

H. MAEY.

CAR HEATER AND VENTILATOR.

No. 177,858.

Patented May 23, 1876.

Fig. 3.

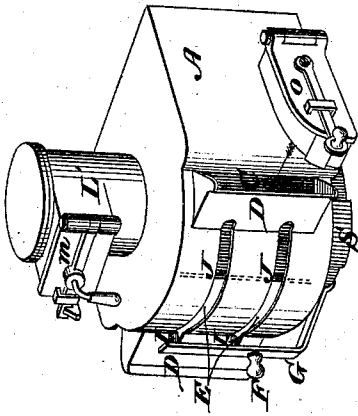


Fig. 2.

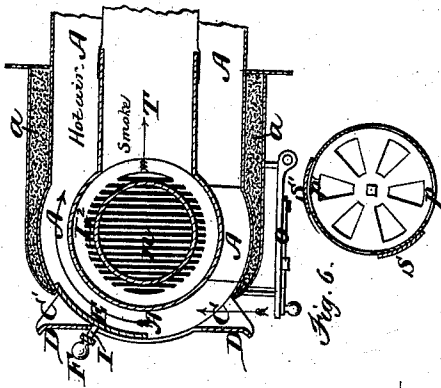
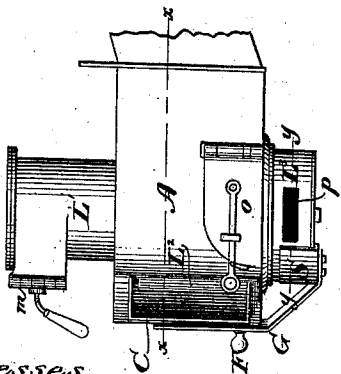


Fig. 1.



Witnesses:
Casper C. Turner
Grover C. Lewis

Fig. 4.

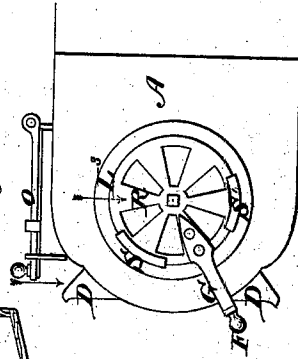
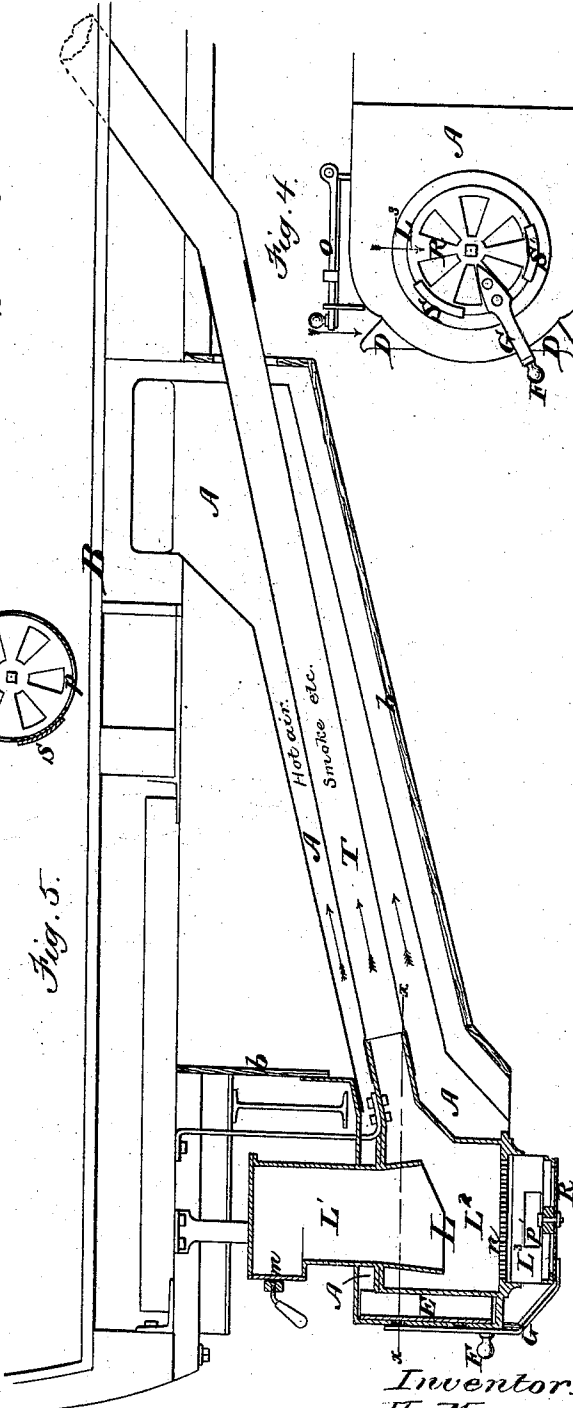


Fig. 5.



