Feb. 20, 1940. J. L. MOHUN ET AL 2,190,728

RIDE STABILIZER

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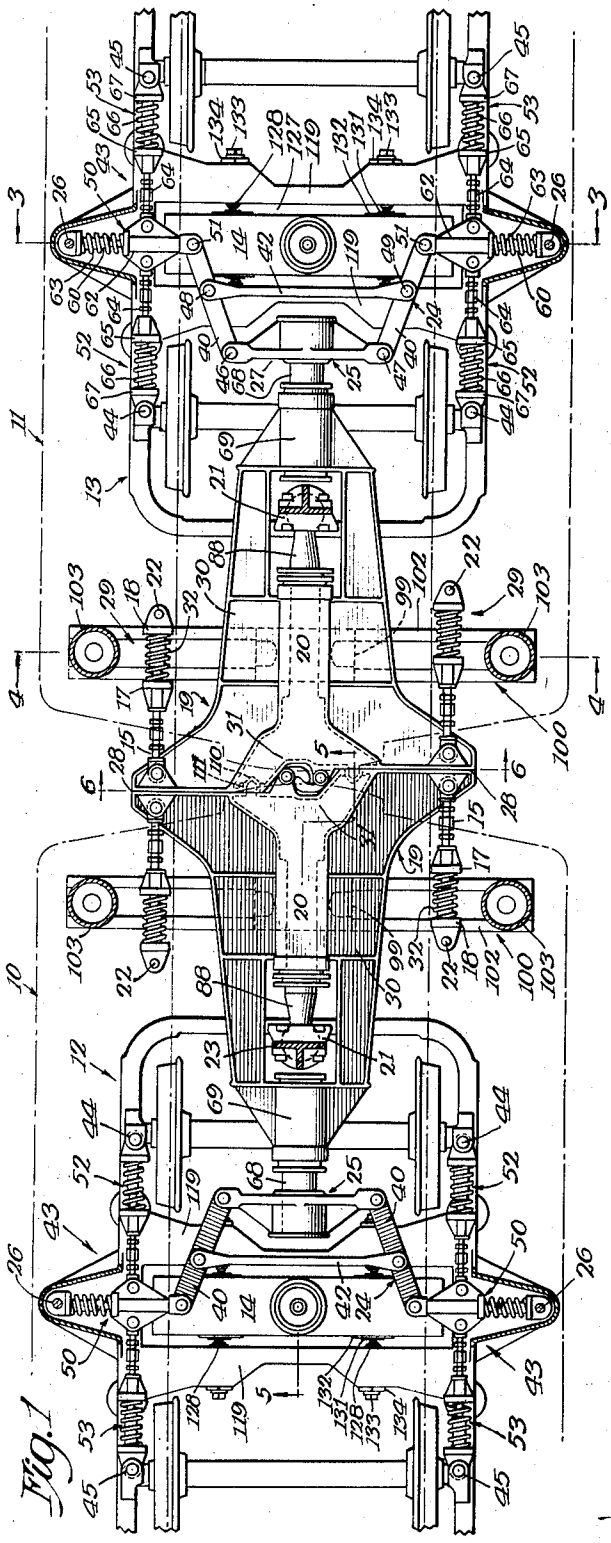


