July 22, 1958 A. M. MIERS ET AL 2,844,106

STABILIZER FOR SELF-ENERGIZED MULTIPLE-UNIT RAILROAD CAR TRAINS

Filed Nov. 18, 1953 5 Sheets-Sheet 1

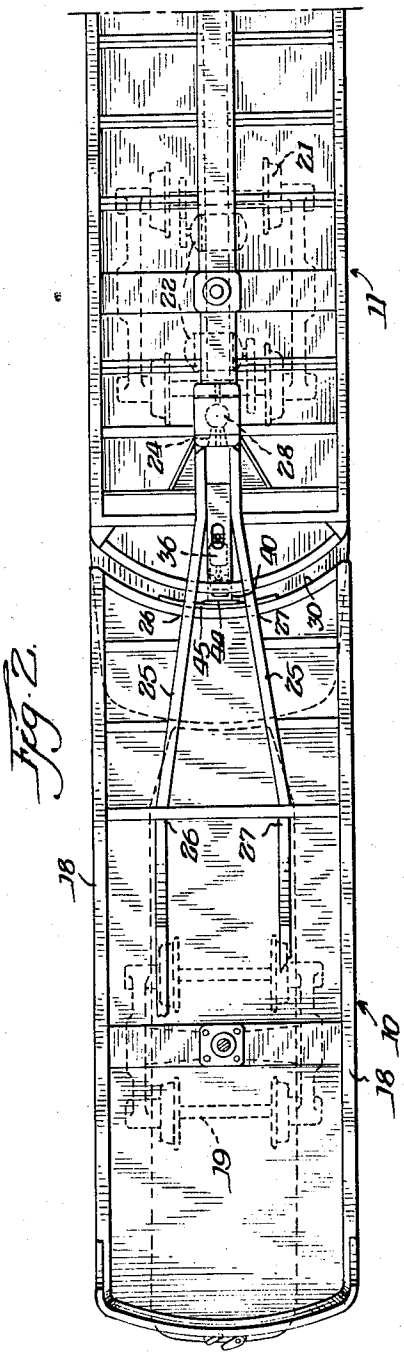


Fig. 2.

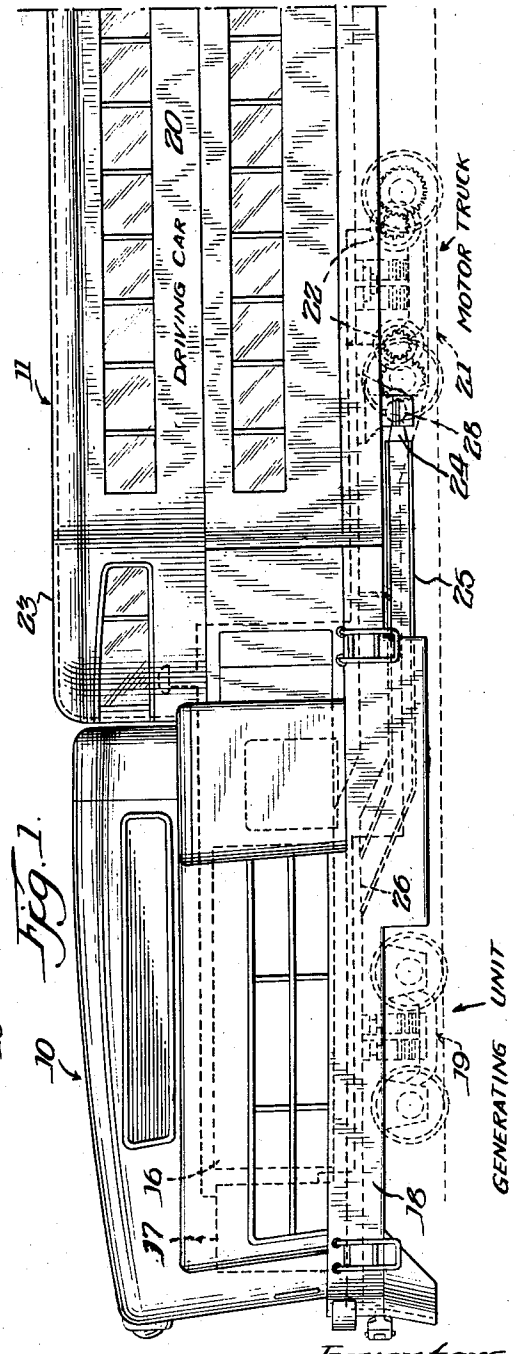


Fig. 1.

