

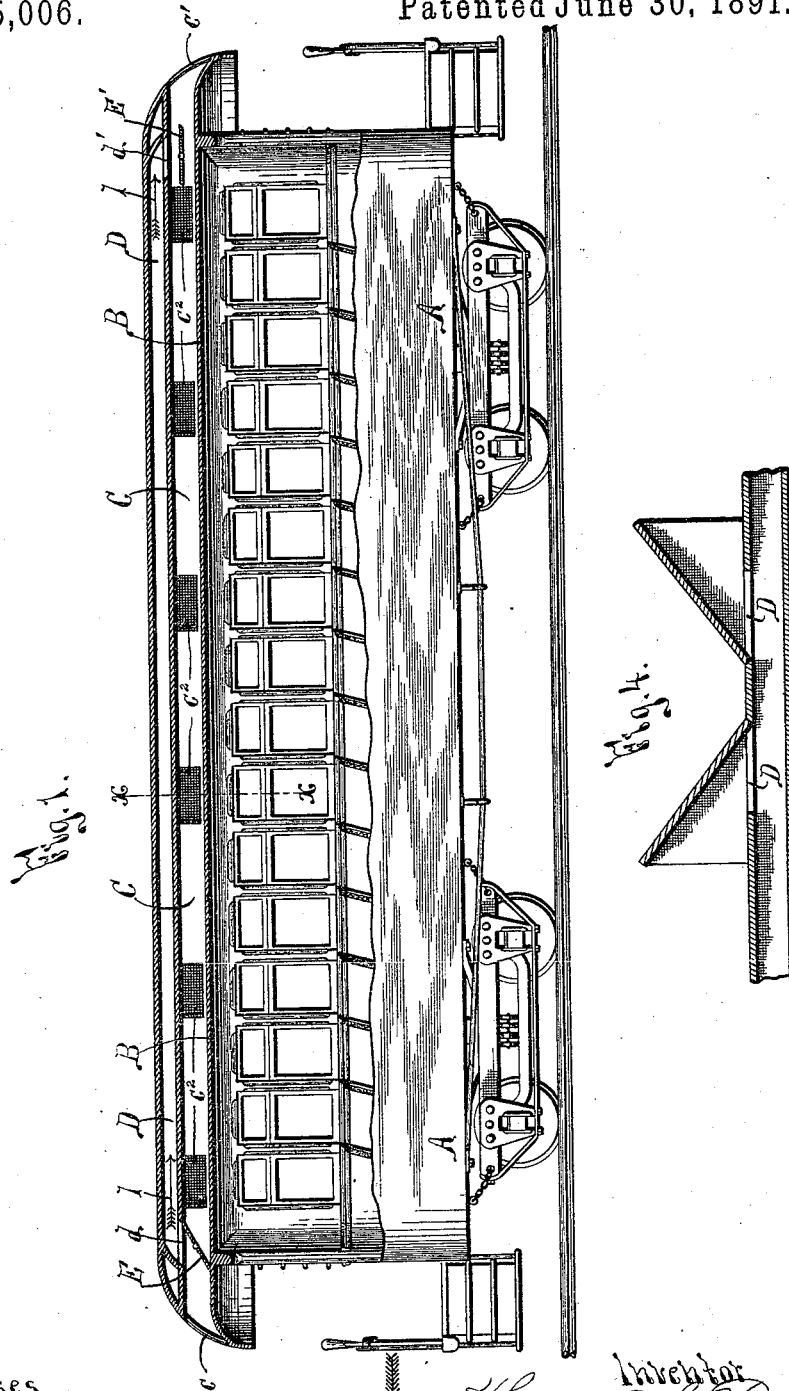
(No Model.)

2 Sheets—Sheet 1.

T. S. PURDIE.
VENTILATING APPARATUS.

No. 455,006.

Patented June 30, 1891.



