(No Model.) 2 Sheets—Sheet 1.

J. T. EARNEST.

CAR HEATING AND VENTILATING APPARATUS.

No. 382,956. Patented May 15, 1888.

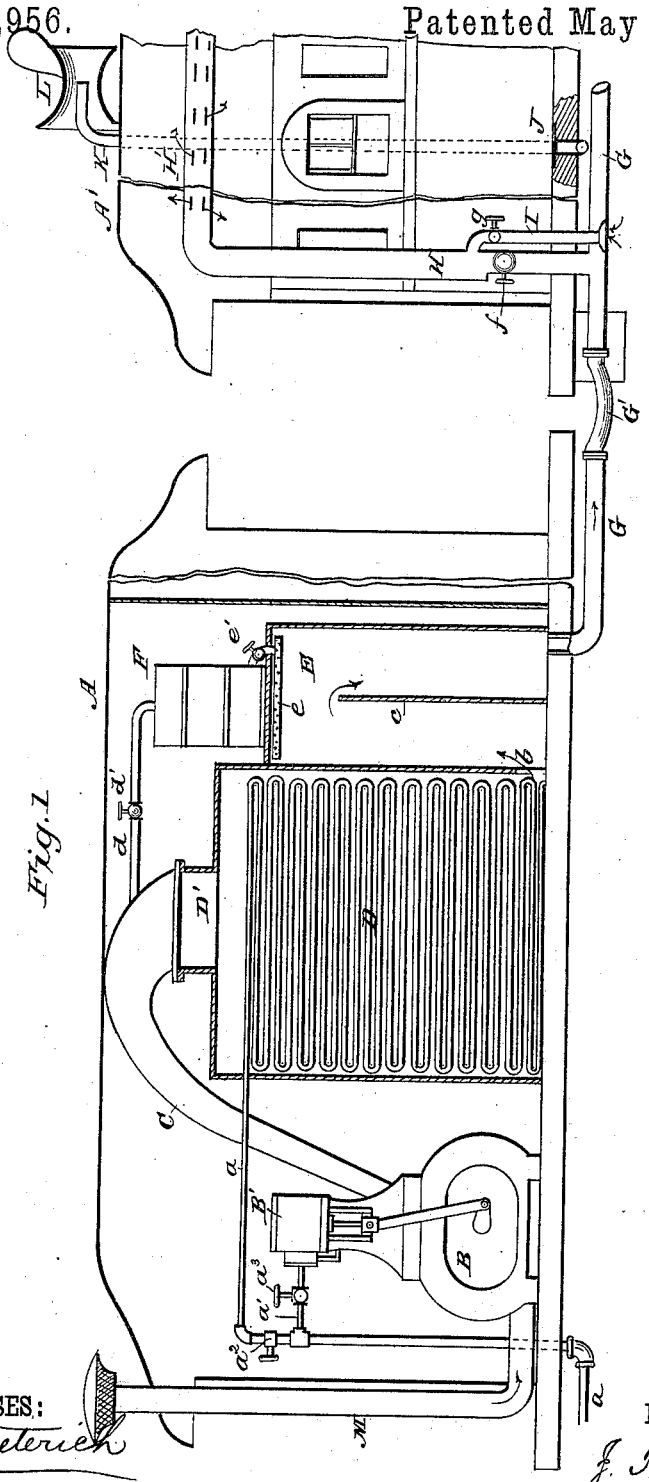

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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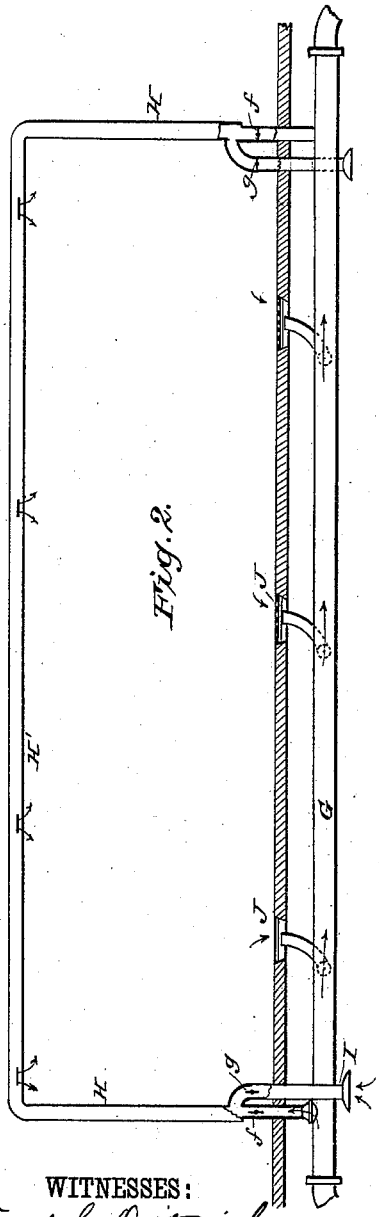

Fig. 2.

