

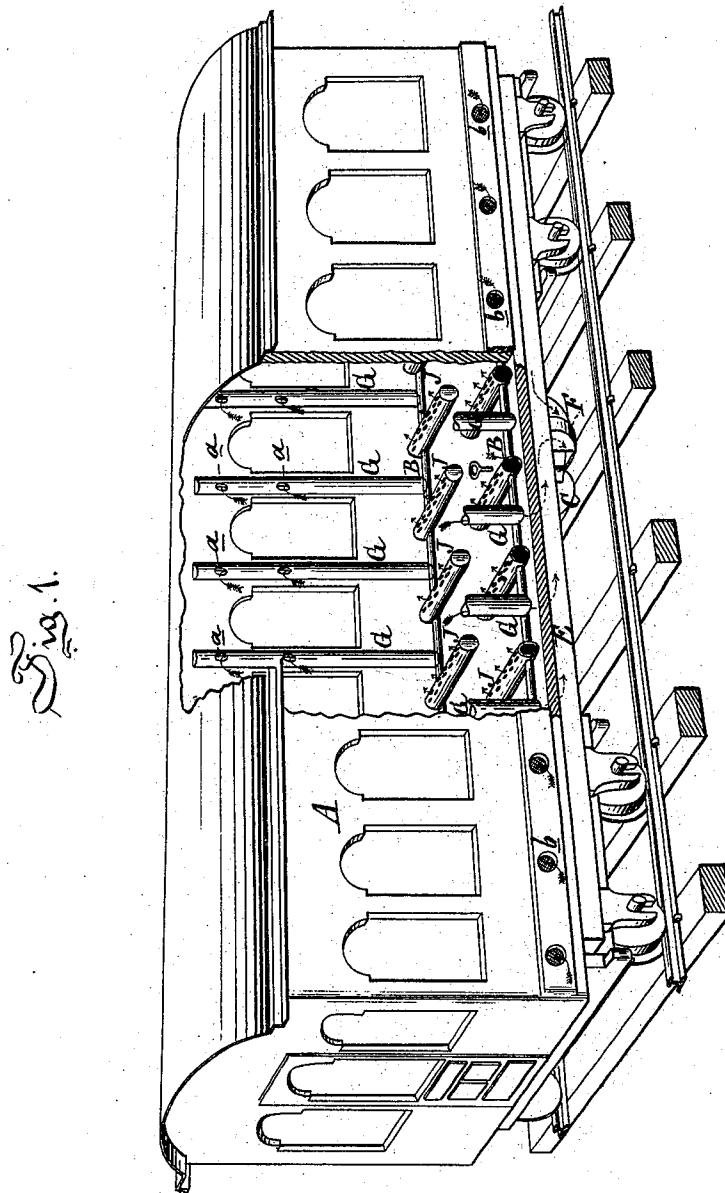
2 Sheets—Sheet 1.

E. E. HARGREAVES.

VENTILATING RAILWAY PASSENGER CARS.

No. 173,003.

Patented Feb. 1, 1876.



Witness:

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Inventor:

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2 Sheets—Sheet 2.

E. E. HARGREAVES.

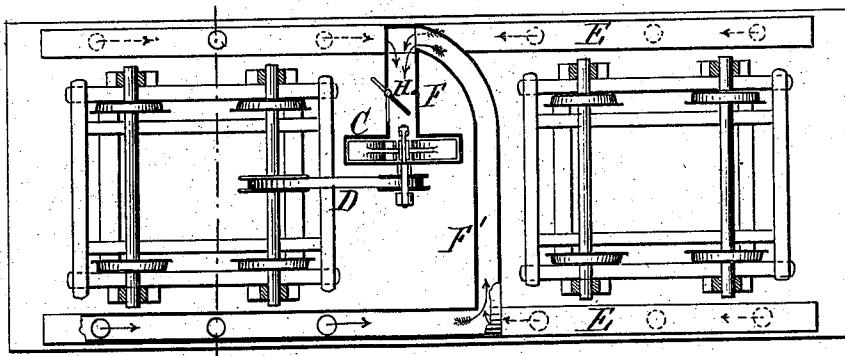
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Fig. 2.



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Fig. 3.

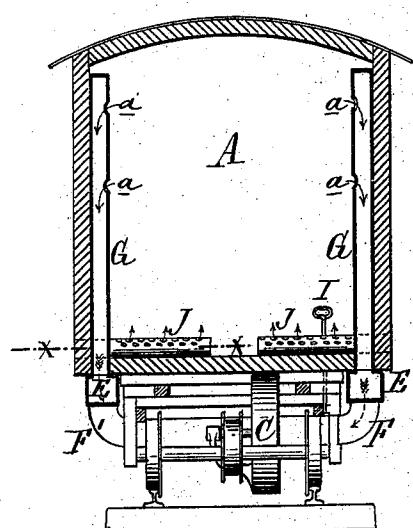


Fig. 4.