Witnesses,
H. C. Chas.,
Wm. H. Randall,

Inventor
Thomas S. Purdie
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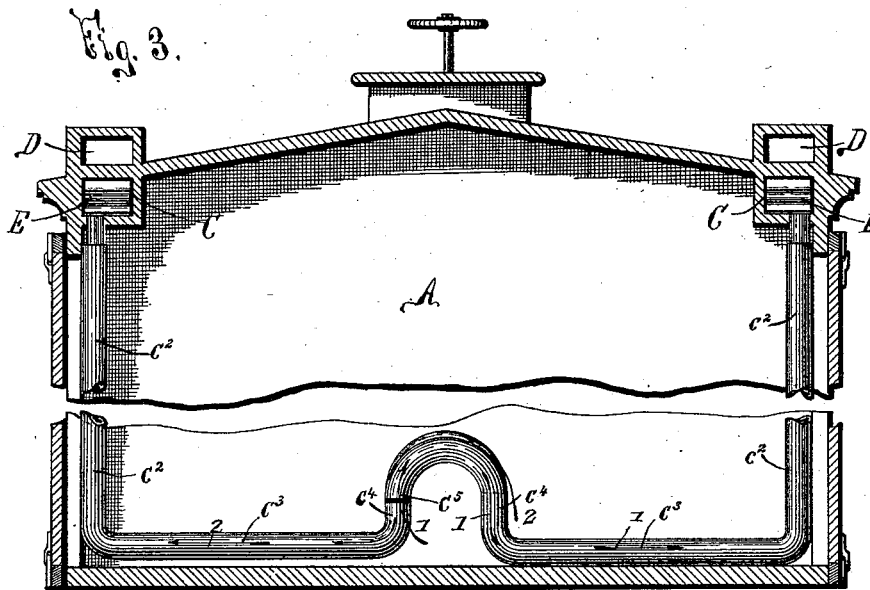
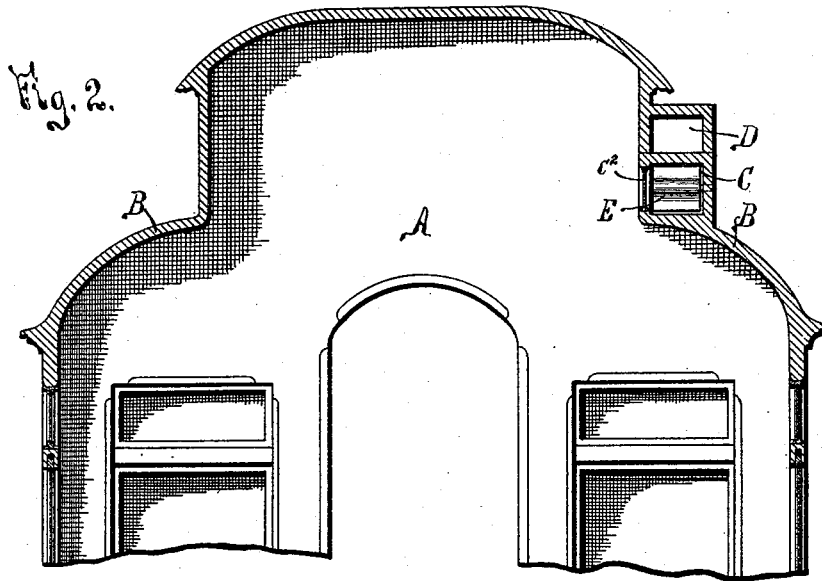
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UNITED STATES PATENT OFFICE.

THOMAS S. PURDIE, OF SYRACUSE, NEW YORK.

VENTILATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 455,006, dated June 30, 1891.

Application filed April 15, 1890. Serial No. 347,990. (No model.)

