No. 839,658. PATENTED DEC. 25, 1906.

J. A. SHIRES.

TRAIN VENTILATING APPARATUS.

APPLICATION FILED MAR. 27, 1906.

3 SHEETS—SHEET 1.

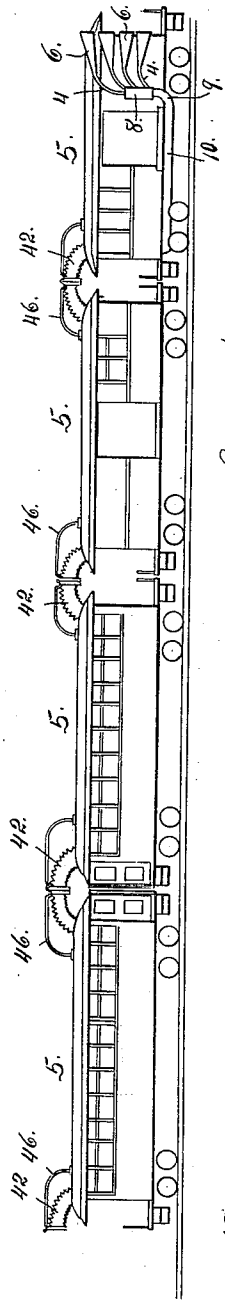


Fig. 1.

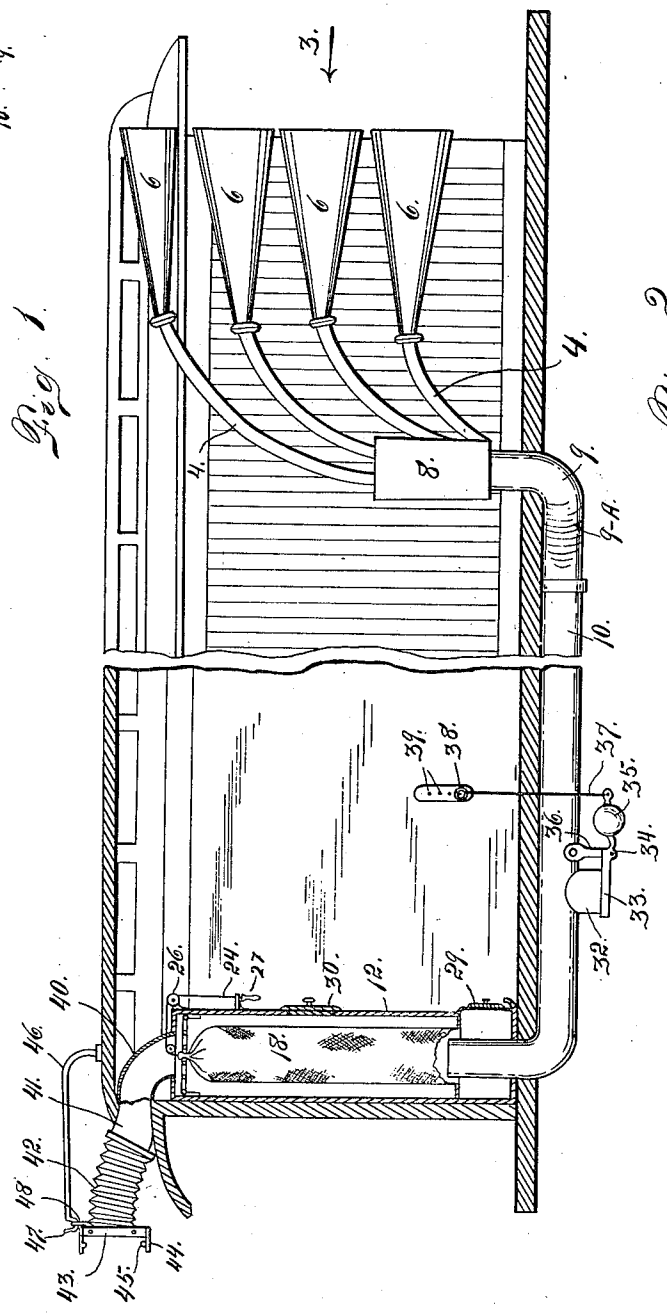


Fig. 2.

