said lower chamber D, for the insertion and removal of the box, the latter being moreover provided with a knob, *d*, for handling it. A plate, H, is affixed to the bottom of the said lower chamber D, for supporting the fire-box F, the longitudinal edges of such plate being bent up to form flanges *e*, (see Fig. 2,) which serve to guide the box when it is slid in and out of the chamber.

When the fire-box F is made removable I combine therewith a spring-catch, *j*, which is so arranged as to engage the box after it is shoved into place. With the box is combined also a spring, *h*, to prevent rattling or shaking thereof, particularly when our apparatus is used in railway-carriages, such spring being fastened to the horizontal partition B, and bearing on the upper edge of the box. In the rear end of the lower chamber D, and in the front end of the fire-box F, are formed orifices *f*, for the admission of atmospheric air, a deflector, *g*, being placed contiguous to the said orifice in the rear end of the chamber, to prevent the air coming in at that point from being thrown directly in contact with the fire-box F or the fuel placed therein. The upper chamber C has orifices *i* formed at each end thereof, for the escape of air. The air entering by the orifices *f* in the lower chamber passes into the fire-box F through the holes *b* in its sides, and if a fire is made in this box the combustion is facilitated therein while the air becomes heated. The air thence passes into the upper chamber C by the opening *a* in the partition B, being made to describe a circuitous course by the plate E, whence it escapes from the upper chamber through the orifices *i*.

In order to heat our apparatus we prefer to make use of an artificial fuel, composed of pulverized tan or bark of trees, charcoal-dust, nitrate of lead, and starch, or any equivalent materials, which forms the subject of another application for Letters Patent by us, and

which has the great advantage, that it produces neither smoke or any perceptible ordor, while it is exceedingly durable.

What we claim as new, and desire to secure by Letters Patent, is—

1. The combination, in an apparatus for heating, of the upper chamber C, and lower chamber D, each provided with orifices *f i* at one or both ends thereof, with the fire-box F, the whole constructed and adapted to operate substantially as described.

2. The fire-box F, having holes *b* in its sides, and provided with a wire-mat, G, substantially as and for the purpose described.

P. GRANDJEAN.
J. B. D. CASSINELLI.

Witnesses:
H. BONNEVILLE,
W. H. DAUBRAY.