(No Model.) 3 Sheets—Sheet 1.

W. E. ANDREW.

RAILWAY CAR OR OTHER VENTILATOR.

No. 600,975. Patented Mar. 22, 1898.

Fig. 1.

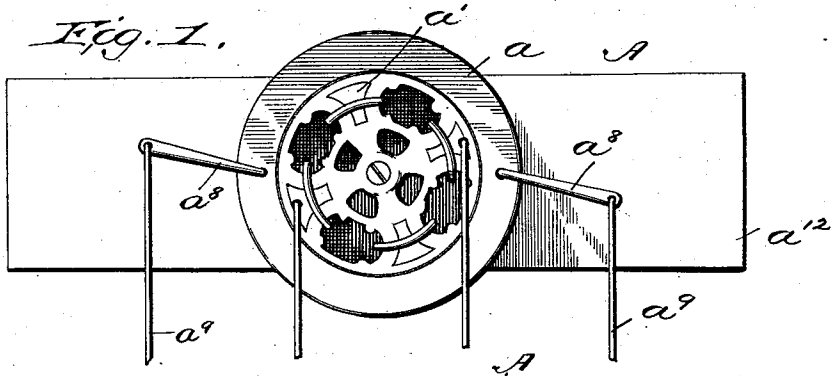


Fig. 2.

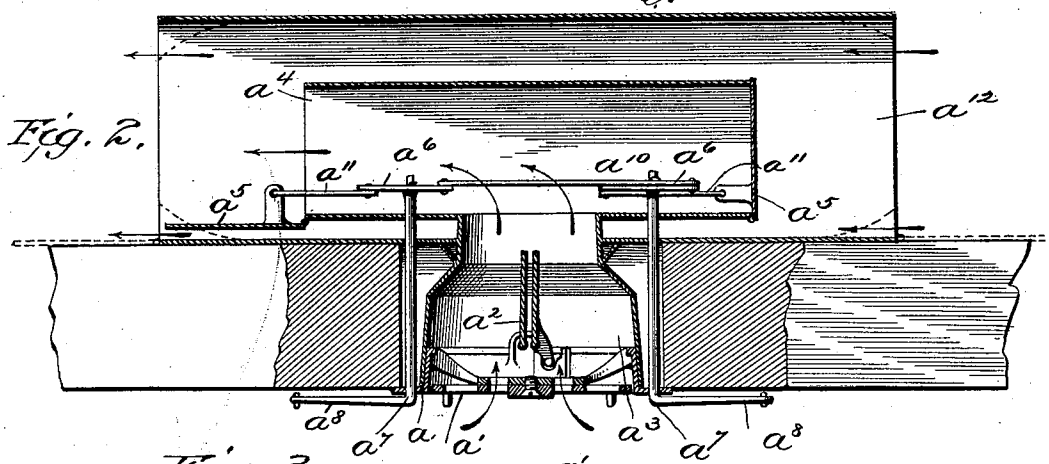


Fig. 3.

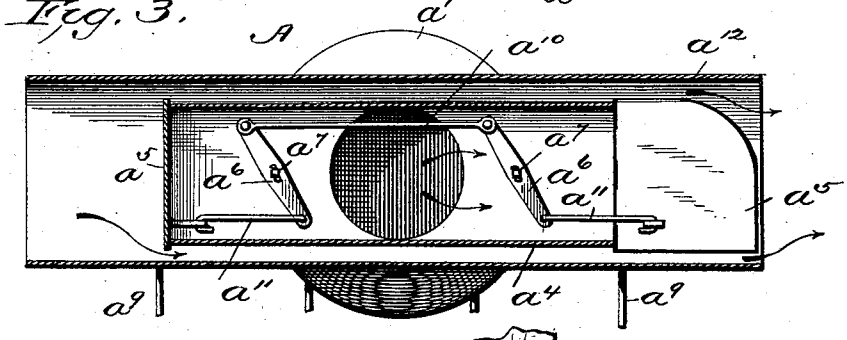
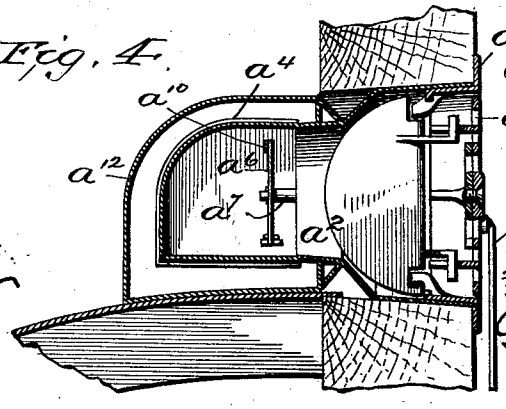


Fig. 4.