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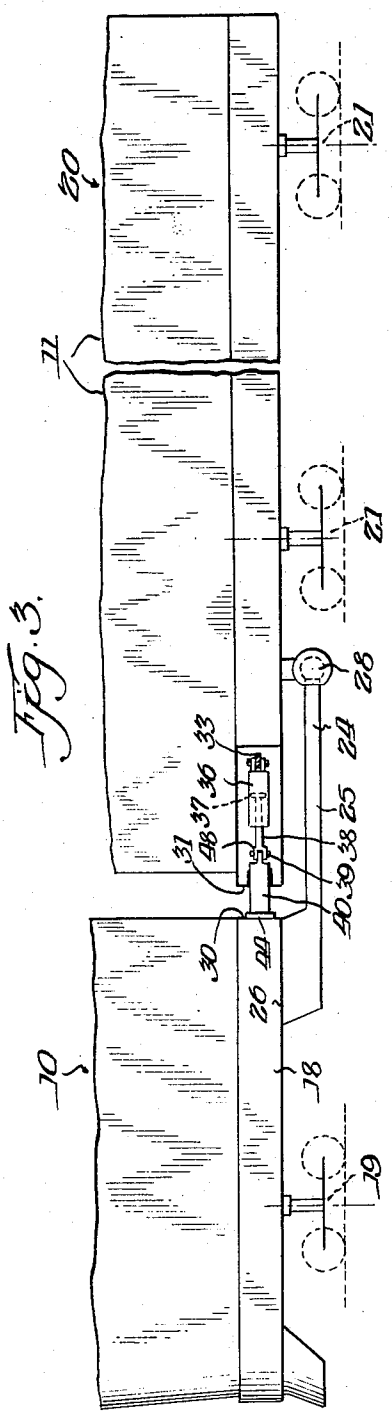


Fig. 3.

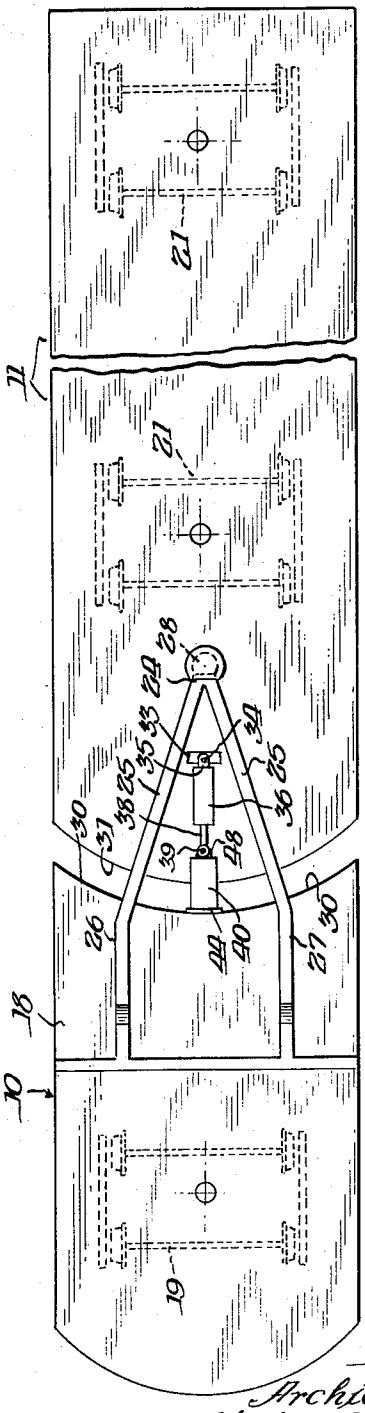


Fig. 4.

