May 24, 1955 F. E. VAN ALSTINE 2,708,887

TRAILER-TYPE RAILWAY TRAIN

Filed July 28, 1953 2 Sheets-Sheet 1

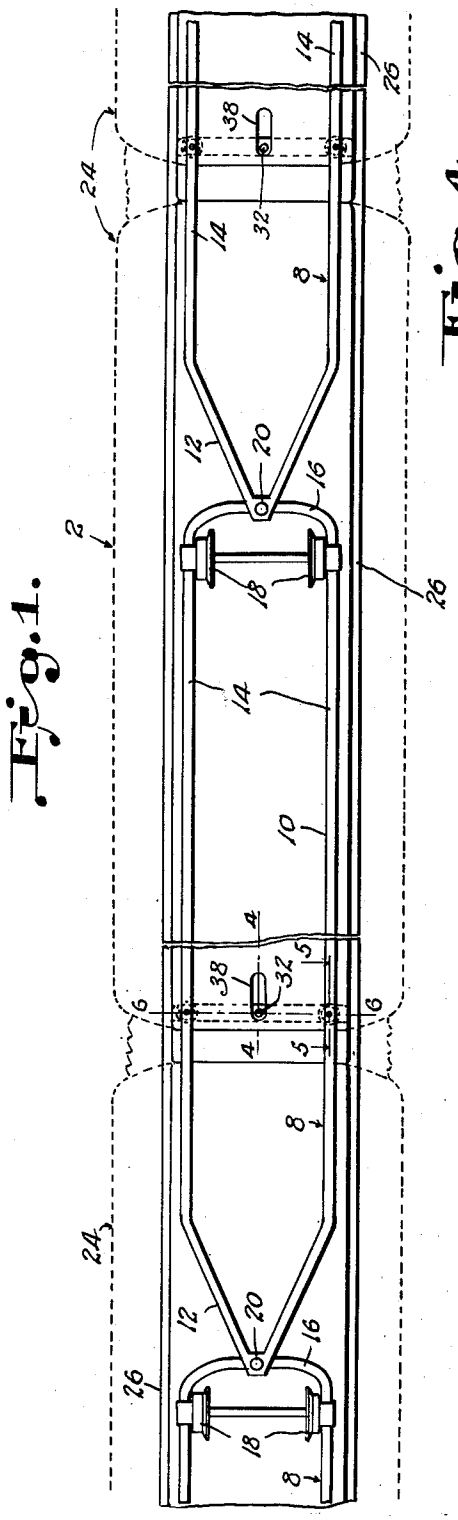


Fig. 1.

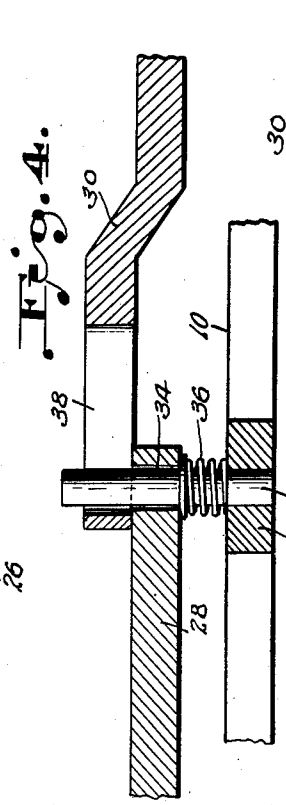


Fig. 4.

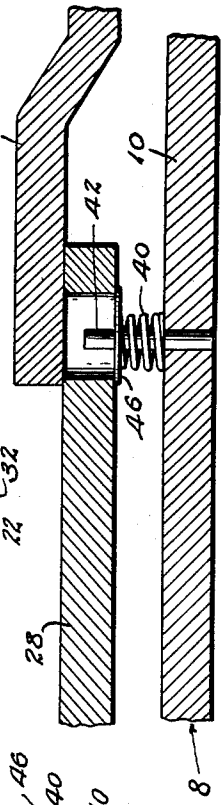


Fig. 5.

