(No Model.)

W. W. GREEN.

RAILWAY CAR.

No. 447,054. Patented Feb. 24, 1891.

Fig. 1.

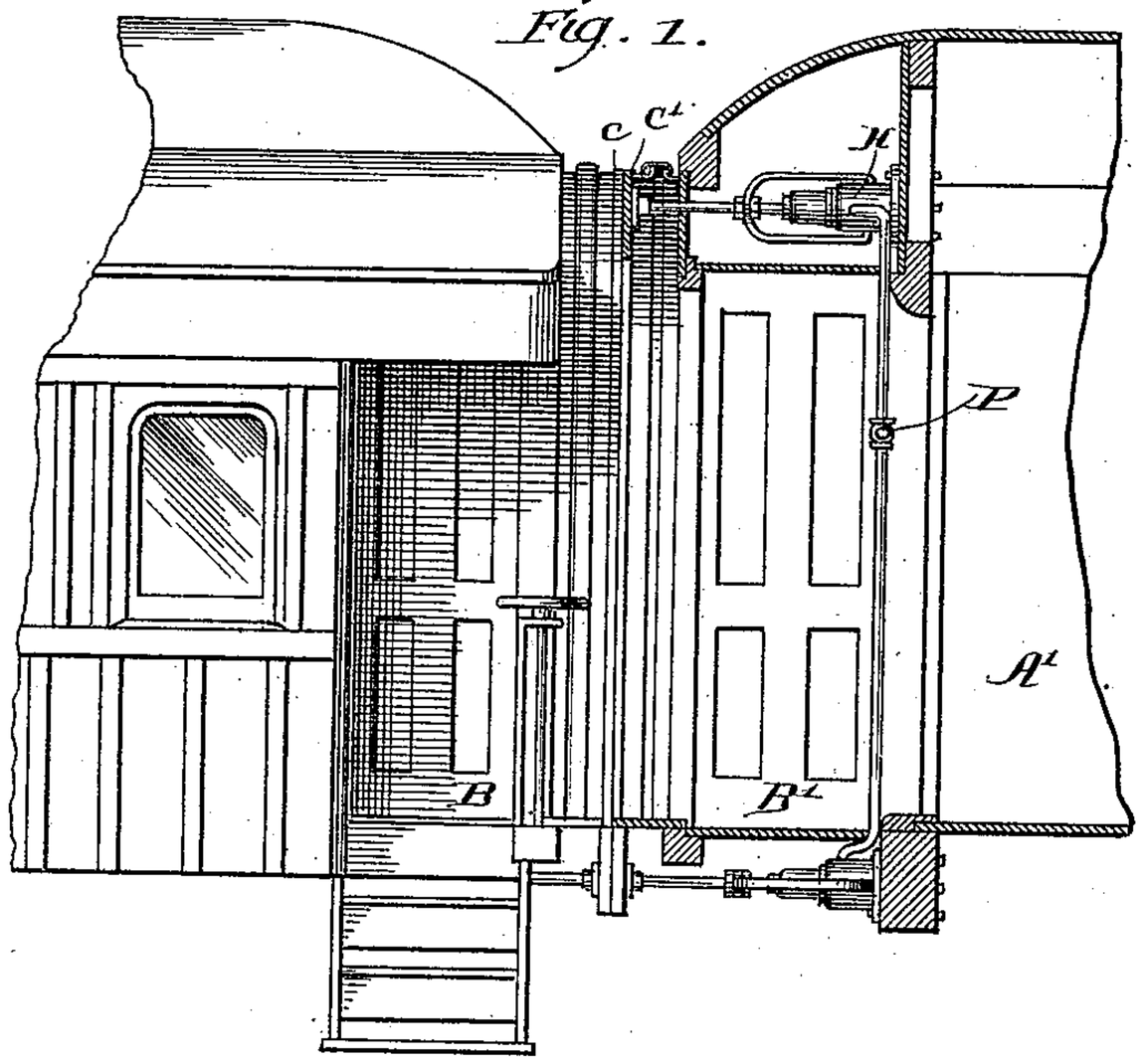


Fig. 2.

