

UNITED STATES PATENT OFFICE.

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METHOD OF VENTILATING AND EXCLUDING DUST FROM RAILROAD-CARS.

Specification of Letters Patent No. 20,176, dated May 4, 1858.

To all whom it may concern:

Be it known that I, APOLLOS B. SPENCER, of the city of Rochester, county of Monroe, and State of New York, have invented a new and useful Instrument for Purifying Air and Ventilating Railroad-Coaches; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon.

These instruments are to be inserted in the roof of the railroad coach in a line over the center of the aisle, and will vary in number according to the capacity of the car. They should be numerous enough to fill the car so completely with fresh air as to cause it to press outward through cracks or openings around the windows, doors, &c. The lower part comes slightly into the car and is arranged so as to regulate the amount of air introduced and discharged and to give it a gentle and equable diffusion.

In its general form the ventilator is square or four sided.

In my description I shall use the term "sides" only for the two pieces A, Figure I, which stand parallel to the sides of the car, while the two pieces which look toward the ends of the car, I shall call "faces" B, Fig. I. For near two-thirds of their height from the bottom the sides have a uniform width; from thence upward their width increases.

The two faces B, are about two-thirds as high as the sides, the remaining space to the top being left open making a mouth C for the admission of the air. The top is made of two similar pieces D D, Fig. VII, the ends of each piece being attached to the two sides of the ventilator, and so placed as to leave an opening in the center through which to insert the frame, rollers, and sheet hereafter to be described. Near the bottom a flange V, projecting an inch or more from its sides and faces constitutes a bearing to sustain it upon the deck of the car, and to fasten it thereto.

In Fig. I, W represents the carlines of rafters in the deck. Fig. I, X, represents the cross pieces between the carlines to surround the ventilator. Fig. I, Y, represents the

deck planking. Fig. I, Z, represents cleats for leveling deck.

The frame and rollers before mentioned are illustrated in Fig. V. The frame consists of two side pieces O, O, connected by two cross bars. In the lower end of each side piece is a slot P, P, in which the bearing of the lower roller N is permitted an upward or downward motion, thus giving a proper tension to the sheet or apron. In the upper end of these side pieces is placed the upper roller N, having a diameter about twice that of the lower roller. Attached to this frame is an arched covering E over the large roller N, which rests upon the two pieces of the top D, D, before mentioned and entirely closes the opening before described in the center of the top. An endless belt, sheet, or apron passes over these rollers. The front of the apron is shown by Q Fig. I and its edge by Q Fig. III. The frame above described is inserted through the opening in the center of the top and is held in a perpendicular position by guides or grooves upon the inner surfaces of the sides A A.

The wings or checks R R, are diagonally attached to the sides of the mouths C, C, to contract it sufficiently to prevent the air from passing the edges of the belt or apron. For a vertical view see Fig. VIII.

A tank S Fig. VI is inserted from below and reaches from side to side, and receives into itself the lower portion of the frame shown in Fig. V. The tank S is kept in an upright position by guides or grooves upon the inner surface of the sides A A; and is held up by snap catches U, or bolts or other suitable mechanical appliances. The height of the tank S gives it capacity for water sufficient to submerge the lower roller N and the portion of the belt or apron constantly passing under the same within the tank.

From the mouths C C two spaces V V extend downward between the tank S and the faces B B; these spaces or flues I call throats.

Across the inside of the faces B B and even with their upper edges runs a projection of a triangular form T, T, Figs. II and III designed to contract the upper portion of said throats.

