(No Model.) 2 Sheets—Sheet 1.

S. HUGHES.

VENTILATING RAILWAY CARRIAGES.

No. 521,316. Patented June 12, 1894.

Fig. 1.

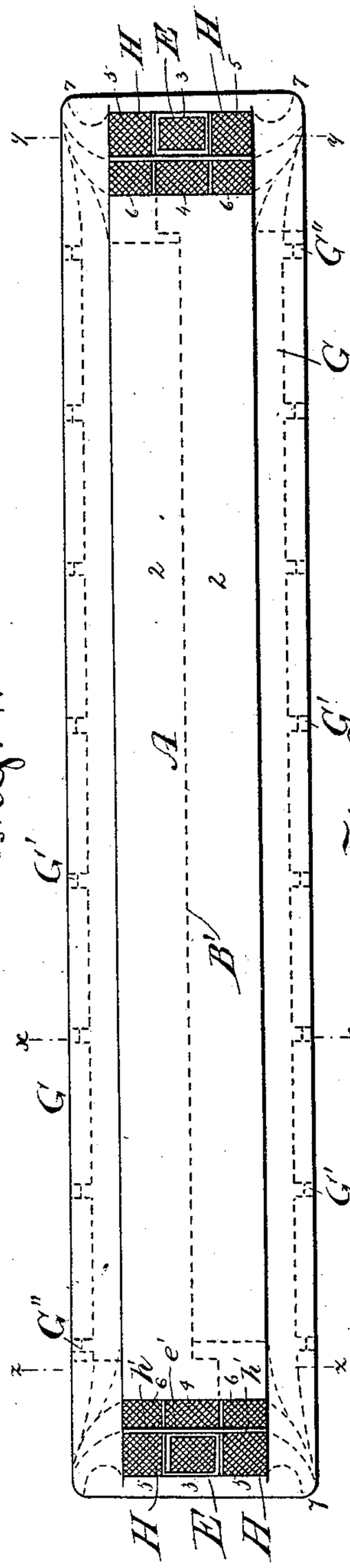


Fig. 2.

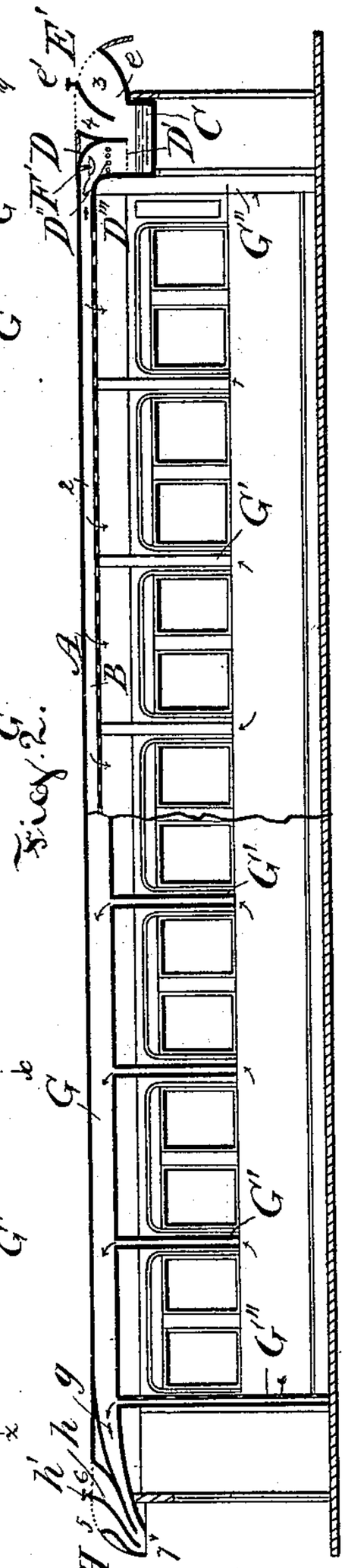


Fig. 5.