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Fig. 5.

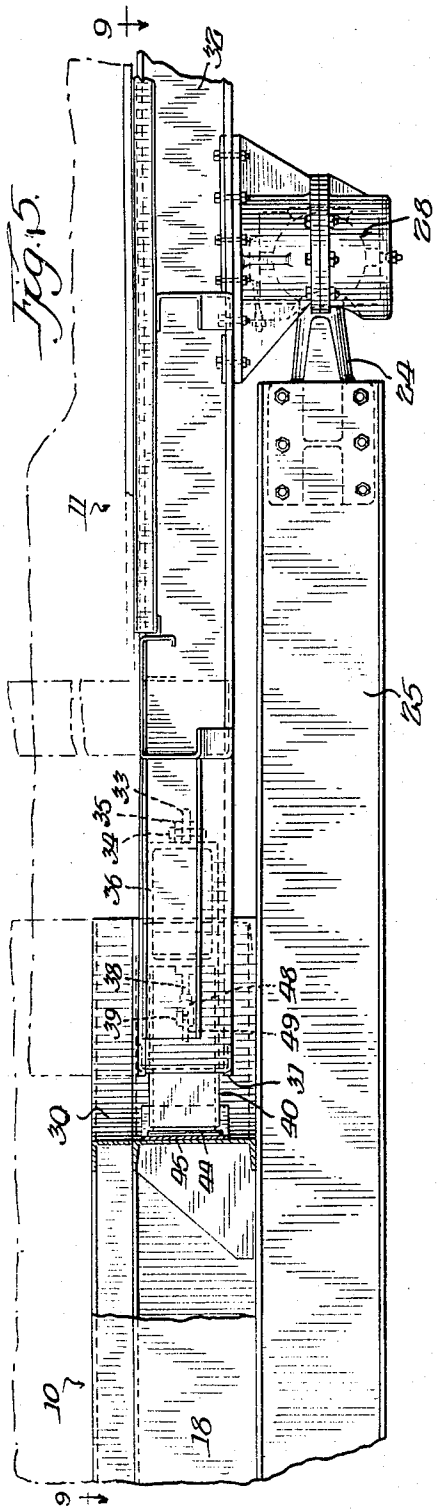
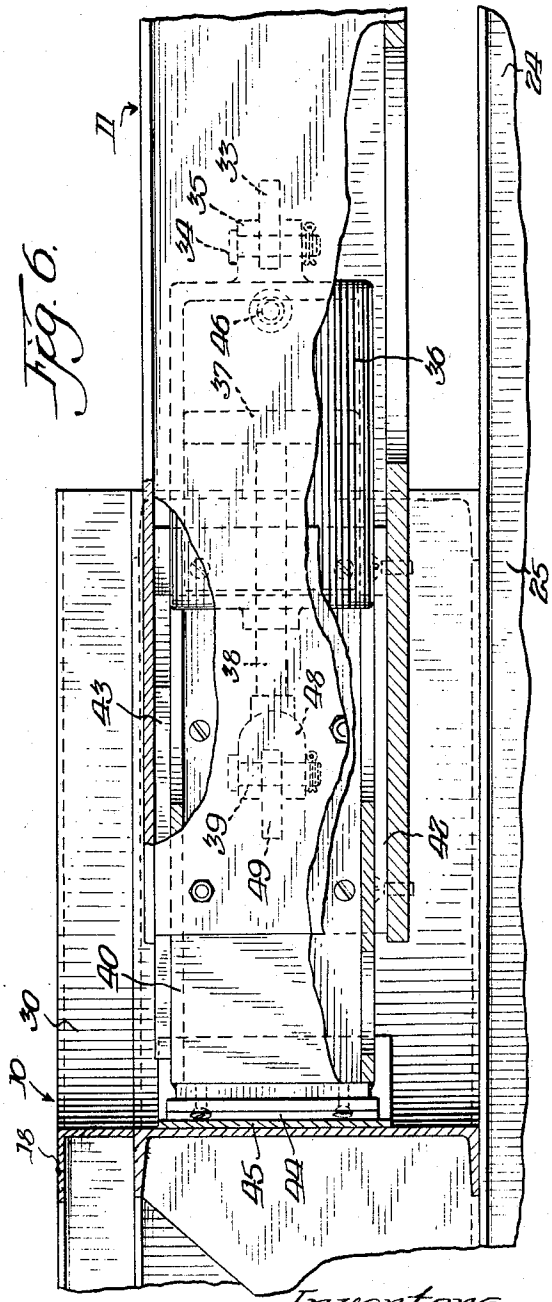