Fig. 1

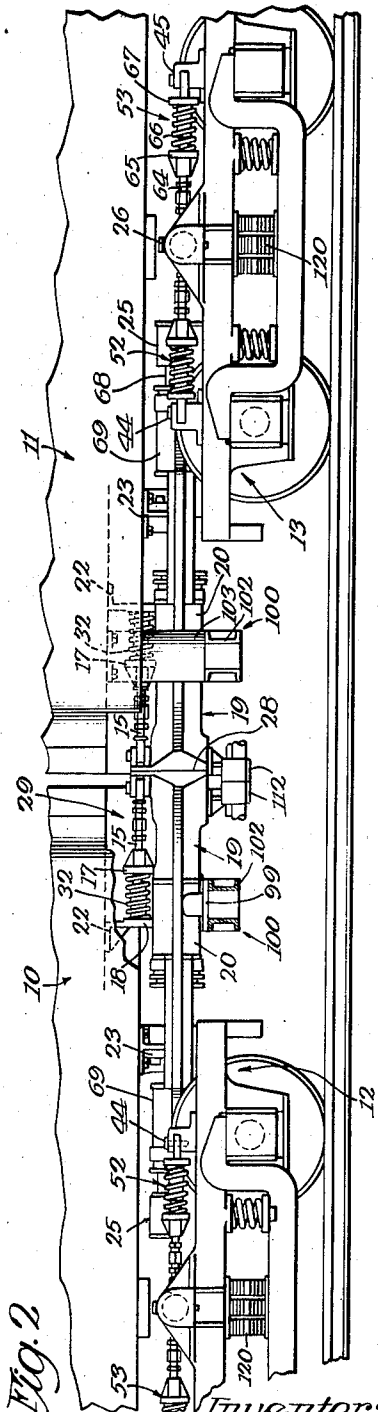


Fig. 2

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RIDE STABILIZER

Filed Oct. 3, 1936 5 Sheets-Sheet 2

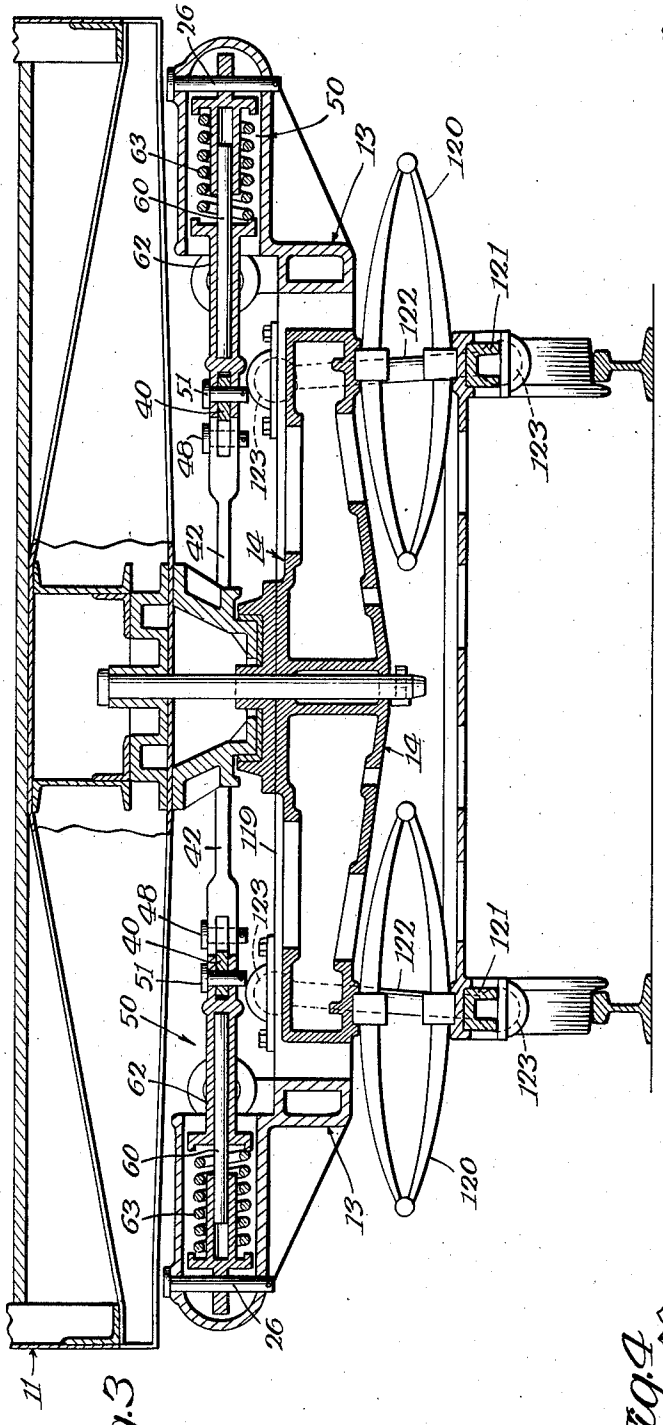


Fig. 3

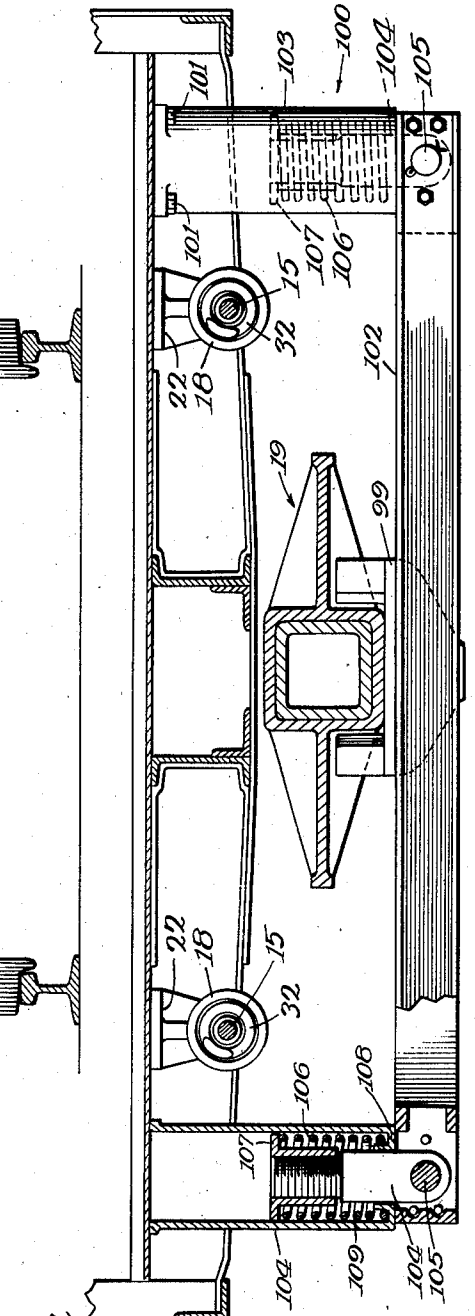


Fig. 4

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RIDE STABILIZER