To all whom it may concern:

Be it known that I, THOMAS S. PURDIE, of Syracuse, in the county of Onondaga, in the State of New York, have invented new and useful Improvements in a Ventilating Apparatus, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

My invention relates to an improved ventilating apparatus for ventilating chambers by withdrawing the air therefrom instead of forcing a current of fresh air thereinto, and is especially applicable for use on cars, ships, and other moving carriers, which at the best are but poorly ventilated; and to this end it consists, essentially, in a passage or conduit through which a current of air is passed, and in the case of the moving chambers or carriers by means of their motion; a second passage connected to the former near its opposite extremities, and preferably of greater area in cross-section at its opposite extremities than the former passage, whereby a suction is created within said second passage, and passages or openings connecting the said second passage with the interior of the chamber to be ventilated.

The invention also consists in the detail construction and arrangement of the parts, all as hereinafter more particularly described, and pointed out in the claims.

In describing this invention reference is had to the accompanying drawings, forming a part of this specification, in which like letters indicate corresponding parts in all the views.

Figure 1 represents a side elevation of a car provided with my invention. Fig. 2 is a transverse vertical sectional view taken on line $x x$, Fig. 1, showing the upper portion of the car shown in said figure and illustrating, particularly, the connection of the exhaust-passage to the interior of the car. Fig. 3 is a transverse vertical sectional view of a freight-car provided with a slightly-modified form of my invention, and Fig. 4 is a longitudinal sectional view of the detached central portion of a modified form of the passage for receiving the air and creating the desired suction.

It is well known that great difficulty is at

present experienced ineffectively, thoroughly, and evenly ventilating chambers, and particularly moving carriers, as cars, vehicles, and ships, especially when the temperature is low and necessitates the closing of the ventilating-openings leading from the outside to the inside of said chambers or carriers. Moreover, even when the temperature is warm and these ventilators are opened for the purpose of admitting a current of fresh air, it is well known that owing to the law by which cold air seeks the lowest possible strata a draft is produced directly beneath the said ventilator which renders persons or passengers within said chambers or carriers and beneath or adjacent to said openings extremely liable to colds, rheumatism, and other like ailments. This lack of ventilation is especially evident in cars heated by steam, since steam-heat produces a certain dry atmosphere, which upon contamination with carbonic-acid gas and other impurities becomes absolutely unbearable and greatly detrimental to good health.

The object of my invention is to ventilate chambers or moving carriers by withdrawing the impure air and preventing the direct inlet of cold air. In the case of moving carriers, as vehicles, cars, and ships, I prefer to effect this desirable object by the progress of such carriers. It will be understood, however, that the construction of my apparatus is such that the passage of the carrier does not force the cold air from the outside directly within the carrier, but, as will be presently stated, forces a current of air through a passage or conduit, which discharges into the extremity of a second passage or conduit suitably connected to the interior of the carrier, and thereby creates a suction within the same as the air passes out from said latter passage, which draws the air from the interior of the carrier.

A represents the moving carrier, here shown in Figs. 1 and 2 as a passenger-car and in Fig. 3 as a freight-car; but it will be understood that the said carrier or chamber may be of any desirable form, size, and construction or designed for any desired purpose, and that the same is not necessarily a car, but may be an ordinary vehicle, ship, or like carrier.

Suitably supported in any desirable manner, and as illustrated by the roof B of the car, is a passage or conduit C of rectangular form in cross-section and preferably extending the entire length of the car-roof. Provided at the opposite extremities of this passage C is the forward opening c and the rearward opening c' , which open outside of the car, and interposed between said extremities are exhaust-openings c^2 of suitable number, form, size, and construction and opening on the interior of the car for conveying air from within the same to said passage.

Provided in suitable proximity to the passage C, and also suitably supported in any desirable manner and position, is a second passage or conduit D of desirable form, size, and construction, and here shown as imposed above said passage C. As shown in the drawings, the top wall of the conduit C forms the bottom wall of the passage D, and the sides of said passage D rest upon said bottom wall with substantially an air-tight joint, in order that no air may enter or pass from the passage D, except from either extremity, and into and out of the pipe C, as presently described. This passage D is formed with an inlet d to receive the air as the car moves onward and conduct the same in a backwardly moving current, as shown by the arrow l , to the rear of said passage, whence it escapes by the outlet d' .

