

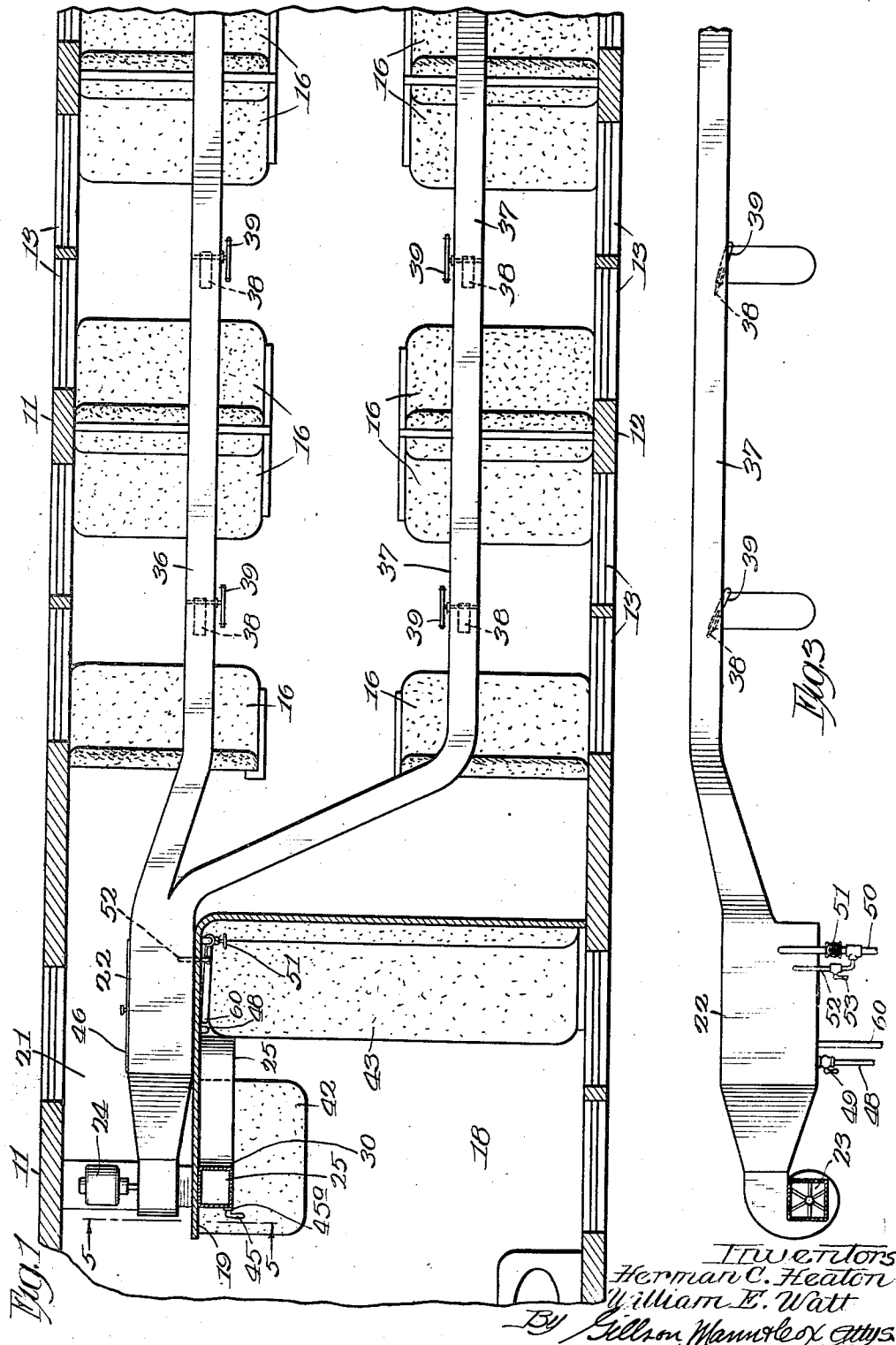
Dec. 22, 1936.