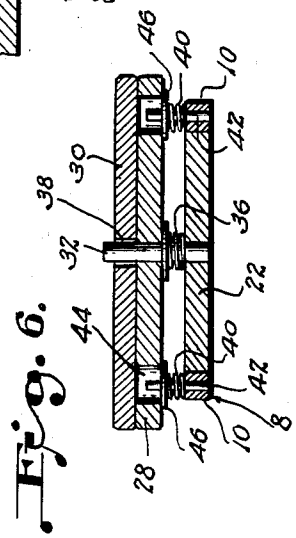


Fig. 6.

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TRAILER-TYPE RAILWAY TRAIN

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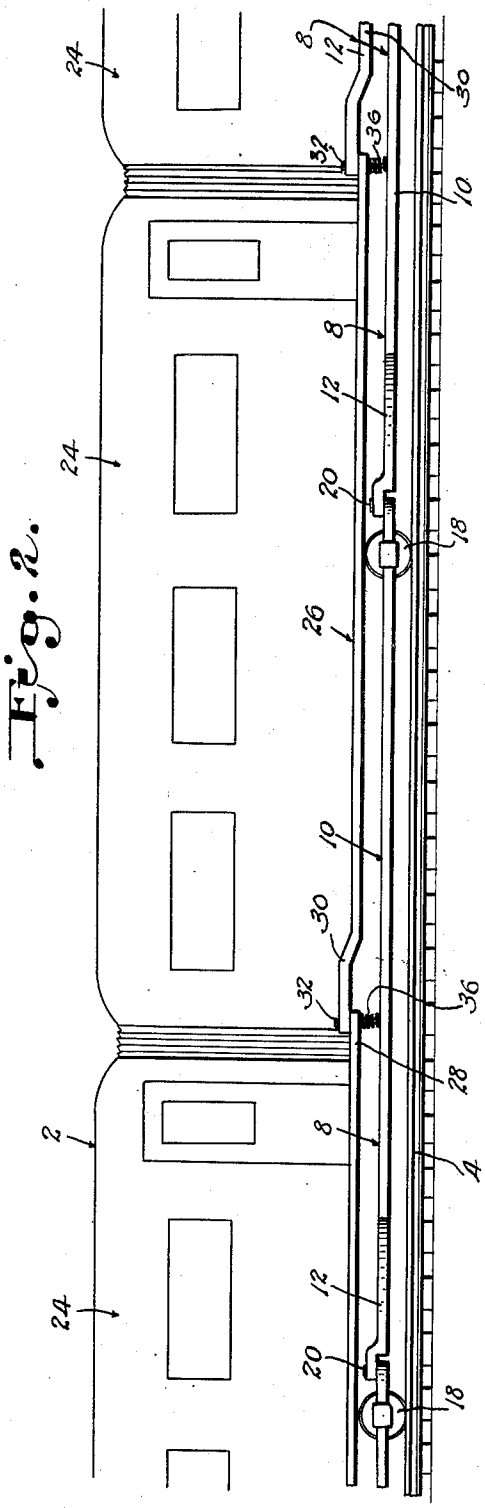


Fig. 2.

