(No Model.)

2 Sheets—Sheet 1.

J. A. MILLER.

RAILROAD CAR.

No. 568,166. Patented Sept. 22, 1896.

Fig. 1.

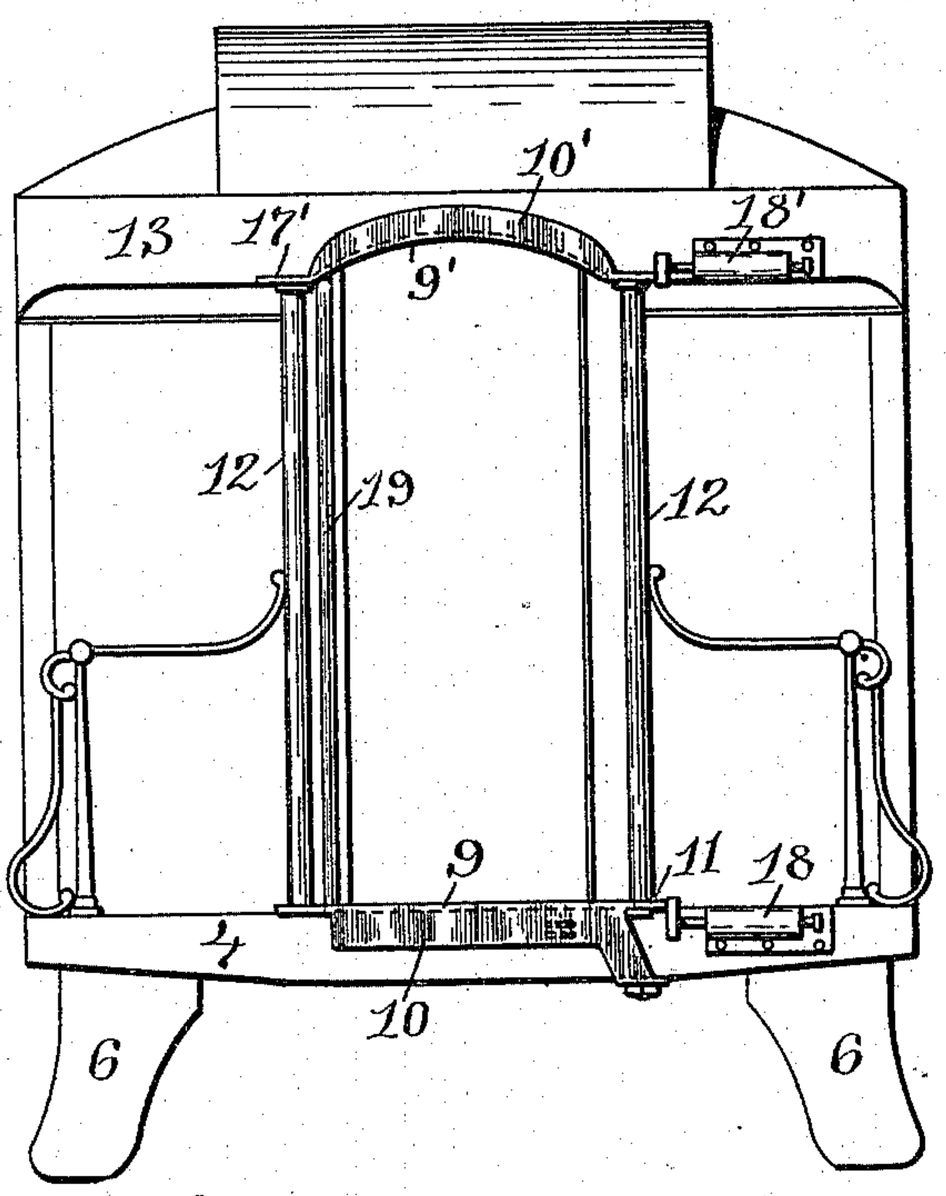


Fig. 2.