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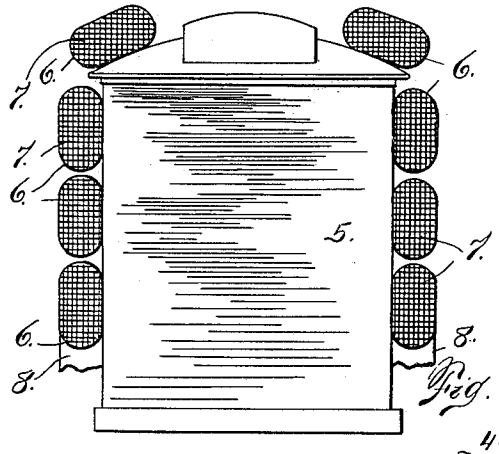


Fig. 3.

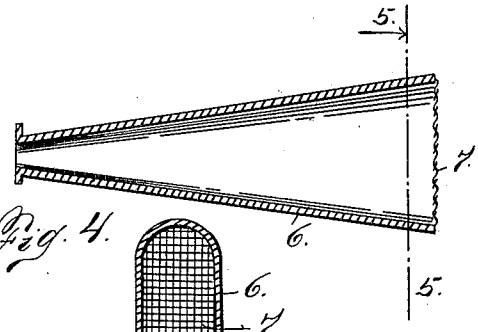


Fig. 4.

Fig. 5.

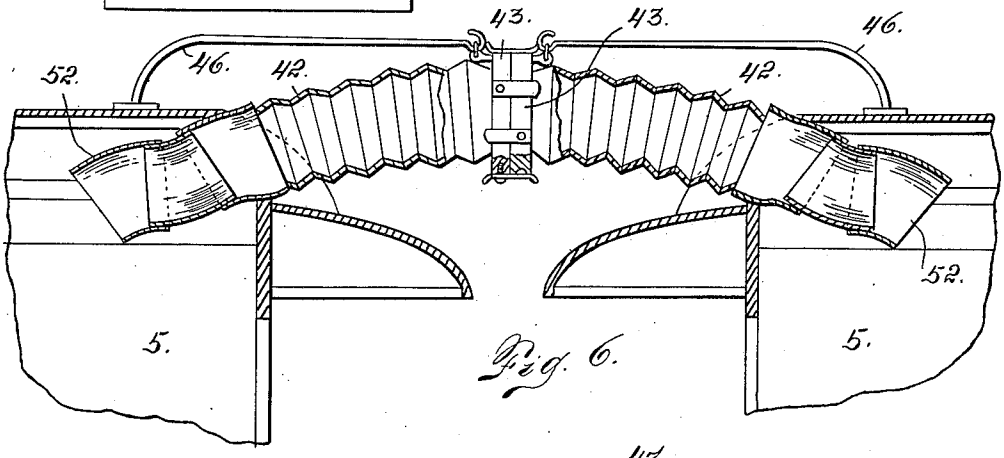


Fig. 6.

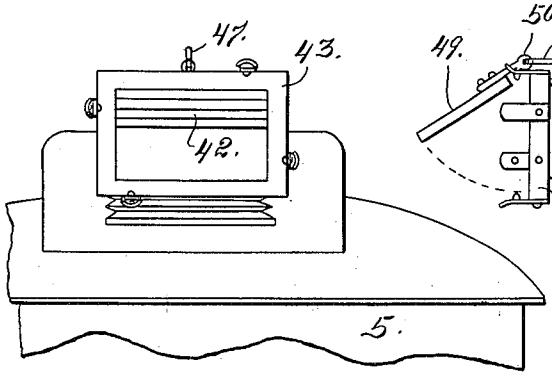


Fig. 7.

