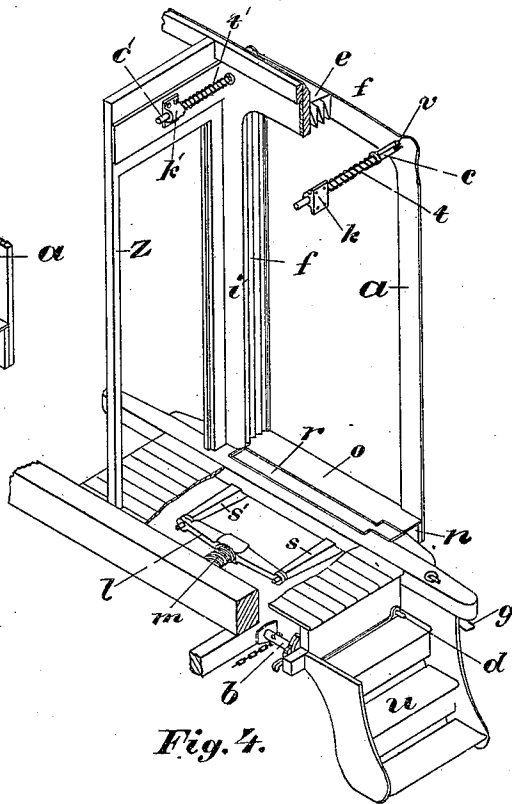
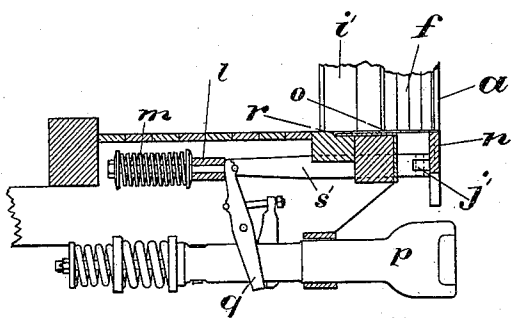
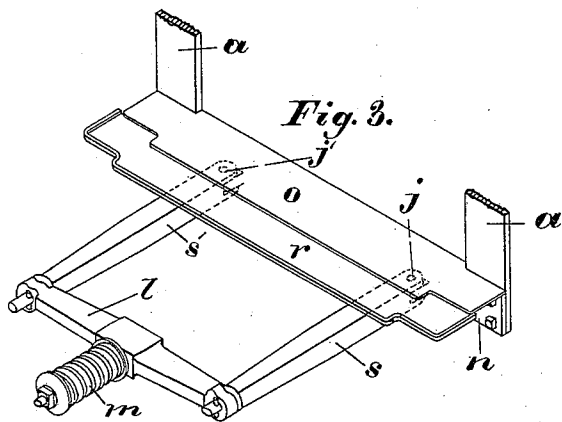
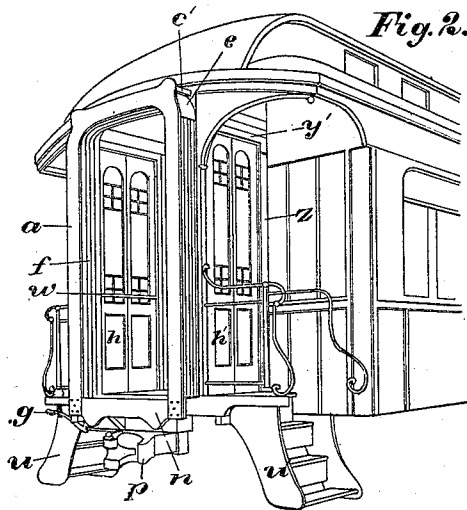
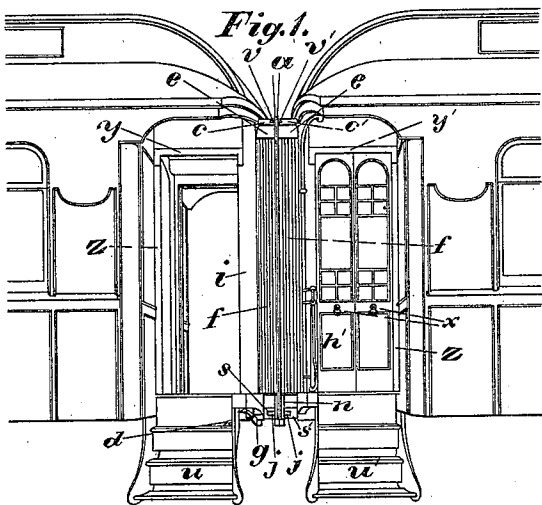