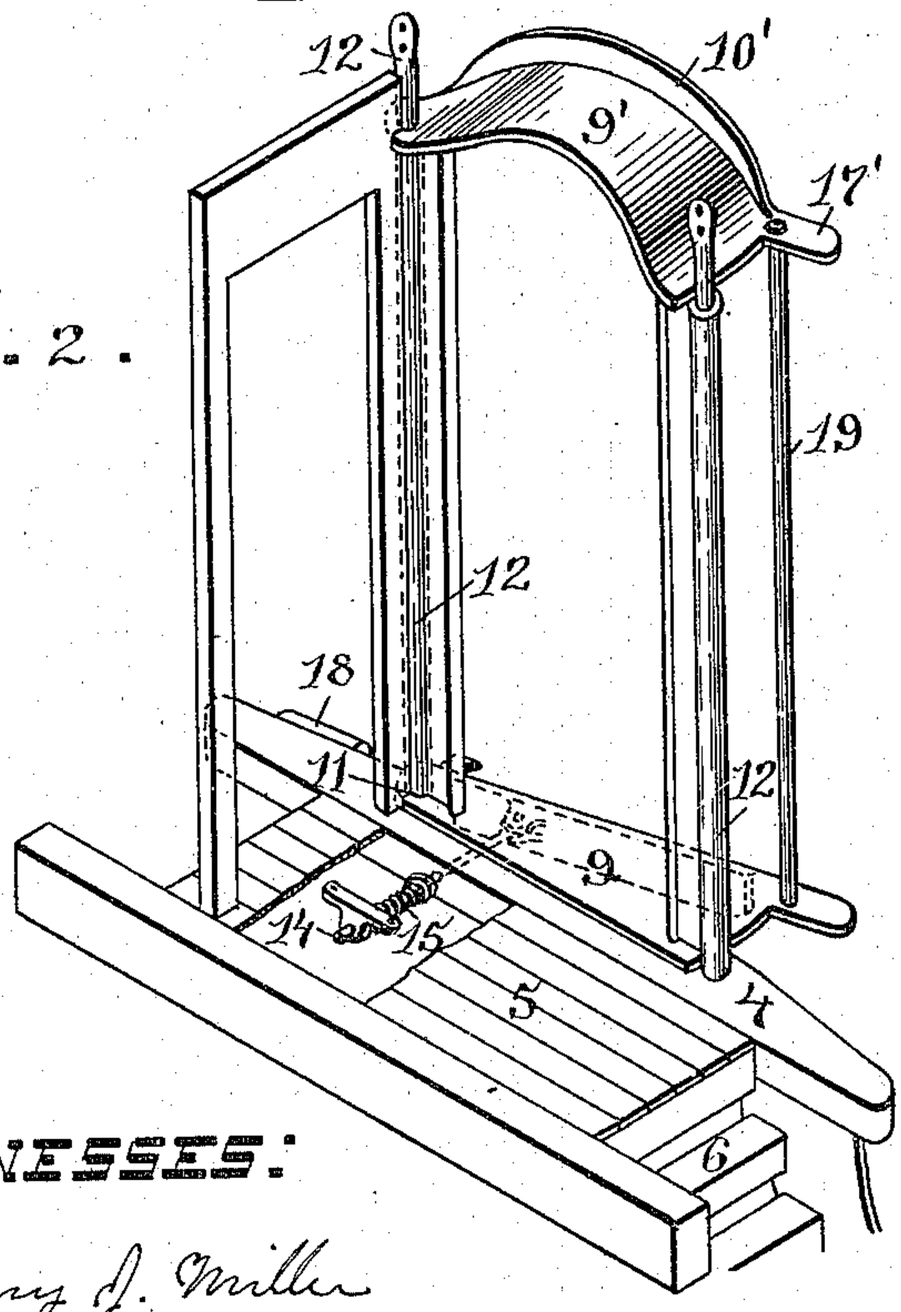
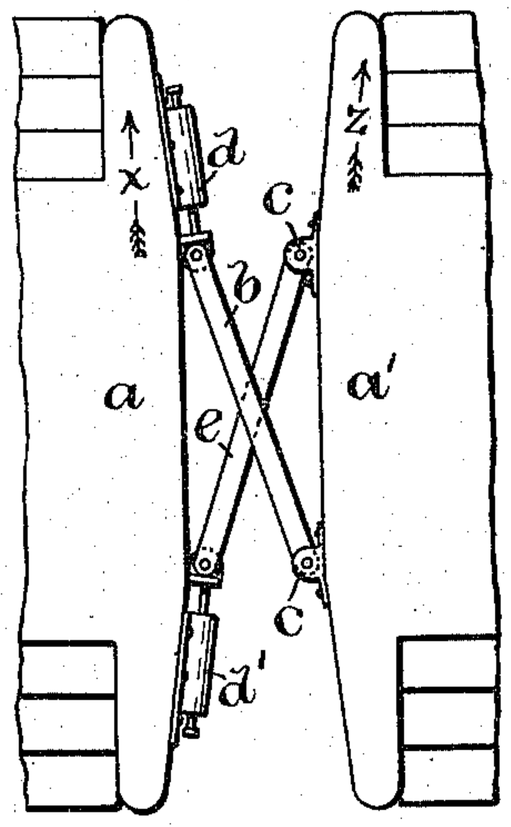


Fig. 3.