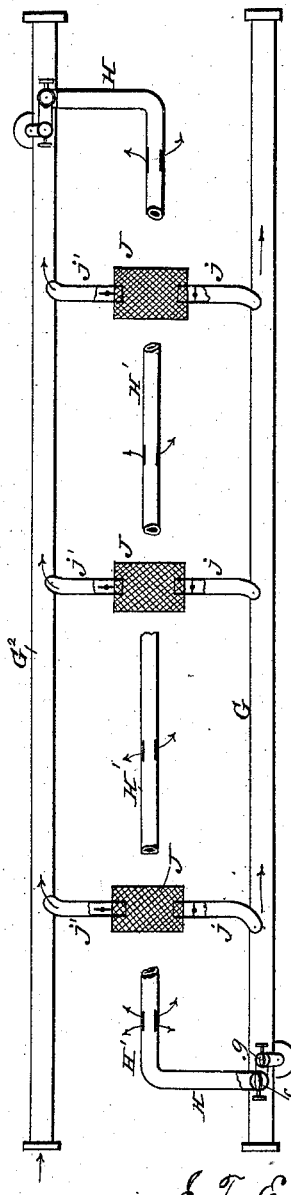

Fig. 3.

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UNITED STATES PATENT OFFICE.

JACOB T. EARNEST, OF JACKSONVILLE, FLORIDA, ASSIGNOR OF THREE-FOURTHS TO JOHN H. STEPHENS, CHARLES R. BISBEE, AND ROBERT S. MARVIN, OF SAME PLACE.

CAR HEATING AND VENTILATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 382,956, dated May 15, 1888.

Application filed August 31, 1887. Serial No. 246,244. (No model.)

To all whom it may concern:

Be it known that I, JACOB T. EARNEST, of Jacksonville, in the county of Duval and State of Florida, have invented a new and useful Improvement in Car Heating and Ventilating Apparatus, of which the following is a specification.

The object of my invention is to provide an apparatus for supplying railroad-trains with fresh pure air, either heated or cooled and suitably moistened, and to remove the foul vitiated air, and also to regulate the temperature and quality of the air in the different cars of the train to suit the varying requirements of full, partly-filled, or empty cars; and to this end it consists in the peculiar construction and arrangement of parts which I will now proceed to more fully describe with reference to the drawings, in which—

Figure 1 is a sectional view of a part of a train of cars with my invention applied to the same. Fig. 2 is a side view of the ventilating-pipes as arranged in each passenger-car, and Fig. 3 is a plan view of the same.

A is the baggage or express car, in the front part of which the air forcing and heating and cooling devices are contained.

M is a stand-pipe, which rises above the car, and is surmounted by a cap to exclude rain or snow, but opens below the cap into the outer air through woven-wire netting. This pipe is the fresh-air inlet, and it communicates at its lower end with an air-blower, B, which is driven directly by an engine, B′, which is mounted upon the top of the blower. This blower forces its air through a large pipe or blast-conduit, C, into the top of a casing, D′, in which is contained a steam-heating coil, D. This steam-heating coil D connects with a pipe, *a*, which extends to the boiler of the locomotive, and has a valve, a^2, in the same. From this pipe *a* a branch pipe, *a′*, with valve a^3, leads to and supplies the engine B′ with steam to drive the blower.

E is a moistening-chamber for imparting a proper degree of humidity to the air heated by coil D. This chamber E is located beside D′ and opens into it at the bottom through orifice *b*, and has a vertical partition, *c*, extending from the bottom nearly to the top.

On top of chamber E is supported a water-tank, F, which has a spray-pipe, *e*, arranged in the top of chamber E, and provided with a stop-cock, *e′*. This water-tank F is connected at its upper end with the blast-pipe C by a pipe, *d*, having a valve, *d′*, in it.

From the bottom of chamber E, on the opposite side of the partition *c* from inlet *b*, emerges the main air-pipe G, which extends along under the cars of the entire train and has at the ends of the cars flexible hose-connections G′. Now, when the blower B is set in operation by its engine B′, fresh air is taken through the stand-pipe M and forced through blast-conduit C into chamber D′, where it is heated by the steam-coil D. This air, then passing through opening *b* into chamber E, rises over partition *c*, and at this point receives a certain amount of moisture to render it fit for breathing by a shower of fine spray from pipe *e*. This pipe is perforated with very minute holes, and in order to drive the water forcibly through these small holes a pressure is brought upon the surface of the water in tank F by opening valve *d′* in pipe *d*, which causes the water to be delivered in chamber E in the form of a fine spray that is quickly absorbed by the air. A trap may be arranged in the bottom of chamber to carry off any accumulation of water.