Fig. 3.

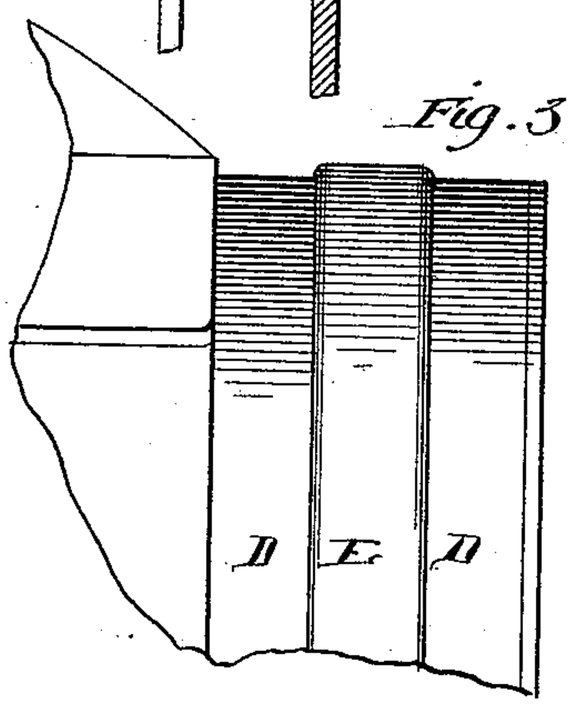
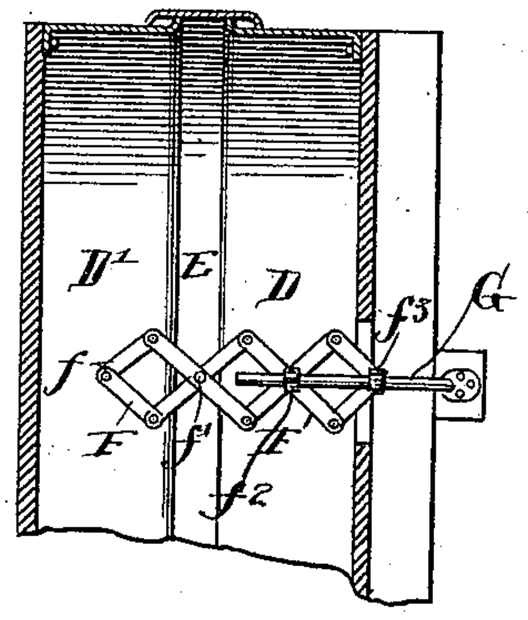


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM W. GREEN, OF CHICAGO, ILLINOIS.

RAILWAY-CAR.

SPECIFICATION forming part of Letters Patent No. 447,054, dated February 24, 1891.

Application filed December 15, 1890. Serial No. 374,799. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. GREEN, a citizen of the United States of America, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Railway-Cars, of which the following is a specification.

My invention is applied to that class of railway-cars known as "vestibule-cars," and pertains especially to the vestibules arranged at each end of the cars and projecting therefrom. In the use of these vestibules much ingenuity has been expended in devising means for keeping the bearing-plates, which are brought together when the cars are coupled up in close contact, and also in the construction of a flexible and extensible dust-proof connection between these bearing-plates, which are necessarily movable to a certain extent, and the rigid portions of the car. For the former purpose different devices have been tried, such as springs, compressed air, &c., which have given more or less satisfaction, but which have shown certain defects, the removal of which is the end of my invention. Whatever force or device be employed to press the chafing or bearing plates together, it is exceedingly desirable that such force be constant and invariable. It is best that the chafing-plates be pressed together as firmly when the cars are separated as far as possible while they are coupled as when they are crowded together as much as their connections will permit. It is of course obvious that the force of a spring increases as the spring is compressed. Again, it is clear that if in place of a spring compressed air be employed against a piston that the pressure upon the piston will vary as it travels back and forth in its cylinder. An effort has been made to avoid this by connecting the cylinder or cylinders used with a large reservoir, so that a sufficient quantity of compressed air may be used to render the variation in volume caused by the piston movement of little importance. This is exceedingly unsatisfactory, as it not only requires a large quantity of compressed air, but, besides, provision must be made somewhere for the large reservoir, and the whole apparatus must necessarily be quite expensive.

