Oct. 9, 1928. 1,687,156

F. C. DUERK

VENTILATING APPARATUS

Filed July 30, 1925 2 Sheets-Sheet 1

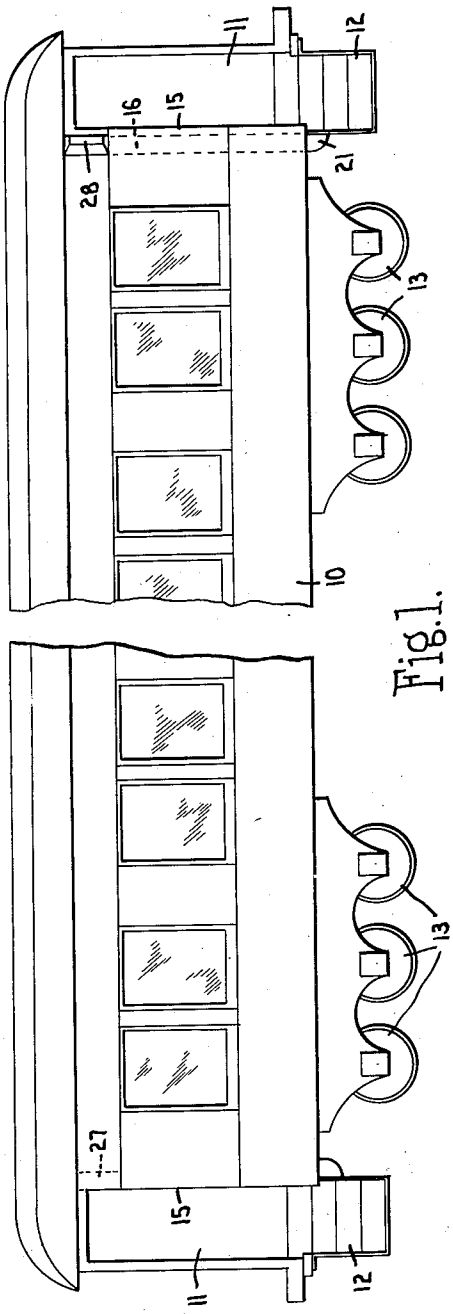


Fig. 1.

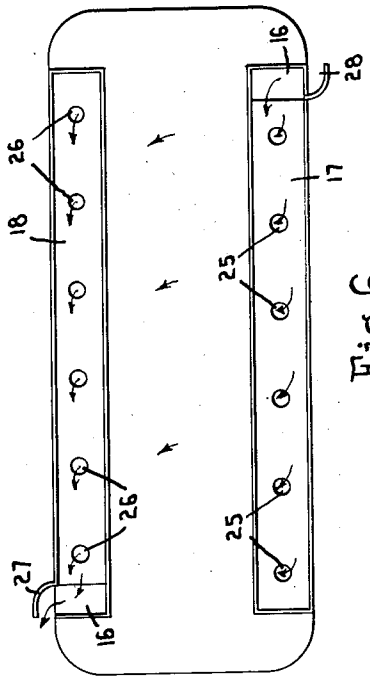


Fig. 6.

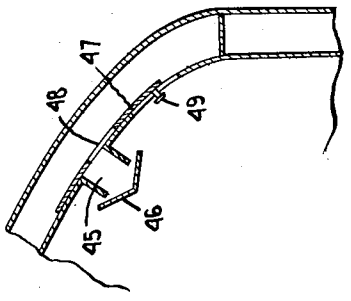


Fig. 5.