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W. E. ANDREW.

RAILWAY CAR OR OTHER VENTILATOR.

No. 600,975. Patented Mar. 22, 1898.

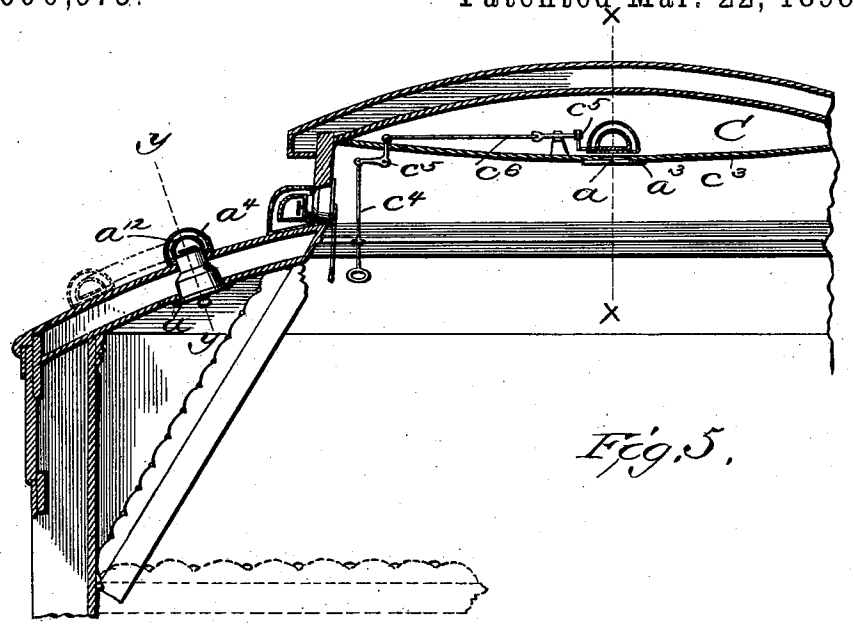


Fig. 5.

Fig. 6.

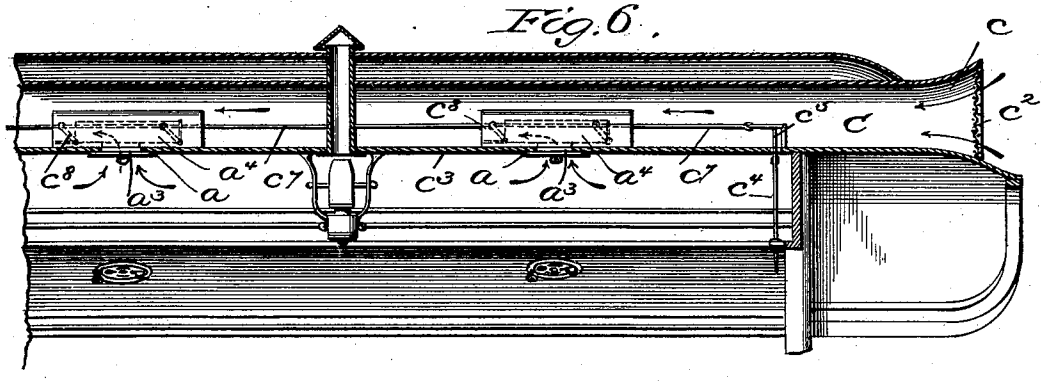
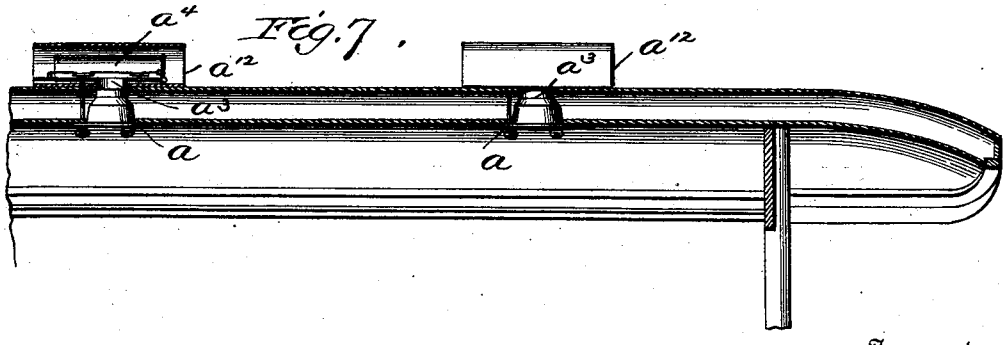