In order to produce the most desirable results and simplicity of construction I connect the opposite extremities of the passage D to the passage C at points a sufficient distance short of its extremities, and with this construction the said openings d and d' are formed directly in the wall of the passage C, and open into said passage instead of directly to the outside of the car. It will be noted that in order to produce the best results the extremities of the conduit D, when connected to the extremities of the conduit C, are connected substantially with an air-tight joint. Oppositely arranged to said openings d and d' and within the passage C are valves E E' of any desirable form, size, and construction, and here shown as assuming when closed an inclined plane for the purpose of more readily enabling the air entering the extremity of the passage C to pass upward without check or hinderance into the passage D, by which the same is conducted to and discharged into the opposite extremity of said passage C, thereby creating a suction in the portion of said passage C on the opposite side of said inclined valve. As the valve E' at said opposite extremity of the passage C is open, it necessarily follows that in order to prevent the formation of a vacuum, which is contrary to all the natural laws of gases, the air is drawn from the interior of the car through the exhaust-opening c^2 into the passage C, whence it is discharged with the passing ex-

hausting-current discharged thereinto from the passage D.

As preferably constructed, the parts of my ventilating apparatus are so arranged that the same may be readily worked without regard to the direction of movement of the car, and this desirable result is effected by the construction previously explained, and particularly by means of the valves E E'. When, as illustrated in Fig. 1, the car is moving in the direction shown by the arrow, the valve E is closed, compelling the air entering the extremity of the passage C to follow or pass into the passage D, and the valve E' at the opposite end of the passage C is either entirely or partially open, so as to permit the air from the interior of the car to escape from this extremity of the passage C when drawn by the suction created within the same. As illustrated, this valve is shown in a horizontal position; but it will be understood that the same may be deflected therefrom to regulate at will the amount of air escaping from the passage C. When it is desired to move the car in the opposite direction, the position of the valves E E' is reversed, and thereupon the apparatus is ready for operation. As shown and described, the valves E and E' form when closed an inclined wall; but it will be understood that said wall may be rigidly secured within the passages and provided with valves for opening or closing the same.

One particular advantage accruing from using two passages in proximity to each other is that the entrance of cold air directly within the car by the motion thereof is absolutely prevented, and that, moreover, the passage of the air rearwardly, induced by the progress of the car, is unimpeded and does not pass in proximity to the exhaust-openings c^2 , leading from the interior of the car, or any valve which it would be desirable to provide at the exit of said passage for governing the flow of air therefrom. It will further be noted that the air enters one extremity of the passage C, and striking against the valve at such extremity is prevented from further passage within the pipe C and is deflected upward into the pipe D, through which it passes and from the exit of which it is discharged into the opposite extremity of the passage C, and that since the exit of the passage D is of less area in cross-section than the said extremity of the passage C, into which said exit discharges, the discharging current of air from the pipe D forms a moving core within the said extremity of the passage C and creates a suction within the same which draws the air from the rear of said passage C and from the interior of the chamber to be ventilated. It will also be understood upon reference to the drawings that the passage C, or at least the extremities thereof, is preferably of greater area in cross-section than the passage D, which construc-

tion tends to induce the formation of the desired suction, as if said parts were of the same size the air passing through the passage D would form a wall which would prevent the escape of air from the rear end of the passage C.

If desired to utilize my apparatus for forcing fresh air directly within the car by the progress thereof, the forward valve E may be opened and the rear valve E' closed, whereupon the current of air passes through the easier passage C, and thence through the exhaust-openings c^2 into the car.

