

D. I. COOKE.
CAR VENTILATING SYSTEM.
APPLICATION FILED APR. 26, 1909.

932,761.

Patented Aug. 31, 1909.
3 SHEETS—SHEET 1.

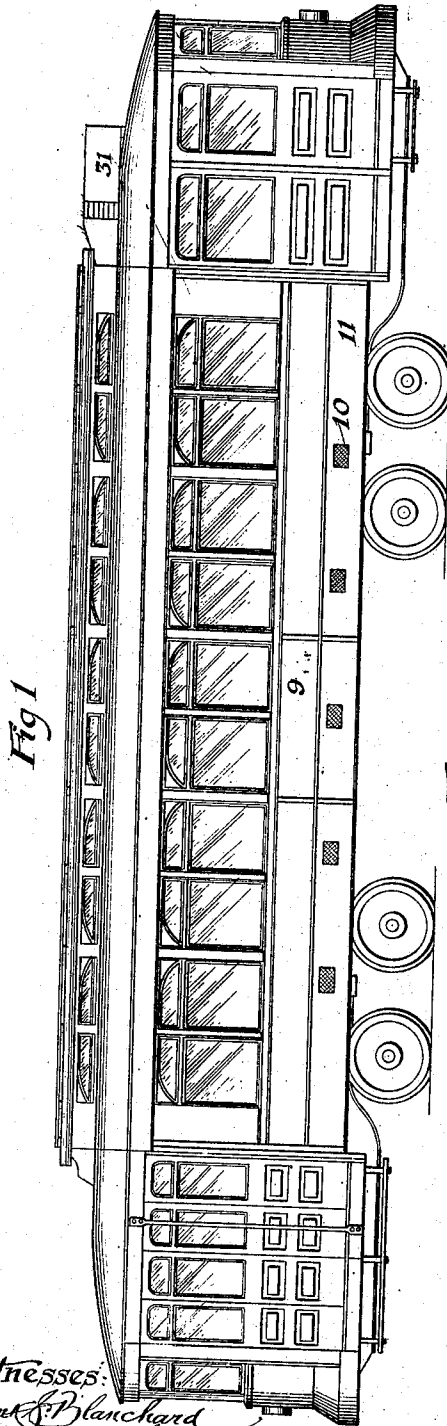


Fig 1

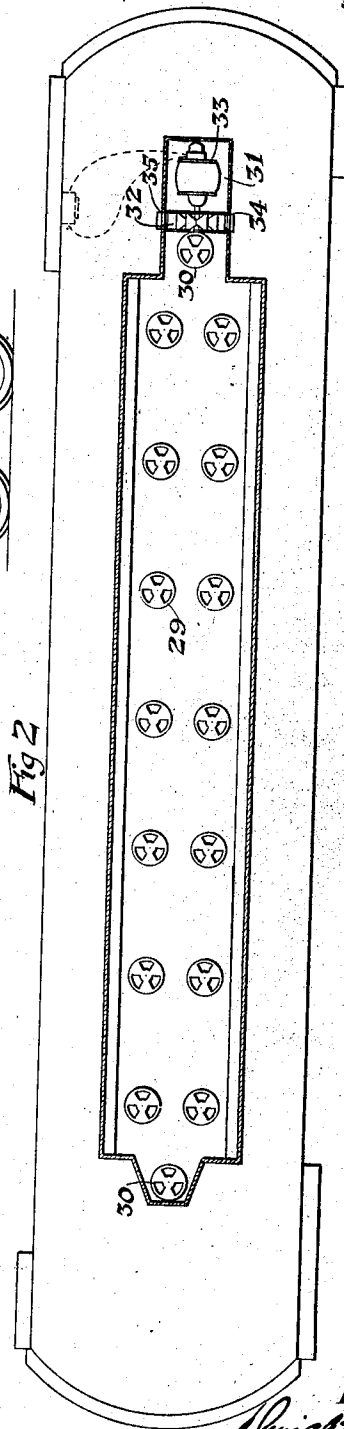


Fig 2

Witnesses:

Frank P. Blanchard
Ernest H. Lanning

Inventor:

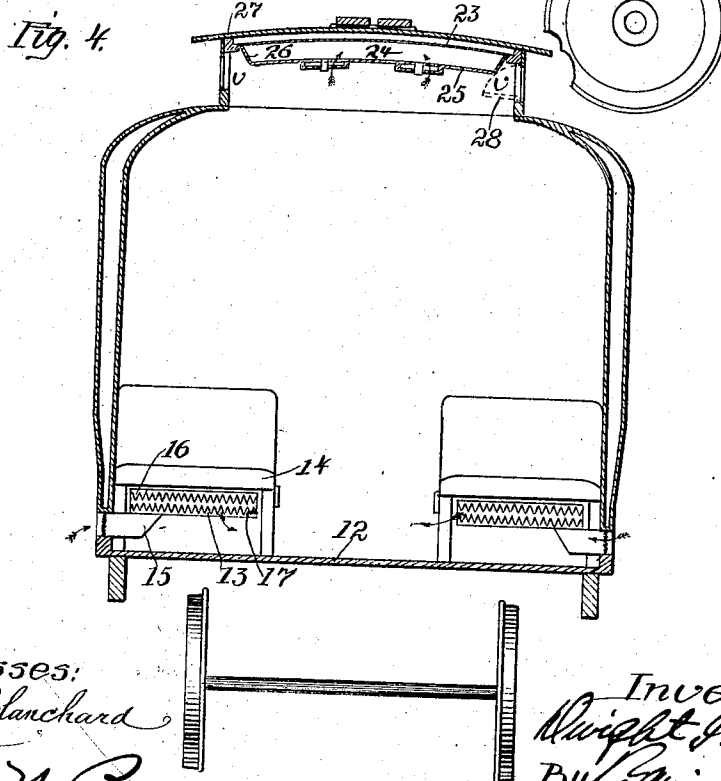
Dwight P. Cooke
By *Ernest H. Lanning*
Attorney.

D. I. COOKE.
CAR VENTILATING SYSTEM.
APPLICATION FILED APR. 26, 1909.

932,761.

Patented Aug. 31, 1909.