The main feature of my invention consists in the provision of means whereby the pressure of the atmosphere is employed to hold the chafing-plates together. This pressure is practically invariable, and is not effected in the least by any motion of the part which sustains it. Supplementary to this main improvement I have made certain minor improvements, which are fully described herein. All of these are illustrated in the drawings presented herewith, wherein—

Figure 1 is a side view of the adjacent ends of two cars, the one at the right hand being shown partly in section. Fig. 2 is a detail section, which will be described below. Fig. 3 is an enlarged broken view of a portion of the outside of one of the vestibules, and Fig. 4 shows the interior of one of the same.

Applying reference-letters to the different parts shown in the drawings, A and A′ are the two cars, B and B′ the vestibules thereof, and C and C′ the chafing-plates. Between the latter and the ends of the vestibules is seen an extensible connection (shown enlarged in Figs. 3 and 4) consisting of the two plates D and D′, attached, respectively, to the chafing-plate and to the end of the vestibule, and of a third plate E, covering the joint between the first two. The two plates are turned outwardly slightly at their adjacent edges, and the edges of the middle plate are turned inward, so as to form a tight joint between the three plates, while at the same time allowing their edges to slide back and forth and the whole structure to expand or contract. These plates are held together and supported by means of pivoted levers F, arranged in the manner common in what are known as "lazy-tongs." The plates are pivoted to these levers at $f f' f^2$, and the two levers seen at the right in Fig. 4 are pivoted at f^3 to the solid frame of the vestibule. A rod G, bolted to the latter frame, extends through eyes in the pivots f^2 f^3, and while allowing said pivot f^2 to move horizontally, yet prevents the whole frame from swinging upon the pivot f^3. The plates D E are preferably made of thin metal lined with asbestus. This renders them light and noiseless, and at the same time allows both sides of the vestibule to be made pleasing to the eye.

Upon the frame of the car in the four corners of the vestibule I bolt cylinders H, the interiors of which are connected together, which cylinders are open to the atmosphere at the ends adjacent to the body of the car and contain pistons I, connected to a yoke J, working back and forth in slots in the sides of the cylinders and extending away from the car to unite with a rod K, jointed to the chafing-plate. The air is exhausted from the closed ends of the cylinders, and the atmosphere entering at the open ends bears against the pistons and presses the rods K away from the car to crowd the chafing-plates together when the cars are coupled up. This, it will be seen, gives a practically constant pressure upon the chafing-plates, the only difference that it is possible for the piston movement to make in this pressure being the difference caused by the expansive pressure of the air contained within the partial vacuum of the cylinder. This, of course, will be infinitesimal if anything approaching a vacuum is obtained. The means by which the air is exhausted from these cylinders are to a certain extent immaterial; but I believe that I have made a valuable improvement in the construction shown in the drawings, wherein a smaller cylinder L is attached to each of the larger cylinders and connected to the interior thereof by a port containing a valve *l*, opening toward the smaller piston, and said smaller cylinder is equipped as an air-pump. This is done by fitting to the interior thereof a piston *m*, connected to a rod, which is preferably an extension of the rod K above described. A valve *n* is mounted in said piston, opening away from the larger cylinder, and another valve *o* is placed in a port leading from the closed end of the smaller cylinder to the atmosphere.