At Fig. 3 I have shown a similar sectional view to Fig. 2 of a freight-car provided with my invention, and the only difference in the construction of the devices shown in this figure and the preceding figures is the connecting exhaust-openings c^2 from the interior of the car to the passage C extend downwardly along the side thereof. This connecting-passageway is provided with a horizontal portion c^3 and the vertically-disposed portion c^4 , preferably provided with the downwardly-turned extremity c^5 . In this construction I have shown the conduit D and C as applied to the opposite sides of the car, and the exhaust-openings as consisting of pipes having one extremity discharging into the passage C and the other extended to the central part of the car in proximity to the adjacent extremity of the opposite pipe, whereby the air is drawn directly from the center of the car, as shown by the arrows 1 and 2.

At Fig. 4 I have shown the passage D as provided with hoods having oppositely-arranged openings for receiving the air at the central portion of the same; but this is not the preferred construction of said part. This construction is, however, particularly applicable in the case of freight cars, since it obviates the necessity of an operator for adjusting valves in order to adapt the car to motion in either direction.

The operation of my invention will be readily perceived from the foregoing, and it will be readily perceived that the same is of great advantage and utility, since it is produced at a minimum cost of expense, is extremely simple in construction, and efficient in use. It will also be understood that I do not limit my invention to the precise position and arrangement of the passages or conduits C and D to any construction of valve for regulating the flow within said passages, nor to the detail construction and arrangement of the parts, since the same may be somewhat varied from that described without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In combination with the chamber to be ventilated, the herein-described ventilating apparatus, the same consisting of a conduit having an outlet-opening, an exhaust-open-

ing connecting said conduit and chamber, an opening in the outer shell of said conduit between said outlet and exhaust-opening, and a second conduit having an air-inlet at one extremity and having its opposite extremity connected to said opening in the wall of the former conduit, substantially as and for the purpose set forth.

2. In combination with the chamber to be ventilated, the herein-described ventilating apparatus, the same consisting of a conduit having openings at its extremities for the inlet and outlet of air, exhaust-openings connecting said conduit and chamber, openings d and d' in the outer shell of said conduit at each extremity, a second conduit on the outside of the former conduit having its opposite extremities connected to the openings d and d' , and a valve for governing the direction of the air in said conduit, substantially as and for the purpose specified.

3. In combination with the chamber to be ventilated, a passage or conduit having openings at both extremities for the inlet and outlet of the air, an exhaust-opening for conducting air from the interior of said chamber to the said passage or conduit, a second conduit having its opposite extremities connected to the former conduit at points interposed between said openings in the former conduit, and an inclined wall within said second conduit for conducting the air into the former conduit, substantially as and for the purpose specified.

4. In combination with the chamber to be ventilated, a passage or conduit having openings at both extremities opening to the outside of said chamber, an exhaust-opening c^2 for conducting air from the interior of said chamber to the said conduit, a second passage or conduit having its opposite extremities connected to the former conduit at points interposed between said openings at the extremities of the former conduit, an inclined wall within said former passage for conducting the air into the latter passage, and a valve for governing the flow of the air in said former passage, substantially as and for the purpose set forth.

5. In combination with the chamber to be ventilated, a passage or conduit having openings at both extremities opening to the outside of said chamber, an exhaust-opening for conducting air from the interior of said chamber to the said conduit, a second conduit having its opposite extremities connected to the former conduit at points interposed between said openings at the extremities of the former conduit, and inclined valves at the opposite extremities of the former conduit for governing the flow of the air, substantially as and for the purpose set forth.

6. In combination with a moving chamber, a conduit having openings at its opposite extremities, exhaust-openings leading from the interior of said chamber to said conduit, and

a valve within said conduit movable from one portion of its inner wall to the remainder for opening and closing the passage of the air therethrough, substantially as and
5 for the purpose specified.

In testimony whereof I have hereunto signed my name, in the presence of two attesting

witnesses, at Syracuse, in the county of Onondaga, in the State of New York, this 10th day of April, 1890.

THOMAS S. PURDIE.

Witnesses:

CLARK H. NORTON,
M. BAXTER.