3 SHEETS—SHEET 2.



Witnesses:
Frank Blanchard
Pierce H. Lanning

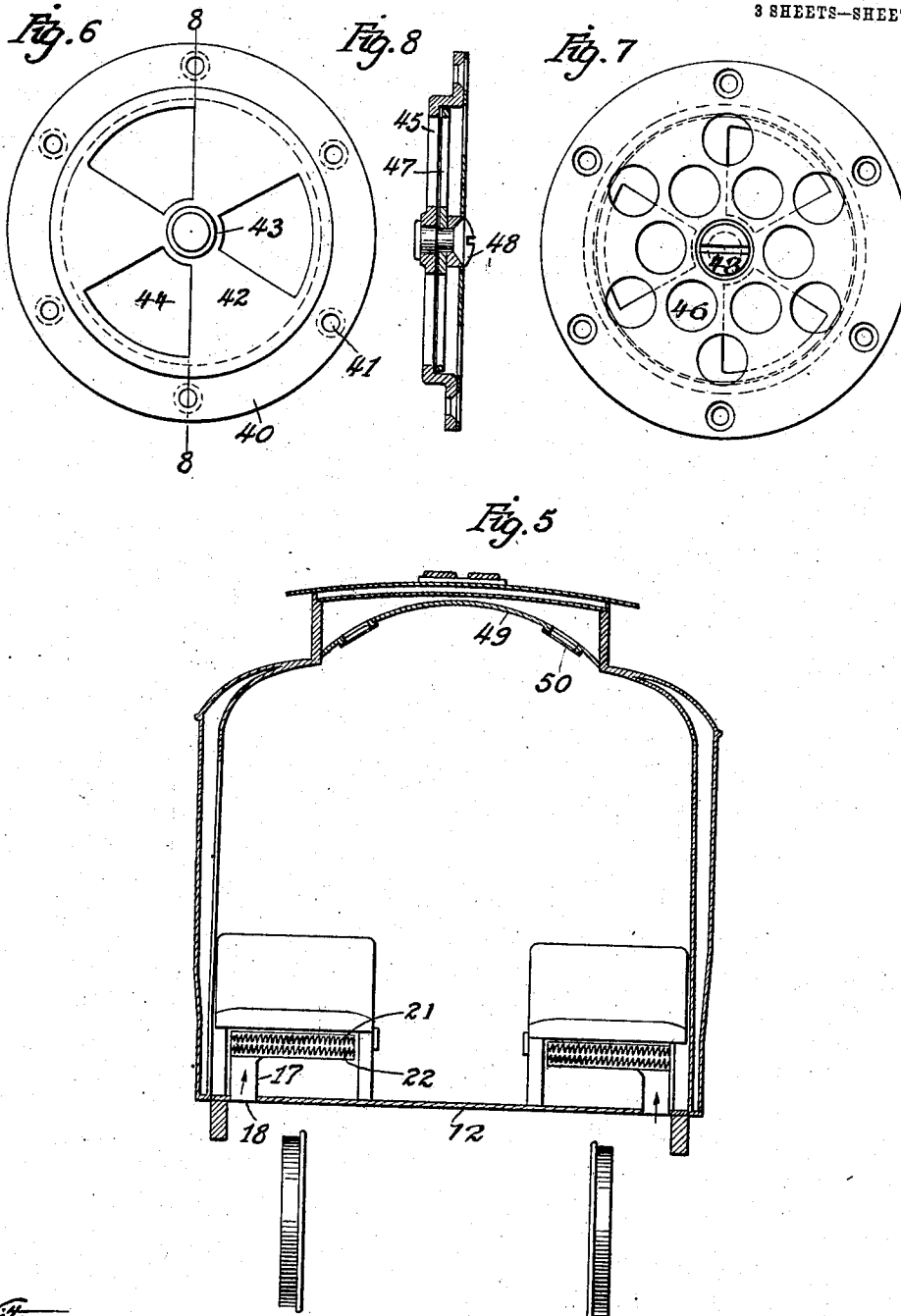
Inventor:
Dwight S. Cooke
By *[Signature]*
Attorneys.

D. I. COOKE.
CAR VENTILATING SYSTEM.
APPLICATION FILED APR. 26, 1909.

932,761.

Patented Aug. 31, 1909.

3 SHEETS—SHEET 3.



Witnesses:
Frank Blanchard
Parson W. Banning

Inventor:
Dwight I. Cooke
By *William J. Manning*
Attorneys.

UNITED STATES PATENT OFFICE.

DWIGHT I. COOKE, OF CHICAGO, ILLINOIS.

CAR-VENTILATING SYSTEM.

932,761

Specification of Letters Patent.

Patented Aug. 31, 1909.

Application filed April 26, 1909. Serial No. 492,108.

To all whom it may concern:

Be it known that I, DWIGHT I. COOKE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Car-Ventilating Systems, of which the following is a specification.

This improved ventilating system is applicable for use more especially with Pullman, passenger and street cars.

One of the essential objects is to provide a compact, concealed ventilating construction which will not interfere in any way with the present standard type of car.

Another object is to provide simple and efficient means for regulating the flow of exhaust vitiated air from the car body.

Another object is to position and construct the fresh air intakes and passages in communication with car heaters, the temperature of the admitted air being influenced by its passage over and through the same.