(No Model.)

G. M. PULLMAN.  
VESTIBULE CONNECTION FOR RAILWAY CARS.

No. 403,137.

Patented May 14, 1889.



WITNESSES:

*Frederick Goodwin*  
*Charles K. Offield*

INVENTOR,

*George M. Pullman*  
BY *Offield & Fowler*

ATTORNEYS,

# UNITED STATES PATENT OFFICE.

GEORGE M. PULLMAN, OF CHICAGO, ILLINOIS.

## VESTIBULE-CONNECTION FOR RAILWAY-CARS.

SPECIFICATION forming part of Letters Patent No. 403,137, dated May 14, 1889.

Application filed May 13, 1887. Serial No. 238,134, (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE M. PULLMAN, a citizen of the United States, residing in the city of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Solid Vestibule-Connections between Railroad-Cars, with flexible or adjustable joints to permit of sufficient movement between individual passenger-cars, which I desire to protect by Letters Patent of the United States, and of which the following is a specification.

The object of my invention is to provide suitable means whereby there may be made a continuous connection between contiguous ends of passenger railway-cars, this connection being an entirely-closed passage-way, preferably of the width of the car-platforms, and serving at the same time as a vestibule for entrance and exit to the respective ends of the cars, the connection between the solid parts forming a vestibule being made of flexible or adjustable material, so as to constitute a loose or flexible joint that will permit of sufficient movement of each unit car in travel, but at all times preserving a complete vestibule-connection between the respective cars.

One form of construction by means of which I propose to carry out my invention, and which I have found by far the most desirable in practical use, is illustrated in the annexed drawings, forming part of this specification, in which—

Figure 1 is a side elevation showing contiguous ends of adjacent cars. Fig. 2 is an isometrical perspective view of the end of a car. Fig. 3 is a detail view of the foot-plate device. Fig. 4 is a perspective view showing portions of the platform, vestibule, and buffer mechanism; and Fig. 5 is a detail view, in section, longitudinally through the platform.

Like letters indicate like parts in each of the figures of the drawings.

In the particular form of my invention herein described sleeping-cars or passenger-cars of ordinary construction are used. Stanchions *i* are located at the outer or front end of the platform near the sides of the latter, extending to an extension of the car-roof, and are there firmly secured. Between these stanchions and posts *Z*, at the end of the car, are beam-connections, which, with the former,

constitute door-frames. The stanchions of respective sides of the platform are joined at the top, forming an archway in the passage-way between the cars. These stanchions, when supplied with doors, hereinafter described, and the roof above them inclose the ordinary platform, except at the outer ends thereof, which are open or have a passage-way between the stanchions *i*. Now, I am aware that it has been attempted to form an inclosed connection between these last-named passage-ways by means of a bellows somewhat like that of an accordion without the side-boards; but such bellows have never, so far as I know, been so provided with means for holding them in position, and at the same time insuring a tight joint between the bellows of adjoining cars, as to really possess a practical value.