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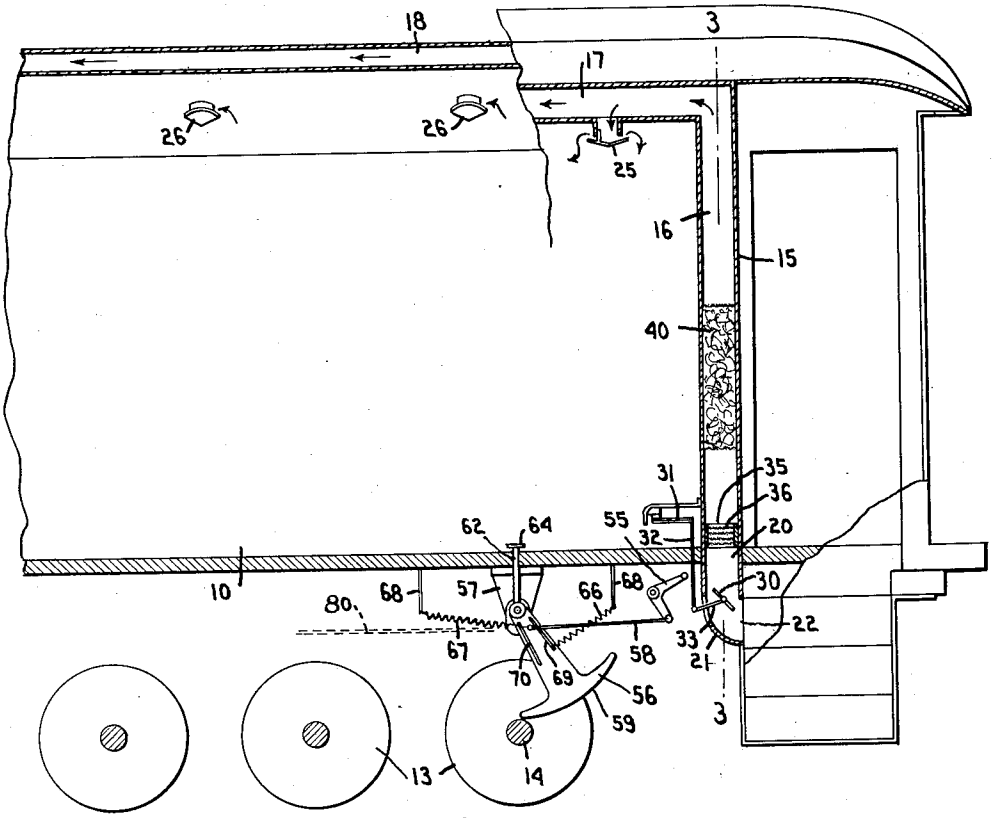


Fig. 2.

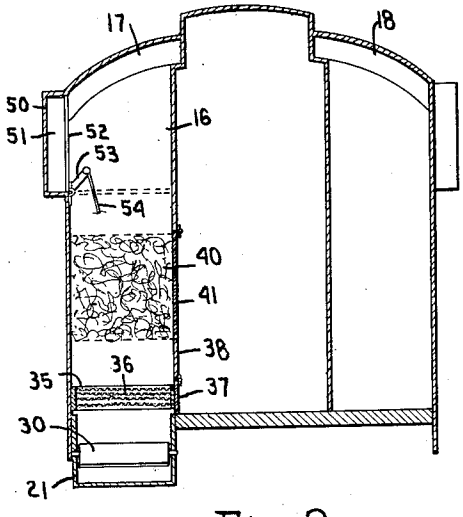
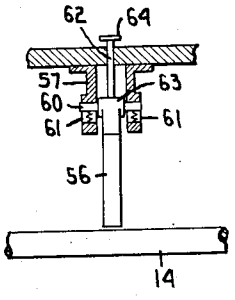


Fig. 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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VENTILATING APPARATUS.

Application filed July 30, 1925. Serial No. 46,970.

This invention relating as indicated to a ventilating device is more particularly directed to an improved type of ventilator and air purifying system for use on railway cars and like public conveyances. The primary object of the invention is to provide means which may be attached or assembled on an ordinary passenger car without greatly modifying the structure thereof, said means being adapted to maintain a variable flow of fresh air through the interior of the car. A further object of the invention is to provide in connection with a railroad car a ventilating apparatus having inlet ports at either end of the car on opposite sides thereof and cooperating discharge ports, which are adapted to conduct fresh air from the front end of the moving car into its interior and to discharge the foul air at the rear end. The inlet and outlet ports are actuated by mechanism automatically operated by the direction of movement of the car to open the proper inlet and cooperating discharge outlet, i. e. to open the inlet at the end of the car which is traveling forward and the outlet at the rear end thereof on the opposite side.