WITNESSES:

Henry J. Miller

Chas. H. Luther Jr

INVENTOR:

Joseph A. Miller

(No Model.) 2 Sheets—Sheet 2.

J. A. MILLER.

RAILROAD CAR.

No. 568,166. Patented Sept. 22, 1896.

Fig. 4.

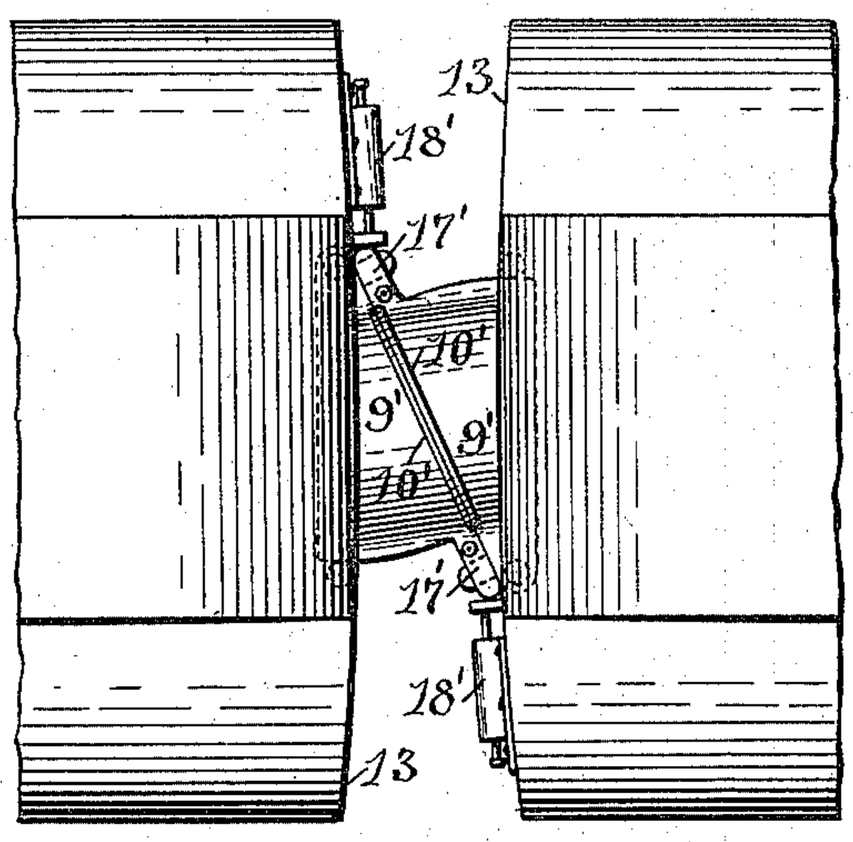


Fig. 6.

Fig. 5.