H. C. HEATON ET AL

2,064,912

VENTILATING SYSTEM

Original Filed July 14, 1926 2 Sheets-Sheet 1



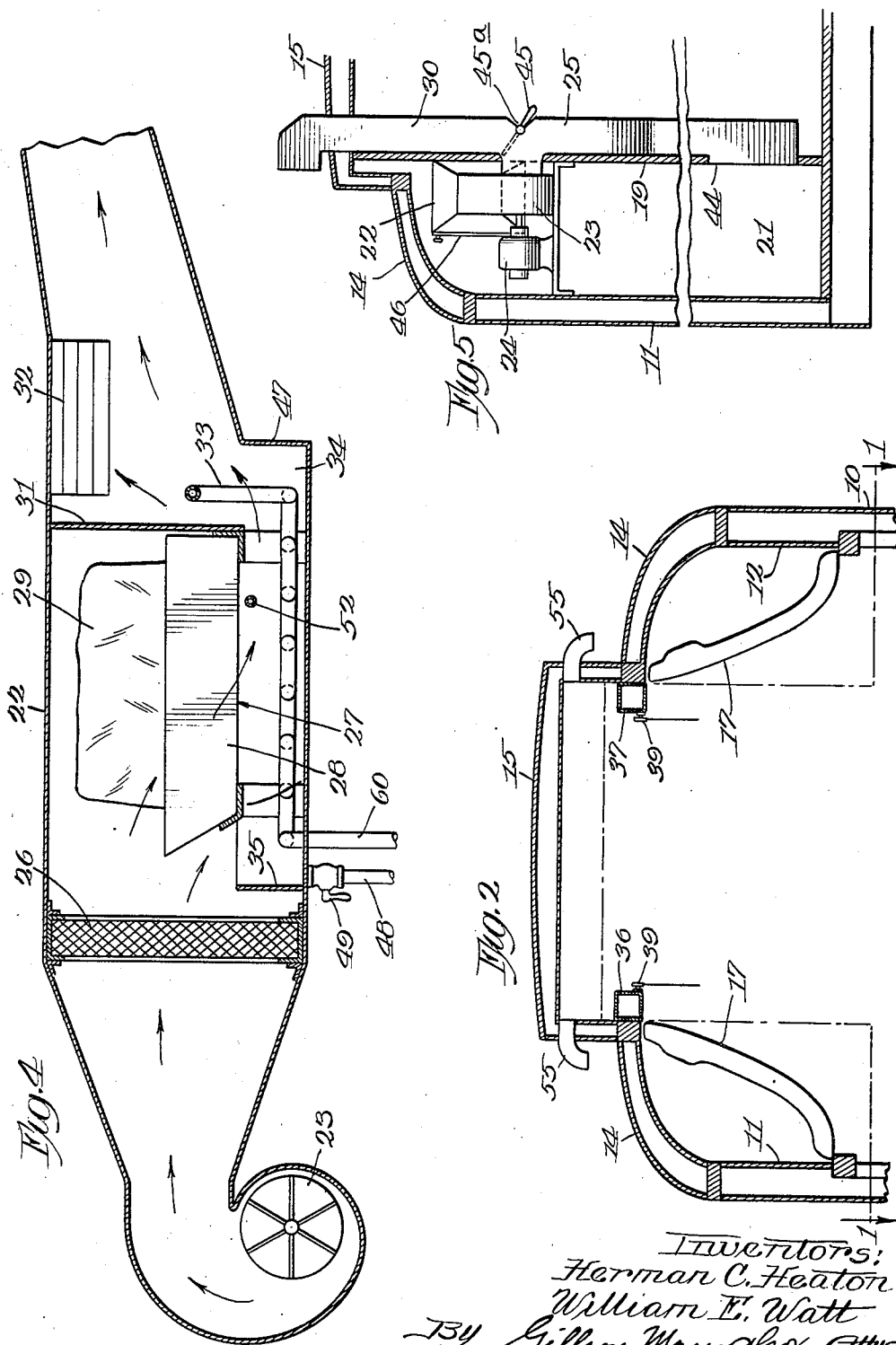
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UNITED STATES PATENT OFFICE

2,064,912

VENTILATING SYSTEM

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2 Claims. (Cl. 98—10)

This invention relates to ventilating systems and more particularly to ventilating systems for railway cars, buses and other inclosures.

The principal object of the invention is the provision of new and improved means for removing impure air from railway passenger and sleeping cars and other inclosures, supplying pure air, circulating the same, and removing all dust therefrom during its circulation.

Another object of the invention is the provision of new and improved means for causing a continuous circulation of air within an inclosure, as a railway car; maintaining the air within said car under a pressure slightly above atmospheric; removing the impure air from the car; and heating or cooling the circulating air as desired or as climatic conditions may require.

A further object of the invention is the provision of a ventilating system for inclosures that is cheap to manufacture, that may be easily and readily installed, even in present structures, that is simple in construction, efficient in operation, composed of a minimum of moving parts, and that is not likely to get out of order.