Other objects will appear from a detailed description of the invention, which consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of this improved car ventilating system as applied to a street car of the "Pay as you enter" type; Fig. 2 a top or plan view thereof, the upper roof section being removed; Fig. 3 a sectional elevation of one end of the car; Fig. 4 a transverse section, taken on line 4—4 of Fig. 3; Fig. 5 a transverse section, showing a modified form of duct constructed in the roof of the car, together with a modified position of fresh air intakes; Fig. 6 a detail of one of the exhaust air regulators, looking down from the top of the car; Fig. 7 a similar view, looking at the device from within the car; and Fig. 8 a transverse section, taken on line 8—8 of Fig. 6.

This improved car ventilating system is installed as shown in a passenger street car of the "Pay as you enter" type. The body of the car has a series of fresh air intakes 10 formed in the lower side walls 11 of the car, in proximity to the car floor 12. These fresh air intakes, for practical purposes, are usually positioned in proximity to electric car heaters 13, secured beneath the car seats 14, as shown in Fig. 4, the fresh air intakes each having an air passage 15 lead-

ing into an air chamber 16 inclosing the electric car heaters 13, the farther end of said chamber having an exhaust orifice 17 for permitting the tempered fresh air to escape into the car body.

Referring to Fig. 5, fresh air intakes 18 are formed along the outer sides of the car floor 12, and air chambers 19 are in communication both with the car floor and electric car heaters 20, which are likewise incased within suitable casings or chambers 21 having, as shown, exhaust orifices 22 at their opposite ends for permitting the admitted tempered air to flow into the car body.

It is to be understood that the number of fresh air intakes positioned in the lower level of the car may be such that their aggregate area will admit of the passage of the fresh air to the car body proper at a velocity of not to exceed 300 feet per minute, as a greater velocity would tend to produce a perceptible draft, which the use of this system eliminates.

Within the car roof 23 is formed a concealed exhaust chamber 24 by means of a supplemental transverse roof 25, as illustrated in Fig. 5, the outer longitudinal side walls 26 thereof being upwardly turned and secured to a transverse frame or brace 27, which in turn is secured to the car roof. As indicated, the side walls 26 of this supplemental roof are proportioned and secured in such manner as not to interfere with the movement and operation of the ventilator deck sash windows 28. This supplemental roof 25, as best shown in Fig. 2, has a series of register faces 29 formed therein, preferably equidistant apart and parallel to each other; and where it is desirable to ventilate the end sections or platforms of a car additional register faces 30 may be employed. The total free area of these registers is so calculated as to permit of the flow of air through the same taking place at a velocity of not to exceed 300 feet per minute, as a velocity in excess of this would tend to produce a perceptible draft. As shown, the front end of the exhaust chamber merges into an elongated fan chamber 31 having an exhaust fan 32 actuated by an electric motor 33, or otherwise as desired, the fan chamber having exhaust ports 34 and 35, respectively, on opposite sides of the fan.

In the ventilation of passenger cars, it is essential that the flow and travel of the admitted air be accurately regulated, since it

LOT 398

is conducive to both the health and comfort of the passengers. Accordingly, the speed of the exhaust fan is regulated by a controller or rheostat 36, where an electric motor is used for motive power, but it is to be understood that other regulating means may be employed where other power is used. This electric controller or rheostat is secured inside of the end car platform 37 within convenient reach of the car operator, and electric wires 38 connect the rheostat or controller with the motor upon the car roof. An insulating base 39 is placed under the motor on the car roof, all of the exhaust mechanism being incased within the housed fan chamber 31.

Referring particularly to Figs. 6 and 7, the register faces comprise an annular rim 40 having openings 41 drilled therethrough, for inserting fastening means for securing same to the supplemental car roof, and the body of these register faces comprise three concentric webs or plates 42 merging centrally into a hub 43 leaving openings 44 therein. The outer annular rim 40 is integrally formed with a rear wall 45, which may be of the formation shown in Fig. 7, having a series of annular openings 46, or may be of the conventional register design. Intermediate the fixed front and rear walls is an annular movable plate 47 locked to a screw or axle 48, said plate being of the same construction and formation as that shown in Fig. 6, so that when the central axle or screw 48 is rotated in either direction, the intermediate plate 47 will revolve therewith and partially cover the openings 44 formed in the front of the device. As the intermediate plate 47 is moved, it will decrease the amount of free area through the register faces. The position of this damper mechanism will be determined by the use of an anemometer, it being the intention to secure an equal velocity of outgoing air through all ports regardless of their proximity to the fan, thereby securing a consequent equal flow of air. When this system is first installed within the car, the respective register faces are first tested and accurately set by means of the set screw 48 which locks the intermediate plate 47 in proper position.