Filed Oct. 3, 1936 5 Sheets-Sheet 3

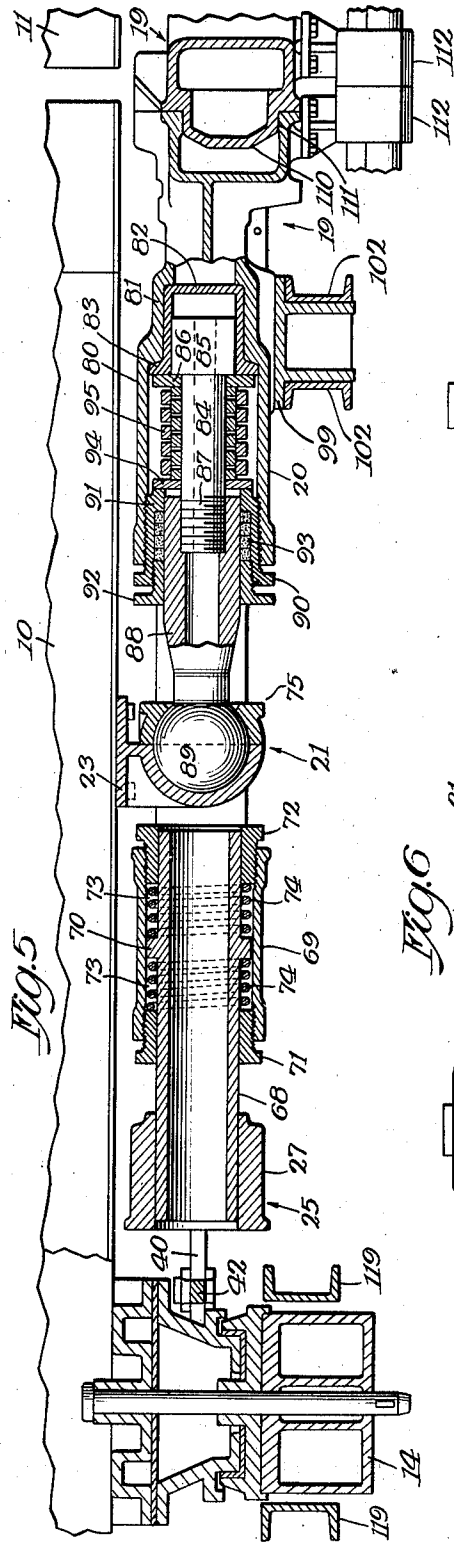


Fig. 5

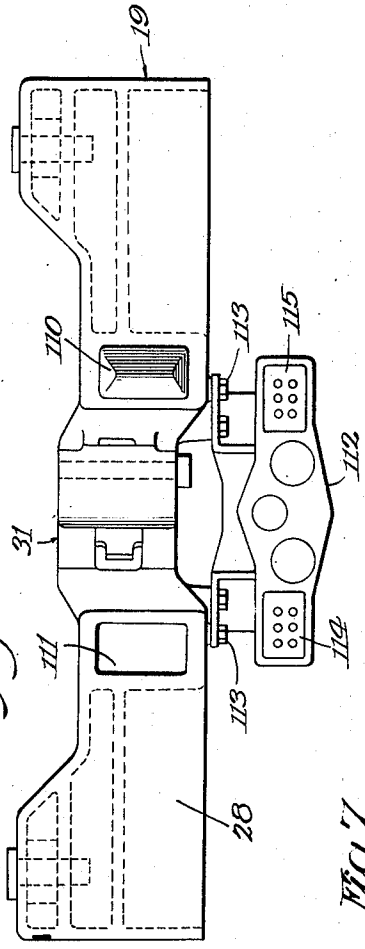


Fig. 6

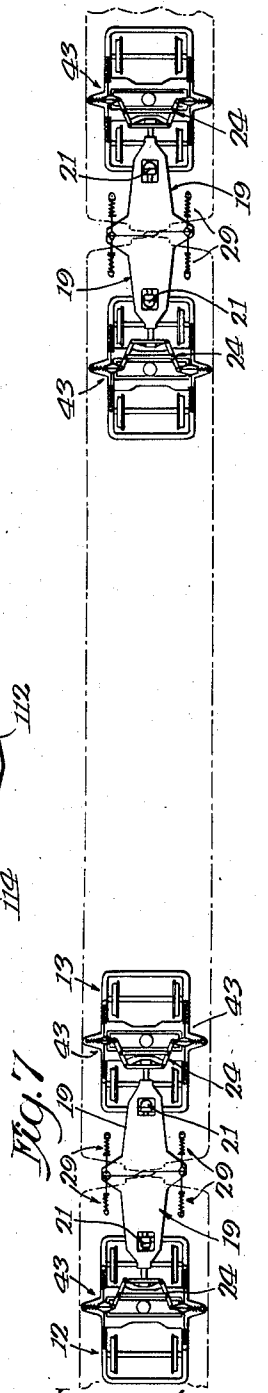


Fig. 7

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RIDE STABILIZER

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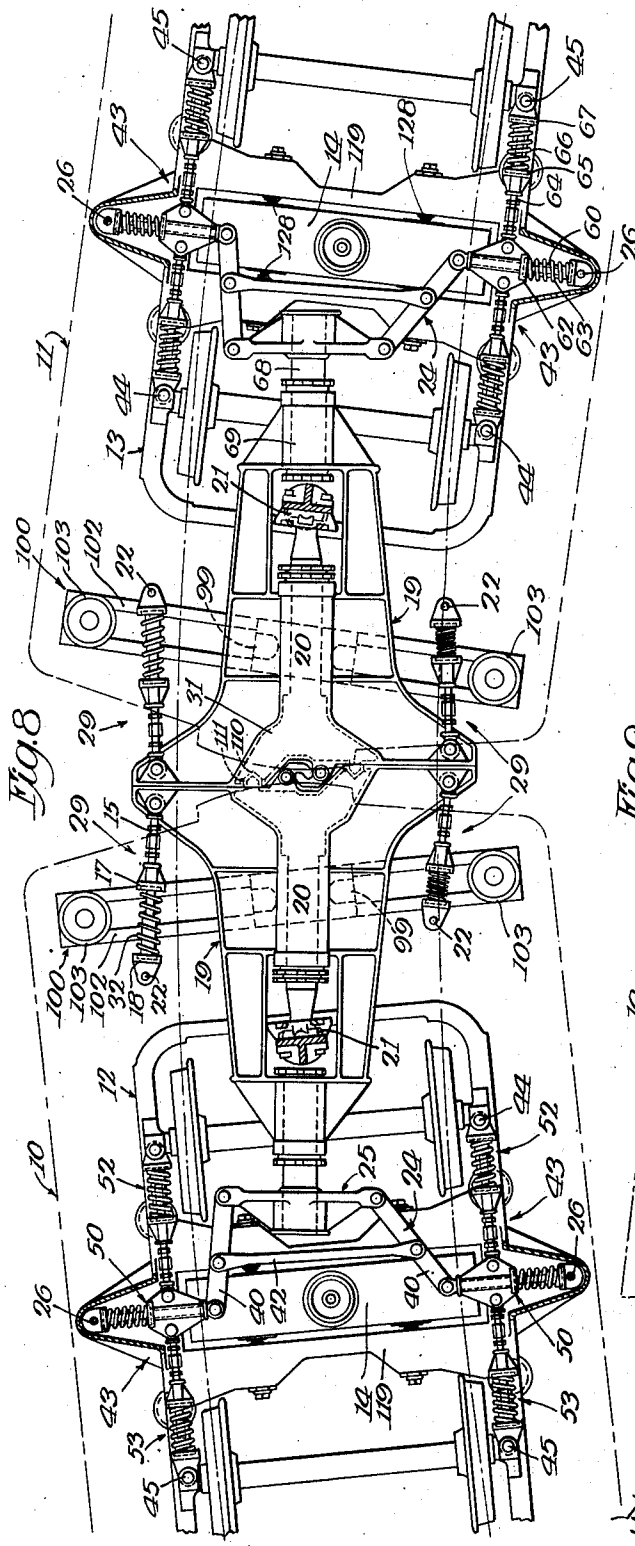