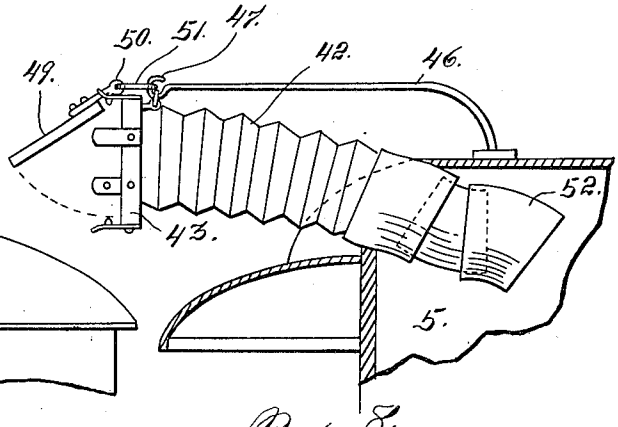


Fig. 8.

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3 SHEETS—SHEET 3.

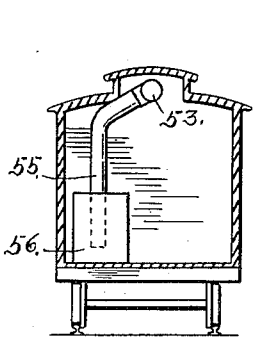


Fig. 10.

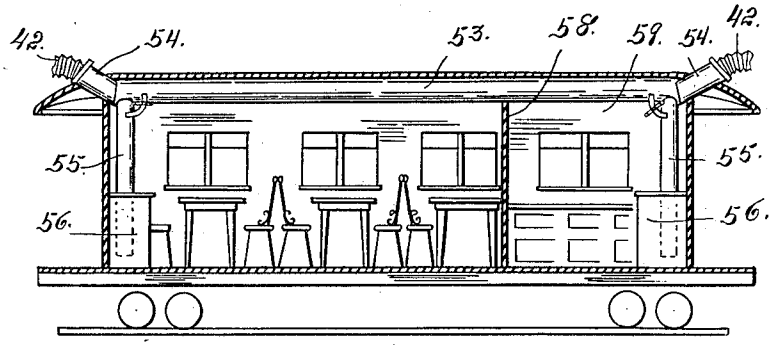


Fig. 9.

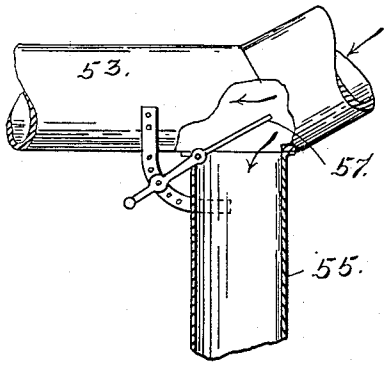


Fig. 11.

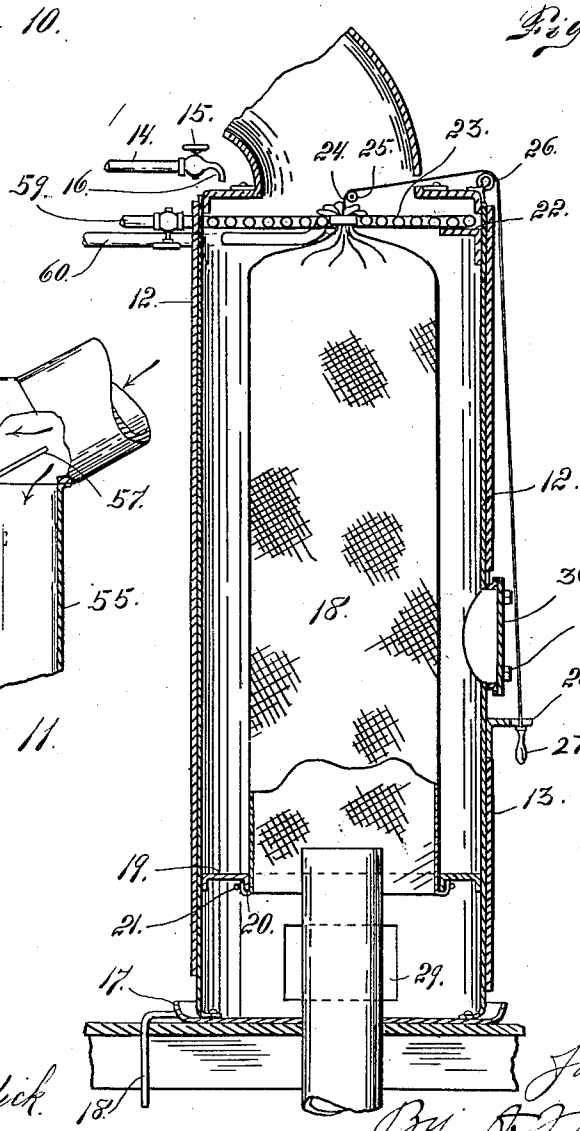


Fig. 12.