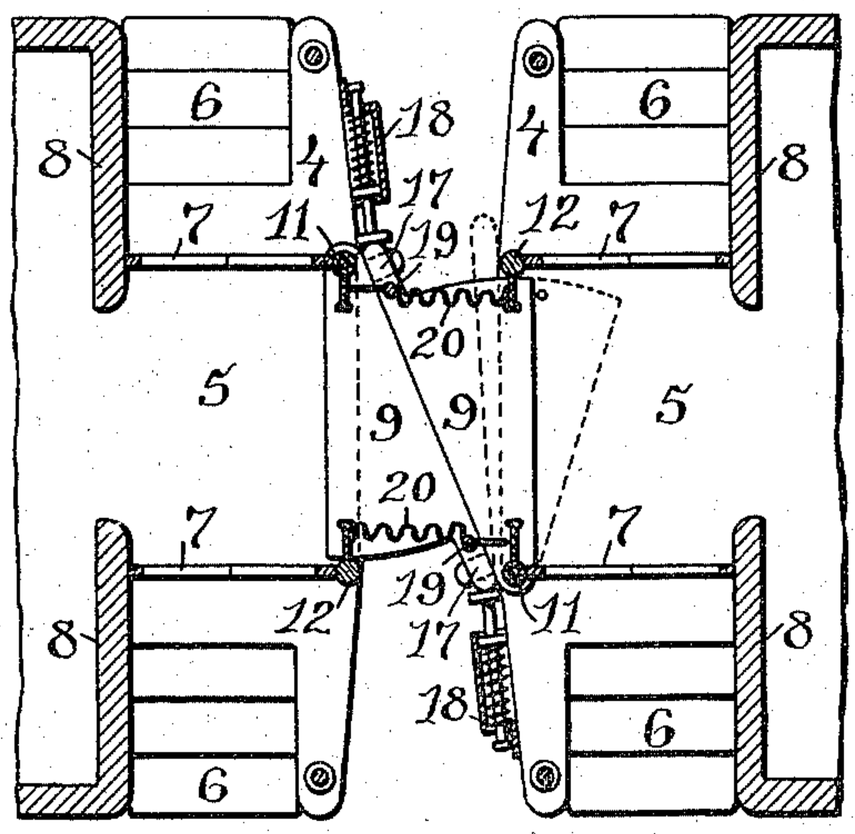
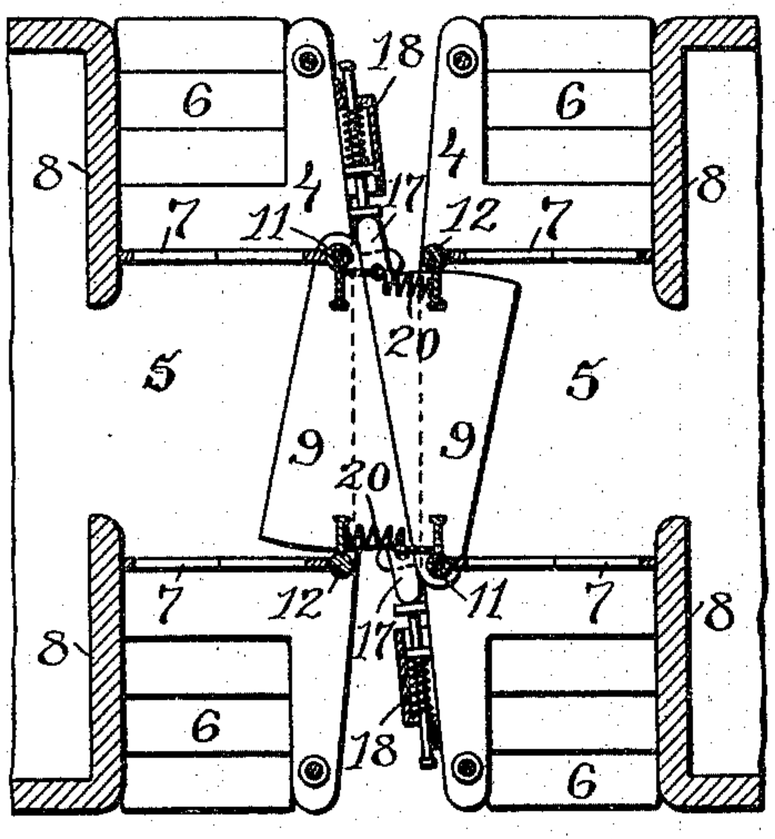


Fig. 7.