Fig. 8

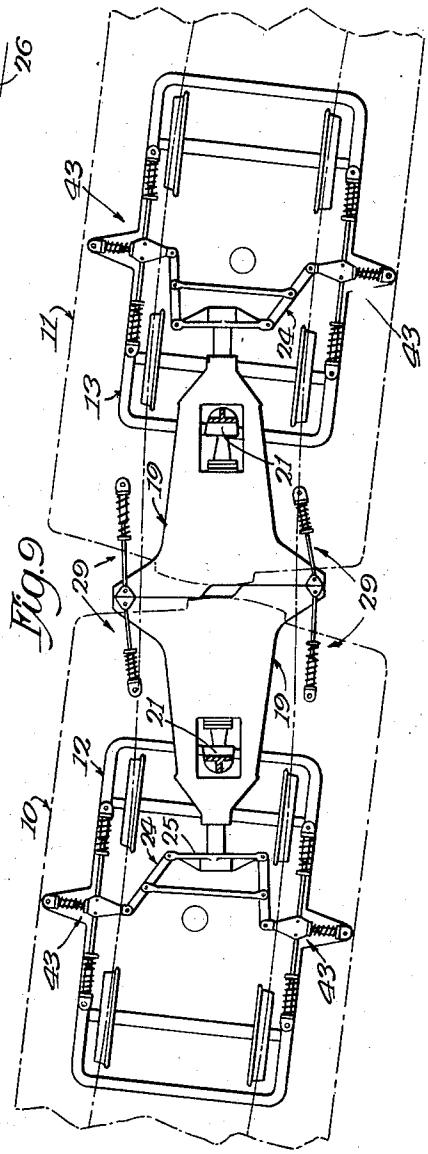


Fig. 9

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RIDE STABILIZER

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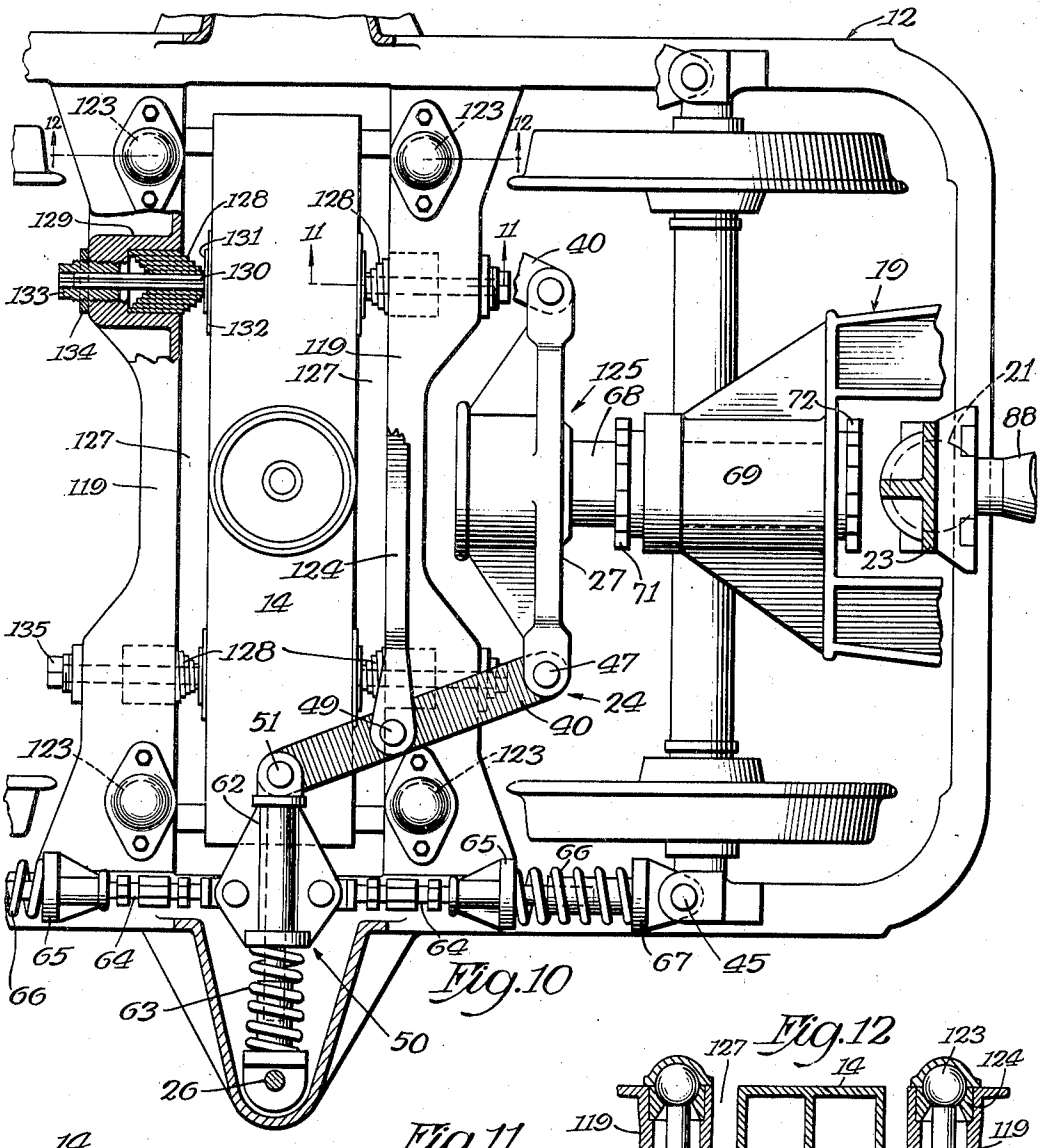


Fig. 10

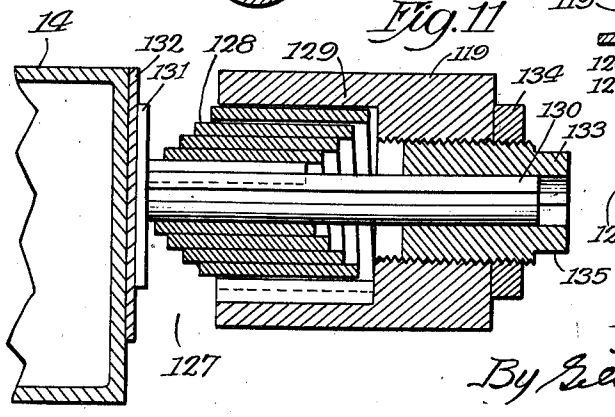


Fig. 11

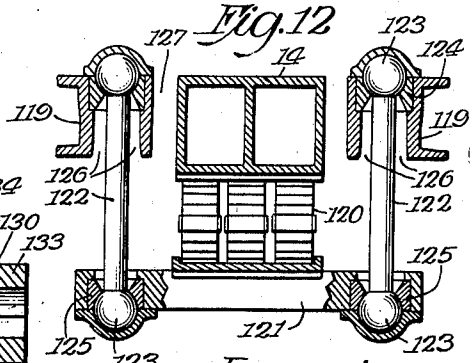


Fig. 12

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Patented Feb. 20, 1940 2,190,728

UNITED STATES PATENT OFFICE

2,190,728

RIDE STABILIZER

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Application October 3, 1936, Serial No. 103,914

22 Claims. (Cl. 105—176)

A survey of the riding qualities of the several articulated and other high speed passenger trains operating throughout the country indicates that a majority of the articulated trains ride smoothly, with little side motion or noise, and give good passenger comfort with the possible exception of the rear end.

Trains having conventional couplings and well designed trucks are fairly free from vertical shocks, although the trucks vibrate severely. This truck vibration, combined with the uncushioned longitudinal and lateral shocks, causes the cars to ride very roughly both on curves and tangents at speeds above 60 M. P. H. In this connection the following editorial is quoted from the Railway Mechanical Engineer of April, 1936:

". . . passengers have a real cause for complaint about poor riding qualities of some of the new equipment. It is difficult to read a book or a paper in a car that vibrates or has a tendency to side-sway to an extent that the type on a page is continually jumping before one's eyes and, at high speed, violent action of a car body gives the nervous passenger a feeling that something might happen."

Besides causing discomfort to passengers, the longitudinal and lateral shocks result in severe impact blows being transmitted to the cars and the track, and in order to take care of the stresses caused by these shocks, it has been found necessary, over a period of years, to materially strengthen new cars and the roadway structures at large increases in weight, cost of materials and maintenance.

In order to keep the shocks within the safety zone, it has been found necessary to reduce the speed of trains having conventional couplings and trucks over track with a large amount of curvature, and this requires that they be operated at exceedingly high speeds in unrestricted territories so as to maintain the schedule. This is anything but ideal operation.

Furthermore, slack control with conventional couplings becomes a serious braking problem with high speed trains and the noise set up between the couplings is exceedingly annoying.

Articulated trains have a number of inherent features which are objectionable from an operating standpoint, such as the non-interchangeability of the power cars or other cars and the need for carrying in stock a large amount of costly parts for use only on these trains necessitated by the special nature of the equipment.

Indications are that in most cases high speed trains in the future will consist of cars weighing about 100,000 pounds having four wheel trucks and automatic car couplers, or rebuilt conventional cars. But it seems necessary to provide means for materially improving the riding qualities of these cars, as otherwise the traveling public which is becoming very comfort-conscious may react against them.

The principal object of this invention therefore is to provide means for improving the riding qualities of non-articulated trains and preferably to associate such means with an automatic tight-lock coupler.