The invention also contemplates the provision of a simply constructed inexpensive ventilating apparatus which is accessible for repair and adjustment, and in which is employed a screening device that may be quickly removed for cleaning as by an attendant when a train is stopping at a terminal.

To the accomplishment of the foregoing and related ends, said invention then consists of the means hereinafter fully described and particularly pointed out in the claims. The annexed drawings and following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting however but one of the various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:

Fig. 1 is a side elevation of a conventional type of railway passenger car showing the present improved ventilating system as applied thereto.

Fig. 2 is an enlarged longitudinal cross-sectional view taken through one end of said car.

Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 2.

Fig. 4 is a detailed view showing manually operative means for actuating the direction control.

Fig. 5 is a transverse sectional view taken through the roof of the car illustrating an improved type of air inlet; and

Fig. 6 is a diagrammatic view illustrating the mode of operation of the present invention.

The present embodiment of the invention illustrated in said drawings refers to the application of my improvement in ventilating apparatus on a railroad passenger car, it being obvious, however, that the essence of the invention may be slightly modified to adapt the same for use on street-cars, motor busses or the like.

Essentially the apparatus comprises an air inlet positioned at the forward end of a car communicating with a vertical passage which leads to a second passage disposed longitudinally at the top of the car. In the vertical passage are located the several devices of this invention adapted to purify and control the flow of air to such longitudinal passage, which latter passage is provided with suitable outlet ports communicating with the interior of the car. In railway car construction there are vertical passageways located at the ends thereof at either side of the entrance doors, and also a horizontal passage at each side edge of the roof portion. It has been found that the same may be advantageously employed in connection with the ventilating system of this invention. As stated above, there is provided an inlet port at each end of the car, and it is intended that one of these inlet ports communicates with one of the horizontal passages while the other inlet communicates with the horizontal passage on the other side of the car.

Referring now to the drawings, particularly Figs. 2 and 3, the railway car 10 has entrance passageway 11 at either end, steps 12, and suitable wheels 13 mounted on axles 14. In the end walls 15 at each end of the car, there is provided a vertical passageway 16 which communicates with horizontal passageways 17 and 18 extending along the upper side edges. The vertical passages 16 normally extend from the floor line to such horizontal passage and in this invention there is attached to the lower end 20 thereof an inlet scoop 21 having its opening 22 di-

rected toward the adjacent end of the car. This opening 22 is positioned at the extreme side edge of the car and air is permitted to pass by the adjacent step portion into the scoop 21 where it is directed upwardly through the passages 16 and 17 into the interior of the car. The horizontal passage 17 is provided with inwardly directed outlet ports 25 through which the air enters the interior of the car while the other horizontal passage 18 has similar ports 26 through which the air may enter from the interior of the car to such passage to be discharged. A scoop 27 is provided at the rear end of the car in communication with the passage 18 and in operation serves not only as a discharge port for foul air, but also as a suction scoop to draw the air from passage 17 into the interior of the car and thence through the ports in the passage 18. As has been stated above, an inlet is provided at each end of the car to permit the present ventilating device to be employed regardless of the direction of movement of the car. Therefore, a similar suction scoop 28 is provided at the upper end of the vertical passage 16 in communication with passage 17 which scoop functions when the car is moved in the opposite direction, at which time passageway 18 is then the inlet and passageway 17 the outlet. The same will be apparent from an inspection of Fig. 6.

Mounted in each of the vertical passageways 16 at the lower end thereof is a valve or damper member 30 which is actuated by suitable mechaism to control the flow of air from the adjacent inlet 22. In the illustrated embodiment of the invention, the valve 30 is shown as automatically controlled by a thermostatic device 31 carried in the interior of the car and connected to such valve by suitable links 32 and 33, it being obvious that many types of temperature actuated mechanism may be employed for this purpose.

Mounted in the passageway 16 directly above the valve or damper member 30 is an air screening device which is adapted to remove from the air passing therethrough such dirt and cinders that are in the air along railroad systems. This screening device consists of a framework 35 removably mounted in the passageway 16 and having a plurality of screens 36 transversely disposed across the passage 16. At any convenient place there may be provided a hinged door 37 which may be swung open to permit the removal of the screen frame together with screens 36 for cleaning purposes, such door being here shown as provided at the inner side wall 38 of vertical passage 16.