Fig. 7.



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W. E. ANDREW.

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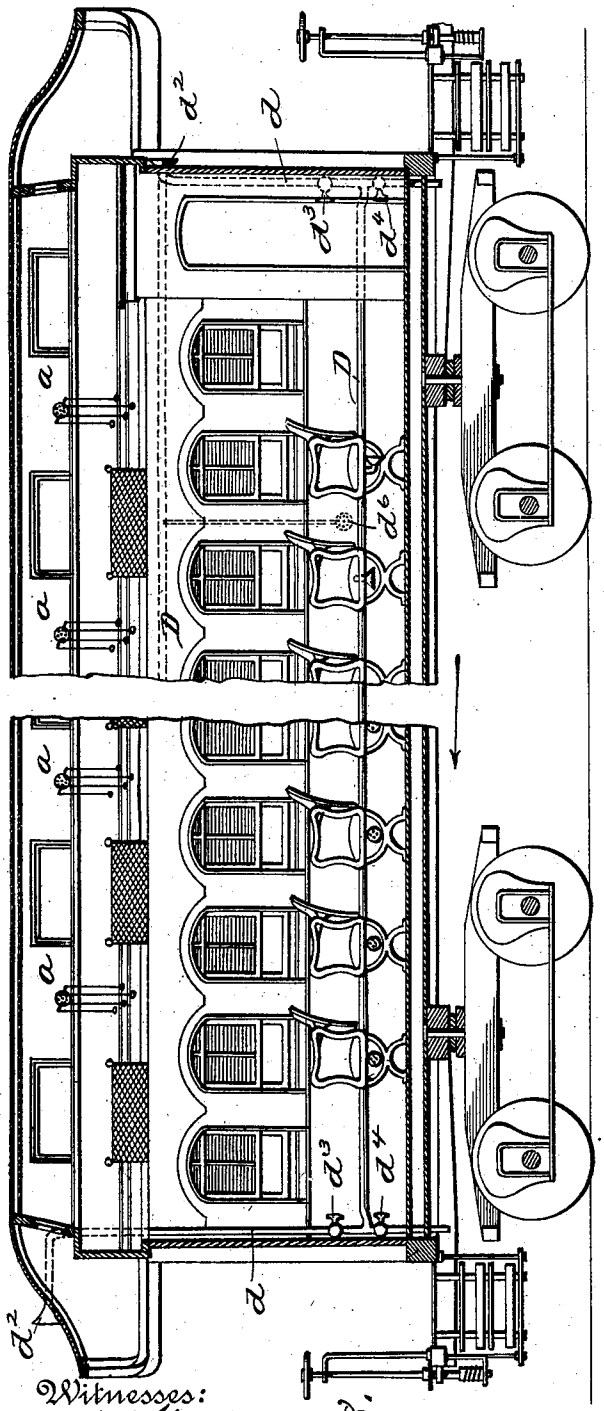


Fig. 8.