Further and other objects and advantages will become apparent as the disclosure proceeds and the description is read in conjunction with the accompanying drawings, in which

Fig. 1 is a plan view of the stabilizer and coupler as applied to abutting car bodies and to their adjacent trucks, with the cars placed on tangent track;

Fig. 2 is a side elevational view of the device shown in Fig. 1 with the upper portions of the car bodies broken away;

Fig. 3 is an enlarged transverse sectional view taken on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged view taken transversely of the car bodies along the line 4—4 of Fig. 1 showing a method of suspending the coupling device from the car underframe and of guiding it in a horizontal plane;

Fig. 5 is an enlarged detail view taken longitudinally of the coupling device along the line 5—5 of Fig. 1;

Fig. 6 is an enlarged end view of the facing plate and coupler taken on the line 6—6 of Fig. 1, and showing means for supporting the train line connectors;

Fig. 7 is a diagrammatic plan view of the tight coupling and stabilizing device as applied to a train of cars;

Fig. 8 is a plan view of the device shown in Fig. 1 as applied to car bodies which are rounding a curve, the latter being of comparatively small radius in order to better illustrate the action of the device;

Fig. 9 is a diagrammatic plan view of the device shown in Fig. 1 as applied to car bodies which are passing over a reverse curve, the curve being exaggerated to more clearly illustrate the action of the stabilizer rigging;

Fig. 10 is an enlarged plan view of a portion of one of the car trucks showing the relative positions of the truck bolster and the transoms and the resiliently backed chafing plate;

Fig. 11 is a sectional view taken on the line

11—11 of Fig. 10 showing in detail the volute springs backing the bolster chafing plate and a method for adjusting the action of the springs; and

Fig. 12 is a sectional view taken on the line 12—12 of Fig. 10 showing a preferred means for suspending the spring plank from the transoms.

A preferred form of the invention has been shown in the drawings and will be described for the purpose of complying with section 4888 of the Revised Statutes, but it will be understood that the appended claims are not limited to the specific disclosure but should be construed as broadly as the prior art will permit.

In general there are three types of undesirable truck motion which may be transmitted to the car body, and consequently should be suppressed if possible. These three type of motion are vertical motion caused by high and low spots in the track, lateral motion caused by irregularities in track alignment and surface, and last, longitudinal movement which may result from truck nosing, track irregularities, etc. Together, these various types of motion produce objectionable vibration.

Conventional trucks are designed to absorb vertical shocks by mounting the truck bolster on a spring plank suspended by swing hangers from the truck frame, the latter in turn being resiliently supported on the journal boxes associated with the axles. The present invention is not particularly concerned with this type of truck movement.

In swing motion trucks of conventional design, lateral forces applied to the truck frame are theoretically changed to vertical forces by the suspension of the truck bolster on the truck frame. In some cases, resilient buffers have been interposed between the truck frame and the ends of the truck bolster in order to cushion lateral movement of the bolster relative to the truck frame. The objection to this arrangement, as will be seen later, is that the car body acts directly as the reacting force, and, as a result, lateral movement of the car truck is necessarily transmitted to the car body.

The conventional car truck makes little, if any, provision for absorbing longitudinal forces applied to the truck frame, although in some isolated cases, the chafing plates between the truck transoms and the truck bolster have been resiliently backed.

The present invention concerns itself primarily with the lateral and longitudinal forces which act on the truck frame and the broad purpose of the invention is to absorb these forces sufficiently to prevent undesirable car body movement. This is done by having the forces act on a ride stabilizer in such a way that by the time the forces are transmitted to the car body, they are of such form and magnitude that undesirable car body movement is avoided. Preferably, though not necessarily, the ride stabilizer is combined with some form of tight coupling means, for the two are capable of cooperating to give smooth train operation.

The invention also concerns itself with train movement as a whole, for the stabilizer device serves to stiffen the entire train and make it act as a semi-rigid, resiliently yieldable body. This stabilizing action of the train makes for safer operation at high speeds, both on tangent track and on curves, and greatly improves the riding qualities of the several cars.

Throughout this specification, attempts will be made to explain the scientific principles which are believed to underlie the invention, but it will be understood that these explanations are to be construed not as defining a mode of operation, but merely as possible reasons for the advantageous results which come from the use of this invention.

Referring now to Fig. 1, the invention is shown applied to the adjacent ends of a pair of car bodies 10 and 11 which are mounted on trucks 12 and 13, respectively. Each truck is provided with a bolster 14 which is resiliently supported in the usual manner on journal boxes through full elliptical springs, spring planks and swing hangers. A suitable truck is illustrated and described in Railway Mechanical Engineer, December, 1921, pp. 758–759 and the disclosure of that publication may be considered as supplementing the disclosure here. However, for reasons which will later appear, a special type of swing hanger is employed and greater clearance is preferably provided between the truck bolster and the transoms (in which case the chafing plates are resiliently backed in any suitable manner) so that braking forces (and traction forces in the case of a motor truck) are transmitted directly through the transoms and truck bolster, whereas undesirable longitudinal truck vibration or movement is resiliently resisted by the stabilizer of this invention.

The complementary portions of the stabilizer and coupling device for the abutting car bodies are identical on each car end, so for the purpose of description, the equipment on one car only will be described.

The combination stabilizer and coupler consists broadly of a coupling device generally indicated at 19 having a projection extending longitudinally of the car body in the form of a coupler shank 20 and terminating in a ball and socket joint 21 anchored to the car body by some appropriate means 23, as shown in Fig. 5, and a stabilizing rigging generally designated 24 resiliently secured to the truck at 26, 44 and 45. The rigging cooperates with the coupling device through a T member 25. The face 28 of the coupling device 19 is urged against the complementary face of the device on the abutting car by resilient buff means generally indicated at 29 extending between the coupling device and the car body.

More specifically, the combination stabilizer and coupler consists of the coupling device 19 which comprises a facing plate 30 surrounding a coupler casting 31 and the coupler shank 20 extending longitudinally of the car body and terminating in the ball and socket joint 21, and the stabilizing rigging which cooperates with the coupling device 19 to transmit shocks received by the car truck to the coupling device. Buff means 29 serve to urge together the complementary faces 28 of the coupling devices of abutting cars, and each consists of an arm 15 pivoted to the coupling device 19 at 16, a pair of spring seats 17 and 18, the former being secured to the arm 15 and the latter being secured to the car body at 22, and a buff spring 32, surrounding the free end of the arm 15. The spring 32 is under an initial compression, so that the two buff means on each car end serve not only as auxiliary draft gears and shock absorbers, but also serve to center the couplers when the cars are uncoupled.

The facing plate extends rearwardly of the ball and socket joint and is provided with a recess

for receiving the T member 25 which constitutes a part of the stabilizing rigging 24.

The stabilizing rigging comprises a head 27 of the T member which is yieldingly secured to the end of the facing plate, a pair of levers 40, bar 42 and three-way truck shock absorbers 43 resiliently secured to the truck frame at 26, 44 and 45. The head 27 is provided with pivot points 46 and 47 at its outer extremities to which are pinned the levers 40. The bar 42 lies parallel to the head 27 and extends between and is pivotally secured to the levers 40 at points 48 and 49 intermediate the extremities of such levers.