The problem is to hold each bellows so firmly to its car that it will maintain its place when the car is uncoupled from others; second, to so support them that when cars are coupled the ends of adjoining bellows or connections take their relative proper positions, so as to form a continuous passage without any necessity of manipulating the bellows or flexible connections; third, to provide a continuous flooring between the cars; fourth, so to combine the parts that both the flexible connections and the flooring shall be so supported that the cars may approach nearer and remove farther from each other without disturbing either the continuity of the flooring or that of the bellows or inclosed flexible passage-way; fifth, that the cars may, as in traveling around curves they must, have the longitudinal line passing through the center of one car at an angle with that passing through the center of another car without disturbing the continuity of the foot-passage or causing open spaces between the ends of adjoining flexible passage-ways. Now, I think I have solved this problem by a construction to be described, premising, however, that parts of my structure may be used without or dissociated from other parts.

I prefer to mount the arch-plate *a*, or face-plate forming the open end of a vestibule-extension, to a railway-car when not coupled with another car in a train, and which sustains the outer edge of the flexible connection upon the ordinary buffer-rod located be-

low the platform of the car; but it may be mounted upon other buffer-rods—*i. e.*, rods which are so acted upon by springs as to tend to move outward from the end of the car. I prefer to mount the foot-plates, also, in the same way, but may mount them on separate spring-rods.

I will commence my description with the foot-plates and the preferred way of supporting them.

The drawings show a buffer-rod and draw-bar of a well-known kind. The buffer-spring *m* incloses the buffer-rod, and this rod is moved outward by the spring and inward by the impact of an adjoining car or buffers connected therewith. Upon this rod is mounted a cross-bar or equalizing-bar, *l*, in such manner that it can move out and in with the buffer-rod, and at the same time oscillate upon its center as the evener of a wagon does upon the pole. Two rods, *s s'*, are attached to the ends of this cross-bar *l*, not firmly, but by a sort of ball-and-socket joint in such manner that the cross-bar may change its angle to horizontal lines drawn perpendicular to the length of the car, while the rods *s s'* always remain substantially parallel with the sides of the car. These rods *s s'* pass through mortises or guide-plates made in or supported by the transverse timbers of the car, and are thus confined in such manner that they can slide outward and inward in the direction of their length, but cannot practically move in any other direction. These rods at their outer ends project beyond the outer cross-beam of the car and are there pivoted to the buffer-plate *n*. This plate is a vertical plate as long as the width of the flexible connection, with its upper edge on a level, or thereabout, with the top of the ordinary platform. A study of the mode of supporting this buffer-plate, as above described, will show that it is pressed out by a spring, that it can be shoved toward the car by the application of sufficient force, and that it can change its angular position with reference to the end of the car when at its extreme outward and inward locations or anywhere between them. This buffer-plate on one car could not have its acting-face coincident with a similar buffer-plate on an adjoining car when the two cars are rounding a curve unless it could change its angle with reference to a longitudinal line passing through the center of the car, so that it can be at times at right angles to such a line and at times at various other angles. The support of the buffer-bar before described not only permits these changes of angular position and the in-and-out motions of the buffer-bar, but prevents its center from leaving a horizontal longitudinal line passing through the center of the car to which it is attached, so that the center of the buffer-bar is always, whether projected or shoved in, practically in line with the center or middle of the platform. The mode of supporting this

buffer-bar must be such as to permit it to have these motions so long as the buffer-bar is permitted to move as described, and at the same time have its center restrained, so that it can move only in a certain path, as before described.