Fig. 6.



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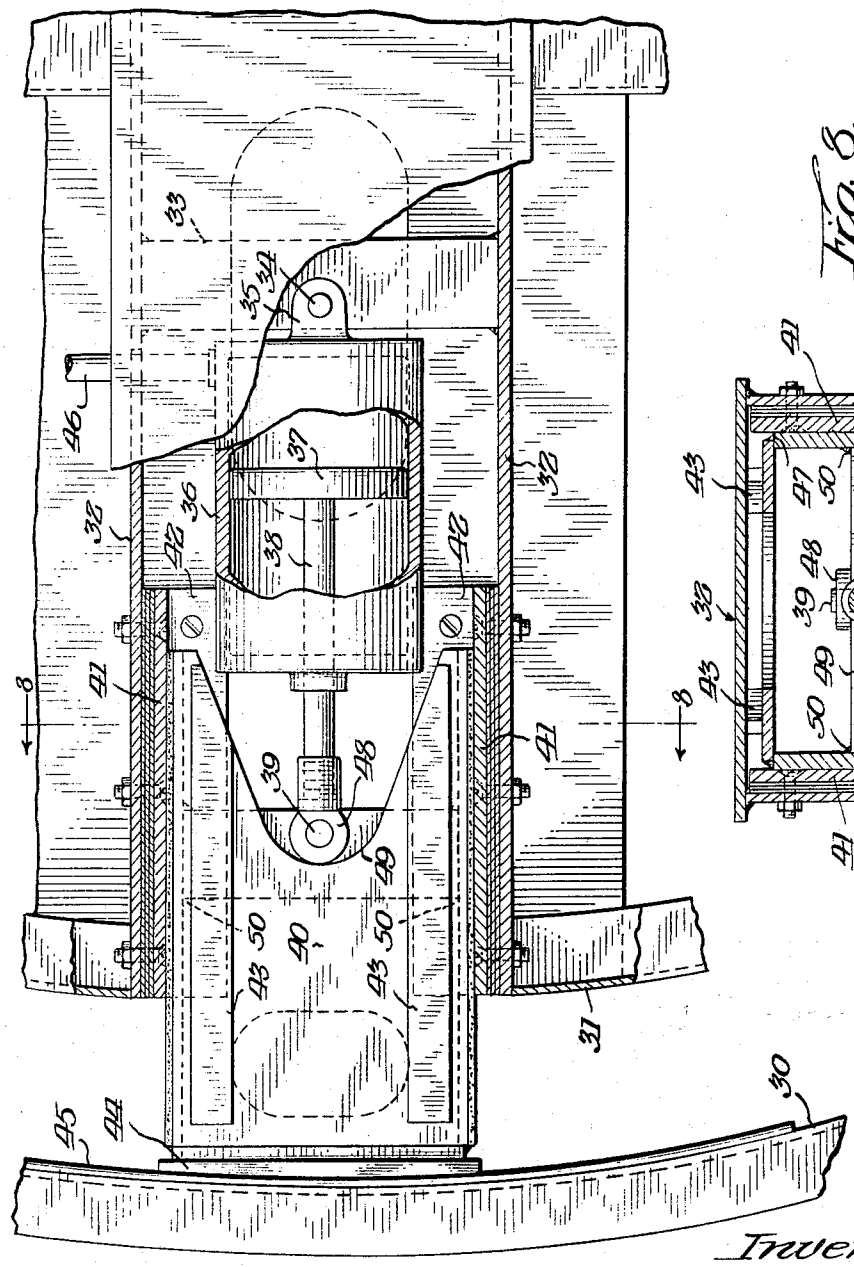


Fig. 7.