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UNITED STATES PATENT OFFICE.

JOSEPH A. SHIRES, OF DENVER, COLORADO.

TRAIN-VENTILATING APPARATUS.

No. 839,658. Specification of Letters Patent. Patented Dec. 25, 1906.

Application filed March 27, 1906. Serial No. 308,326.

To all whom it may concern:

Be it known that I, JOSEPH A. SHIRES, a citizen of the United States, residing in the city and county of Denver and State of Colorado, have invented certain new and useful Improvements in Train-Ventilating Apparatus; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in ventilating apparatus for trains and includes features for filtering the air introduced for ventilating purposes, whereby it is deprived of all impurities, as dust, smoke, cinders, and other foreign elements, which, particularly during certain seasons of the year, are exceedingly annoying to passengers on cars as now constructed.

My improved ventilating apparatus also includes features whereby the air may be tempered—that is to say, either cooled or warmed—according to the requirements, which of course will depend to a large extent upon the change of seasons. It is assumed that during the summer or hot season it may be necessary to cool the air, while during the winter or cold part of the year it will be desirable to raise the normal temperature. In my improved construction provision is made for conducting the air from one car to another of the train, and to this end flexible conduits or air-ducts are employed, the flexibility being such as to compensate for the variation in the position of the train resulting from its lateral or swinging movement, as well as its longitudinal or lengthwise vibration. The length of the flexible features of the ducts or conduits may correspond approximately with the width of the flexible vestibule portions of vestibuled trains. The adjacent members of each conduit are connected in such a manner that if the train breaks or the cars separate the duct or conduit members will separate automatically without injury. In coupling their extremities are simply pressed together, and the yielding or spring features maintain the connection under ordinary circumstances.

Having briefly outlined my improved construction, as well as some of the functions it is intended to perform, I will proceed to describe the same in detail, reference being made to the accompanying drawings, in which is illustrated an embodiment thereof.

In the drawings, Figure 1 is a side elevation of a train composed of a number of cars equipped with my improvement. Fig. 2 is a side elevation of a car, partly broken away and partly sectionized, the same being equipped with my improvements. It is assumed that this is the foremost car of the train, ordinarily the baggage, mail, or express car. Fig. 3 is a front end elevation of Fig. 2 or a view looking in the direction of arrow 3 in Fig. 2. Fig. 4 is a front end elevation of one of the funnel-shaped devices with which the front car is equipped. In this view the construction is shown on a scale somewhat larger than in Figs. 2 and 3. Fig. 5 is a longitudinal section of one of the funnel-shaped air-gathering devices. Fig. 6 is a sectional view taken through the adjacent extremities of two cars equipped with my improvements and showing the air-ducts in connected relation. Fig. 7 is a fragmentary rear end view of the rear car, showing the outlet for the air from the train. Fig. 8 is a side view of the same, the car being sectionized. Fig. 9 is a longitudinal section taken through a dinning-car equipped with my improvements. Fig. 10 is a cross-section of the same. Fig. 11 is an enlarged elevation, partly in section, illustrating the juncture of the several branches of the air-conduit in the form of construction employed with a dining-car. Fig. 12 is a sectional view taken through the air filtering and tempering apparatus.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate the individual cars of a train. The front car, or the one nearest the locomotive, is equipped, preferably, with a number of funnel-shaped air-gathering devices 6. The larger ends of these devices are forwardly directed and are preferably covered with a screen 7, which may be composed of wire-mesh sufficiently fine as to exclude the coarser impurities of the air, but at the same time sufficiently open to allow free entrance of the air. This forward car is preferably equipped on both sides with the devices 6, those on each side

being arranged one above another, the uppermost device on each side occupying a position on the roof of the car. Each funnel 6 terminates at its smaller extremity in a pipe 4, leading to a casing 8, with which a large pipe 9 communicates and through which the air passes to a main conduit 10.