That part of the ventilator which comes below the head lining within the coach I term the "diffusers." They are thus constructed: The part marked *a*, Fig. I is a continuation of the side A. The edges *b, b, b*, Fig. I diverge from the head lining at an angle of about 45 and terminate in a flange placed upon their inner surface. A bottom (*c c* representing its end) is attached by hinges *d, d* to the side *a* and when closed is fastened to the opposite side by the snap catch, bolt or other appliance represented by *e* Fig. IV. This bottom opens or lets down to remove and replace the water tank. The aperture *g* is connected with the throat and may at pleasure be contracted by the damper *h*, which turns freely within a hinge made by a convolution of the end of the metallic bottom *j*. The damper *h* when fully closed rests against the flanges aforesaid upon the inner sides of the edges *b, b, b*. A flat piece of firm metal corresponding in width with the tank and designed when shut up for the bottom of the tank to rest upon forms the middle portion of the bottom. See, *i*, Fig. I. Two pieces of thinner metal *j, j*, joined to this are slightly curved or dished as they proceed toward their outer edges which edges being convolved constitute the before-mentioned hinge for the damper *h*. *k* represents a lever to move damper *h*. Upon one of the sides A, two boxes connected by an oil trough, the whole represented by H Fig. II, are firmly secured. In these boxes rests the shaft I having at its center an endless worm M which revolves in the oil trough H. Upon each end of the shaft I is attached a wind wheel J J. The endless worm meshes into the intermediate wheel L. Said intermediate wheel L meshes into the pinion K which is attached to the large roller N above described.

Pinion K has half its diameter covered by cap F Figs. I and V.

G G Fig. I forms caps for the bearings and a tight covering for the oil trough H intermediate wheel L and lower half of pinion K to keep them clear from dust.

Having shown the construction of my ventilator and purifier I will proceed to describe its operation.

The sheet may be kept in motion either by wind, springs, weights, or by power communicated from the axles of the car wheels. The ventilator having been secured to the roof of the car, and the tank S containing a proper quantity of water having been placed in its position, the onward motion of the car forces the wind wheels J, J, Fig. I against the air, which causes them to give motion to the endless worm M, which motion is communicated to the pinion K by the intermediate wheel L thus causing the upper roller N to revolve, carrying the endless belt or apron Q and passing it constantly through

the water in the tank S. The progress of the car, also forces the mouth C against the air, which rushes into it horizontally, and strikes against the moving, wet, endless apron. The air enters the mouth with a steady pressure and unable to escape above or at the sides, turns downward and passing through the throat, &c., enters the car horizontally or at right angles to the throat, through the aperture *g*, Fig. I. The course taken by the air in entering the car is represented by the four darts in the left hand portion of Fig. II. There is also an upward draft produced by the displacing of the atmosphere by the body of the ventilator. This causes the heated air in the car to rush in at the other opening *g*, and pass up the other throat and thence out at the other mouth C. The course taken by impure air passing out of the car, is represented by the darts in the right hand portion of Fig. II. The endless apron and the tank *s* which receives its lower end constitute an upright partition, which divides the whole ventilator into two equal and similar divisions or chambers each having a "mouth" a "throat" and a diffuser but looking in opposite directions. Whichever one of these mouths faces the direction in which the car is moving receives the air and conducts it into the car, while at the same time the other discharges the impure air from within the car. When the car runs in the opposite direction the action is exactly reversed. The triangular projection T which is even with the upper edge of the face B and runs across its inner surface is designed to prevent any air passing into the throat and until it has been brought in contact with the wet belt or apron Q. All of the air which enters the mouth C is driven forcibly against the moving wet apron Q and deposits upon its wet surface every particle of dust or cinder. The air purified and in some measure cooled by the process passes down into the car; the quantity of air admitted is regulated by the damper *h*, while the other damper *h*, will control the amount of air permitted to escape. The endless belt or apron having taken from the air its dust and cinders deposits them in the tank S; and being washed clean in its passage through the water constantly presents to the impinging air a fresh and wet surface.

It may be proper to state that I have generally in my experiments thus far made the apron Q of woolen felt cloth.

This ventilator and purifier is also suitable for boats, and by the simple addition of a rotating collar and a vane can be used upon buildings of every description.

What I claim as my invention and desire to secure by Letters Patent is,

The revolving wet sheet or endless apron (passing through water) for the purpose of

cleansing and purifying the air as it passes
into the car, which sheet, or apron together
with the tank containing the water, and that
portion of the bottom whereon it rests, I
5 claim as a partition by which I divide the
instrument into two complete ventilators,
either of which as heretofore set forth will

act as the downward ventilator, while the
other always acts simultaneously in the
opposite direction.

APOLLOS B. SPENCER.

Witnesses:

DWIGHT GIBBONS,

SAML. A. STARR.