This invention also contemplates the provision of a chemical agent which will act to remove from the air passing through the ventilating conduits the various gases caused by smoke tunnels on railway system. A very common method has been employed to counteract gases used in war-time which consist of activated charcoal and soda lime, and it has been found that the same may be used in the present instance, with slight modification. The chemical agent is retained in a chamber or section 40 in the passage 16 above the screening frame 35. Like the screen frame 35, the section 40 may also be made removable through a second hinged door 41 to facilitate the replacement of new air purifying substance.

The ports connecting the passages 17 and 18 with the interior of the car may consist of any of the well-known fixed ventilating devices. The one illustrated in Fig. 5 comprises an opening 45 communicating the passage 17 with the interior of the car, and having a deflecting member 46 at its inner end. Movable within the passage 17 along the upper side of the lower wall thereof is a sliding member 47 in which is provided a hole 48 adapted in one position to register with the opening 45. When it is desired to reduce or shut off the flow of air to the interior of the car, slide 47 is moved to position the solid portion thereof over the opening 45. In use a slide 47 may be provided at each port 25 and suitable handles 49 or other actuating mechanism positioned at various points where they may be operated by the occupants of the car, the same being of particular advantage in "Pullman" sleeping cars.

As has been stated hereinbefore, there is provided in communication with the upper end of passage 16, a suction scoop on the exterior of the car. The scoops 27 and 28 are best shown at 50 in Fig. 3 and provides a passage 51 connecting the passage 16 to the exterior. Means for automatically closing the suction scoop of the ventilating conduit in use, that is, the one at the end of the car moving forward and for automatically opening the scoop at the other end of the car consists of doors 52 pivoted within the passage 16 and adapted to close off such suction scoops. A lever 53 is attached to hinge portion of door 52 and is connected by a link 54, which has its lower end attached to a bell crank 55. This crank 55 is pivoted beneath the floor of the car and is actuated by a shoe member 56 pivoted in a bracket 57 depending from the car floor. The lower surface of shoe 56 is adapted to engage with the axle 14 of the car and be moved in a direction depending upon the movement of the car. Means as a link 58 is utilized to connect the shoe member 56 with the bell crank arm 55.

To eliminate excessive wear on the axle engaging surface 59 of the shoe 56 certain mechanism is provided by this invention to remove such shoe out of contact with the axle after the pivoted door 52 has been moved to proper position. The shoe member is carried by the brackets 57 on a shaft 60 which is

journaled in vertical slots 61 provided in such brackets. Engaged between the lower ends of slots 61 and shafts 60 are compression springs which tend to keep the shoe member 56 normally pressed upwardly and out of engagement with the axle 14. A vertical push rod 62 is positioned above the upper end 63 of shoe 56 which rod extends through the car floor and has on its upper end a pedal member 64. In the operation of the present ventilating apparatus when it is desired to set the same to control the flow of air to the interior of the car depending upon the direction of movement thereof, the attendant merely depresses the shoes 56 at each end of the car by placing his foot on the pedal member 64 at the time the car is first started in motion. This will properly position the doors 52 adjacent the suction scoops and condition the ventilating apparatus for operation. If desired, only one shoe may be employed to control the doors 52 at each of the suction scoops, in which case a rod 80 will be attached to the shoe (as shown in dotted lines, Fig. 2) and to the second bell crank 55 at the opposite end of the car. By this construction the door 52 is closed at one end by the movement of the shoe 56 and the door at the other end simultaneously opened. Means are also provided which serve to keep the shoes together with the pivoted doors 52 in set position after once having been moved by engagement of the shoe with the axle 14. This latter means comprises a pair of tension springs 66 and 67 attached at one end to suitable projections 68 on the lower side of the car floor or frame. The other ends of the springs are engaged in slots 69 and 70 provided in the shoe member 56 at either side of its pivotal point 60. As seen in Fig. 2 of the drawings, it will appear that as the shoe is moved to one side of its central pivot, the end of the spring at that side will move along the slot to the end which is nearest the support 68. Likewise will the end of the other spring move to the nearest end of its cooperating slot in the shoe member 56. Such mechanism is very similar to well-known self-locking toggle link construction, and serves to effectively lock the shoe 56 in set position.

