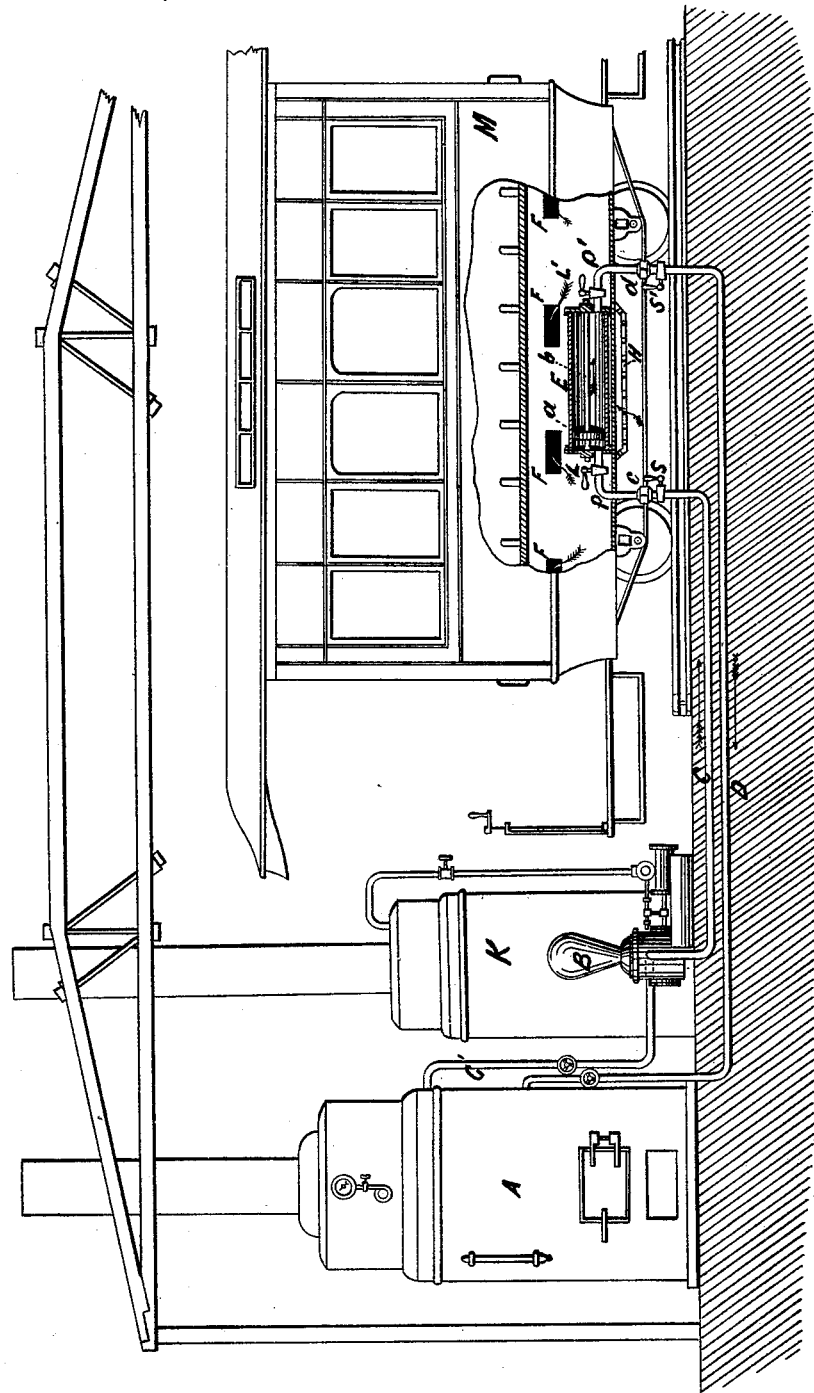


W. E. PRALL.  
Heating and Ventilating Cars.

No. 218,685.

Patented Aug. 19, 1879.



Witnesses:

*Ernest H. Rogers*  
*Stevenson Towle*

Inventor:

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# UNITED STATES PATENT OFFICE.

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SAME PLACE.

## IMPROVEMENT IN HEATING AND VENTILATING CARS.

Specification forming part of Letters Patent No. **218,685**, dated August 19, 1879; application filed  
May 16, 1879.

*To all whom it may concern:*

Be it known that I, WILLIAM E. PRALL, of New York, county and State of New York, have invented a new and useful Improvement in Heating and Ventilating Street-Cars and Omnibuses, of which the following is a specification.

My invention relates to an improved method of heating and ventilating street-cars and omnibuses.

In the accompanying drawing is represented a part sectional view of the apparatus. It is constructed in a manner so that many cars may be supplied with pure warm air without the annoyance of stoves or fire located on the cars. To accomplish this end, I propose to establish at the terminal station a large heating-tank, A, constructed as an ordinary steam-boiler, but to be used for heating liquid substances possessing a very high capacity for receiving and retaining heat, such as oils. Among those best adapted for the purpose are linseed-oil and lard, the former requiring six hundred and forty degrees (640°) of heat before the boiling-point is reached.