Referring to Fig. 5, the exhaust air duct 24 is of slightly different formation than that heretofore described, by reason of the lower supplemental arched roof 49 made of any suitable composition, such as veneer, metal sheathing, wood or canvas, having a series of register openings 50. With this system a partial vacuum will be created within the car body, due to the motion of the exhaust fan. The vacuum created will cause the fan to operate against a dynamic pressure equivalent to the amount of vacuum produced. The upward tendency of the air within the car body produced by

the exhaust fan in motion will, in turn, produce an inward movement of air at the various fresh air intakes, these being so distributed as to produce an even, constant and imperceptible movement of fresh air throughout the lower portion of the car body. The air passing into the car body from the air intakes is conducted through and over the car heaters, thereby tempering the admitted air and preventing a consequent reduction in the temperature of the car.

Due partially to the tendency of the heated air to rise, aided in turn by the movement of the exhaust fan, with its consequent partial vacuum, as indicated above, there will be an upward movement of air throughout the car body, causing the foul or vitiated air to rise through the register faces positioned in the exhaust chamber of the car roof. Due to the fact that the respective areas of intakes and outlets are proportioned, as indicated in the specification, to admit of the movement of air through them at a maximum velocity not to exceed 300 feet per minute, the consequent circulation of air produced in the car will be imperceptible and will be accomplished without any discomfort due to draft.

Using a register face controlled as specified above, it is possible, after completion of the installation in a car, to start the exhaust fan, and, by means of an anemometer, to gage the air velocity at each register face. This air velocity is equalized throughout the entire length of the car by partially closing off the register faces approaching the fan and leaving a somewhat increased area in those farthest away from the fan, for the reason that the dynamic pressure nearest the fan will be greater than the pressure farthest away from the fan, due to the resistance of the ducts increasing with their distance from the fan.

What I claim as new and desire to secure by Letters Patent is:

1. In a mechanical car ventilating system, a series of fresh air in-takes formed in the lower portion of the car body, a concealed exhaust chamber formed in the car roof, said exhaust chamber having a series of register faces capable of exact adjustment to permit an equal amount of air to be withdrawn irrespective of the location of the register faces to the exhausting means, and means for exhausting the vitiated air from the car body through the register faces into the exhaust chamber, substantially as described.

2. In a mechanical car ventilating system, a series of fresh air in-takes formed along the sides of the car floor, air passages connecting the air in-takes with a casing about the car heaters for tempering the admitted air flowing therethrough, a concealed exhaust chamber in the roof of the car, having register

faces capable of exact adjustment to permit an equal amount of air to be withdrawn irrespective of the location of the register faces to the exhausting means, and means for exhausting the vitiated air from the car through the register faces of the exhaust chamber, substantially as described.

3. In a mechanical car ventilating system, a series of fresh air in-takes formed in the lower portion of the car body, an elongated concealed exhaust chamber formed in the car roof, having register faces therein, the side walls of the exhaust chamber being positioned with respect to the deck sash windows so as not to interfere with their movement and operation, and means for ex-

hausting the vitiated air from the car body through the register faces of the exhaust chamber, substantially as described.

4. In a car ventilating system, a series of fresh air in-takes formed in the lower portion of the car body, and a concealed exhaust chamber formed in the car roof, having register faces therein, the side walls of the exhaust chamber being positioned with respect to the deck sash windows so as not to interfere with their movement and operation, substantially as described.

DWIGHT I. COOKE.

Witnesses:

WALKER BANNING,
PIERSON W. BANNING.