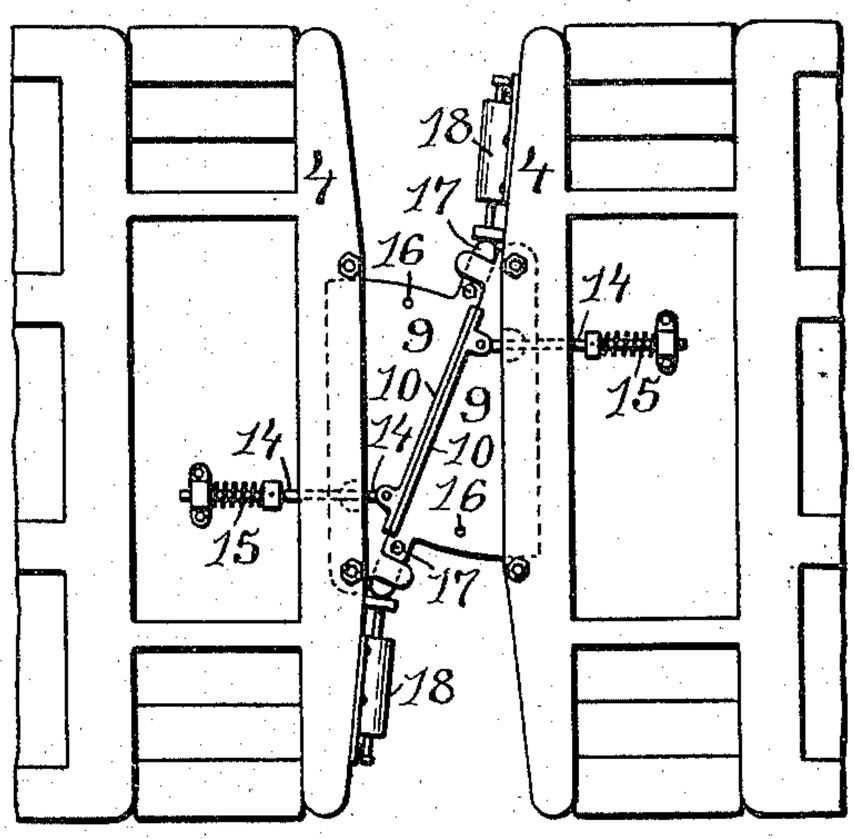
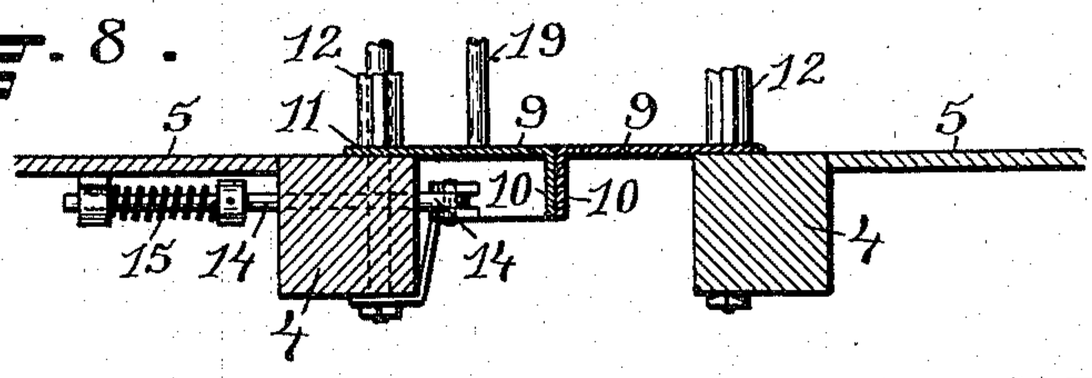


Fig. 8.



WITNESSES:

Henry J. Miller

Chas. H. Luther Jr.

INVENTOR:

Joseph A. Miller

UNITED STATES PATENT OFFICE.

JOSEPH A. MILLER, OF PROVIDENCE, RHODE ISLAND.

RAILROAD-CAR.

SPECIFICATION forming part of Letters Patent No. 568,166, dated September 22, 1896.

Application filed May 16, 1894. Serial No. 511,393. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH A. MILLER, of the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Railroad-Cars, of which the following is a full and clear description, reference being had to the accompanying drawings, forming part of this specification.

This invention has reference to an improvement in the end platforms of railroad-cars; and it consists in the peculiar and novel construction more fully set forth hereinafter.

Railroad-cars, as now constructed, are supported on the trucks in such a manner that the car-wheels can adapt themselves to the varying levels as well as to the curves of the rails. On curves the outer rail is usually higher than the inner rail and on reverse curves the higher rail is first on one side and then on the opposite side. With the long cars now in use the two trucks under a car frequently run at opposite inclinations to the horizontal line. The car is supported on the centers of the two trucks and is free within certain limits to rock on this central support. As the support for the car-body is not at the extreme ends of the car-body, but at considerable distance from the ends, the several cars in a train are connected so that when running on curves, on reverse curves, and on entering or leaving curves the ends of the cars may swing laterally while the trucks follow the changing direction of the track. While this freedom of the trucks to adjust themselves to the track independent of the car-body is necessary, it produces a complication of motions that are very disagreeable to the passengers. Car-sickness is nearly as prevalent as sea-sickness. It is caused by the transverse rolling motion of the car-body, accelerated by sudden lateral motions of the ends of the cars. These motions, when once started at some curved portion of the road or on an imperfectly lined or leveled piece of road, continue for a considerable time before the momentum of the heavy car-body is gradually brought to rest, to be again disturbed by the next change in the level or direction of the rails. Even the fast express-trains, with their luxurious appointments and vestibule connections, are subject to the excessive and disagreeable motions even on straight portions of the better roads.

One object of this invention is to prevent all unnecessary lateral motion of the ends of cars made up in a train and yet permit the required independent lateral motion of the ends on contiguous cars in a train when running on curved portions of the railroad-track.

Another object of this invention is to yieldingly limit the rocking or oscillating motion of the cars of a railroad-train automatically and thus secure more steady running cars, which can be run at high speed with less inconvenience to the passengers and with greater safety.