Fig. 6.

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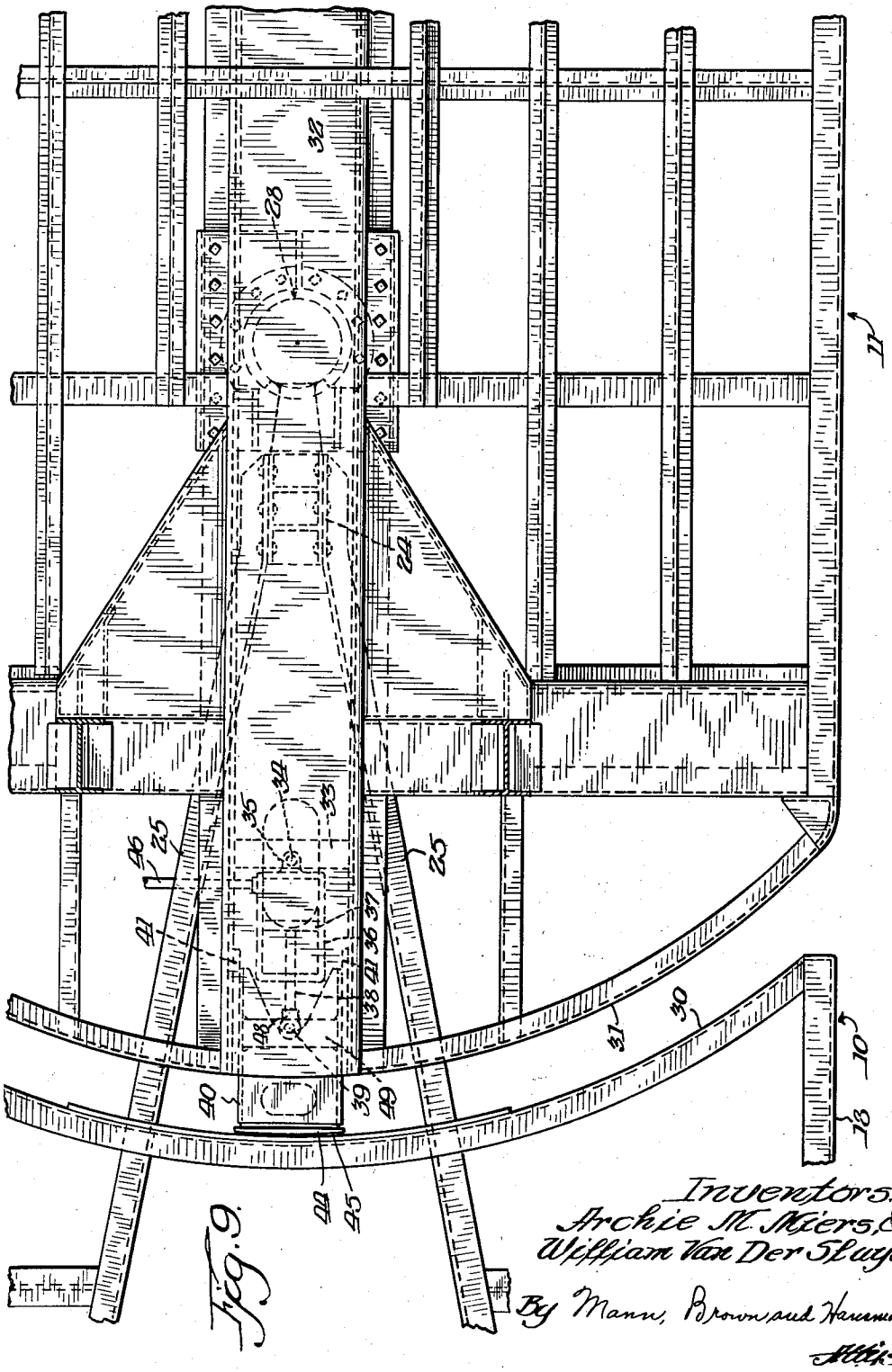