It must be assumed that each side of the car is equipped as shown in Fig. 2 and that the branch pipes 9 on each side curve inwardly, as indicated at 9^A, and merge into or are suitably connected with a suitably-located pipe 10. The body portion of the pipe 10, as shown in the drawings, passes below the bottom of the car, while its rear extremity extends upwardly through the bottom of the car and enters a casing 12. (Best illustrated in Fig. 12.) This casing is covered on the outside with a canvas or other suitably-absorbent material 13, adapted to be saturated with water supplied by a conduit 14, provided with a valve 15. This conduit has a downwardly-directed nozzle 16, through which water may be delivered to the top of the casing, whereby it is allowed to run downwardly and saturate the absorbent covering 12. This water will have a tendency to cool the air which enters the casing.

The bottom of the casing is provided with a drip-trough 17, having an outlet or waste pipe 18, leading downwardly through the bottom of the car, for the escape of the drip collecting in the trough 17, into which the water from the absorbent covering 12 drains. Within this casing is located a filter 18, composed of flexible mesh material. The bottom of this filter is connected with a flange 19, secured to the inside of the casing and surrounding an opening which the bottom of the filter enters. The bottom of the filter is detachably connected with this flange. As shown in the drawings, the flange is provided with a downwardly-bent portion 20. The bottom of the filter-cloth is turned upwardly around the portion 20 and held in place by a removable spring or other suitable device 21, whereby the filter is readily detachable. The top of the filter-bag is closed, as shown at 22, and passes upwardly through the center of a steam-coil 23, which may be employed to warm the air when its normal temperature is too low for use. This closed upper extremity of the filter-bag is connected with a cord 24, passing over pulleys 25 and 26 and thence outwardly and downwardly, its lower extremity being provided with a hand piece 27. This cord enters a slot formed in a ledge 28, connected with the filter-casing. By removing the cord from the ledge 18 the top of the filter-bag may be raised and lowered for the purpose of shaking out the impurities which have collected during the performance of its function. These impurities may be collected in the bottom of the casing and removed through an opening 29, which may be controlled in any suitable manner. Access is gained to the casing about midway by removing a closure 30, which, as shown in the drawings, is held in place by fastening devices 31.

The pipe or conduit 10 below the car is provided with an opening surrounded by a depending nipple 32, normally closed by a valve 33. This valve is fulcrumed at 34 and is provided with a weight, as shown at 35, of sufficient size to normally hold it in the closed position. The valve is fulcrumed on a hanger 36. To the weighted extremity of the valve is attached a manipulating device 37, which has a cord, wire, or rod whose upper extremity is provided with an eye 38, adapted to engage a supporting device 39. The car is provided with a series of these devices 39. When it is desired to open the valve 33, it is only necessary to pull upwardly on the device 37 and connect its eye with one of the upper supports 39. This valve-opening is important, since it provides means for the removal of any water which may have entered the funnel 16 by reason of snow or rain. It may also be employed to remove foreign matter which may have collected within the pipe 10 and which may have entered the same by way of the funnel 6 or from the filter-casing.

The top of the filter-casing is provided with a short outlet-conduit 40, which communicates with the casing and passes outwardly to the rear end of the car, as shown at 41. To this outwardly-protruding part of the conduit 40 is connected a flexible conduit or duct 42, to whose outer extremity is applied a band 43, having locking devices 44, provided with short projections 45. This flexible conduit member 42 is supported by an overhanging arm 46, one extremity of which is connected with the roof of the car, while the other extremity extends above the end of the car and is provided with a hook 47, over which an eye 48, connected with the flexible member 42, is passed.

The bands 43 of the flexible members are each provided with one or more locking devices 44. It may be assumed that there is an equal number of these locking devices on each band, each band being also provided with openings adapted to receive the short projections 45.