Inventor.
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UNITED STATES PATENT OFFICE.

HEINRICH MAEY, OF ZURICH, SWITZERLAND.

IMPROVEMENT IN CAR HEATERS AND VENTILATORS.

Specification forming part of Letters Patent No. **177,858**, dated May 23, 1876; application filed April 24, 1876.

To all whom it may concern:

Be it known that I, HEINRICH MAEY, of Zurich, Switzerland, have invented certain Improvements in Car Heating and Ventilating Apparatus, of which the following is a specification:

In the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of my improved heating and ventilating apparatus. Fig. 2 represents a horizontal section of the same on the plane of line *xx*, Fig. 1. Fig. 3 represents a perspective view. Fig. 4 represents a bottom plan view. Fig. 5 represents a vertical section, showing my improved apparatus applied to a car, and Fig. 6 represents a horizontal section on the plane of line *yy*, Fig. 1.

This invention relates to that class of car-heating apparatus in which the heater is located under and outside of the car; and it has for its object to provide an apparatus of this class which shall be capable of being regulated so as to produce any required degree of heat in the car, and shall be adapted to thoroughly heat a car without waste of fuel, and also to be used for ventilating, either by introducing fresh air, artificially cooled, or at its natural temperature, into the car, or by withdrawing heated and impure air therefrom. To these ends my invention consists, as a whole, in the peculiar construction of an apparatus whereby either the heating, the cooling, or the ventilation of the car is effected. It consists also in certain details of construction, all of which I will now proceed to describe.

In the drawings, A represents a casing of sheet metal or other suitable material, which constitutes an air passage or flue from the interior of the car B to the outside air. The outer end of the casing A is located under the side of the car, and the body of the casing is inclined upwardly until it enters the bottom of the car, as shown in Fig. 5, its junction with the bottom being preferably at the center of the car. The outer end of the casing A is provided with two mouths, C C', through which the air passes. These mouths open respectively toward the front and rear ends of the car, and are made opposite each other in the casing, which runs substantially at right

angles with the length of the car. The outer end of the casing is rounded, the mouths C C' being made preferably in this rounded portion, and provided with hoods D D, as shown in Fig. 2. E represents a concavo-convex plate or valve, which has the same curvature as the rounded end of the casing, and is adapted to fit snugly against the inner side thereof. The valve E is adapted to slide along the inner surface of the rounded end of the casing and cover either of the mouths C C', its length being equal to the space between the mouths; hence it is adapted to cover one of the mouths and leave the other open, or to leave both of the mouths open. The valve E is operated by a handle, F, attached to a bar, G, which is connected to the valve by stems I I, passing through slots J J in the end of the casing A, the bar G being pivoted at its lower end at a point below the casing, in the plane of the center of the circle of which the rounded end of the casing A is an arc. L represents a stove or heater, which is partially inclosed in the outer end of the casing A, the stove and casing being suitably supported from the bottom of the car. The stove L is preferably of the continuous or base-burning type, and is composed of three parts, viz: the magazine L¹, which projects above the casing, and is provided with a door, *m*, for the introduction of fuel; the fire-chamber L², which is inclosed in the casing, and is provided with a grate, *n*, and a door, *o*; and the ash-box L³, which projects below the casing, and is provided with two draft-orifices, *p p'*, which are made in opposite sides of the ash-box, and open respectively toward the front and rear ends of the car. The bottom of the ash-box is slotted or perforated, and is provided with a correspondingly slotted or perforated plate, R, which is pivoted to the center of the bottom of the ash-box, and is adapted to be rotated and cover and uncover the orifices thereof, these orifices being for the escape of ashes, &c., from the ash-box. S S' represent segmental slides or valves, attached to the plate R, and fitting snugly against the sides of the ash-box, the latter being cylindrical in cross-section. These slides or valves are adapted to cover one of the draft-orifices *p p'* at a time, or leave both