Each three-way truck shock absorber comprises a transverse member 50 extending from, and secured to, the end 51 of the levers 40 and terminating at the pivot point 26, and a pair of longitudinal members 52 and 53 at right angles to the transverse member 50 and secured to the truck frame at the pivot points 44 and 45, respectively.

The transverse member 50 comprises a pin 60 pivoted to the lever 40 at 51, a collar 62 adapted to receive the pin 60, and a spring 63 adapted to fit over the end of the pin 60 and seat itself against the collar 62. The spring 63 is anchored to the pivot point 26 and when assembled is placed under an initial compression.

The longitudinal members 52 and 53 each comprise a pin 64 supporting a spring seat member 65, a spring 66 adapted to fit over the end of the pin 64, and a spring seat member 67 pivoted to the truck frame at 44 and adapted to receive the other end of the spring 66. The springs 66 are likewise placed under an initial compression.

The T member 25 is resiliently secured to the rearward extension of the facing plate 30, as shown in Fig. 5, and consists of the head 27 and a plunger 68 adapted to be received by a cylinder 69. The plunger is provided with an annular flange 70, the outside diameter of which approximates the inside diameter of the cylinder 69. The ends of this cylinder are closed by caps 71 and 72 which are adjustably held in place by threads or other suitable means. Spaces 73 are left on both sides of the annular flange 70 to permit longitudinal motion of the plunger 68 in the cylinder 69, and springs 74 are inserted in these spaces and placed under an initial compression by adjusting the caps 71 and 72 so that the longitudinal motion of the plunger will be restrained.

This same type of spring device may be substituted for the buff means 29 if desired.

Between the ball and socket joint 21 and the coupler casting 31 provision is made for taking care of buff and draft by any suitable draft gear, as shown in Fig. 5. The coupler casting includes a hollow cup-shaped portion 80 having a tapered portion 81 adapted to receive a cup-like insert 82 flanged at its mouth at 83 so that the contour of the outer surface of the insert corresponds with the contour of the inner surface of the tapered portion 81. A plunger 84 having an enlarged head 85 is inserted in the cup-shaped member 80, the enlarged head being adapted to be received by the cup-like insert 82. A metal washer 86 fits around the narrow portion of the plunger 84 and is adapted to seat itself against the open face of the cup-like insert 82. The plunger 84 is threaded, as shown at 87, and is received by the shank 88 attached to the ball 89 of the ball and socket joint 21. A sleeve 90 is secured to the cup-shaped portion 80, as shown at 91, and a cap 92 is threaded into the sleeve 90 with a packing gland 93 interposed between the cap and the sleeve. A second metal washer 94 surrounds the plunger 84 and is seated against the inner face of the sleeve 90 and springs 95 are spaced between these two washers. Space is provided between the end of the shank 88 and the washer 94, as shown in Fig. 5.

The coupling device 19 is suspended from the car body by means of a carrier 100 secured to the car underframe by any suitable means, as, for example, bolts 101, and is received and guided in a horizontal plane by means of a saddle 99 adapted to ride on a plank 102 extending transversely of the car body and resiliently secured to vertical members 103 flanged at their lower extremities at 108. Arms 104 are pivoted to the ends of the plank 102 at 105 and are adapted to be received by the vertical members 103. A flanged collar 106 is secured to the free end of each arm 104 and the outer diameter of the flange 107 approximates the inside diameter of the vertical member 103. A spring 109 surrounds the arm 104 and extends between the flanges 107 and 108, and is adapted to absorb vertical shocks received on the coupler casting. A resilient centering device for the coupler may be employed in conjunction with the suspension arrangement (in a manner well known to the art), although in the present disclosure, the buff springs 32 serve this purpose.

The tight coupler shown in the drawings and described above is essentially the same as the coupler manufactured and sold by the Ohio Brass Co. of Mansfield, Ohio, and no further description is deemed necessary here. However, with slight modifications, a conventional coupler with ordinary draft gear may be used, if desired.

The abutting faces of the coupler 19 are provided with complementary pins 110 and funnels 111 (they may be on the facing plates 30), and means may be provided for carrying the train line connectors below the coupling device, as, for example, a casting 112 secured by means of bolts 113 to the coupling device providing spaces 114 and 115 for the train line connectors.

The trucks used for the purpose of illustration differ from standard construction in that provision is made to permit limited relative motion between the truck bolster 14 and the transoms 119, as shown in Figs. 10, 11 and 12. The bolster 14 is mounted on elliptical springs 120 carried by a spring plank 121, and swing hangers 122 pivotally support the spring plank (and hence the car body) from the truck frame transoms 119.

As shown in Fig. 12, the ends of the swing hangers 122 are provided with balls 123 which are adapted to be received by sockets 124 and 125 on the transoms and spring plank, respectively. The swing hangers extend downwardly from the transoms in vertical planes so that the plank 121 remains in a horizontal position when moved longitudinally with respect to the truck frame. Clearance is provided between the swing hanger and the transoms, as shown at 126, to permit the swing hangers to oscillate in a direction longitudinally of the truck.

A relatively large clearance space 127 is allowed between the truck bolster 14 and the transoms 119 and any suitable restraining means, as for example, volute springs 128, are inserted between the bolster and the truck transoms. Each spring is received by a spring seat 129 provided in the truck transoms 119 and a guide shaft 130 is connected to the outer end of the spring and projects rearwardly through a bearing collar 133. To the outer face of the spring is attached a cir-

cular chafing plate 131 which engages a second chafing plate 132 secured to the truck bolster 14. The shaft 130 is splined to the notched collar 133 which is threaded into the rear portion of the spring seat 129. The purpose of the splined shaft and collar arrangement is to provide means for adjusting the amount of friction between the coils of the volute spring 128. A lock nut 134 is threaded onto the end of the collar 133 for the purpose of locking the collar 133 in a fixed position. Facets 135 are provided at the outer end of the collar 133 to enable a wrench to be attached for adjusting the position of the collar.

Preferably the volute springs are wound with a slight clearance between the larger coils and substantially no clearance between the smaller ones, so that the relatively high frictional resistance of the spring does not come into play until after the spring has been deflected an amount corresponding to normal truck movement. This property is desirable because small vibratory motion of the transoms will not be transmitted through the springs to the bolster, but motions of greater magnitude, due to braking forces and the like, will be transmitted through the springs to the bolster.

The increased spacing between the truck bolster and the transom is more or less essential if longitudinal vibratory movement of the truck frame is to be effectively absorbed. The practice in the past of resiliently backing the chafing plates was for a different purpose, viz: the cushioning of the blow transmitted to the car body by brake application, or similar forces. The bolster cushioning arrangement of this invention permits the undesirable longitudinal truck movements to be absorbed through the ride stabilizer but transmits such forces as are created by acceleration (in case the truck is a motor truck) and by the application of the brakes direct to the car body.