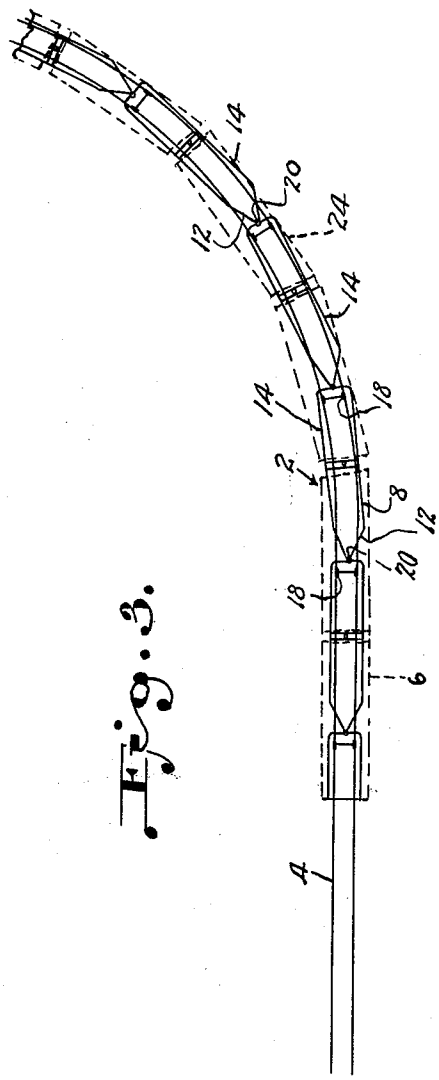


Fig. 3.

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United States Patent Office 2,708,887 Patented May 24, 1955

2,708,887

TRAILER-TYPE RAILWAY TRAIN

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Application July 28, 1953, Serial No. 370,897

8 Claims. (Cl. 105—3)

This invention relates to railway trains of the articulated trailer type and, more particularly, to trains in which at least some of the adjacent cars are supported by a single pair of wheels or trucks.

In modern high speed, light weight trains, it has been found that one set of wheels or trucks can be eliminated by a fifth wheel suspension of one end of one car on the adjacent end of the next. Benefits resulting from the savings in weight are, to some extent, offset by the tendency of trailer type cars to whip, roll and side-sway, particularly on curves, and to react more readily to all irregularities and inequalities of the track and road bed than heavier equipment. The object now is to provide a chassis and car body assembly for trailer type railway cars to permit the car bodies to pass curves in the track on a shorter radius than the path of the chassis and trucks, and to move the center of gravity of the cars transversely of the track and inwardly of the curve, thereby reducing the hazards of rounding curves at optimum speeds, and to reduce the moment of movement transmitted to the cars by curves and inequalities of the track.

In accordance with the above object, it is intended now to provide a train having a series of chassis connected trailerwise, i. e., a chassis having a single pair of wheels or trucks at one end with the other end fifth-wheel supported on the adjacent end of the next chassis, and a car body, instead of resting directly over a single chassis, having its opposite ends pivotally supported at or adjacent the midde of two adjacent chassis so that the mid-portion of the body overlies the connection between the chassis. Thus, in going around a turn the chassis will (as to the cars of the present trailer type trains) form two sides of an isosceles triangle but the car body will form the base of the triangle. In order to compensate for changes in the effective length of between the points of body supports on the adjacent chassis and the supported points of the car body, it is intended to provide a lengthwise lost-motion connection between an end of a car body and the underlying chassis. And by suspending the cars in such manner that the articulated ends of each car (except the first and last cars of the train) are supported upon and at or near the longitudinal center of the chassis, causing the chassis frame to operate as a fulcrum whereby the lateral and vertical movements of the trucks are transmitted to the cars in reduced form, and the shocks and moment thereof are partially absorbed by the resilience of the chassis frame, whereby the riding qualities of the cars are improved.

These and other objects will be apparent from the following specification and drawings, in which:

Fig. 1 is a plan diagram of a train embodying the principle of my invention;

Fig. 2 is a side elevation of a portion of the train diagrammed in Fig. 1;

Fig. 3 is a diagram illustrating the principle of operation of the train while negotiating a turn; and

Figs. 4, 5, and 6 are sections taken along lines 4—4, 5—5, and 6—6, respectively, of Fig. 1.

Referring now to the drawings, in which like reference numerals denote similar elements the trailer-coach train illustrated generally at **2**, is shown stripped of virtually all details not essential to the operation of the invention. Train **2** runs on conventional tracks **4**, it being understood that the train may be drawn by a suitable locomotive, diagrammatically denoted at **6**.