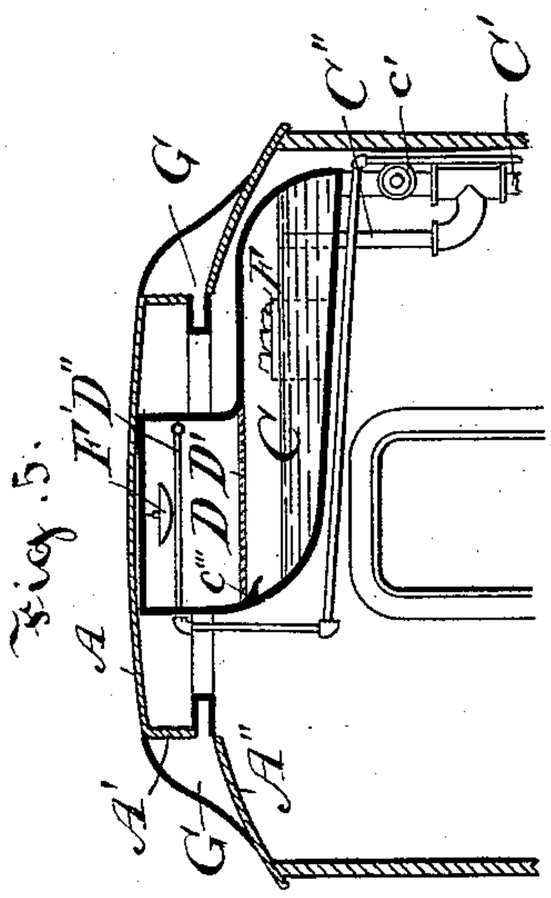
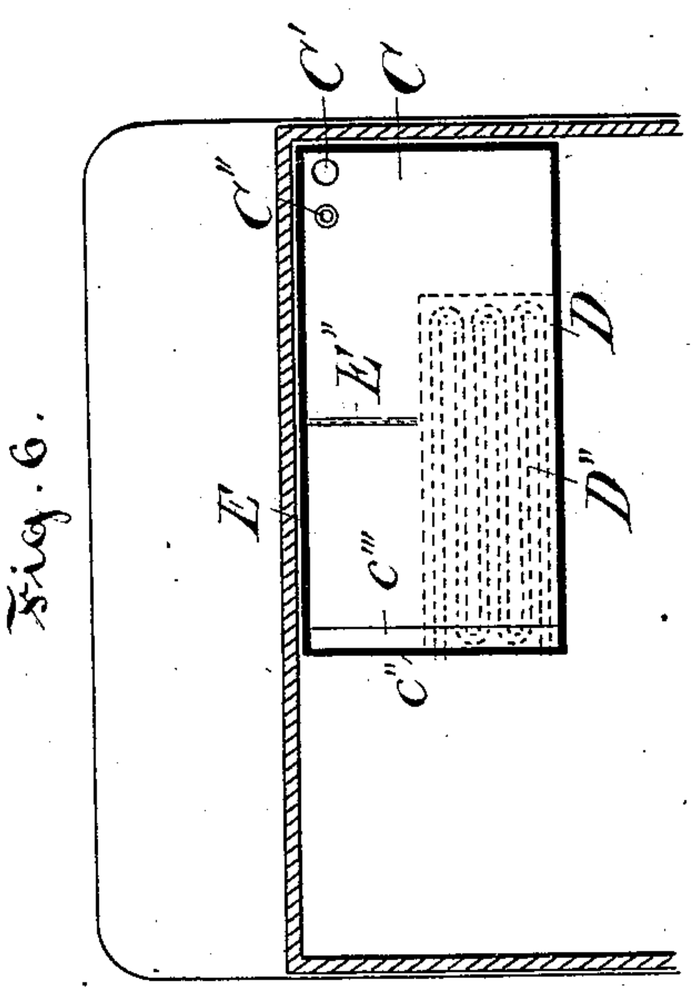


Fig. 6.



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(No Model.) 2 Sheets—Sheet 2.

S. HUGHES.

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Fig. 7.