Fig. 9.

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United States Patent Office 2,844,106 Patented July 22, 1958

2,844,106

STABILIZER FOR SELF-ENERGIZED MULTIPLE-UNIT RAILROAD CAR TRAINS

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Application November 18, 1953, Serial No. 392,884

10 Claims. (Cl. 105—3)

The most annoying characteristic of modern railroad cars is the tendency to oscillate about a vertical axis which gives a violent lateral motion to the ends of the car. The principal object of this invention is to prevent that oscillation, particularly in self-energized multiple-unit railroad car trains.

Generally speaking, this is accomplished by curving adjacent portions of the car units and providing friction buffer means between them constantly resisting the tendency to oscillate with strong but yielding pressure.

Further objects and advantages of the invention will be apparent as the description is read in connection with the accompanying drawings, in which:

Fig. 1 is a side elevation of a generator unit and portion of a driving car unit equipped with means embodying the invention;

Fig. 2 is an inverted plan view of Fig. 1 with the trucks indicated in broken lines;

Fig. 3 is a diagrammatic side elevation corresponding to Fig. 1 emphasizing the connection between the two units and the stabilizing buffer;

Fig. 4 is an inverted plan view corresponding to Fig. 3;

Fig. 5 is an enlarged side elevation showing adjacent portions of the car unit frames, the connection between them, and the buffer means;

Fig. 6 is a vertical section along the center line of the car with parts broken away;

Fig. 7 is an enlarged plan view of the buffer means with parts broken away;

Fig. 8 is a vertical cross-section on the line 8—8 of Fig. 7; and

Fig. 9 is a horizontal section on the line 9—9 of Fig. 5.

But these diagrammatic drawings and the description are for the purpose of illustrative disclosure only, and are not intended to impose unnecessary limitations on the claims.

In the drawings, a generating unit and a driving car unit are respectively indicated generally by **10** and **11**.

As best shown in Fig. 1, the generating unit includes a prime mover **16** driving an electric generator **17** both mounted on a frame **18** carried by wheeled truck means **19**.

The driving car unit **11** in this illustrative embodiment includes a two-level and double-deck coach body **20** mounted on and carried by trucks **21** having traction motors **22** energized by current from the generating unit and delivered to the motors through suitable means chosen from those familiar to the art.

The general arrangement corresponds to that disclosed in the copending application of Gray et al. Ser. No. 378,562, filed September 4, 1953, the disclosure of which is incorporated herein by reference.

The connection between the generating unit **10** and the driving unit **11** is here shown as including a forked coupler tongue **24** having arms **25** connected to the frame **18** of the generating unit at **26** and **27**, and connected to the frame of the driving car unit by ball and socket joint generally indicated at **28**.

It will be apparent from Figs. 2, 3, and 4 that the ball joint connection **28** between the driving car unit **11** and the coupler tongue **24** is located forwardly of the center plate connection of the forward supporting truck **21** for the driving car. Thus when the train of the present invention is traversing curved track, the ball joint connection **28** is displaced outwardly with respect to the track centerline and the coupler tongue becomes more nearly tangentially aligned with respect to the track portion that is being traversed by the single supporting truck **19** of the generator unit.