In summer-time, when the air requires to be cooled, steam is cut off from the coil D by valve a^2, and the air which passes through is cooled and freshened by the spray in chamber E.

In supplying air to the cars of a train through a longitudinal pipe, G, it is not only difficult to regulate the amount of air admitted to each car, but it is not possible in any practical size of pipe G to get enough volume of air for a long train, as the cars nearest the blower will get the larger share and those at the end of the train will have an insufficient amount.

I do not rely upon the air in pipe G alone; but, in addition to the inlet-pipe to each car from pipe G, I provide a supplementary inlet, which opens into the outer air, and is arranged in such relation to the inlet-pipe from the longitudinal pipe G as to cause the

blasts in pipe G to draw outside air directly into the car through this induction-pipe, thus largely increasing the volume of air taken into the cars. Thus from the longitudinal pipe G a stand-pipe, H, rises and opens into a horizontal pipe, H′, in the ceiling, which is perforated to form the air-inlet. Leading into pipe H is a supplementary pipe, I, whose lower end opens directly into the outer air. This pipe I has a regulating-damper, *g*, and H has a regulating-damper, *f*. By this arrangement the volume of air delivered into any car may be increased by the induced draft of air through pipe I. This permits an increased amount of air to be delivered into the rear cars of a train, or into any car which by its overcrowded condition requires more air than the others. J is a grated outlet for the foul air which settles to the bottom of the car. This outlet connects with pipe K, which at the top of the car is surmounted by a draft-inducing cowl, L. When trains are left stationary within the depot for receiving passengers, steam is supplied to run the blower and heat the air from a stationary boiler in the depot, with which communication is established by detachable connections.

In arranging the longitudinal pipes G, I prefer to place them in pairs below the car, as shown in Figs. 2 and 3, in which the two main pipes G and G^2 act alternately as fresh-air and foul-air pipes, according to the direction the car is traveling in. The pipe G has a connection with the branch H at one end, and the pipe G^2 has a similar connection with a pipe, H, at the other end, and both G and G′ have independent connections with gratings J through branch pipes *j j′*, having dampers. Now, when G is in open communication with H H′, G^2 is cut off therefrom and G is cut off from gratings J by dampers in *j*, while G^2 has open communication with gratings J. The pipe G is in this adjustment the fresh-air pipe, and G^2 is the foul-air or exhaust pipe. When the car is going in the opposite direction, this adjustment of parts is reversed, and G^2 becomes the fresh-air pipe, while G is the foul-air or exhaust pipe.

In pointing out more distinctively the value and functions of the induction or injector pipe I, I would call attention to the fact that it does not introduce fresh air into the main hot-air pipe G, for this would continually reduce the temperature of the air in the main pipe as it extended rearward, and would prevent the independent control of each car. By allowing the fresh-air pipe I to open into the branch pipe H it only increases the volume and modifies (by dilution) the temperature of that particular car, leaving the standard hot current in G to pass to the rearward unreduced in temperature, which renders it possible to regulate the volume of air and temperature of any car independently of the preceding ones. As the volume of hot air forced rearwardly by the blower is very much less than that which is actually delivered into each car, it will be seen, also, that with my system a relatively-small blower and conducting-pipes may be employed.

Having thus described my invention, what I claim as new is—

1. In a car-ventilating apparatus, the combination, with an air-blower, of a closed water-tank with spray-pipes, a chamber containing said spray-pipes, a conduit leading from the blower for the passage of air therethrough, and a pipe connecting the water-tank with the blast-pipe of the blower, substantially as and for the purpose described.

2. The combination, with an air-blower, of a chamber, E, having a vertical partition, *e*, extending nearly to the top and connected to the blower for a passage of air over said partition, and a water-tank, F, located above the same, and having a spray-pipe contained within the top of chamber E, substantially as and for the purpose described.

3. The combination of heating chamber D′, with steam-coil D, the blast-pipe C, blower B, with engine B′, spray-chamber E, with partition *e*, and water-tank F, with spray-pipe *e* and pressure-pipe *d*, substantially as and for the purpose described.

4. The combination, with the longitudinal blast-pipe having an inlet branch opening into the car, of a supplementary injector-pipe, I, opening into the branch pipe, to permit the blast of air passing into the car to draw in an additional supply through said injector-pipe.

5. The combination of the two longitudinal pipes G G^2, arranged at the bottom of the car upon opposite sides thereof, the air-pipes H H′, rising from opposite ends and opposite sides of the car, and having independent connections with pipes G G^2, with dampers, gratings J, having independent connecting-pipes with pipes G and G^2, and dampers located in said connecting-pipes, substantially as and for the purpose described.

JACOB T. EARNEST.

Witnesses:
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P. B. TURPIN.