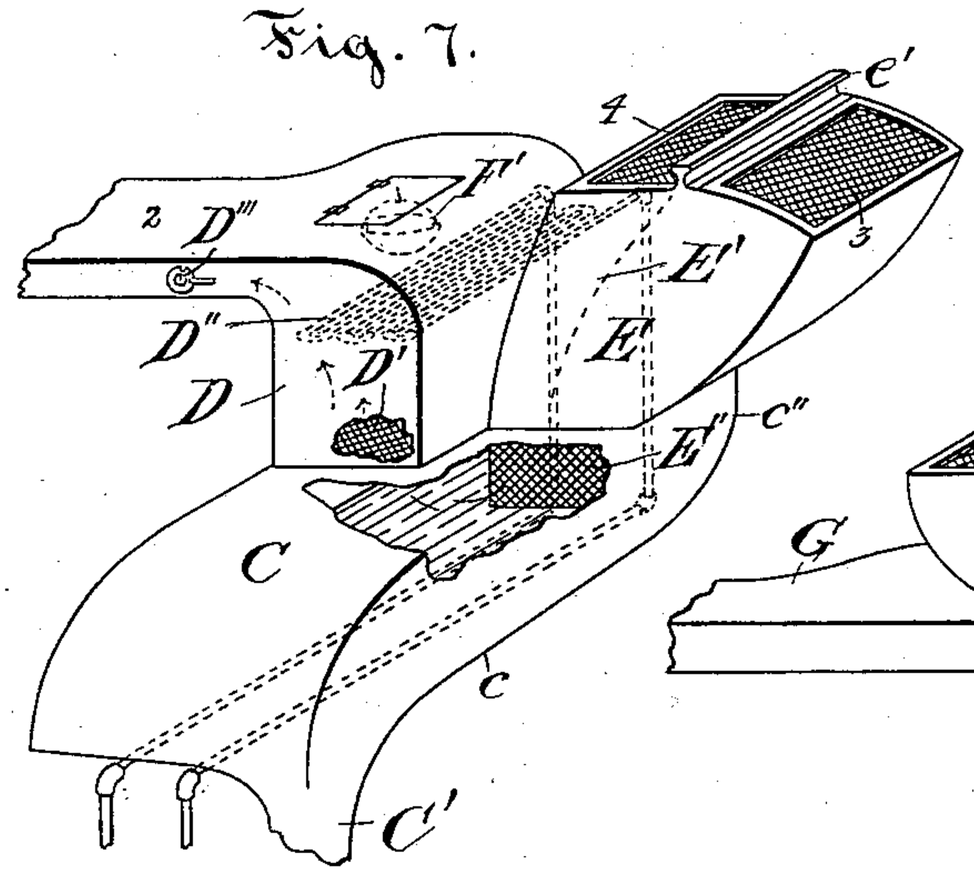


Fig. 8.

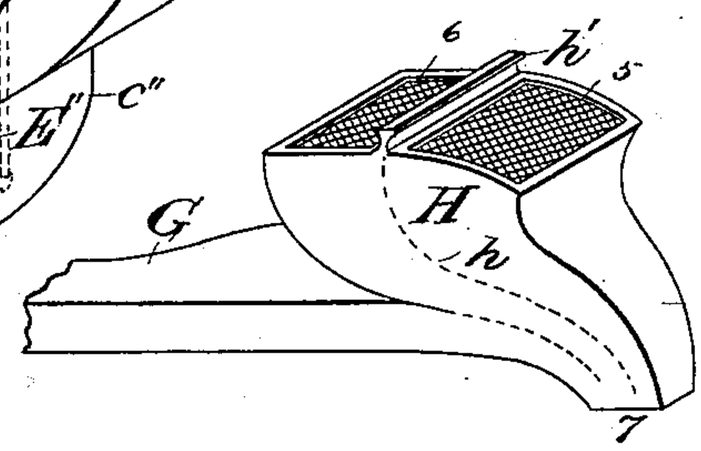


Fig. 4.