Since the generator unit has only one supporting truck, the reaction between the coupler tongue **24** and driving car unit delivers an important steering action to the generator unit. The fact that the ball joint connection is located endwise of the forward truck results in a more stable steering action on curved track. It is contemplated, moreover, that the truck **19** of the generator unit may be non-tractive in which case the stability of the supplemental steering action described above becomes even more important.

As shown in Figs. 2, 4, 7, and 9, the rear end of the generating unit is concave, as indicated at **30**, represented by a sill structure curved on a radius from the center of the ball joint **28**. The front end of the driving car unit is convex, as indicated at **31**, and is represented by a sill curved on a radius from the same center, and the two curved surfaces are spaced apart.

The framing shown somewhat in detail is deemed sufficient for car builders without specific description.

As shown in Figs. 5, 6, 7, 8, and 9, **32** indicates center sills of the driving car; **33** a cross member between the sills; **34** a pin connecting the fork **35** of an air cylinder **36** with a cross member **33**. The cylinder **36** is provided with a piston **37** and a piston rod **38** pivoted at **39** to a boxlike thrust member **40** running between the center sills, where they are provided with brake lining or the like **41** and supported on runners or rails **42** and held from vertical movement by overhead strips **43**.

The front of the thrust member **40** is fitted with a bronze wear shoe **44** urged against and frictionally engaging a manganese steel wear plate **45** on the sill **30**.

Air pressure for operating the piston **37** is taken by a pipe **46** from the main reservoir, which has air under pressure on the order of 125 to 140 pounds per square inch.

The boxlike thrust member **40** is made of plates welded at the corners **47**.

The piston rod **38** has a forked eye **48** astride a stout bar **49** welded to the thrust member at **50**.

The connection between the generating unit and the driving unit has to allow universal pivotal movement and some rotation between them after the manner of torsion in order to take all the relative movements between the two units in passing over vertical and horizontal curves in the track, elevations at curves, and unavoidable movements over rail joints and crossings.

The buffer takes care of all the slack by providing strong but yielding pressure between the two units, tending at all times to separate them, whereas the connection tends at all times to hold them together.

The pressure between the shoe **44** and the wear plate **45** is approximately constant, but, of course, must yield when the connection is bent upwardly and must recover when it returns to normal or is bent downwardly.

The strong and yielding pressure between the shoe **44** and the plate **45** constantly resists the tendency to oscillate and maintains substantially stable conditions in the units.

The damping action of the buffer arrangement whereby oscillations about a vertical axis are eliminated cooperates with the steering action of the coupler tongue since it causes the units to seek out and maintain their intended alignment when rounding curves. The ball joint connection is located at the point that gives the most effective steering action and the buffer holds the units in their intended alignment in order to take advantage of this

pre-selected optimum mounting location for the coupler tongue.

The heavy generating unit has sufficient inertia to offer appropriate resistance to the oscillation of the driving unit through the contact between the shoe **44** and the plate **45** when urged together by the piston **37**.

The interlocking adjacent curved ends of the units cooperate with the pressure between the shoe **44** and the plate **45** to effect the stabilization.

Long travel springs of steel or rubber may be used instead of air pressure, but the latter is preferred because of its fairly constant action and also the ease with which it can be released and applied when the units are to be uncoupled or coupled.

We claim:

1. In a self-energized, multiple-unit car train, a driving car unit including a wheeled frame, a separate generating unit including a wheeled frame, a propelling connection between said driving car unit and said generating unit, said connection being rigid with said generating unit, a ball and socket joint pivoting said connection about a center on the driving car unit, a concave sector member on the generating unit curved in a horizontal plane about said center, a convex segment member on said driving car unit curved in a horizontal plane about the same center and received within said concave sector, and a resilient buffer including a wear shoe on one of said units pressed against the said curved member on the other unit.

2. In a self-energized, multiple-unit car train, a driving car unit including a wheeled frame, a separate generating unit including a wheeled frame, a propelling connection between said driving car unit and said generating unit, said connection being rigid with said generating unit, a ball and socket joint pivoting said connection about a center on the driving car unit, a concave sector on the generating unit curved in a horizontal plane about said center and including a wear plate, a convex segment on said driving car unit received within said sector and spaced from the wear plate, and a buffer on said driving car including a wear shoe and yielding means urging said wear shoe against said sector.