Another object of this invention is to secure a connecting-passage from one car to the next, so that an inclosed and safe corridor connects the cars of a train and communication between the cars may be had without exposure or danger, and another object of the invention is to so construct the ends of railroad-cars that the devices for limiting the lateral and the rocking motion of the car-body and the devices for securing a continuous inclosed passage from car to car are always in the position for coupling any two cars together. The problem is to so connect the cars in a railroad-train that the trucks and the car-wheels can freely adapt themselves to the levels and curves of the rails, while all lateral motion of the cars and the rocking or transverse oscillating motion of the car-bodies is yieldingly resisted and all excessive motion prevented. One form of construction by means of which I propose to accomplish this end is illustrated in the annexed drawings, in which—

Figure 1 is an elevation of the end of a railroad-car body provided with my improvement, showing the open end of the connecting-passage. Fig. 2 is a perspective view, partly in section, showing the pivoted platform extension. Fig. 3 is a horizontal plan view of the end platforms of two adjacent cars connected together by two pivoted bars, illustrative of the manner in which excessive horizontal lateral motion of the ends of the cars is prevented while free articulating motion of the cars is secured. Fig. 4 is a top view of the ends of two adjacent cars in the position when about to be coupled and connected by my im-

proved vestibule connection. Fig. 5 is a horizontal view, partly in section, of the ends and connection between the ends of two adjacent cars on a plane above the floors of the cars, showing the cars in the position when the ends of the connecting-plates touch and before the cars are coupled together. Fig. 6 is a horizontal view, partly in section, of the ends of two cars provided with my improvements shown in the normal position when the cars are coupled together and when running on a straight track. Fig. 7 is a bottom view of two cars provided with my improvement, showing the positions of the hinged connecting-plates when the two plates are extended outward and cover nearly the largest distance between the ends of the platforms. Fig. 8 is a vertical longitudinal cross-section through the axial line of the cars of the adjacent end platforms of two cars, showing the hinged connecting-plates.

The problem intended to be solved by the present invention is illustrated in Fig. 3, in which *a a'* indicate the end platforms of two adjacent cars. *b* is a bar, one end of which is pivotally connected at *c* with the transverse end beam of one of the car-platforms, the other end being pivotally connected with the head of the spring-buffer *d*, secured to the transverse beam of the other car. *e* is a similar bar placed below the bar *b*, one end connected pivotally with one car and the other end with the head of the spring-buffer *d'*, secured to the other car. Considering now the two cars connected by any one of the coupling devices or draw-bars, it will be seen that this connection, by means of the pivoted bars *b* and *e*, is perfectly flexible and that the cars can readily adjust themselves to any curves. If the car *a* is the forward car and enters a curve while the car *a'* is on the tangential straight line, the end of the car *a* will move in the direction of the arrow X, and this movement will be yieldingly resisted by the spring-buffer *d'* acting against the bar *e*, and when the end of car *a'* moves laterally in the direction of the arrow Z the motion will be yieldingly resisted by the spring-buffer *d*, and thus the sudden and excessive lateral motion prevented. If now the same connection between the two ends of adjacent cars is made at the upper part of the car, preferably the hood, which usually extends over the end platforms, the independent transverse rocking motion of the cars is also resisted yieldingly by the spring-buffers, and the bodies of a train of cars are held against excessive and independent lateral and oscillating motion.

The form which I have adopted for carrying my invention into practical use differs in construction, but not in operation, from the illustration shown in Fig. 3, and this form, which I will now proceed to describe more fully, may be modified in the details of construction without materially changing the operation and the beneficial results.

In the drawings, 4 indicates the transverse beam forming the end of the car, or, as used in the usual construction of passenger-cars, the end of the car-platform; 5, the floor of the car; 6, the stairs; 7, doors by which a portion of the platform is closed to form a vestibule; 8, the outer walls of the car. Each end of the car is provided with the wedge-shaped plate 9, the outer edge of which extends downward to form the face-plate 10. The narrow end of the plate 9 is pivoted to the transverse beam 4 at 11, and in the drawings is shown as pivoted on one of the stanchions 12, which connect the car-platform with the overhanging hood 13. The plate 9 may be hinged or pivotally connected to the end of the car or the end face of the transverse beam 4, similar to the hinged connection of the bars *b* and *e* at *c*, Fig. 1, or in any other similar practical manner. In Fig. 1 the face 10 of the plate 9 is extended down and under the transverse beam 4 and is pivoted above and below the same to the stanchion 12, which is also shown in Fig. 8 on an enlarged scale.