Two cars moving in a train vary the distance between the ends of their respective platforms, and also the angles that one of these ends makes with the other, and there is a gap between the platforms. It has been customary to close this gap with a piece of board extending over both platforms and held to one of them by a bolt. This was a clumsy contrivance and needed manipulation when cars were coupled, and would not answer my purpose at all. In order to make a continuous footpath without a gap between adjoining cars, I apply to each of the buffer-plates before described a foot-plate, *o*. This foot-plate is wide enough, preferably, to nearly reach from one stanchion *i* to its neighbor, measuring across the car, and long enough, measuring in the line of the length of the car, to reach from the buffer-plate in its most outward or extended position to a point over the car-platform. I prefer to provide its outer edge with dowels on the under side thereof, which dowels enter depressions or sockets in the upper edge of the buffer-plate, as the foot-plate can then be detached easily; but the outer edge of the foot-plate may be riveted or otherwise secured to the buffer-plate; or the foot-plate may have (when the buffer-plate is not used) its outer edge supported by such a structure as supports the buffer-plate. Whether the foot-plate be attached to the buffer-plate or be used without one, it must be so supported that it can move in and out from the end of the car, must be forced out by a spring or springs, and must, like the buffer-plate, be so restrained that its center always moves in the same longitudinal line parallel with the car-body, while it is free to change its angular position to a line passing longitudinally through the center of the car. The inner edge of the foot-plate rests upon the top of the platform of the car and slides and turns upon it when the car is in motion, or, preferably, rests, as shown in the drawings, in a shallow cavity as deep as the threshold or foot-plate is thick, formed in the top of the platform. In consequence of the threshold or foot-plate being supported as described, so as to be capable of moving as described, it is clear that the outer edges or ends of two adjoining foot-plates in different cars, when coupled and moving, will always remain in contact, thus constituting a footway without a gap in it, and which will admit but little wind or dust into any covered way that may be constructed above it. Upon the two ends of the buffer-plate I mount an arch-plate, *a*, firmly attached to the buffer-plate, made, preferably, of iron and of about the shape and proportions indicated in the drawings. As this

arch-plate is firmly secured to the buffer-plate, it is capable of being moved in the same way, has the same motions, and is restrained in the same manner—that is, it can move in and out from the platform, it can oscillate, and nevertheless a vertical line drawn through its center will always practically be in a vertical plane passed longitudinally through the center of the car, and it must be supported either from the buffer-bar or by other means of the same character, so as to be capable of thus moving.

When two adjoining cars are coupled, the arch-plates on each car abut one against the other, and they thus abut when the cars are upon straight lines or curves, or are being started, tending to separate, or are stopping, tending to come nearer together. The two arches in adjoining cars therefore make a joint. They need no manipulation when cars are coupled, none when they are uncoupled, and in consequence of their being forced together by springs (when the cars are in train) the adjoining faces of the two arches cannot slide one upon the other without inducing considerable friction. This arch-plate is to have attached to it one edge of a sheet of india-rubber fabric or leather or other flexible material, and at the other edge this flexible fabric is to be tacked or otherwise attached to the stanchions or to a wooden framing supported by the stanchions, and the sheet is to be so large, measuring in the direction of the length of the car, that it will be a little loose when the arch-plate is in the position farthest away from the car.

I prefer to provide the spaces between the stanchions on the same side of the platform with doors  $h h'$ , made preferably as double doors, meeting in the center, or of two leaves, one of which is hinged upon the other, so that they may be as much out of the way as possible when open. Now, as the foot or threshold plates of adjoining cars fit each other and their platforms, as the adjoining faces of the arch-plates fit each other, and as the space between each arch-plate and the car is covered with india-rubber fabric, &c., in all positions of two coupled cars, whether in rest or motion, it will be perceived that when the doors are added the whole train may be considered, in fact, as a single car, and that passengers can pass from car to car not only without danger, but in comfort; and it is needless to detail the great utility of such an arrangement, especially in trains which are composed in part of dining or smoking cars, or either of them. Moreover, my construction, as a whole and in all its parts, presents no difficulty in coupling or uncoupling cars and necessitates no extra manipulation. All that is necessary is to push the cars together and couple them just as if my invention were not used. Owing to the peculiar mode of supporting the arch-plates, so that they may move as described and be restrained from moving except with their cen-

ters in longitudinal vertical central planes passing through the cars to which they are attached, and to the fact that they are forced out by springs, it follows that my contrivance has the additional advantage of materially diminishing sidewise vibration of the cars.

