

(No Model.)

J. B. PLATT.

# APPARATUS FOR WARMING AND VENTILATING STREET CARS.

No. 458,982.

Patented Sept. 1, 1891.

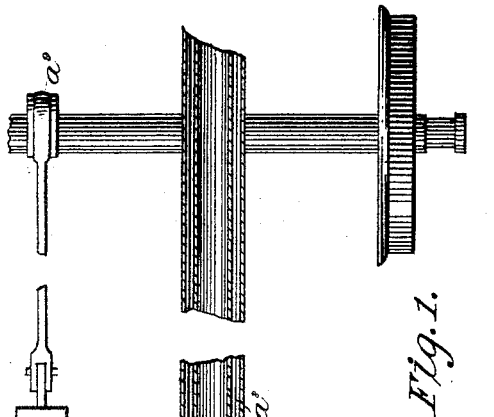


Fig. 1.

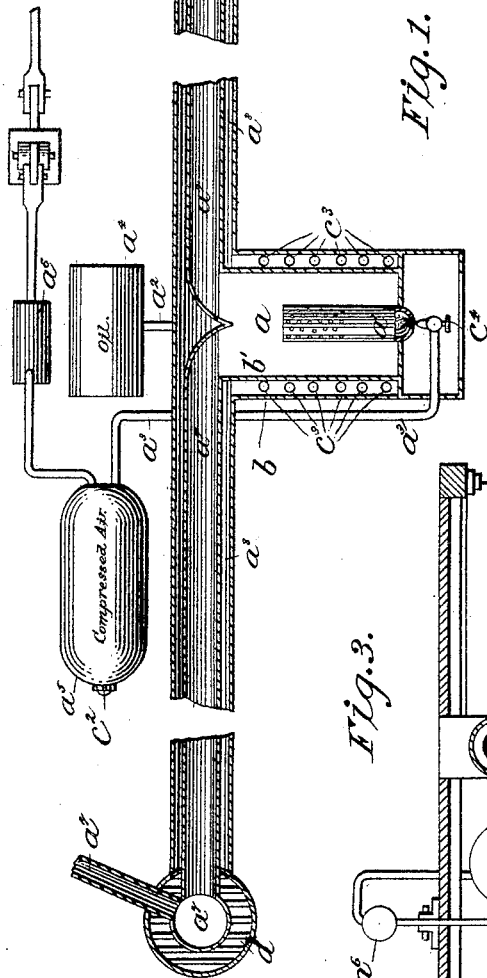


Fig. 3.

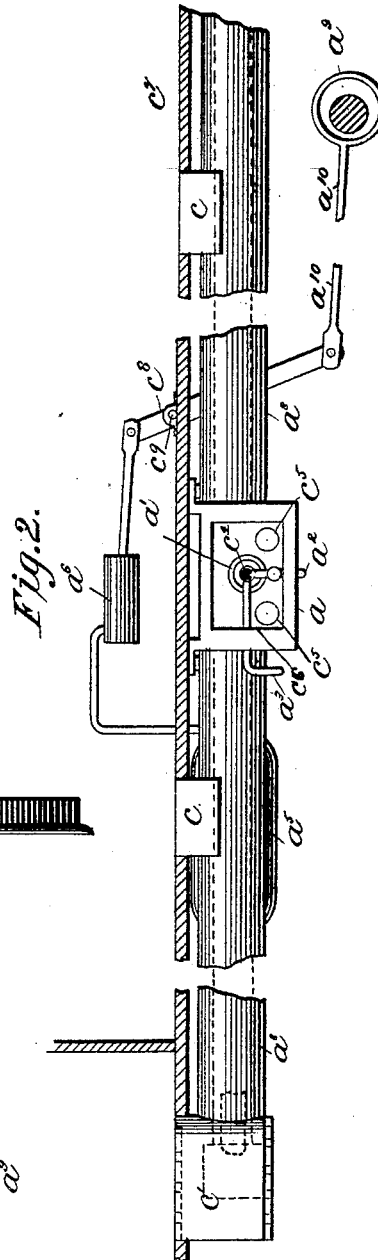
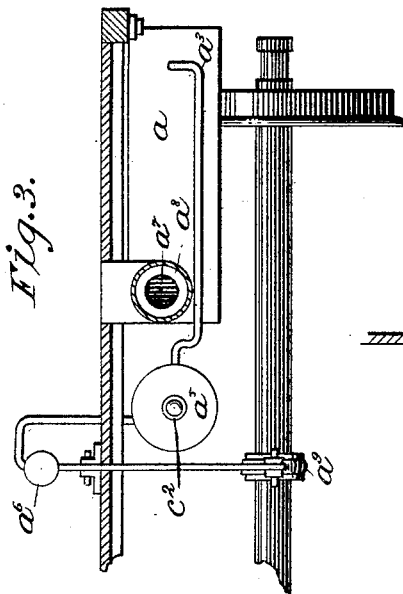


Fig. 2.