The manifold advantages of employing such a medium will be readily comprehended. First, the quantity or bulk and weight to be carried will be small; and, secondly, the intensity of the heat and the capacity of the substance for retaining it will be very great. There will be further advantages in employing such media in that they will not solidify when exposed to frost—at least the linseed-oil will not, nor will it permeate the iron tanks in which it is proposed to carry it on the cars.

In the illustration, K represents a steam-boiler; B, a force-pump; C, a pipe or hose extending from the pump to one end of the receiving-tank E, placed under the seat of the car M; C', a pipe extending from the heating-tank A to the pump B. D is another pipe, extending from the heating-tank directly to the opposite end of the receiving-tank E. *c* and *d* represent a coupling arrangement for uniting the pipes C and D with the branch pipes P P' at each end of the tank E. L and L' and S and S' represent cocks or plugs placed in the branch pipes P and P' and in the supply and

exhaust pipes C and D, the object of these cocks being to enable the operator to shut off communication between the heating-tank and the receiving-tank before disconnecting the couplings *c* and *d*. H represents a register for admitting cold air into the chamber containing the tank E; and F represents the registers controlling the admission of hot-air from the chamber into the interior of the car. *a* represents a piston moving on the rod *b* within the receiving-tank E.

In the practical operation of my system the cars are run into the station in which the heating-tank is placed, and the operator immediately unites the supply and exhaust pipes C and D with the opposite ends of the tank E by means of the adjustable couplings. The cocks controlling the communication are then opened, and by means of the force-pump the oil is forced through the pipe C directly from the heating-tank into the receiving-tank on the car. The piston in said tank will divide the hot oil from that which has been cooled by radiation during the last trip over the road; and as the fresh supply is forced into said tank the piston will be forced in the opposite direction, and that contained in the tank will be driven out and conveyed by means of the exhaust-pipe D back into the heating-tank A.

As soon as the complete exchange has been made the cocks will be closed and the pipes C and D disconnected, and the car is ready for another trip.

The connection of the supply and exhaust pipes C and D with the oil-tank must be reversed each time it is filled, in order that the piston may be driven in opposite directions at each filling of the same.

It will be seen that the piston acts only as a movable partition between the outflowing and inflowing oil, and moves freely with the same.

By this simple arrangement all of the cars may be warmed from one large fire and under the control of one operator, thereby saving much time and expense in fuel and labor that would be required if stoves and separate fires were used in each car, and also a much more desirable and uniform temperature may be

preserved and much better ventilation obtained.

The great heat contained in the oil will be sufficient for warming the car for the length of time required for the trip. There can be no possible danger from overpressure in the tanks, as it will not be necessary to have the oil heated beyond the boiling-point, and at that temperature the pressure is only equal to that of the atmosphere; hence there is really no pressure exerted on the tank containing it.

The same oil can be used over and over for an indefinite time, and there will be no expense except for the first purchase, which would not be large.

The tank can be very small, and if it should be necessary to increase the radiating-surface it may be done by placing corrugated sheet-iron over its outer surface.

There may be a tank placed on each side of the car, if necessary.

As there are many kinds of oil and other substances which have a great capacity for receiving and retaining heat, I do not confine myself to any one, nor to any particular position on the car for placing the receiving-tanks; but they should be placed under the seats, where they will be entirely out of the way.

It is also evident that many different kinds of pump might be employed for exchanging the oil from the heating-tank to the receiving-tank on the car; or it might be done by forcing the oil from the heating-tank into the receiving-tank, and from the receiving tank into another tank placed above the heating-tank, by having a greater pressure in one than in the other by the admission of steam or air, and then it could be returned to the heating-tank by its own gravity by turning the cock

placed in the pipe connecting the two, thus doing away with the pump for that purpose.

The receiving-tanks may be easily removed during the summer months, when no heat is required.

I am aware that oils, on account of the great specific heat obtained without pressure by them, have been used for superheating steam and for drying purposes; hence I do not claim, broadly, the use of them for heating purposes generally.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In an apparatus for heating and ventilating street-cars, a tank carried with the car, and provided with inlet and exhaust pipe connections, and with a movable piston, serving as a partition between the supply and discharge oil to prevent their commingling, substantially as and for the purpose set forth.

2. In an apparatus for heating and ventilating street-cars, the stationary oil-heating tank and the portable heat-radiating tank, charged with linseed or other oil, carried on or with the car, said tanks being provided with adjustable connecting-pipes, and with the necessary cocks for opening and closing the same, in combination with a forcing apparatus for conveying the oil alternately from the heating-tank to the radiating-tank, and from the radiating-tank back to the heating-tank, constructed and operating together for the purpose set forth.

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Witnesses:

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