The structure as a whole would work fairly well as described, with strong arch-plates strongly and firmly secured to springs that force them outward; but I prefer also to support the upper ends of the arch-plates from the car-body. To this end I have connected to the upper ends of the arch-plates, by pivots or hinged joints, two rods,  $c c'$ . These rods slide in guides or supports  $k k'$ , and are forced outward by strong spiral springs  $t t'$ . The guides  $k k'$  are bolted to framing supported by the stanchions, and the rods  $c c'$  can move in and out together or independently, but cannot practically move sidewise or in lines which are not parallel to a line passing centrally and longitudinally through the car. These rods  $c c'$  have the same motions as the rods  $s s'$  below the platform, and as they are pivoted to the arch-plate this arch-plate is so supported at top that its top can move, and is restrained in the same way as the foot-plate, the buffer-plate, and the lower part of the arch-plate. A supporting structure the same as that of the buffer-plate might be used in place of the one shown in the drawings for supporting the top of the arch-plate, as both structures have substantially the same mode of operation. When the upper part of the arch is thus supported, the whole structure is very firm, and the effect in diminishing oscillation is increased, while at the same time the joint between two adjoining arch-plates is a tighter one.

I do not claim, broadly, a series of spring-buffers or a spring-buffer mounted upon the body of a railway-car above the platform thereof, nor two cars provided with such buffers so arranged as to come in contact when the cars are in train, as such devices form the subject-matter of the claims in the patent granted to Sessions, November 15, 1887, No. 373,098; nor do I claim, broadly, and irrespective of the manner in which it is supported upon the car, so as to have the motions and be restrained as described, a strong arch-plate so constructed as to furnish considerable frictional or rubbing surface when it is brought in contact with a similar arch-plate mounted upon an adjoining car; but

I do claim as of my own invention—

1. The combination, substantially as hereinbefore set forth, of a face-plate forming the open end of a vestibule-extension to a railway-car when not coupled with another car in a train, and a buffer-plate which is pivotally connected with a spring-extended buffer-rod and arranged, as described, to be capable of oscillating on a fixed center, but restrained by guide-rods, as described, to compel its center of oscillation to move only in a line passing

longitudinally and horizontally through the center of the car, the said buffer-plate and the face-plate of the vestibule connected therewith being free to move angularly with such fixed longitudinal line of their movement.

2. The combination, substantially as hereinbefore set forth, of a face-plate forming, when railway-cars are not coupled, the open end of a vestibule-extension of a car, a buffer-plate pivotally connected with a spring-extended buffer-rod, and a threshold-plate, the said buffer-plate and threshold-plate being arranged, as described, to be capable of oscillating on a fixed center, but restrained as to other movements to one in a line passing longitudinally and horizontally through the center of the car.

3. The combination of a face-plate, forming, when railway-cars are not coupled, the open end of a vestibule-extension to a car, a buffer-plate pivotally connected with a spring-extended buffer-rod, and the said face-plate connected at its upper end with spring-extended guide-rods, substantially as described, and its foot to the buffer-plate, whereby the said face-plate is made capable both at its top and at its bottom to oscillate on a vertical central line, but is restrained as to other movements to one in a line passing longitudinally and horizontally through the center of the car, substantially as hereinbefore described.

4. The combination of a face-plate forming,

when railway-cars are not coupled, the open end of a vestibule-extension to a car and arranged, as hereinbefore described, to be capable of oscillating on a vertical central line, but restrained as to other movements to one in a line passing longitudinally and horizontally through the center of the car, and a flexible bellows or equivalent extensible connection uniting the face-plate with the car-body structure, substantially as described.

5. A vestibule-extension to a car-body, which is made up of the following components: first, an extension of the car-body, so as to practically inclose the entrance-platform and provided with doors at the sides; second, an extensible section of flexible material uniting the said extension of the car-body with a face-plate, which forms, when railway-cars are not coupled, the open end of the vestibule; third, the said face-plate, combined with the car structure and arranged, as described, to oscillate on a central vertical line, but restrained as to other movements to one in a line passing longitudinally and horizontally through the center of the car, and, fourth, a threshold-plate having the same movements and restraints as the said face-plate, substantially as described.

GEORGE M. PULLMAN.

Witnesses:

EDWARD H. GOODMAN,  
CHARLES K. OFFIELD.