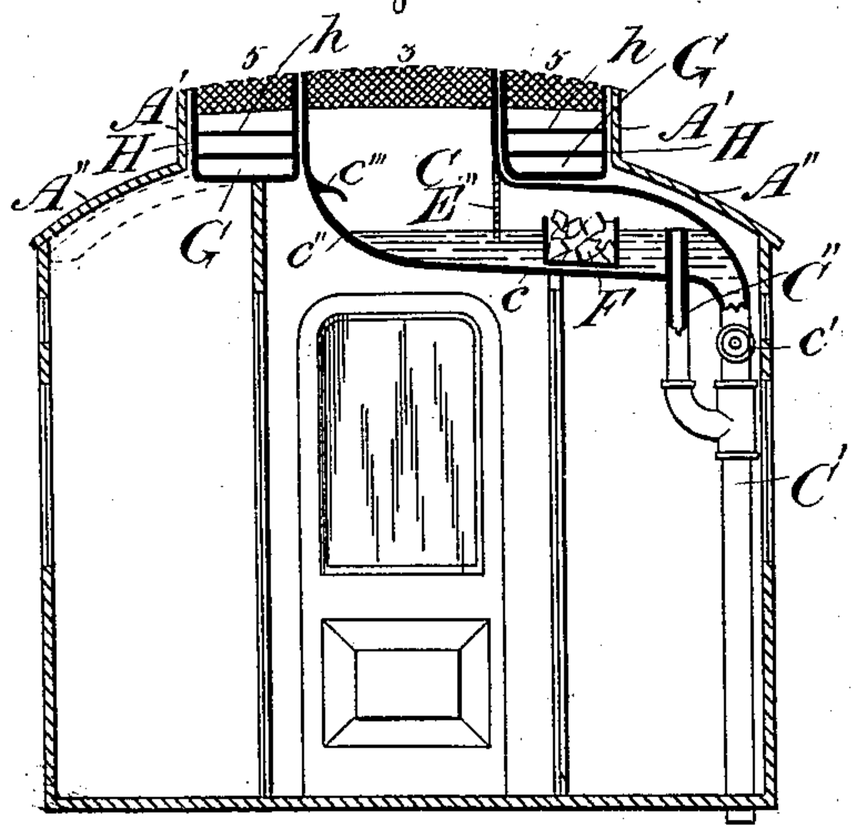
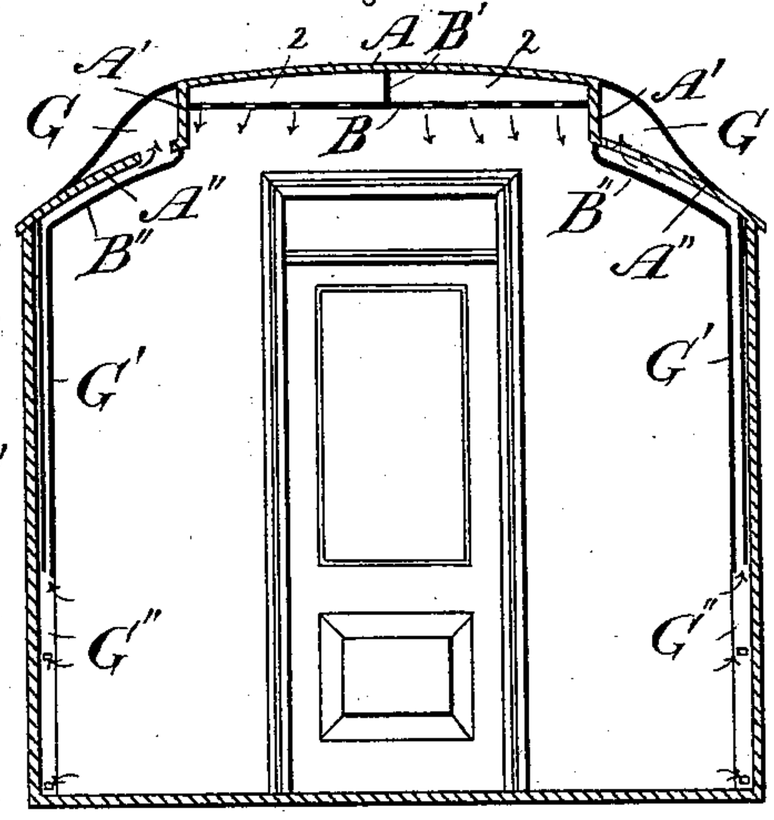


Fig. 3.



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UNITED STATES PATENT OFFICE.

SAMUEL HUGHES, OF LINDSAY, CANADA.

VENTILATING RAILWAY-CARRIAGES.

SPECIFICATION forming part of Letters Patent No. 521,316, dated June 12, 1894.

Application filed July 25, 1893. Serial No. 481,387. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL HUGHES, of Lindsay, in the county of Victoria, in the Province of Ontario and Dominion of Canada, have invented certain new and useful Improvements in Ventilating Railway-Carriages; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part hereof.

My invention, which will be hereinafter fully set forth and claimed, relates to devices for ventilating and heating railway carriages.

The objects of my invention are to obtain greater efficiency from certain devices, to economize space and prevent said devices becoming objectionable in the appearance of the cars either internally or externally. I attain these objects by constructing what is practically a double roof, placing all the ducts and channels in the space formed between the outer and inner skin composing said double roof as far as such is possible and practical, having the inlets and outlets and the heating, cooling and purifying tank in or near said roof.

Figure 1 is a top view of a car showing the air ducts in dotted lines. Fig. 2 is a longitudinal section of a car showing the interior in elevation and partly in section the air inlet being shown at one end and the exhaust at the other. Fig. 3 is a transverse section of a car roof on the line *x x* Fig. 1, showing my improvements. Fig. 4 is a similar section taken near the end, on the line *y y* Figs. 1 and 2, and showing the tank. Fig. 5 is a similar section taken at the other end of the car on line *z z*, Figs. 1 and 2. Fig. 6 is a horizontal section of the tank. Fig. 7 is a perspective view of the air inlet or injector. Fig. 8 is a perspective view of the exhaust or ejector.