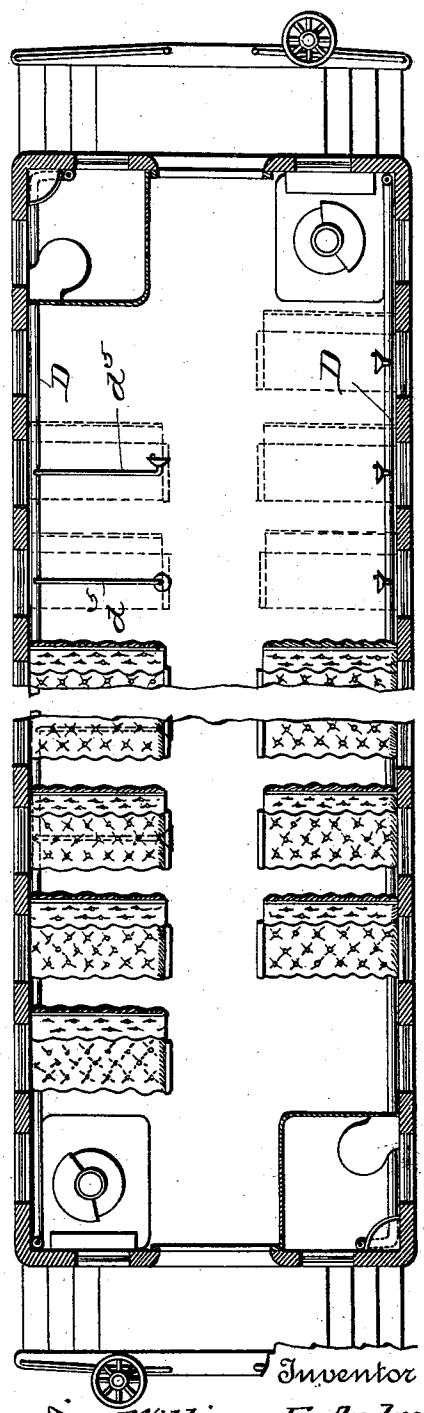


Fig. 9.

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UNITED STATES PATENT OFFICE.

WILLIAM E. ANDREW, OF ATLANTIC HIGHLANDS, NEW JERSEY.

RAILWAY-CAR OR OTHER VENTILATOR.

SPECIFICATION forming part of Letters Patent No. 600,975, dated March 22, 1898.

Application filed January 28, 1897. Serial No. 621,096. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM E. ANDREW, a citizen of the United States, residing at Atlantic Highlands, in the county of Monmouth and State of New Jersey, have invented certain new and useful Improvements in Railway-Car or other Ventilation; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to railway-car and other ventilation.

The object is in a practical, efficient, and inexpensive manner, employing recognized principles of physics, to effect proper and suitable ventilation as requisite, thus to remove foul air from any compartment, such as from a railway-car and its berths, and at once to supply fresh air, keeping such compartments and their contents in a condition of thorough and proper airing.

With this object in view the invention consists in a system of apparatus of varied construction, as will be hereinafter specifically described, all operated by induced draft.

In the accompanying drawings, forming a part of this specification, and in which like letters of reference indicate corresponding parts, Figure 1 is a view in front elevation of the ventilator, displaying its external appearance when in position. Fig. 2 is a view in horizontal section showing the arrangement of the internal parts of the apparatus, displaying one valve or door of the draft-controlling chamber closed and the other opened. Fig. 3 is a view in vertical section taken through the rear portion of the apparatus and looking toward the front thereof, showing more particularly the mechanism for operating the valves or doors of the draft-controlling chamber. Fig. 4 is a view in transverse section through the apparatus, showing more particularly the relative arrangement of the draft-conduit, the draft-controlling chamber, and the valves for closing the respective ends of the latter. Fig. 5 is a view in transverse section showing the upper portion of a sleeping-car and the manner of ventilating the upper berths and the roof portion of the car. Fig. 6 is a view in vertical longitudinal section taken on the line x x, Fig. 5, showing more particularly the means for ventilating the roof. Fig. 7 is a similar view taken on the line y y, Fig. 5, showing the manner of disposition of the ventilators above the upper berths. Fig. 8 is a view in sectional elevation showing the system applied to an ordinary railway-car—that is to say, a day-coach. Fig. 9 is a view in plan with the top of the car removed to display the manner in which the air-supply pipes from the draft-conduit are disposed with relation to the seat.

Referring to the drawings and to Figs. 1, 2, 3, and 4 thereof, A designates the ventilator proper, comprising in this instance a face-plate a, which may be of any desired construction and of any shape, in this instance circular in form, and having a rotatable section a', moved by rods or cords for operating the cut-off slats or doors a^2, as in ordinary ventilators or registers. As the particular arrangement of parts of this portion of the apparatus may be of any preferred style and as it forms no part of the present invention, a detailed description of its various elements and their manner of assemblage is deemed unnecessary.