Train **2** includes a series of trailer chassis **8**, each including a frame **10** preferably having a tapered front end **12**, longitudinal side members **14**, and a blunt rear end **16**. A pair of wheels **18** support one end of each chassis **8**, and the other end of each chassis is pivotally coupled to and supported on the adjacent end of the next chassis by a fifth wheel connection **20**. The wheel supports are illustrated in simplest form, it being apparent that conventional trucks including one or more pairs of wheels may be used. The chassis, wheels, and couplings thus far described are, in all important respects, similar in general construction and operation to the undercarriage of those now coming into vogue, and are characterized favorably by their light weight and high speed, and unfavorably by their tendency for side motion on the turns.

The invention is concerned with the mounting of the car bodies **24** on chassis **8** so as to reduce lateral and vertical movement and avoid side-sway and whipping. Essentially, the ends of car bodies **24** are pivotally supported adjacent the mid-points of chassis **8** so that in turning, when two adjacent trailer chassis **8** form two sides of an isosceles triangle, a car body **24** supported between the chassis mid-points forms the base of the triangle. In its simplest form, the invention comprises a cross support **22** extending between longitudinal side members **14** of chassis frame **10** adjacent the mid-point between front and rear chassis ends **12** and **16**, respectively. While the exact location of the car ends with respect to the chassis mid-points is not critical, it is important that they be nearer the chassis mid-points than the chassis ends in order to obtain the desired triangle-base function.

Each car body **24** includes a floor indicated generally at **26** terminating at its rear end in a flat rearwardly projecting plate **28** and at its forward in a raised offset plate **30**. Each flat plate **28** is pivotally connected and supported on a cross support **22** by a pivot pin rigid with and extending upwardly from cross member **22** and rotatably extending through a hole **34** near the rear end of flat plate **28**, a compression spring **36** being preferably engaged between flat plate **28** and cross support **22**. Pivot pin **32** extends beyond hole **34** in flat plate **28** to engage in a fore-and-aft slot **38** in offset plate **30**, this arrangement being illustrative of a lost-motion coupling between the cars.

The overlapping corner portions of flat and offset plates **28** and **30**, respectively, are in the illustrated embodiment, supported by compression springs **40** in chassis **8** retained around pins **42** extending upwardly from longitudinal side members **14** of chassis frame **10**. In order to permit the necessary turning movements of the ends of car bodies **24** relative to one another and relative also to chassis **10**, the upper ends of pins **42**, as illustrated, extend freely into enlarged openings **44** near the corners of flat plate **28**, suitable bearing washers **46** being provided for the spring ends.

At the rear end of the train, a half length car would be suitably mounted in fixed position on the rear half of the rear trailer chassis, with the rear end of the car and chassis forming a common terminus.

In typical operation the train is assembled with suitable dollies or other temporary supports for the car bodies **24** as they are individually mounted on chassis **8** and interconnected as shown in Fig. 2, it being under-

stood that the train includes a suitable locomotive at the front end and a terminal car, preferably half length, at the rear end. Fig. 3 diagrammatically illustrates the action of the train on a turn, it being noteworthy that the ends of car bodies 24 do not take part in the extreme outward thrust of the fore portions of chassis 8 and that the car bodies 24 remain as bases for the triangles formed by the underlying chassis 8 as they round a turn. While an extreme example has been illustrated, it will be understood that a similar, if less pronounced, action occurs on all turns and slight wanderings of the track, the chassis 8 being free to work from side to side without counterpart action for the car bodies.

It will be apparent that the invention, when constructed for service, will include many of the various refinements presently known to those skilled in the art. Obviously, the floor construction may be altered, spring supports added where needed, the couplings may be variously designed, and snubbers or resilient bumpers may be added, where needed, between the chassis and cars.