A, Fig. 3, is the central raised portion of the car roof known as a monitor roof, A′ A′ the vertical sides thereof and A″ A″ the two sides of the roof. A false ceiling B, containing numerous openings covered with wire gauze or similar material and provided with slides for opening and closing them, is constructed under the central portion A, so as to form a space between the roof and ceiling, which is divided longitudinally by a partition B′ to form two separate and independent channels or ducts 2, 2. Each of these channels, 2, is closed at one end (Fig. 1) and the other end is connected with a tank C (Figs. 1, 2 and 7), which serves for purifying, heating or cooling the air, as the case may be, one placed at each end of the car and near the ceiling. Each of these tanks has its bottom, *c*, sloping downward toward one side of the car and toward one corner which is provided with a draw-off-pipe C′ with valve or cock *c′* and also with an overflow pipe C″, the upper open end of which regulates the level of the water with which each tank is partly filled. An uptake, D, connects the duct 2 with the top of the tank at its rear, a wire screen D′ being placed above the joint and a coil of pipes D″, adapted for being heated by steam or hot water is placed as high above said screen as convenient, the supply pipe passing under or near the tank to keep the latter from freezing. The air inlet funnel or blast pipe E occupies the front of the tank on one side, its throat *e* rising from the top and projecting upward and forward so that one part of the mouth lies in the downward curved end of the raised car roof and thus presents an inclined front in the direction in which the car moves. It occupies a central position in the car roof and is divided transversely in two separate parts or mouths, 3 and 4, by a partition E′ extending down the throat and above the top by a raised ridge *e′* which is curved backward and so divides the whole mouth that the rear one, 4, is level, while the forward portion, 3, is inclined downward. Both mouths thus formed are covered with heavy wire screens, that for the front, 3, being in the form of a hinged lid or door to give access to the tank. Plates, forming covers, by which the size or opening of the mouths 3 and 4 may be more or less reduced in winter, may be provided. The side *c″* of the tank, which forms a continuation with the throat *e*, is formed with a long curve to direct the current sidewise into the tank, but a projecting lip or ridge *c‴* is provided to check the splashing of the water upward. A wire screen E″ is hung on the opposite edge forming the junction of tank and throat and projects into the water below; this may be padded with loose filtering material, such as moss, fiber, and the like. A

receptacle for ice is provided in a suitable position in the tank or throat, such as a box F, held in position by clips or in any other convenient manner and where it can be reached from the mouth of the funnel E for convenience in filling. A lime pot F′ may be placed in the uptake D. There may also be a damper D^3 in the uptake D or close to it in the duct 2, adapted to throttle its area to not less than one half.

So far the provision for the supply of air, which it will be observed operates as follows: As the car moves, air will be forced in the funnels E by atmospheric pressure through the mouth 3 at the forward end and through the mouth 4 at the rear end. This air takes a downward direction in the throats *e* and projects upon the water surface of the tanks C. The heavier impurities, such as cinders and the like are retained by the water and are subsequently discharged through the draw-off-pipe. The finer impurities are retained by the wet filtering materials and wire screens. The air, thus filtered, passes over the cooling surface of the ice if the weather be warm; if cold the ice is dispensed with and the heating apparatus D″ is set to work to heat the air as it passes from the tank through the uptake D. Thence it passes into the ducts 2 and out of any openings therein that may be uncovered.

For the extraction of the vitiated air, collecting channels G, Figs. 1, 2, 3 and 7, are formed in the spandrels formed by the sides A′ with the upper or lower portion of the roof, *i. e.* either inside or outside; outside channels being shown in Fig. 3. An air space may also be formed on the sides A″ of the roof, by adding an inner or outer covering B″ and the space so formed may be used in addition to the channels G or in lieu thereof, or it may be divided into a number of upright ducts or channels connecting with the channels G and connecting downwardly with the vertical collecting or escape pipes or ducts G′ and G″ which are open at the lower end or have a number of adjustable openings. The ducts G form the trunk pipes and the vertical pipes G′ and G″ the branches connecting with them. The pipes G′ may be brought down as far as convenient, even to the car floor, and in Fig. 2 are shown to extend just below the windows all along the body of the car. These pipes are open at the lower end but may have other openings higher up. At each end of the car, however, it is preferred to use long pipes, G″, extending down to the floor and having a number of adjustable openings at intervals all the way down; both pipes and openings lending themselves readily to artistic treatment. Dampers *g* may be placed near the ends of each channel or duct G reducing their area when closed, to not less than one half. Such dampers may also be placed in the collecting or escape pipes G′ and G″.