Other and further objects and advantages of the invention will appear from the following description taken in connection with the accompanying drawings, in which

Fig. 1 is a horizontal section of a portion of a railway sleeping car on the broken line 1—1 of Fig. 2, showing the invention in position therein, with the parts shown more or less diagrammatically;

Fig. 2 is a vertical section of a portion of a car, showing the invention in position therein;

Fig. 3 is a side elevation of the ventilating device, with parts broken away;

Fig. 4 is a vertical section thereof, with parts broken away; and

Fig. 5 is a vertical section of a portion of a car on line 5—5 of Fig. 1.

The conventional methods employed for ventilating railway cars and the like is highly objectionable because of the great amount of dust, dirt and cinders introduced into the car with the air, and especially is this true in warm weather when the side windows of the car are usually opened more or less. When all-metal cars are employed, as is the present practice, the cars are usually uncomfortably warm during the summer season, and the heat and dust, especially in dry weather in the warmer climates, make travel extremely unpleasant.

The present invention contemplates a ventilating system whereby the car will be properly

ventilated and cooled or heated as required, and the doors and windows maintained in closed position for excluding the dust and cinders.

Suitable means are provided for circulating, cleaning, cooling or heating, dehydrating or humidifying and ozoning the air within the car; and also for removing the impure air and introducing sufficient air from the outside to replace the impure air as fast as it is removed.

In the form of the device selected to illustrate one embodiment of the invention, the ventilating system comprises a conduit for conducting the air from a blower and delivering the same at points longitudinally of the car. Exhaust ports or outlets for the impure air are provided, and their size so proportioned that the air in the car will be maintained at a pressure slightly above normal for insuring the expulsion of the foul or impure air from the car.

The ventilating system is adapted to be employed in closures of various kinds, but for the purpose of illustration it is shown as being used in connection with a conventional sleeping car 10 which comprises the side walls 11 and 12 provided with windows 13, the lower deck 14, and the upper deck or clere-story 15.

Seats 16 are arranged adjacent to each of the walls and are adapted to be made into lower berths in the usual manner. The car is also provided with upper berths 17 which, with the lower berth, form sections as is usual in sleeping car constructions.

A rest, toilet or smoking room 18 is provided at one end of the car and its partition wall 19 is spaced from the side wall 11 sufficiently far to form an aisle 21. The parts thus far described are of the usual or any well-known construction and may vary according to the design of the car.

The ventilating system comprises a casing 22 in one end of which is mounted a blower or fan 23. The casing is preferably though not necessarily mounted in one end of the car adjacent to the roof or deck. As shown, it is located in the aisle 21 in the end of the car in order that it may be less conspicuous, and interfere less with the convenience and comfort of the passengers.

The fan or blower 23 is adapted to be operated in any suitable manner. As shown it is operated by an electric motor 24. The intake of the fan is connected with a conduit 25, see Figs. 1 and 5, which extends to a point adjacent to the floor of the car, and with a conduit 30 leading to the exterior of the car. The conduit 25 may be located either in the aisle 21 or in the smoking room 18. As shown, it is located within the

smoking room 18 between the seats 42 and 43. It is located between these seats because this space is unoccupied and the conduit would be less obtrusive here than elsewhere. Its lower end is secured in the opening 44 in the partition 19 whereby the returning air flowing along the aisle 21 will be drawn into said conduit. The conduit 25 extends upwardly from the opening 44 to a point adjacent the top of the car and then rearwardly and laterally to the fan intake.

The conduit 30 extends through the top portion of the car and is provided with a valve or damper 45 having a friction hinge 45^a or other suitable means for holding the valve in adjusted position for admitting the required amount of air to replace the impure air removed.

In order to clean the air of dust, dirt, cinders and the like the casing 22 is provided with an air cleaner 26 of any approved construction, through which the air passes from the blower or fan 23. The air cleaner 26 may be any one of the commercial types now on the market, and in order to clean the same it is adapted to be removed through a suitable door 46 in the side of the casing.

It is well known that the discomfort of warm weather is due largely to humidity in the atmosphere. Suitable means are therefore provided for removing a large proportion of the moisture contained in the air within the car. In order to dehydrate the air and at the same time cool the same, the casing 22 is provided with a cooling device 27 of any approved construction. That shown is a commercial form and comprises a receptacle 28 in which a cooling element such as ice 29 is adapted to be placed. The receptacle 27 is so mounted that the air passing through the cleaner 26 may flow on all sides of the same. A baffle 31 may be provided at the rear of the receptacle extending from the receptacle to the top and sides of the casing 22, the lower edge of said baffle terminating short of the lower wall of the casing whereby the air will pass over and about the ice and the receptacle 28 and down beneath the baffle 31 into what for convenience will be termed the rear portion of the casing 22. The air coming in contact with the cool walls of the container will become chilled and will deposit its moisture which will be collected in the container 34 formed by the partition 35 and the offset portion 47 of the casing 22. The water collected in the container 34 is removed through the drain 48 by opening the valve 49 in said drain.