The spring-buffer rod 14 is pivotally connected with the inside of the vertical face 10 of the plate 9. The spring 15 bearing against a collar on the rod 14 acts to push against the plate 9 so as to swing outward, but the plate 9 may be secured, when the car end is disconnected, by inserting a pin into the hole 16 and a hole in the platform. The plate 9 is provided with the projecting bar 17, the end of which bears against the head of the spring-buffer 18. When the cars approach each other to be coupled, the ends of the bars 17 are nearly in touch with the heads of the spring-buffers 18, as shown in Figs. 5 and 7, and when the cars are coupled together the ends of bars 17 bear against the heads of the spring-buffers 18 and partially compress the springs, as is shown in Fig. 6, and in this position the buffer-springs 15 are also partially compressed. The cars when so connected are free to adjust themselves to any curves on which the train may run, but all motions pivotal or lateral are yieldingly resisted by the springs 15 and the spring-buffers 18. The faces 10 of the plates 9, are never at right angle to the axial line through the center of the cars, but at an angle to that line, so that the lateral motion of either end of the car, which carries the plate 9 away from the buffers 18, acts like two wedges driven from opposite ends and is resisted by the friction on the faces 10 of the plates 9 held in contact with each other by the buffer-springs 15. All excessive lateral or side motion of the ends of the cars is yieldingly resisted by the combined actions of the springs 15 and the spring-buffers 18. By applying the same arrangement to the upper portion of the cars as is shown in Fig. 4 the disagreeable independent oscillating and excessive lateral motion is entirely avoided, while, when the arrangement described is only applied to the base or platform

of the cars, these disagreeable transverse motions are materially reduced and the whole train of cars runs with much greater steadiness than was possible with the older form of connections. Having thus provided a flexible extension of the car platforms or floors and also of the roofs, a flexible connection on each side of the passage so formed is made by connecting the hinged floor-plate 9 with the hinged roof-plate 9′ by the rod or stanchion 19, and a corrugated flexible curtain is secured to the stanchion 12 and the stanchion 19, extending sufficiently beyond the stanchion 19 to form an inclosing wall on one side, which, when two cars are connected, forms with the curtain 20 of the other car an inclosed passage between the cars. The roof-plate 9′ has the face-plate 10′ and the extension 17′, and this extension 17′ bears on the head of the spring-buffer 18′ in the same manner as these parts act on the floor-plate 9, the roof-plate being preferably somewhat arched so as to form an arched roof for the connecting-passage.

A train of railroad-cars provided with my improvement, while sufficiently flexible to pass around any curves or reverse curves, will be far more steady than such a train as now connected, the rocking motion of the cars, which makes the walking through the cars so difficult and which creates the nauseating car-sickness, will be avoided and travel, particularly for ladies and invalids, made much more comfortable and enjoyable.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination with the end of a car, of a buffer-head adapted to yieldingly resist transverse strain, and a thrust-bearing projecting from the car end; the buffer-head and thrust-bearing separated from and not coöperating with each other, but constructed to bear against and coöperate with the buffer-head and thrust-bearing of an adjacent car, when two cars are coupled together, as described.

2. The combination with the ends of a car, of an upper and lower buffer adapted to yieldingly resist transverse strain, and upper and lower thrust-bearings projecting from the car end, the buffers and thrust-bearings separated from and not coöperating with each other, but constructed to bear against and coöperate with the buffers and thrust-bearings of an adjacent car, when two cars are coupled together, whereby independent oscillating motion of the cars is yieldingly resisted, as described.

3. The combination with the ends of a railroad car-body, of thrust-plates pivotally secured near one of their ends to the ends of the platform and roof of each car and disconnected from the adjacent car, substantially as described, adapted to bear against lateral buffers on an adjacent car to resist the excessive independent lateral and transverse rocking motion of the cars when the cars are made up and running as a train.

4. The combination with the end of a railway-car, of a plate, pivotally secured to the transverse end sill of the car near one of its ends, adapted to form a wedge-shaped extension of the car end, and a lateral buffer secured to the end sill constructed to bear against the end of the wedge-shaped extension, as described.

5. The combination with the ends of two adjacent cars when made up in a train, of two plates, each pivotally secured to the transverse end sills of a car near one of their ends, and lateral buffers constructed to bear against the free ends of the plates, adapted to form the floor connection between two cars, as described.