3. In a self-energized, multiple-unit car train, a driving car unit including a wheeled frame, a separate generating unit including a wheeled frame, a propelling connection between said driving car unit and said generating unit, said connection being rigid with said generating unit, a ball and socket joint pivoting said connection about a center on the driving car unit, a concave sector on the generating unit curved in a horizontal plane about said center and including a wear plate, a convex segment on said driving car unit received within said sector and spaced from the wear plate, and a buffer on said driving car including a wear shoe and pneumatic means urging said wear shoe against said sector.

4. In a self-energized, multiple-unit car train, a driving car unit including a wheeled frame, a separate generating unit including a wheeled frame, a propelling connection between said driving car unit and said generating unit including a longitudinal element rigid with said frame of the generating unit, a ball and socket joint pivoting said connection about a center on the driving car unit, a concave sector member on the generating unit curved in a horizontal plane about said center, a convex segment member on said driving car unit curved in a horizontal plane about the same center and received within said concave segment, and a resilient buffer including a wear shoe on one of said units pressed against the said curved member on the other unit.

5. In a self-energized, multiple-unit car train, a driving car unit including a wheeled frame, a separate generating unit including a wheeled frame, a propelling connection between said driving car unit and said generating unit including a longitudinal element having a plurality of points of rigid connection with the frame of the generating unit, a ball and socket joint pivoting said connection about a center on the driving car unit, a concave sector member on the generating unit curved about said center, a convex segment member on said driving car unit curved about the same center and received within said concave sector, and a resilient buffer including a wear shoe on one of said units pressed against the said curved member on the other unit.

6. In a self-energized, multiple-unit car train, a driving car unit including a wheeled frame, a separate generating unit including a wheeled frame, a propelling connection between said units said connection being rigid with one of said units, a ball and socket joint pivoting said connection about a center on the other of said units, a concave surface on one of said units curved in a horizontal plane about said center, a convex surface on the other of said units curved in a horizontal plane about the same center and received within said concave surface, and a resilient buffer including friction means on one of said units pressed against the said curved surface on the other unit.

7. In a multiple-unit car train having a propelling connection between adjacent units of said train, the improvement wherein said propelling connection between said units is rigid with one of said units, a ball and socket joint pivoting said connection about a center on the other of said units, one of said units having an arcuate surface curved in a horizontal plane about said center, and a resilient buffer including friction means mounted on the other unit and pressed against the said curved surfaces.

8. In a multiple-unit car train having a rigid coupler connected between adjacent units of said train, the improvement comprising one car unit having a frame mounted on a single truck, an adjacent car unit having a frame supported on a plurality of trucks, said rigid coupler being rigidly connected to one of said units, a ball and socket joint pivoting said connection about a center on the other of said units, one of said units having an arcuate surface curved in a horizontal plane about said center, and a resilient buffer including friction means engaging said arcuate surface, said buffer being mounted on the other of said units to act along a line passing through said center and press said friction means against said arcuate surface.

9. A multiple-unit car train comprising a forward car unit having a frame pivotally mounted on a single truck, a rearward car unit having a frame pivotally supported at spaced points on a plurality of trucks, a rigid coupler rigidly connected to the frame of one of said units, a ball and socket joint pivoting said coupler to the frame of the other of said units, said coupler being connected to said rearward car unit at a point spaced forwardly a substantial distance from the point of support between the frame of said rearward car unit and its forward supporting truck.

10. A multiple-unit car train as defined in claim 9 wherein the ball and socket joint between said coupler and the other of said units constitutes a center, one of said units is formed with an arcuate friction surface curved in a horizontal plane about said center, and a resilient buffer including friction means engaging said friction surface is mounted on the other unit to act along a line passing through said center and press said friction means agaist said arcuate surface.

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