The terms "lost motion" and "providing limited relative movement," as applied to the pivotal connection, are intended to cover various types of connections other than those providing only absolutely concentric rotation.

The invention is not limited to the details, but is intended to cover all modifications, substitutions and equivalents within the scope of the following claims.

I claim:

1. In a railway train, an adjacent pair of trailer-type chassis, one of said chassis including a truck of supporting wheels adjacent one end and a fifth wheel connection supporting the other end thereof on the adjacent end of the other chassis, a car body having a mid-portion overlying the fifth wheel connection, and pivotal connections supporting the ends of the car body respectively on mid-portions of said adjacent connected chassis one of said pivotal connections including means providing for limited relative movement between one end of the car body and the chassis on which it is connected.

2. In a railway train, an adjacent pair of trailer-type chassis, one of said chassis including a supporting truck adjacent one end and a fifth wheel connection supporting the other end thereof on the adjacent end of the other chassis, a car body having a mid-portion overlying the fifth wheel connection, and means including pivotal connections supporting the ends of the car body respectively on mid-portions of said adjacent connected chassis, one of said connections being of the lost-motion type to permit limited longitudinal movement between the elements connected thereby.

3. In a railway train, a plurality of trailer-type chassis in series, each of said chassis including a pair of supporting trucks adjacent one end and a fifth wheel connection supporting the other end thereof on the adjacent end of an adjacent chassis, a plurality of car bodies, means connecting said car bodies in series, each of said car bodies having a mid-portion overlying the fifth wheel connection between two adjacent chassis and pivotal connections supporting the ends of the car bodies respectively on mid-portions of said adjacent connected chassis, one of said pivotal connections including means providing for limited relative movement between one end of the car body and the chassis on which it is connected.

4. In a railway train, a plurality of trailer-type chassis in series, each of said chassis save at the end of the train, including a supporting truck adjacent one end and a fifth wheel connection supporting the other end thereof on the adjacent end of an adjacent chassis, a plurality of similar car bodies, each, save the last, having a mid-portion overlying the fifth wheel connection between two adjacent chassis, pivotal connections supporting one end of each car body on a mid-portion of one of said chassis, and a fifth wheel connection supporting the other end of each car body on the pivotally supported adjacent end of the next car body, at least some of said fifth wheel connections being of the lost-motion type to permit longitudinal movement between the elements connected thereby.

5. In a railway train, a plurality of chassis, pivotal connections connecting said chassis, in series, a car body having a mid-portion overlying the connection between adjacent chassis, and means including pivotal connections supporting the ends of the bar body on mid-portions of said adjacent chassis, at least one of said pivotal connections providing limited relative movement between the elements connected thereby to permit said train to operate on a curved track.

6. In a railway train, a series of trailer-type chassis, each of said chassis save at the end of the train, including supporting trucks adjacent one end and a fifth wheel connection supporting the other end thereof on the adjacent end of an adjacent chassis, a series of car bodies substantially equal in length to said chassis and each having a mid-portion overlying a fifth wheel connection, means supporting the ends of each car body on mid-portions of one of said chassis, and lost-motion means connecting said car bodies in series.

7. In a railway train, a series of trailer-type chassis, each of said chassis, save at an end of the train, including a supporting truck adjacent one end and a fifth wheel connection supporting the other end thereof on the adjacent end of an adjacent chassis, a series of car bodies generally similar to one another, each having a mid-portion overlying the fifth wheel connection between adjacent chassis, pivot means supporting similar ends of said car bodies on mid-portions of said chassis, and lost motion connections supporting the other ends of said car bodies on the pivotally supported ends of the adjacent car bodies.

8. In a railway train, a plurality of chassis, pivot means connecting said chassis in series, a car body having a mid-portion overlying the connection between adjacent chassis, and means pivotally mounting the ends of the car body on mid-portions of said adjacent chassis, said means constructed and arranged to provide relative movement of the car body with respect to one of the supporting chassis to permit said train to negotiate curved track.

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