6. The combination with the end of a railway-car, of a plate pivotally secured near one end to the car, and a flexible and extensible curtain, connected to the other end of the pivoted plate and to the car, adapted to form an inclosed passage between two cars when coupled together, as described.

7. The combination with the end of a railway-car, of a plate pivoted near one end to the car, a spring-buffer the rod of which is connected with the plate, and a flexible extensible curtain, secured to the free end of the plate, adapted to form an inclosed passage between the cars when the cars are coupled together in a train, as described.

8. The combination with the end of a railway-car, of a floor-plate and a roof-plate each pivotally secured near one of their ends to the end of the car, a stanchion connecting the floor and the roof-plates near their free ends, a flexible and expansible curtain connected with the car and the stanchion, and a spring-buffer, the whole adapted to form, when the cars are made up in a train, an inclosed vestibule connection between the cars, as described.

9. The combination with the end of a railway-car, of a floor-plate pivoted to the car at one end, the opposite end adapted to swing outward, a vertical face-plate on the outer line of the floor-plate, and a buffer the rod of which is connected with the face-plate all arranged to form, when two cars are coupled together, the floor connection between two cars, and a flexible buffer, as described.

10. The combination with the two ends of two adjacent cars of a railway-train, of floor-plates each pivotally connected at one end to a car, a spring-buffer connected with each floor-plate to push the free end of the floor-plate outward, and a buffer secured to the end of each car, each buffer arranged to bear against the end of the floor-plate of the adjacent car; the whole adapted to form the floor connection between two cars and to resist excessive independent lateral motion of the cars, as described.

11. The combination with the end platforms of cars connected in a train, and lateral thrust-

resisting devices secured to and projecting beyond the ends of the platforms, of mechanism pivotally secured to the ends of the platforms and adapted to swing outward, whereby the free end of the mechanism, pivotally connected to one car, bears against the lateral thrust-resisting device of the adjacent car, and excessive lateral motion of the car ends is yieldingly resisted, as described.

12. In railway-cars, in combination the following instrumentalities, buffer-plates pivoted near one end to the end of the car, floor extensions forming a passage from one car to the adjacent car, when cars are coupled together, and lateral thrust-resisting devices projecting beyond the ends of the cars, whereby when two cars are coupled together the free ends of the buffer-plates of each car engage with the lateral thrust-resisting devices of the other car, a continuous passage is formed and excessive lateral motion of the ends of the cars is yieldingly resisted, as described.

13. The combination with the end of a railway-car, of the plate 9, pivotally secured near one end to the end sill of the car, adapted to form a flexible extension of the car and, when cars are coupled together, a floor connection between two cars.

14. The combination with the end of a railway-car, of the plate 9 pivoted at one end to the end sill of the car, the buffer-rod 14, the spring 15 and face-plate 10 adapted, when two cars are coupled together, to form a floor connection between the cars.

15. The combination with the ends of railway-cars and the plate 9, pivoted at one end to the end sill of the car, provided with the face-plate 10, of the buffer-rod 14 and spring 15 adapted to swing the free end of the plate 9 outward, and the buffer 18; the whole adapted, when two cars are coupled together, to form a floor connection between the cars and resist excessive lateral motion of the cars.

16. The combination with the ends of railway-cars, of the plates 9 and 9′ pivotally secured near one end to the end frames of the car, the stanchions 12, the stanchion 19, secured to the free ends of the plates 9 and 9′, the extensible curtain 20, and buffers for pressing the plate 9 outward; the whole adapted to form, when two cars are connected together, an inclosed passage between the cars.

17. The combination with the ends of railway-cars, of the hinged plates 9 and 9′, the face-plates 10 and 10′, the buffer-rods 14 and springs 15, the end bars 17 and 17′, the stanchions 19 and 12, and the extensible curtains 20 adapted to form, when cars are connected together in a train, an inclosed passage between the cars, and a flexible connection adapted to resist excessive independent lateral and transverse rocking motion of the cars.

18. The combination with the end platforms of railway-cars, the vestibule-doors, the hoods 13 extending over the end platforms, and the stanchions 12, of the floor-plates 9, the roof-plates 9′, the stanchions 19, the extensible curtains 20, the end bars 17 and 17′, the lateral buffers 18 and 18′, and buffers acting to extend the curtains and plates beyond the ends of the car-platforms; the whole adapted to form, when cars are connected to form a train, a vestibule extension and a continuous inclosed passage between the cars, as described.

In witness whereof I have hereunto set my hand.

JOSEPH A. MILLER.

Witnesses:

JOSEPH A. MILLER, Jr.,

M. F. BLIGH.