An ozonizer 32 may, if desired, be mounted in what, for convenience of description, will be referred to as the front portion of the casing 22, in such a position that a portion of the air will pass through the same and become ozonized. Since the ozonizer is of the usual commercial form and since the details of its construction constitute no part of the present invention, it is not thought necessary to illustrate or describe the same.

In cold weather it may be desirable to heat the air and for this reason a steam coil 33 is provided in the casing 22. The heating coil may be located beneath the receptacle 28 whereby the air will be deflected down onto the coil by said receptacle. The pipe 50 leading to the heating coil is preferably provided with a valve 51 whereby the steam may be cut off when not desired. The heating coil is provided with a return pipe 60 as is usual in such constructions.

In dry climates or under certain conditions it may be desirable to humidify the air. Any suit-

able form of humidifier may be employed for this purpose. As shown, a pipe 52 extends from the pipe 50 below the valve 51 into the casing 22 for delivering steam to the air as it flows through said casing. The pipe 52 is provided with a valve 53 for shutting off the humidifier when the same is not required.

Attached to the casing 22 and extending lengthwise of the car along the lower portion of the upper deck 15 are conduits 36 and 37. These conduits are provided with ports or valves 38 which are adapted to be opened and closed by any suitable mechanism, such as the handles 39. The areas of the valves 38 are so proportioned that whether one or all of the valves are opened the air will be under pressure throughout the entire length of the conduits, whereby a sufficient quantity of air will be delivered through the ports farthest from the fan or blower as well as through those nearest it. The valves 38 are pivoted at their front ends and are adapted to open inwardly toward the front, whereby they will, when partially open, deflect the air downwardly through the port openings into the car. Each of the handles 39 may, if desired, be provided with a cord forming a loop of sufficient length to be within reach of the occupants of the seats, for operating the valve. The hinges for the valves are preferably of any well known friction type, whereby the valves will be held in adjusted position.

A port or valve 38 is arranged above each section in order to supply fresh air thereto. The air is conducted the full length of the car by the conduits but it is unconfined on its return. The return-pipe 25 which extends to a point adjacent the floor is adapted to return the air, that flows back along the floor, to the blower or fan.

In occupied inclosures the impure air is found in the upper stratum because it is chiefly air that has been exhaled by the lungs of the occupants and is therefore warmer and consequently lighter than the cooler and purer air in the car. Ports 55 are therefore provided adjacent the top of the car for permitting the escape of this impure air. In other words, by taking off the top stratum of the air, we get rid of the foul air which is caused chiefly by the exhalations of the skin and lungs of the occupants of the car.

In order to insure the removal of this foul or impure air the air within the car or inclosure is maintained under a slight super-atmospheric pressure and suitable vents or discharge ports 55 in the roof portion or deck of the car are provided. These ports are comparatively small but are large enough to properly ventilate the car. They may if desired be provided with valves for regulating the size of the openings.

In the operation of the system, doors and windows are maintained in closed position. The blower 23 sucks air through the conduit 30 from the outside, and conduit 25 within the car, and forces the same through the casing 22 where it is cleaned, dehydrated or humidified as occasion may require, cooled or heated as desired, ozonized and forced through the conduits 36 and 37, delivered through the ports 38 and, flowing back along the floor, is drawn up by the return pipe 25, thus completing its circuit. The valve 45 is adjusted to admit the required amount of air to the cause sufficient pressure within the car to force the impure air out through the ports 55.

We claim as our invention:

1. In combination, a railway coach having a partition forming a compartment, and an aisle

at one end of said coach, a casing in said aisle adjacent the top of said coach, a blower in said casing, a pair of conduits for conveying air to said blower, an opening in said partition, one of
5 said conduits being in communication with the external air and the other extending downwardly within said compartment and terminating adjacent said opening, means in said casing for removing dust and moisture from the air delivered
10 to said casing by said blower, and means for delivering said air under pressure to different portions of said coach.

2. In combination, a railway coach having a partition forming a compartment, and an aisle

at one end of said coach, a casing in said aisle adjacent the top of said coach, a blower in said casing, a pair of conduits for conveying air to said blower, an opening in said partition, one of
5 said conduits being in communication with the external air and the other extending downwardly within said compartment and terminating adjacent said opening, means in said casing for removing dust from, and for changing the temperature of, the air delivered to said casing by said
10 blower, and means for delivering said air under pressure to different portions of said coach.

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