The flexible member 42 of the rearmost car should be provided with a closure 49. This closure may be readily removable, whereby it may be applied to any car. Its upper extremity, as shown in the drawings, is supplied with an apertured member 50, through which passes a link 51, which may be passed over the hook 47 of the suspension-arm 40. This valve or closure 49 may be manipulated for the purpose of regulating the draft through the train and the escape of the air at its rear extremity.

In the coaches in the rear of the foremost car the air is discharged into the upper part of the car, as shown in Figs. 6 and 8, the exterior duct 42 communicating with an interior nozzle or extremity 52. The air is discharged into the upper part of the car at one extremity to a nozzle 52 and escapes from a corresponding nozzle 52 at the opposite extremity of the car. This arrangement induces a longitudinal current in the upper part of the car, which current produces sufficient suction to remove the impure air of the car. Enough of the air which enters the top of the car moves downwardly therein to take the place of that removed by the suction resulting from the upper current.

In the case of the dining-car (shown in Fig. 9) the construction and arrangement is somewhat different. In this case there is a pipe or conduit 53, extending from one end of the car to the other and communicating with nozzles 54 at the opposite extremities of the car, which nozzles are connected with the exteriorly-located flexible conduit members 42. The pipe 43 also communicates at the opposite extremities of the car with vertically-disposed pipes 55, which lead into ice-boxes or other receptacles 56. The lower extremities of these vertical pipes are open. At the junction of the pipes 53 and 55 a damper 57 is located, which may be adjusted to allow a portion of the air to enter the downwardly-extending pipe 55 at the end of the car where the air enters at its forward extremity. There is also a similar damper located at the opposite extremity of the car. It is evident, however, that a portion of the air which enters at the forward extremity of the car, assuming that the damper is open or in the position shown in Fig. 11, will pass downwardly through the pipe 55 and be discharged into the car. The current, however, passing through the upper conduit 53 will produce more or less suction in passing over the upper extremity of the pipe 55 in the rear and, it is believed, draw air from the rear extremity of the car, thus allowing the impure air to escape. In Fig. 9 the partition 58 separates the cooking-compartment 59 of the dining-car from the guest-compartment.

Referring to the steam-coil 23 in the upper part of the filter-casing, the exteriorly-located pipe 59 may be termed the "inlet" and the pipe 60 the "return" or "outlet" therefrom.

From the foregoing description the use and operation of my improved train-ventilating apparatus will be readily understood.

Referring to Fig. 1 of the drawings, it is assumed that a train equipped as shown is moving toward the right. During this movement the air to be employed in ventilating the cars enters the funnel-shaped devices 6 and passes thence into the conduits 9 and therefrom into the main conduit 10 and thence upwardly through the bottom of the car into the filtering-bag 18, located within the casing 12, where all impurities are strained out or removed therefrom. The air passes through the mesh of the bag and outwardly through the conduit members 40 and 41 and thence into and through the flexible members 42 between the cars and thence into the next car, which it may be assumed is a coach or Pullman occupied by passengers. The air enters the upper extremity of the car, producing a current through the car to the escape-nozzle 52, through which the impure air from the car passes out. Enough of the pure air which enters the car remains to take the place of the impure air which escapes. This operation is continued until the air-current escapes at the rear extremity of the rearmost car. The only change of operation is in passing through a dining-car, where a portion of the air is allowed to pass downwardly into the car, while another portion passes through an inclosed conduit located in the upper part thereof.

While my invention is more especially intended for use in connection with passenger-trains, it is evident that it may be employed to advantage in connection with freight-cars containing classes of freight requiring special ventilation, as where it is necessary or desirable to exclude the dust, dirt, and cinders which ordinarily enter cars of all classes through the ventilating-apertures.

Having thus described my invention, what I claim is—

1. In train-ventilating apparatus, the combination of open-ended induction devices mounted on a forward car, a conduit with one extremity of which said devices communicate, and an air-filtering device with which the opposite extremity of the conduit communicates, the filtering device being located within the car and having an outlet communicating with the next car.

2. In train-ventilating apparatus, the combination with a conduit mounted on the forward car, air-gathering devices mounted on the forward extremity of the car and communicating with the forward extremity of said conduit, and an air-filtering device located within the car and communicating with the opposite extremity of the conduit, the said filtering apparatus including a mesh bag into which the air is delivered and from which it escapes, the said bag being surrounded by a casing provided with an outlet communicating with the next car.