This ventilator is set into or secured to a casing or housing a^3, constituting a combined exhaust and supply chamber, the double duty ascribed to this chamber being due to the fact that under some conditions it performs the first-named function and under others the second named, as will appear later on. Secured to or connected with the rear portion of this chamber is a casing a^4, constituting a suction or draft controlling chamber, the ends whereof are provided with doors or valves a^5, connected by mechanism in such manner that when one door is closed the other is opened, and vice versa. The mechanical appliances for accomplishing this result may be of many kinds; but from a standpoint of simplicity of organization, cheapness of production, and certainty and readiness of operation I employ in this instance two plates or levers a^6, each secured centrally of its length to a rod or bar a^7, the free end of each of which projects beyond the face-plate a and is bent to

form an arm a^8, to which is secured a rod or cord a^9 for rocking the rod a^7 and thereby opening either door a^5 to effect exhaust of the foul air or supply of fresh air, as the case may be, the interposed mechanism between the levers and the doors for accomplishing this result comprising a rod a^{10}, connecting like ends of the levers, and two rods a^{11}, connecting the other ends of the levers to the doors, as clearly shown in Fig. 3.

It will be observed by reference to Fig. 1 that the arms a^8 do not lie in the same plane, but that one points upward and the other downward. The object of this arrangement is to enable the conductor to ascertain at a glance which of the doors or valves a^5 is opened and which closed, and therefore these arms subserve the function of indicators for determining this.

The suction or draft controlling chamber a^4 is incased by an open-ended draft-conduit a^{12}, projecting at both ends beyond the chamber and free from the same at all points, so that there will be an uninterrupted space for air to pass entirely around the suction-chamber throughout its entire length, except for the small portion occupied by the neck of the exhaust and supply chamber. This conduit is here shown as straight from end to end; but it may be reduced at its ends to increase the force of the draft, as indicated by dotted lines in Fig. 2.

The ventilator and its accessories thus far described are adapted for use in a railway-car or any other place where its use will be needed, and as its application to any compartment will be obvious I will confine myself at this point in the description to its adaptation to the top portion or deck of a railway-car, as clearly seen in Fig. 4. It will be understood in this connection that in this embodiment of the invention there will be a number of these ventilators along a car and that each operates independently of the other, so that every ventilator of the series exerts the same power of exhaust and supply, and the current of air passing through the separate draft-conduits will act equally on each ventilator of the series as opposed to a continuous draft-conduit extending the length of the car and exerting exhaust or supply action on a series of independent suction or draft controlling chambers, the result of this latter arrangement being that the ventilator nearest the open end of the draft-conduit would exhaust or supply with the greatest force, the next one with somewhat less force, and so on progressively decreasing throughout the whole series of ventilators. It will thus be apparent that where a car is equipped with a continuous draft-conduit the rear end of the car will be best ventilated as regards the exhaust of foul air and the front end best ventilated as regards the supply of fresh air.

As shown in Fig. 4, the exhaust and supply chamber extends through the roof-timbers, with the face-plate secured to the inner side thereof and with the draft-conduit resting upon the car-deck. As a matter of mere convenience of illustration I have displayed the draft-conduit and draft-controlling chamber as rounded on their upper sides, this to avoid the presentation of sharp corners or edges; but it is to be understood that these parts may be of any other preferred shape in cross-section without departing from the spirit of my invention. When positioned as shown, each draft-conduit and draft-controlling chamber of a series extending throughout a car will be in direct line of passage of the air and will be positively acted upon thereby either to exhaust foul air from the car or supply fresh air thereto, according to which of the doors or valves a^5 is opened. Thus if a car is moving in the direction opposite the straight arrows shown in Fig. 2 and with the door next the ingress end of the draft-conduit closed the rapid passage of air through the said conduit will induce a draft in the suction or draft controlling chamber a^4, operating to suck or exhaust the foul air from the car, while if the car is moving in the direction of the straight arrows in Fig. 2 and the same door of the draft-controlling chamber is closed fresh air will be forced into the car, the volume of supply thereto being controlled by the flaps or slats of the ventilator.