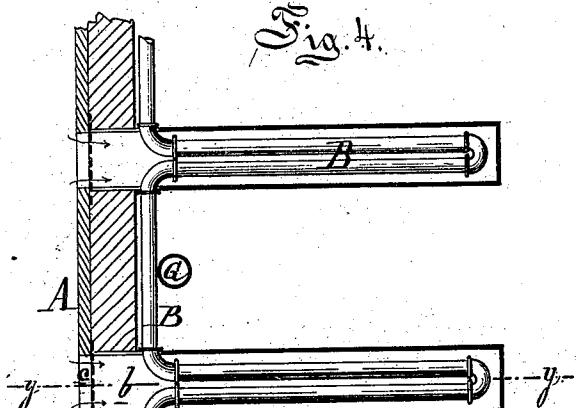


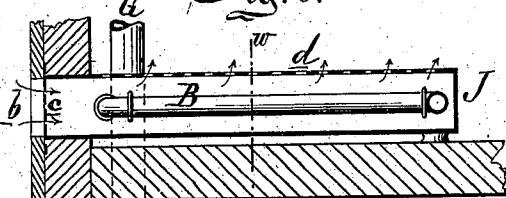
Fig. 6.



Fig. 7.



Fig. 5.



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# UNITED STATES PATENT OFFICE

EDWARD E. HARGREAVES, OF SARNIA, CANADA.

## IMPROVEMENT IN VENTILATING RAILWAY PASSENGER-CARS.

Specification forming part of Letters Patent No. 173,003, dated February 1, 1876; application filed January 7, 1876.

To all whom it may concern:

Be it known that I, EDWARD E. HARGREAVES, of Sarnia, in the county of Lambton and Province of Ontario, Canada, have invented an Improvement in Ventilating Railway Passenger-Cars, of which the following is a specification:

The nature of this invention relates to an improvement in ventilating passenger-cars that are warmed by steam or hot-water pipes coiled under each seat, and, more particularly to ventilating sleeping-cars so warmed.

The invention consists, first, in inclosing the heating-coil under each seat with a perforated case or muffle, communicating with the external atmosphere through an opening in the side of the car, to retain the influent air-currents in contact with the hot pipes, until such currents have been raised in temperature to the required point; secondly, in a vertical eduction-pipe let into each side wall of the car at each berth section, with one or more openings at the plane of the upper part of each berth for the eduction of foul air by means of an exhaust-fan located under the car, and connected therewith by suitable eduction main and cross pipes under the car; thirdly, in a means for regulating the volume of air to be withdrawn from the car, governing thereby the volume of fresh air to be admitted thereto.

Figure 1, Sheet 1, is a perspective view of a sleeping-car fitted with my improved means for ventilating it, the seats, berths, and inner linings being removed to better show the same. Fig. 2, Sheet 2, is a bottom plan of the car, showing the eduction mains and fan-case partially in section. Fig. 3 is a cross-section of the car at  $z z$ , in the last figure. Fig. 4 is an enlarged horizontal section of one section of the car, taken at  $x x$ , in Fig. 3. Fig. 5 is a vertical section of the same at  $y y$ . Fig. 6 is a cross-section of the same at  $w w$ . Fig. 7 is an enlarged sectional plan of the valve.

In the drawing,  $\Delta$  represents the body of a sleeping-car warmed by hot-water-circulating pipes  $B$ , arranged to form a flat coil of two members under each seat, in the usual manner.  $C$  is an exhaust-fan, driven by a belt,  $D$ , from a pulley on one of the adjacent axles, which fan is so constructed that it will operate equally well when driven in either direc-

tion.  $E$  is an eduction-pipe, running the entire length of the car under each side sill. One of these communicates directly with the fan by a short main pipe,  $F$ , and the other by a cross-pipe,  $F'$ , leading into the former.

From the pipe  $E$  exhaust-pipes  $G$  rise into the car, nearly to the top, one at each berth-section, and should be placed behind the interior linings of the car, at the plane of the upper part of the upper and lower berths, when "made up." The pipe is perforated with an opening,  $a$ , for the eduction of foul air, which is drawn out by the fan when the car is in motion.

$H$  is an inwardly-swinging valve hung in an opening in the side of the exhaust-main  $F$ , and is actuated by a spindle,  $I$ , from the inside of the car. By opening this valve more or less, the volume of air to be withdrawn from the car can be regulated as desired. The more it is opened the less rapidly will the fan withdraw it from the car.

Each coil under a seat is inclosed in a cylindrical case,  $J$ , closed at the inner, but open at the outer end, where it communicates with the outer air through an opening,  $b$ , made in the side of the car, fitted with a screen,  $c$ , of very fine mesh, to exclude the dust. The top part of the case  $J$  is perforated with numerous small apertures,  $d$ , Fig. 5, through which fresh air is drawn into the car to replace that withdrawn by the fan. The purpose of the case  $J$  is to detain the influent air-currents long enough in contact with the hot pipes to insure their being pleasantly warmed before entering the body of the car.

It will then be seen that the air of the car will be continually changed so long as the car is in motion; and that, when the season demands, the air that enters the car will be raised to the proper temperature. During the season that no heat is required, the cases  $J$  serve to distribute the influent fresh air in minute jets, from which no unpleasant drafts will be felt.

What I claim as my invention is—

1. The perforated cases  $J$  inclosing the heating-pipes  $B$  of a passenger-car, and communicating with the external atmosphere through openings in the side of the car, in combination with a means for withdrawing or exhaust-

ing air from said car, substantially as described.

2. The vertical eduction-pipes G at the sides of a sleeping-car, each provided with one or more openings, *a*, and by means of air-trunks connected with an exhaust-fan located and operated under the car, substantially as described.

3. The valve H in the main air-trunk F, arranged to be operated by the spindle I, substantially in the manner and for the purpose set forth.

EDWARD E. HARGREAVES.

Witnesses:

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