The ducts G are open at both ends of the car, extending to the extreme end of the platform roof, as shown in Figs. 1 and 2 where they are connected with ejectors H, shown in detail in Fig. 8, and terminating in nozzles 7. These are double mouthed and double throated, being divided by a partition *h* terminating above the mouths 5 and 6 by a raised and lipped edge *h′*. Said mouths are transversely in line with the blast pipe or injector mouths 3 and 4 and on each side of the latter and like them are covered with wire gauze and with them occupy the whole width of the raised portion of the roof.

This exhausting device operates as follows: As the car moves, air is forced by atmospheric pressure in the ejector mouths 5 at the forward and in the mouths 6 at the rear end of the car, the mouths 5 presenting an inclined surface to the movement of the car and the mouths 6 catching the current by the raised ridge *h′*. The current thus created in and passing down the throats and out of the nozzles 7 of the ejectors H, exhaust the ducts G. The air in the body of the car then passes through the branch pipes G′ and G″ to balance the pressure in the ducts G and is, of course again drawn out in the same way.

I claim as my invention—

1. In a ventilating system for railway carriages, the combination with the carriage roof of a false ceiling B in the monitor roof provided with screened adjustable openings, false ceilings B″ extending from the sides of the monitor roof to the sides of the carriage and a channel G formed to adjoin each side of the monitor roof, and complete a false ceiling formed in sections and partly or wholly serving the purpose of channels or ducts, substantially as set forth.

2. In a ventilating system for railway cars, the combination with the car roof of a false ceiling B and partition B′ forming two ducts 2 each closed at one end, a tank C at each end of the car, a connecting pipe or uptake D at the rear of each tank connecting said tank with one end of a duct 2, substantially as set forth.

3. In a ventilating system for railway cars, the combination with the car roof of a false ceiling B and partition B′ forming two ducts 2 closed at one end and having at its lower surface a series of openings, a connecting pipe or uptake D at the other end of each duct, heating pipes D″ in said uptake, a wire screen D′ at the bottom of said uptake, a tank C at each end of the car communicating with one of the ducts by said uptake and a blast funnel or injector E on each tank, substantially as set forth.

4. In an over head tank for a ventilating system for railway cars, a bottom *c* sloping to one side, an overflow pipe and draw-off-pipe with cock at the lowest point of the bottom, a part of one end of the tank extending upward to form part of an inlet and the junction with the bottom made with a large curve and provided with a lip *c‴*, a wire screen E″

hung at the opposite side of the inlet, an ice box F, an uptake D at the rear with wire screen at the mouth and lip dipping in the water at the front and an inlet for air, substantially as set forth.

5. In a ventilating system for railway cars, the combination with the raised portion of the roof, of a series of three openings occupying the width of the raised portion of the roof near each end and each divided transversely by a partition and raised and curved rims to form mouths 3 and 4 in the center and 5 and 6 at each side of said center, the mouths nearest the end situated in the curved end of the roof so as to present an inclined face and said openings covered with wire gauze, said openings continued by downwardly projecting throats and through which said transverse partition partly extends, the throats of the central openings connecting with a tank and the side throats forming nozzles in the ends of ducts, substantially as set forth.

6. In a ventilating system for railway cars, the combination of ducts G formed on each side of the car roof and extending to each end of the same, branch pipes G′ and G″ connecting with said ducts and extending down the sides of the car and having one or more openings, and an ejector at each end of each duct having its mouth flush with the top of the car roof and divided transversely by a raised ridge in two parts facing in opposite directions and the end of their throats forming a nozzle in the ends of said ducts, substantially as set forth.

7. In a ventilating system for railway cars, the combination with the raised portion of the roof of openings formed therein and partly situated in the curved ends, said openings continued downward by contracting throats and terminating in nozzles inserted in the open ends of ducts, a partition dividing said throat and mouth transversely and said partition extending upward by a curved rim, substantially as set forth.

In testimony whereof I have signed my name in the presence of the undersigned witnesses.

SAM. HUGHES.

Witnesses:
JOHN KELLEY,
JOHN R. MCDONALD.