Witnesses:  
Andrew M. Young  
Henry Cooper

*Inventor:*

L. B. Platt  
beg Ch<sup>th</sup> Houghton ally

# UNITED STATES PATENT OFFICE.

JACOB BOGARDUS PLATT, OF AUGUSTA, GEORGIA.

## APPARATUS FOR WARMING AND VENTILATING STREET-CARS.

SPECIFICATION forming part of Letters Patent No. 458,982, dated September 1, 1891.

Application filed March 21, 1890. Serial No. 344,854. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB BOGARDUS PLATT, of Augusta, in the county of Richmond, in the State of Georgia, United States of America, have invented a new and useful Apparatus for Warming and Ventilating Street-Cars, of which the following is a specification.

My invention relates to the construction of the furnace and its several parts, the object of it being to provide convenient and economical means for warming and ventilating street-cars.

To carry my invention into effect I construct under the car to be warmed a furnace or combustion-chamber under the floor of the car at one side, so that the door of it is on a vertical plane with the outside wall of the car, the combustion-chamber in rectangular form extending across under the car to or a little beyond its central line, having double walls with an air-space between them. From the rear part of this furnace, which is under the middle of the car, I carry a pipe or chimney both ways to both ends of the car, and thence upward above the roof of the car, where the products of combustion in the furnace pass into the open air.

Around and inclosing the chimney-pipe I construct a hot-air chamber, having an annular space between it and the chimney-pipe of an inch or more in depth. To this hot-air chamber the space between the walls of the combustion-chamber is connected, so that all the air which goes into the space between the walls passes into the elongated air-chamber, and thence through registers in the floor of the car fresh and warm. A reservoir filled with petroleum placed a little below the point of combustion in the furnace and a pipe from it to an atomizer in the furnace supplies the fuel, a chamber for compressed air with a pipe to the atomizer there joining the oil-pipe furnishes force to bring the oil forward and spray it into the burner prepared for it, on the inside of which it is ignited, making a jet of flame which is driven to the rear of the furnace and thence through the chimney-pipes both ways to the ends of the car and out into the open air above the roof of the

car. The passage of this flame heats the inside wall of the furnace and the chimney-pipe, and through them the air in the space between the walls of the furnace and in the elongated air-chamber around the chimney-pipe, and thence through openings in the floor of the car. By registers in these openings the hot air may be shut off when it is desirable.

In the drawings annexed, Figure 1 represents this improved heating apparatus partly in plan and partly in horizontal section. Fig. 2 shows a side elevation of the heating apparatus. Fig. 3 shows an end elevation of it.

$a$  marks the furnace, in which petroleum sprayed through an atomizer by compressed air is burned. This is placed under the middle of the car at one side, reaching to the central line.

$a'$  marks a burner in the furnace, through and by which the atomized oil and compressed air are mingled and ignited.

$a^2$  marks the pipe which conducts the petroleum used from a storage-tank to the atomizer, where it meets the compressed air and by its force is projected into the burner.

$a^3$  marks the pipe which conducts the compressed air from the air-chamber to the atomizer in the furnace.

$a^4$  marks the tank which contains the petroleum to be used.

$a^5$  marks the chamber in which the compressed air is stored by an air-pump. If the car is standing and the air-chamber is empty, it may be filled by hand-power working the pump.

$a^6$  marks an air-pump, by which air is forced into the air-chamber and there compressed to give it the required projective force. The compression is regulated by a safety-valve, which opens at the desired degree of pressure. The air-pump is actuated by a cam on the axle of the car working in an eccentric band having a stem  $a^{10}$  pivoted to one end of the lever  $c^8$ , which, as the car moves, gives motion to the piston of the air-pump and drives the air compressed into the air-chamber.

The lever  $c^8$  is pivoted at  $c^9$  to the floor  $c^7$

of the car and is used as a compensating device to maintain a uniformly-operative connection between the axle of the car and the pump piston-rod, while the body of the car has an up-and-down motion upon its springs.

$a^7$  marks a pipe or chimney through which the products of combustion of the oil and the air in the furnace pass into the open air above the top of the car.

$a^8$  marks a pipe or elongated chamber, in which air for warming the car is to be heated by the passage of the products of combustion in the furnace through the chimney  $a^7$ , which is surrounded by and inclosed in the chamber  $a^8$ , between the walls of which and the walls of this pipe there is an annular space of an inch or more in which fresh air is introduced and warmed on its way to the register, through which it is admitted to the interior of the car by the heat passing from the furnace through the chimney-pipe  $a^7$ , which is in the center of the annular space. The chimney-pipe  $a^7$  and the hot-air chamber  $a^8$  extend from the rear of the furnace-chamber toward both ends of the car on the centralline of the car, the chimney-pipe being thence turned upward above the roof of the car, where the smoke escapes.