Obviously any kind of shock absorbing device may be substituted for the volute springs, such as multiple coil springs, rubber, and the like, but preferably the device should have characteristics which require a rapidly increasing increment of load per equal increment of deflection after an initial deflection of an amount corresponding to normal truck movement. Adjusting nuts 99, or equivalent means, are provided throughout the stabilizer for initially alining the component parts, setting the springs to their desired characteristics, adjusting the parts for wear, etc.

The coupling and uncoupling of cars is accomplished in the conventional manner for tight-lock couplers, and for this reason no attempt has been made to illustrate and describe the coupling levers.

On tangent track the combination stabilizer and coupler tends to minimize relative car movement particularly because of the action of the buff means 29. In effect a train when equipped with this invention acts as an elongated resilient member, no part of which can move relative to any other part without transferring the force throughout the length of the member. This means that side sway and other lateral car body movement are substantially reduced.

In addition to resisting lateral forces which may be transmitted to the car body, as explained above, the combination stabilizer and coupler substantially prevents such forces from being transmitted to the car body. This is accomplished by the resilient connection between the truck frames and the coupler member. Obviously whenever a lateral force is applied to the truck frame, as, for example, when the car wheels pass over an irregularity in the track, the force must be absorbed in some manner if it is not to be transmitted to the car body. The combination stabilizer and coupler of this invention accomplishes this function in such a way that it is practically impossible for lateral shock to be transmitted to the car bodies. The reason is that the stabilizer rigging, while it permits the car trucks to turn when the train is taking a curve, nevertheless locks itself whenever the truck frame moves laterally, and consequently transmits the lateral forces through the inclined levers 40 to the T member 25. This force, which is still transverse to the truck frame, tends to rotatively move the coupling device around the ball and socket joint 21 as a fulcrum, and the rotative force is yieldingly resisted by the buff means 29, the truck shock absorbers on the adjacent truck, and the inertia of the entire stabilizer and coupler. As a result lateral forces are effectively absorbed.

Longitudinal truck movement is similarly absorbed through the combination stabilizer and coupler by the locking of the stabilizer rigging upon application of external forces. The longitudinal forces must therefore successively go through the truck shock absorbers 52 and 53, the springs 74 associated with the T member 25 and the springs in the draft gear before reaching the car body, and are thus effectively absorbed. The bolster arrangement is such that the undesirable longitudinal truck forces are not transmitted to the car body before they have an opportunity to be absorbed in the manner above described.

The springs 74 in the T member 25 permit relative longitudinal movement between the stabilizer rigging and the facing plates, and therefore resiliently resist undesirable truck movement, whether it be lengthwise or transverse of the car.

When the train is rounding a curve, as shown in Fig. 8, the stabilizer rigging changes its position, but lateral and longitudinal forces applied to the truck frame are absorbed in the same manner as when the train in on tangent track. The same is true when the train is on a reverse curve, as shown in Fig. 9.

The pins and funnels associated with the facing plate prevent relative lateral movement. Consequently, they serve to transmit some of the forces which travel along the ride stabilizer of one car to the stabilizer of the adjacent car.

The springs used in the stabilizer, including those constituting the buff means 29, are selected with a capacity sufficient to absorb the forces acting on them without appreciably affecting normal train operation, or materially increasing wheel flange resistance.

Although mechanical means have been shown for absorbing the undesirable forces, it is obvious that the invention may be embodied in forms employing other means, such, for example, as hydraulic, pneumatic, or electrical means. These other adaptations will be apparent to those skilled in the art from the specific disclosure above.

Rubber may be substituted for springs wherever shown in the drawings, but preferably the rubber should be used under shear.

The fact that the stabilizer has been shown and described as associated with the coupler should not be construed as indicating that the two are necessarily combined. Obviously, the

coupler may be entirely separate from and independent of the stabilizer, but in that case, the stabilizer should be fulcrumed at one or more places on the car body to provide the equivalent of the ball and socket joint 21.

In one sense, the preferred arrangement of this invention may be regarded as one in which the adjacent ends of the car bodies are supported on a single truck having a long wheel base, for forces acting on the truck frame beneath one car are transmitted through a series of resilient means to the truck frame beneath the other car.

It will be understood that throughout this specification and the appended claims the expression "tight-lock coupler" is intended to include all forms of tight couplings.

We claim as our invention:

1. In combination with the adjacent ends of two car bodies, a car truck under each of the adjacent ends, a ride stabilizer connecting the car bodies and comprising a relatively large rigid body having its two ends operatively connected to the car trucks in such a manner that all transverse shocks passing between the ride stabilizer and each truck are directed along the transverse center line, and resilient means interposed in the latter connection.

2. In combination, two adjacent car body ends, a car truck under each end, a combination ride stabilizer and tight-lock coupler member connecting the two ends and constituting a rigid body between the car ends, and resilient means for connecting the ride stabilizer and coupler member to the car trucks, said means being adapted to transmit shocks between each car truck and the ride stabilizer in such a manner that all components of such shocks directed transversely of the truck are directed along the transverse center line of the truck.

3. In combination, a pair of car bodies, each of the adjacent ends of which is supported on a car truck, a rigid coupler member joining the two car body ends, and means associated with the coupler member and truck for cushioning truck movement relative to the car bodies, said means being so positioned with respect to the truck that all transverse components of the shocks passing between the truck and said means are directed substantially along the transverse center line of the truck.

4. In combination, a pair of car bodies, each of the adjacent ends of which is supported on a car truck, a rigid tight-lock coupler member joining the two car body ends, and means associated with the coupler member and truck for cushioning truck movement relative to the car bodies, said means being so positioned with respect to the truck that all transverse components of the shocks passing between the truck and said means are directed substantially along the transverse center line of the truck.

5. In combination, a pair of car bodies, each of the adjacent ends of which is supported on a car truck, a combination ride stabilizer and coupler joining the two car bodies and comprising a tight-lock coupler member pivotally secured to each of the car bodies, lateral extensions associated with the coupler between the car bodies, and resilient means connecting the extensions to the adjacent car ends.

6. In combination, a pair of car bodies, each of the adjacent ends of which is supported on a car truck, a combination ride stabilizer and coupler joining the two car bodies and comprising a tight-lock coupler member pivotally secured to each of the car bodies and constituting a rigid body between the car bodies, longitudinal extensions associated with the coupler member projecting rearwardly toward the trucks and beyond the pivotal connection of the stabilizer to the car, and a resilient connection between the longitudinal extensions and each of said trucks, said connection being adapted to transmit shocks between each car truck and its corresponding ride stabilizer in such a manner that all components of such shocks which are directed transversely of the truck are directed along the transverse center line of the truck.

7. In combination, a pair of car bodies, each of the adjacent ends of which is supported on a car truck, a combination ride stabilizer and coupler joining the two car bodies and comprising a tight-lock coupler member pivotally secured to each of the car bodies, longitudinal extensions associated with the coupler member projecting rearwardly toward the trucks and beyond the pivot point, and a resilient connection between the longitudinal extensions and each of said trucks, said resilient connection comprising a group of levers and resilient means for connecting the ends of the levers to the car truck frames whereby lateral movement of the frames relative to the car bodies is yieldingly resisted through the resilient connection.