Referring to Figs. 5, 6, and 7, I have shown the device as applied to a sleeping-car and to three parts thereof—viz., to the deck-timbers, as shown in Figs. 1 to 4, to the dead-air space between the ceiling and the roof, and to the upper-berth space. The first arrangement has already been described, and therefore needs no further description. The second arrangement consists of a continuous draft-conduit C, extending from one end of a car to the other and terminating at each end in this instance in a bell-mouth c, covered with a reticulated screen c^2. This may be a conduit such as that designated by a^{12} in Figs. 1 to 4 or may be formed by the space between the ceiling and roof, as preferred. Arranged against the ceiling c^3 are a number of exhaust and supply chambers a^3, the face-plates a of which lie substantially flush with the ceiling, as seen in Figs. 5 and 6. The doors or valves of the draft-controlling chambers a^4 are the same as those already described and are operated by a cord c^4, bell-crank lever c^5, and rod c^6, connecting the said lever with the valve. These valves may be operated separately, as described, or the whole series may be operated by means of a continuous rod c^7, connected by plates or levers c^8 with the valves, and by this latter arrangement the entire ceiling of the car may be ventilated at one time to exhaust the foul air and the heat generated by the lamps or gas-jets. If desired, the ends of the draft-controlling chamber may flare, so that when a door or valve is closed an air-tight closure will be effected,

or instead of having these ends flaring resilient gaskets may be provided at the ends, against which the doors will bear when closed.

Along the deck of a car and in that portion that will be over the upper sleeping-berths I arrange a series ventilators, one for each berth, these ventilators being in all essential points similar to those shown in Figs. 1 to 4 and operating in the same manner. In all sleeping-cars as now constructed there is no provision made for effectually ventilating the upper berths, the only fresh air that comes into contact with the bedding thereof during the day being the little that will strain in between the bed-frame and its casing. This is a very objectionable feature to many people and one that causes them positively to refuse to occupy one of these berths. Another objection is that there is no practical way of supplying the requisite and desired amount of fresh air direct to an occupant of an upper berth, as the ventilators commonly employed are arranged in the deck-timbers and therefore above and to one side of the berth. If to obtain a supply of fresh air these ventilators are opened, the warm air will escape from the car and in cold weather cool the same to an objectionable degree to occupants of the lower berths. By arranging the ventilators in the deck over the upper berths each occupant will be enabled to adjust the ventilator as he wishes and thereby have the temperature of his berth just as he desires it without inconvenience to occupants of the berths below or on each side of him, and when the berths are closed for the day the ventilators may be left open to allow either a constant supply of fresh air to pass to the bedding, and thereby thoroughly and effectively air the same, or to exhaust the air from the space between the bedding and the side of the car and around the bedding.

It will be understood that the ends of the draft-conduits a^{12} may be provided with suitable screens to preclude the entrance of snow, rain, or dust and that the ventilators may be placed at other points in the deck than those shown, or in some instances they may be arranged in the side of the car near the bottom thereof or close up to the deck.

In some instances in order absolutely to exclude the entrance of snow, rain, dust, or cinders to the berths I may provide the draft-conduit a^{12} with doors, as shown in dotted lines in Fig. 2, similar to those on the draft-controlling chamber a^4, the said doors being operated in such manner that when a door or valve at one end of the draft-controlling chamber is opened the door at the same end of the draft-conduit will be closed, and by this arrangement the air entering the draft-conduit will be caused to traverse its entire length, contact with a closed door thereof, be stopped in its passage long enough to allow any extraneous matter to settle, and then escape down or through the exhaust and supply chamber a^3 to the interior of the car.