partially open, they being so located that when one of them covers one of the draft-orifices the other draft-orifice will be open, as shown in Fig. 6. The bar G is attached to the pivoted plate R, and connects the latter and the slides or valves S S' with the valves E of the casing A. These parts are therefore moved in unison, and are so arranged as to cover the mouth and draft-orifice on one side of the casing and ash-box at the same time, and leave the opposite mouth and draft-orifice open, or to leave both mouths and draft-orifices open at the same time, the perforated plate R closing the bottom of the ash-box when the valves cover either of the mouths and draft-openings, and opening the same when the valves are in an intermediate position. T represents a flue for the escape of the products of combustion from the fire-chamber. This flue passes along through the casing A to the car, and is conducted in any desired direction through the latter to the roof, where it is provided with a suitable pivoted hood or deflector, the mouth of which is kept toward the rear of the car by a vane, so as to insure a free outlet of smoke and gases.

From the foregoing description it will doubtless be seen that external air, entering either of the mouths of the casing A, when the car is in motion, will pass through the casing into the car, any suitable system of pipes or conduits being provided for its distribution in the car. It will also be seen that the flow of air through the casing is governed, when the car is in motion, by the valve E and mouths C C'—for instance, when the valve E is adjusted so as to cover the mouth opening toward the rear of the car, and leave the forward mouth open, the motion of the car will naturally cause the air to rush into the casing at the forward mouth, the current being deflected by the rounded inner surface of the end of the casing; and guided into the car, as shown by the arrows in Figs. 2 and 5. An amount of air proportioned to the speed of the train and the size of the mouth is thus forced into the car. If, on the other hand, the valve E be made to cover the forward mouth and leave the rear mouth open, the current of air will be reversed, the motion of the train tending to draw the air from the car through the casing, instead of forcing it in, as will be readily seen. Again, if the valve E be adjusted in an intermediate position, so as to leave both mouths open, the greater part of the current will pass in at one mouth and out at the other, so that hardly any air will enter the car through the casing, the mouths being in line with the line of motion of the car. These facts being borne in mind, and also the fact that the draft or air supply of the heater is regulated in the same manner and at the same time as that of the casing, it will be seen that when the stove is supplied with fire, any desired quantity of heated air can be introduced into the car, the operation of regulating the

admission of air into the car also regulating the supply of air to the fire; hence, the greater the volume of air which enters the car the greater the heat generated by the heater, the air being thus uniformly heated regardless of its volume.

The heat is utilized, as far as possible, by causing the flue T to traverse the whole, or nearly the whole, length of the casing A, the air being thus exposed to a large area of heating-surface. To obviate loss of heat, the outer end of the casing A is provided with double walls, between which are spaces *a a*, which are filled with some non-conducting material.

The rear portion of the casing A is inclosed in a wooden jacket, *b*, which I prefer to coat on the inside with soluble glass. The air in this jacket, which becomes heated by contact with the casing A, may also be conducted to the interior of the car.

This apparatus may be used in connection with cars of any construction, the casing A being connected to a suitable system of pipes for distributing the heat through the car, or opening directly into the car through a grating.

I have found by practical tests that any temperature from 90° or 100° Reaumur down to that of the outside atmosphere, can be maintained by the use of the apparatus.

When not used for heating, the stove or any suitable receptacle substituted for it may contain ice or a refrigerant mixture for cooling the air before it enters the car. This function is a great advantage in cars for transporting the sick or wounded, and for first-class cars, in hot weather. According to experiments, the temperature can be reduced in this manner by from 4 to 6° Reaumur.

I claim as my invention—

1. In combination with a car, the casing A, having the mouths C C', and interchangeable valve E, and adapted to conduct air into or out of the car, substantially as described, for the purposes specified.

2. In combination with a car, the casing A, having the mouths C C', and interchangeable valve E, and inclosing a heater or a receptacle for a cooling substance or mixture, substantially as described, for the purposes specified.

3. A car-heating apparatus, consisting of the heater L, having the valved draft-orifices *p p'* and flue T, and the casing A, inclosing a portion of the heater and its flue, and having the valved mouths C C', the apparatus being arranged in such relation to the car that the motion of the latter in either direction shall cause currents of air to enter and pass through the heater and its flue and the casing simultaneously, substantially as described.

4. The combination of the heater L, having draft-openings *p p'* and valves S S', with the casing A, having the mouths C C' and valve E, the valves S, S', and E being connected to

operate simultaneously, substantially as described.

5. The valve E of the casing A, and the valves S, S', and R of the ash-box L³, combined with the connecting-bar G, whereby they are operated simultaneously, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HEINRICH MAEY.

Witnesses:

FREDERIK VETTERLIN,
ROB. MELNY.