8. In combination, a pair of car bodies, each of the adjacent ends of which is supported on a car truck, a combination ride stabilizer and coupler joining the two car bodies and comprising a tight-lock coupler member pivotally secured to each of the car bodies, longitudinal extensions on the coupler member projecting rearwardly toward the trucks and beyond the pivot point, and a resilient connection between the longitudinal extensions and each of said trucks, said resilient connection comprising a group of levers and resilient means for connecting the ends of the levers to the car truck frames whereby both longitudinal and lateral movement of the frames relative to the car bodies is yieldingly resisted through the resilient connection.

9. In combination, a pair of car bodies, each of the adjacent ends of which is supported on a car truck, a combination ride stabilizer and coupler joining the two car bodies and comprising a tight-lock coupler member pivotally secured to each of the car bodies, lateral extensions on the coupler member between the car bodies, resilient means connecting the extensions to the adjacent car ends, longitudinal extensions on the coupler member projecting rearwardly toward the trucks and beyond the pivotal connection of the stabilizer to the car, and a resilient connection between the longitudinal extensions and each of said trucks, said resilient connection comprising a group of levers and resilient means positioned so as to direct the transverse components substantially through the center of the truck for connecting the ends of the levers to the car truck frames whereby lateral movement of the frames relative to the car bodies is yieldingly resisted through the resilient connection.

10. In combination, a pair of car bodies, each of the adjacent ends of which is supported on a car truck, a combination ride stabilizer and coupler joining the two car bodies and comprising a rigid tight-lock coupler member pivotally secured to each of the car bodies, longitudinal extensions, resiliently changeable in length, on the coupler member projecting rearwardly toward the

trucks and beyond the pivotal connection of the stabilizer to the car, and a resilient connection between the longitudinal extensions and each of said trucks, in such a manner that shocks passing from the trucks to the resilient connection are directed substantially along the transverse center line of the truck.

11. In combination with the abutting ends of a pair of railway cars mounted on trucks, a device of the class described comprising in combination tight coupling means for restraining relative longitudinal motion between the car ends, lateral shock absorbers associated with the trucks and coupling means, and being so arranged that transverse shocks passing from the trucks to the lateral shock absorbers are directed along the transverse center line of the truck, and means for transmitting impacts delivered to the shock absorbers to the tight coupling means.

12. In combination with the abutting ends of a pair of railway cars mounted on trucks, car coupling means for restraining relative longitudinal motion between the car bodies, resilient means associated with the coupler and car bodies to resist the turning of one car relative to the other, lateral shock absorbers secured to adjacent trucks of the abutting cars and being so positioned that transverse shocks passing from the car truck to the shock absorbers are directed along the transverse center line of the truck, and means for transmitting impacts applied to the shock absorbers to the coupling means.

13. In combination with a pair of railway car bodies mounted on trucks, a tight coupling member extending between the abutting ends of the car bodies and pivotally secured thereto, lateral shock absorbers secured to adjacent car trucks and being so arranged that all transverse shocks passing between the truck and the shock absorbers are directed along the transverse center line of the truck, and means cooperating with the shock absorbers and the coupling member for transmitting blows from the former to the latter.

14. In combination with a pair of railway car bodies mounted on trucks, a tight coupling member extending between the abutting ends of the car bodies and pivotally secured thereto, lateral shock absorbers secured to adjacent car trucks, means cooperating with the shock absorbers and the coupling member for transmitting blows from the former to the latter, said means comprising a pair of transverse members extending along the transverse center line of each truck on opposite sides of the truck center bearing, and a series of levers extending from the ends of said transverse members and secured to the coupling member, said transverse members being resiliently held in position along the said truck center line.

15. In combination with a pair of railway car bodies mounted on trucks, a tight coupling member extending along the longitudinal center line of the car bodies, lateral shock absorbers cooperating with the adjacent trucks of the said cars and arranged so that all transverse shocks passing between the truck and the shock absorbers are directed substantially along the transverse center line of the truck, and means cooperating with the shock absorbers and the coupling member for transmitting blows applied to the shock absorbers on one of said trucks to the shock absorbers on the other of said trucks through the tight coupling member.

16. In combination, a pair of car bodies, each of the adjacent ends of which is supported on an individual car truck, means associated with the frame of each car truck for permitting relative longitudinal motion between the frame of the truck and the car body, a coupler joining the two car body ends, and means associated with the coupler and the truck for cushioning truck movement relative to the car bodies.

17. In combination, a pair of car bodies, each of the adjacent ends of which is mounted on an individual car truck, said truck being provided with transoms and a truck bolster spaced for substantial relative movement longitudinally of the truck, a plurality of swing hangers for suspending the bolster from the transoms, means for supporting the swing hangers from the transoms for universal movement, a coupler joining the two car body ends, and means associated with the coupler and the truck for cushioning truck movement relative to the car bodies.

18. In combination, a pair of car bodies, each of the adjacent ends of which is mounted on an individual car truck, said truck being provided with transoms and a truck bolster spaced for substantial relative movement longitudinally of the truck, resilient buff means between the transoms and the bolster of each truck, said means being adapted to offer little resistance to limited vibratory motion between the transoms and the bolster but being adapted to resist relative movements of greater magnitude, a plurality of swing hangers for suspending the bolster from the transoms, means for supporting the swing hangers from the transoms for universal movement, a coupler joining the two car body ends, and means associated with the coupler and the truck for cushioning truck movement relative to the car bodies.

19. In a car, a car body, a car truck for supporting the car body including a truck frame, a shock absorber for cushioning lateral movement between the body and truck frame, and means for translating a part of said lateral movement to longitudinal movement before it is transmitted to the car body.

20. A device of the class described to be applied at the abutting ends of adjacent railway cars, comprising in combination a tight coupling member extending between the ends of adjacent cars and pivotally secured to each car body, said member constituting a rigid connection extending between the car ends and having lateral extensions, resilient buffing means extending from the car bodies to the lateral extensions on the coupling member, said buffing means adapted to cooperate with the coupling member, lateral shock absorbers secured to the car trucks, and a series of levers adapted to cooperate with the lateral shock absorbers and the coupling member to transmit blows received by the shock absorbers to the coupling member.

21. In combination with a pair of railway car bodies mounted on trucks, a tight coupling member extending between the abutting ends of the car bodies and pivotally secured thereto, lateral shock absorbers secured to adjacent car trucks, means cooperating with the shock absorbers and coupling member for transmitting blows from the former to the latter, said means comprising a pair of transverse members extending along the transverse center line of each truck on opposite sides of the truck center bearing and engaging its corresponding lateral shock absorber, and a series of levers extending from the ends of said transverse members and secured to the coupling member.

22. In combination, a pair of car bodies, each

of the adjacent ends of which is mounted on an individual car truck, the truck being so arranged as to provide relative vibratory motion between the truck and the car body both longitudinally and transversely of the car body, means associated with the frame of each truck and its associated bolster for cushioning longitudinal components of said vibratory motion, a coupler joining the two car body ends and means associated with the coupler and the truck for cushioning truck movement relative to the car bodies.

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