$a^9$  marks the eccentric-cam on the axle of the car inclosed by a band or loop, in which the cam rotates, giving it and the pump-rod a forward and backward motion, which moves the pump-piston in the barrel of the pump.

$c$  marks the registers through which heated air passes from the elongated air-chamber  $a^8$  to the interior of the car to be warmed. There may be also a register over the well  $d$  on either or both outside platforms of the car. These registers may be opened and closed like the registers of ordinary hot-air furnaces. The well  $d$  is placed under the location generally occupied by the driver of the car, and although containing a cylindrical drum connecting the horizontal and vertical pipes or flues  $a^7$  the interior of said well is partitioned from the heated-air pipes  $a^8$  to prevent any cold air from entering through said well into the pipes  $a^8$  and thence into the car under the impulse of motion of said car. The air employed to keep warm the feet of the driver enters the bottom of the well, (which may have a grating,) ascends against the surface of the drum therein, and escapes through the register on top of said well.

$c'$  marks a register in the platform of the car.

$c^2$  marks a safety-valve on the chamber for compressed air, by which the pressure in the chamber can be regulated as may be desired.

$c^3$  marks apertures through which fresh air is admitted into the space between the walls of the combustion-chamber and between the chimney-pipe  $a^7$  and the outer wall of the chamber  $a^8$ .

$c^4$  marks the location of the atomizer in the furnace where the oil from the storage-tank

$a^4$  meets the current of compressed air from the air-chamber  $a^5$ , which sprays it into the burner  $a'$ , on the inside of which the mingled oil and air is ignited and burned.

$c^5$  marks openings into the chamber of the furnace  $a$  for the admission of air to support combustion there.

$c^6$  marks the door of the furnace.

$c^7$  marks the floor of the car.

$b$  marks the outside wall of the furnace.

$b'$  marks the inside wall of the furnace.

The tank for storage of oil will be placed a little lower than the atomizer, so that the oil will not flow to it, but will be taken up by the current of air when it is let on from the air-chamber and carried forward to the atomizer, and the sprayed oil and air driven into the burner, where it will be ignited on the inside of the burner, by which the inner wall of the furnace and the chimney-pipe will be heated and the air in the elongated air-chamber  $a^8$  heated. When the sprayed oil is ignited, the flame is divided at the back of the furnace and is conducted in the chimney-pipe toward both ends of the car, warming the air between the walls of the furnace and in the elongated air-chamber  $a^8$ , from whence it passes through the registers into the car, which will at all times be supplied with fresh air and abundantly ventilated. The oil used in this apparatus must be cleared of all sediment by filtering or otherwise, so that it may not clog the atomizer.

Having thus described my invention, I claim as new—

1. The combination of a car-body, a combustion-chamber beneath the floor thereof, a smoke-flue extending in opposite directions from the rear of said chamber, a heated-air pipe surrounding said smoke-flue and having registers opening into the car, a well  $d$  under the platform and partitioned from the heated-air pipe, and a heating-drum therein, substantially as described.

2. The combination of a car-body, a combustion-chamber beneath the floor thereof and a hydrocarbon-burner in said chamber, a compressed-air reservoir having a pipe leading to said burner, an air-pump connected with said reservoir, an eccentric on the car-axle, a lever pivoted to the car-body and having one end connected to the pump-piston and the other end connected with the eccentric, smoke-flues leading from the combustion-chamber, heated-air pipes surrounding said smoke-flues, and registers upon said pipes, substantially as described.

3. The combination of a car-body, a combustion-chamber disposed beneath the floor thereof, a hydrocarbon-burner disposed in said combustion-chamber, an oil-tank attached to the car-body, a pipe leading from said tank to said burner, a reservoir for compressed air attached to said car-body, a pipe leading from said reservoir to said burner, an air-pump attached to the car-body and connected with

said reservoir for compressing the air therein, an eccentric on the car-axle, a lever pivoted to the car-body and connected at one end with the pump-piston, a connecting-rod connecting  
5 the other end of said lever with the eccentric, smoke-flues leading from said combustion-chamber, an air-chamber surrounding said combustion-chamber, a heating-flue connect-  
ed therewith and surrounding said smoke-flue, and registers from said heating-flue into 10 the car, substantially as described.

JACOB BOGARDUS PLATT.

Witnesses:

CHS. HOUGHTON,  
S. HENRY HOOPER.