It will be apparent from the foregoing that I have accomplished the objects primarily stated, and that I have devised certain new and improved ventilating apparatus which is adapted to conduct air into the interior of a vehicle, which air is acted upon by certain devices to remove dust and cinders therefrom and to purify its condition. While in the present embodiment the invention is shown in connection with railway passenger cars, it will be obvious that the same may be utilized in the front end of motor busses or the like to convey air from the front end thereof to the interior of the car in a purified condition.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. The combination with a railroad car having air passages in the end walls and communicating horizontal passages in the roof thereof, of air screening and purifying apparatus mounted in said vertical passages, air inlet ports at the lower end of said vertical passages, discharge ports at the upper end of said vertical passages, shut off valves for said discharge ports, and means operable by the running mechanism of the car for opening the discharge port at the rear end and for closing the discharge port at the front end thereof.

2. The combination with a railroad passenger car having a vertical air passage in the end wall and a communicating horizontal air passage in the roof thereof, of an air intake mounted at the lower end of said vertical passage, a discharge port located at the upper end of the vertical passage, and means including a door for closing off said discharge port, said means being actuated by the running mechanism of the train.

3. The combination with a railroad passenger car having a vertical air passage in the end wall and a communicating horizontal air passage in the roof thereof, of an air intake mounted at the lower end of said vertical passage, a discharge port located at the upper end of the vertical passage, a door for said discharge port, and means engaging the axle of the car for closing said door upon rotation of the axle in one direction.

4. The combination with a railroad passenger car having a vertical air passage in the end wall and a communicating horizontal air passage in the roof thereof, of an air intake mounted at the lower end of said vertical passage, a discharge port located at the upper end of the vertical passage, a door for said discharge port, a pivoted member mounted to engage the car axle, and connections between said member and said door, said member being actuated by the rotation of the axle in one direction to close said door.

5. The combination with a railroad passenger car having a vertical air passage in the end wall and a communicating horizontal air passage in the roof thereof, of an air intake mounted at the lower end of said vertical passage, a discharge port located at the upper end of the vertical passage, a door for said discharge port, a pivoted member mounted on the underside of the car floor, said member being yieldingly supported transaxially

of the car axle, and having a surface adapted to engage said axle, and connections between said member and said door whereby the latter may be actuated by the pivotal movement of the former.

6. The combination with a railroad passenger car having a vertical air passage in the end wall and a communicating horizontal air passage in the roof thereof, of an air intake mounted at the lower end of said vertical passage, a discharge port located at the upper end of the vertical passage, a door for said discharge port, a pivoted member mounted on the underside of the car floor, said member being yieldingly supported transaxially of the car axle, and having a surface adapted to engage said axle, connections between said member and said door whereby the latter may be actuated by the pivotal movement of the former, and a pedal member for engaging said pivoted member with the axle.

7. The combination with a railroad passenger car having a vertical air passage in the end wall and a communicating horizontal air passage in the roof thereof, of an air intake mounted at the lower end of said vertical passage, a discharge port located at the upper end of the vertical passage, a door for said discharge port, a pivoted member mounted on the underside of the car floor, said member being adapted to engage said axle and be moved thereby, connections between said member and said door, and means adapted to hold said member in the position moved by said axle.

8. The combination with a railroad passenger car having a vertical air passage in the end wall and a communicating horizontal air passage in the roof thereof, of an air intake mounted at the lower end of said vertical passage, a discharge port located at the upper end of the vertical passage, a door for said discharge port, a pivoted member mounted on the underside of the car floor, said member being adapted to engage said axle and be moved thereby, connections between said member and said door, and springs attached to the car frame and to slots in each side of said member, said springs serving to hold the member in the position where it is moved by said axle.

Signed by me this 27th day of July, 1925.

FREDERICK C. DUERK.