3. In train-ventilating apparatus, the combination with air-filtering means mounted on a car, means mounted on the train for introducing atmospheric air to the air-filtering device, and a suitable connection for establishing communication between the air-filtering device and an adjacent car.

4. In train-ventilating apparatus, the com-

bination of an air-filter mounted on a car of the train, means for introducing atmospheric air to the filter at one extremity, a communication between the opposite extremity of the filter and an adjacent car, the filter comprising a mesh bag into which the air is delivered, a casing surrounding said bag into which the air escapes after filtration, the said casing being surrounded exteriorly by absorbent material, and means for applying liquid to the absorbent material for cooling purposes.

5. In apparatus for ventilating trains, the combination of an air-filter comprising a mesh bag into which the air is delivered, a casing surrounding the filter-bag and into which the air escapes after filtration, an air-tempering coil located at the upper extremity of the casing, and a conduit leading from the filter of one car to the adjacent extremity of another car.

6. Train-ventilating apparatus comprising a filter mounted on the train, means mounted on the car for catching and delivering atmospheric air to the filter, the filter being provided with a mesh bag, a casing surrounding the bag, air-tempering means located in the upper part of the casing through which the air passes, means for supporting the bag in the upright position, and means connected with the top of the bag and exteriorly exposed to permit the manipulation of the bag from the outside of the filter-casing.

7. Train-ventilating apparatus, including exteriorly-located flexible conduit members communicating with the adjacent extremities of two cars, suitable means for connecting the two conduit members, and an air-filtering device located in one car and communicating with the said conduit members.

8. Train-ventilating apparatus including means for collecting atmospheric air and delivering it to a car, an outlet from the car, a flexible connection between two cars, one extremity of said connection communicating with the said car-outlet, and a car-inlet communicating with the opposite extremity of the flexible connection whereby air is taken from one car and delivered to an adjacent car.

9. Train-ventilating apparatus including flexible conduit members connected with the extremities of the cars and communicating with the interior thereof, means for connecting the conduit members to form a continuous passage-way from one car to another, and an air-filtering device located in one car and communicating with the said conduit members.

10. Train-ventilating apparatus including flexible conduit members connected with the upper extremity of each car and exteriorly located, means for connecting the adjacent conduit members of two cars to permit the automatic separation of the conduit members when the cars separate, air-filtering apparatus located within a forward car, means for delivering atmospheric air to the air-filtering apparatus, and means for delivering the filtered air to the flexible train connection for the purpose set forth.

11. Train-ventilating apparatus comprising flexible conduit members connected with the extremities of the cars composing the train, means for connecting the flexible members of two adjacent cars, the inner extremities of said members communicating with the cars, means for delivering atmospheric air to the flexible conduit at one end of the train, and means for the escape of the air at the opposite end of the train.

12. In train-ventilating apparatus, the combination with the cars, of exteriorly-located flexible conduit members communicating with the adjacent extremities of two cars, means connected with the respective cars and projecting toward the intervening space for supporting the individual flexible members in operative position, and an air-filtering device located in one car and communicating with the said conduit members.

13. In train-ventilating apparatus, the combination with the cars, of an air-filtering device located in one of the cars, exteriorly-located flexible conduit members connected with the car extremities and communicating with the said filtering device, the said conduit members being connected with the upper portion of the car, and rigid arms connected with the car extremities for supporting the flexible members in operative position.

14. In train-ventilating apparatus, the combination of open-ended induction devices mounted on a forward car, a conduit with one extremity of which the said devices communicate, an air-filtering device with which the opposite extremity of the conduit communicates, the conduit being provided with a valve-controlled outlet for the purpose set forth.

15. In train-ventilating apparatus, the combination of an open-ended induction device mounted on the forward extremity of the car, a conduit with one extremity of which said device communicates, and an air-filtering device located within the car and with which the opposite extremity of the conduit communicates.

In testimony whereof I affix my signature in presence of two witnesses.

JOSEPH A. SHIRES.

Witnesses:
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