In Figs. 8 and 9 I have shown my principle as applied to a railway-car for removing foul air therefrom and supplying fresh air thereto. The essential features of this embodiment of my invention are, first, that I supply air toward the center aisle of the car, where a draft will be least objectionable to the occupants thereof, and, secondly, I slightly heat the incoming air in cold weather, so as to prevent any undesirable lowering of the temperature of the car and also afford ready and convenient means for supplying cool air in hot weather. To effect these results, I provide pipes or distributing-conduits D, extending the length of the car, preferably in connection with the ordinary heating-pipes, although they may be arranged at the top of the car and be made to operate satisfactorily. At each extremity of these conduits I connect a vertical pipe d, the upper end of which terminates in a bell or funnel mouth d^2, which, as shown in Fig. 8, may extend either above the hood of the car or under the same, as may be preferred, both embodiments of which are shown in Fig. 8. The lower ends of these pipes d extend below the bottom of the car and constitute traps to catch snow, rain, dirt, and the like, valves d^3 d^4 being provided for the purpose, respectively, of preventing escape of the air from the conduit and for allowing the escape of any extraneous matter. Thus when a car is moving in the direction of the arrow shown in Fig. 8 the valves d^3 d^4 at the rear end of the car will be closed to prevent the escape of air, and the valve d^3 at the front end of the car will be opened, the reverse of this being observed when the car is moved in the opposite direction. Tapped into the pipe d is a series of distributing-pipes d^5, arranged beneath the seats, each having a bell-mouth which may extend to the outer side of the seat and discharge into the car-aisle or discharge beneath the seat close up to the pipe D, both of which arrangements are shown in Fig. 9, and the bell-mouths may be movable on the pipes d^5, so as to allow the occupant of a seat to control the direction of flow of the draft. As before stated, the conduits D may be arranged near the top of the car, as shown in dotted lines in Fig. 8, and when this arrangement is adopted there will be pipes d^6, also indicated by dotted lines, leading from the conduit beneath or between the seats, as may be preferred. While I have shown this last embodiment of my invention as applied to a passenger-coach or smoking-car, it is to be understood that the same is equally adaptable to sleeping-cars, and as its application thereto will be obvious illustration is deemed unnecessary. It is also to be understood that in smoking-cars, where more ventilation is necessary than in one of another kind, I also employ the form of ventilator shown in Figs. 1 to 4 between the upper windows in the dome, and as its operation is understood any explanation would be superfluous.

Having thus fully described my invention,

what I claim as new, and desire to secure by Letters Patent, is—

1. A car-ventilating device, comprising a casing through which the air passes, an inner flue or chamber connected with a cross-section extending through and into the car, the inner flue being provided at each end with a closing device connected by bars, and a rod or lever connected by interposed mechanism with the bars and passing through and into the car, and serving to operate the closing devices, and also to indicate their position, substantially as described.

2. A ventilating apparatus comprising a ventilator proper having an open-work face-plate provided with a movable section, slats or bars adapted to be operated by the movement of the said section, a casing or housing in which the ventilator is mounted, said casing constituting a combined exhaust and supply chamber, a chamber secured to the rear portion of said casing, and constituting a suction and draft controlling chamber, doors or valves pivoted at the ends of this latter chamber, and connected by mechanism adapted to be operated in such manner that when one valve is opened the other one is closed, and vice versa, the mechanism for opening and closing these valves constituting, also, indicating devices for determining which of the valves is opened or closed, and an open-ended draft-conduit inclosing the casing and projecting beyond the same, substantially as described.

3. A ventilating apparatus comprising a casing having mechanism for controlling the passage of pure or foul air therethrough, an open-ended chamber, in communication with the casing, having doors adapted to be operated by mechanism arranged externally of the face of the said casing and operating to open or close one or the other end of the chamber, and a draft-conduit inclosing the chamber and a portion of the casing, and having its ends extended beyond the ends of the chamber, and somewhat reduced or constricted, substantially as described.

4. In a sleeping-car, the combination with each upper-berth space, of a ventilating device comprising a casing through which the air passes, an inner flue or chamber connected with a cross-section extending into the said space, the inner flue being provided at each end with closing devices connected by bars, and a rod or lever connected by interposed mechanism with the doors and passing through and into the berth-space, whereby an occupant of a berth can ventilate the same independently of and without interference with any other berth, substantially as described.

5. A sleeping-car having the upper-berth space, roof-timbers, and dead-air space above the ceiling provided, each, with a series of independently-operating ventilators, each ventilator comprising a casing through which the air passes, an inner flue or chamber connected with a cross-section extending into the car, the inner flue being provided at each end with a closing device connected by bars, and a rod or lever connected by interposed mechanism with the bars and passing through and into the car, substantially as and for the purpose specified.

In testimony whereof I affix signature in presence of two witnesses.

WILLIAM E. ANDREW.

Witnesses:
R. G. DYRENFORTH,
R. M. ELLIOTT.