In operation a partial vacuum is preserved at all times in the larger cylinders. It is desirable, of course, that this vacuum should be less perfect when the cars are uncoupled, and for this reason a reducing-valve P is interposed at some point in the large cylinders or their connecting-pipes—as, for instance, in the place seen in Fig. 1. This valve is constructed so that when left free to operate it will allow air to enter the cylinders until a slight pressure is contained within said cylinders, and it then closes automatically before said pressure reaches that of the outside air. It also is provided with means for locking it out of operation. Said means are put into operation when the cars are coupled up, and the apparatus then becomes automatic. As soon as the motion of the cars crowds them together the two pistons are forced toward the right by the approach of the adjacent ends of the cars. When the cars separate, the pressure of the external air upon the large piston I being much greater than that upon the small piston *m*, both are forced to the left, and a small quantity of the air within the partial vacuum in the large cylinder forced into the smaller cylinder. The next movement in the opposite direction closes the connecting-valve and compels the air thus penned up in the small cylinder to pass through the valve in the piston. Thence the succeeding movement in the opposite directions expels it through the valve *o*. This operation is repeated as long as the cars are in motion and soon creates as perfect a vacuum as is necessary for the desired operation. As the motion of the pump is still kept up, any air that may leak into the large cylinder will be removed as fast as it enters. It is of course obvious that a diaphragm may be substituted for the piston I, or equivalent devices may be substituted for said piston and the cylinder H.

I claim as new and desire to secure by Letters Patent—

1. In a car-vestibule, the combination, with two plates secured, respectively, to the rigid frame of a car and to a chafing-plate, of an intermediate plate or of intermediate plates supported in close contact with the first-mentioned plates, but being free to slide back and forth thereon, substantially as described.

2. In a car-vestibule, the combination of a series of plates sliding upon one another, and a series of levers pivoted to each other and to said plates and supported from the frame of a car, substantially as described.

3. In a car-vestibule, the combination of two plates D D′, with outwardly-turned adjacent edges, and a third plate E, arranged outside of the first two in contact with their edges and having its own edges turned inward against their outer surfaces, all of said plates being supported, so that the plates D and D′ may approach each other or separate, substantially as described.

4. In a car-vestibule, the combination of three plates sliding upon one another and carried by a series of levers, pivoted substantially as shown, and supported by a bar G, rigid with the car, substantially as described.

5. In a car-vestibule, a suitable inclosure rigid with the car and provided with means for removing the air therefrom, a movable abutment arranged to sustain the pressure of the atmosphere upon one side and whatever pressure may exist within said inclosure upon the other, and a connection between said abutment, and a chafing-plate adapted to apply the excess of pressure of the atmosphere over that within the inclosure to the chafing-plate, substantially as described.

6. In a car-vestibule, the combination, with a car and a chafing-plate, of an inclosure provided with means for creating a partial vacuum, a valve connecting the interior of said inclosure with the external air, adapted when in operation to preserve a slightly less pressure within the inclosure and provided with means for locking it out of action, a movable abutment arranged to sustain the pressure of the atmosphere upon one side and that within the inclosure upon the other, and a connec-

tion between said abutment and the chafing-plate, adapted to apply the excess of the atmospheric pressure to crowd the chafing-plate away from the car, substantially as described.

7. In a car-vestibule, the combination, with a car and a chafing-plate, of a cylinder rigid with the car, having a piston mounted therein and open at one end to the atmosphere, a connection between said piston and the chafing-plate, and means operated by the motion of the car for creating a partial vacuum within the closed end of the cylinder, substantially as described.

8. The combination, with a car and a chafing-plate, of a cylinder H, rigid with the car, an air-pump mounted adjacent to the cylinder and adapted to remove air therefrom, a rod K, jointed to the chafing-plate, a piston I within the cylinder, and connections between said rod, said piston, and the air-pump, whereby all are operated together, substantially as described.

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