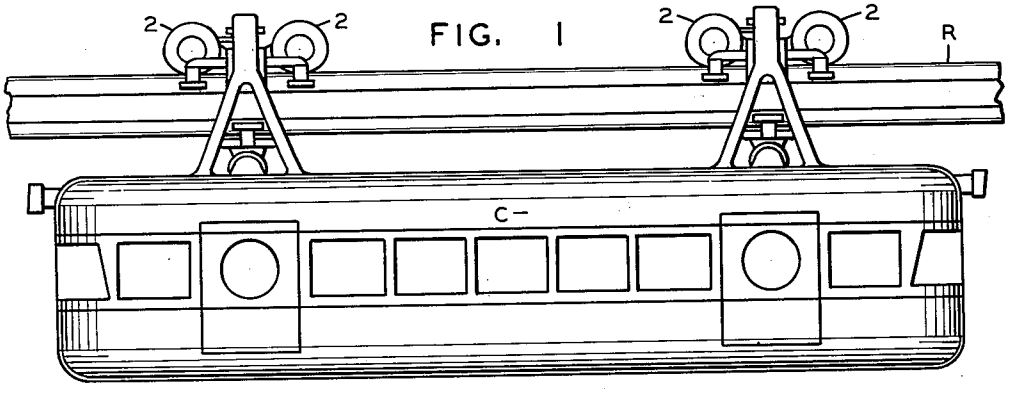
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SUSPENDED RAILWAY SYSTEMS

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FIG. 1



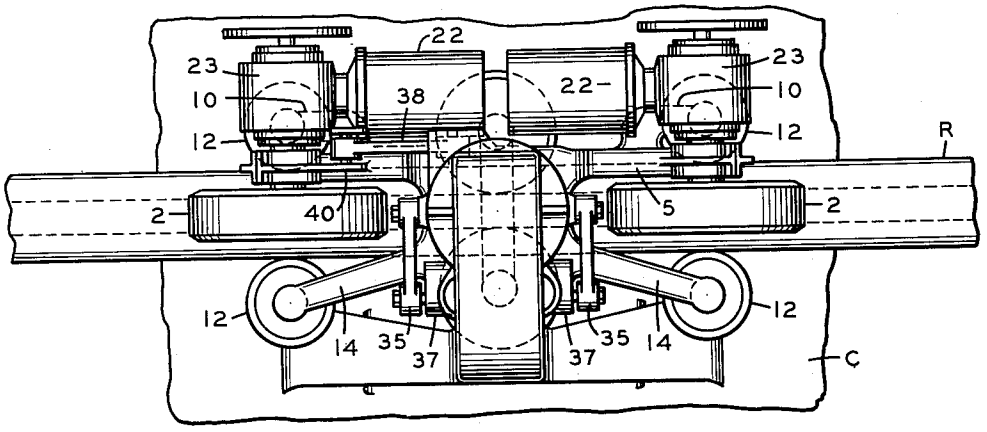


FIG. 2

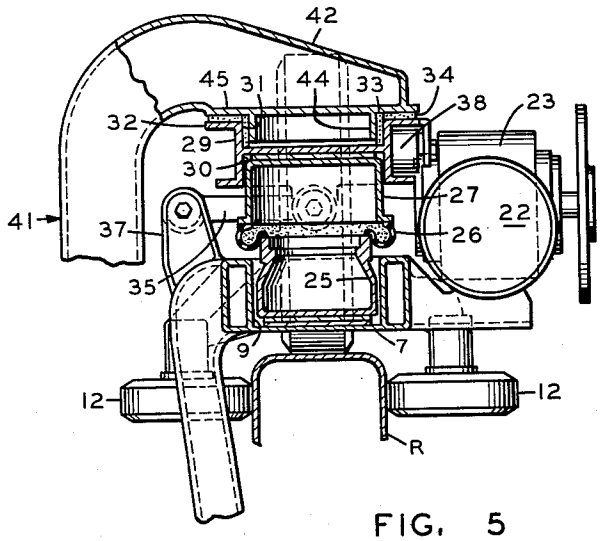


FIG. 5

INVENTOR.
RICHARD L. LICH
BY
Francis T. Burgess
ATTORNEY

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SUSPENDED RAILWAY SYSTEMS

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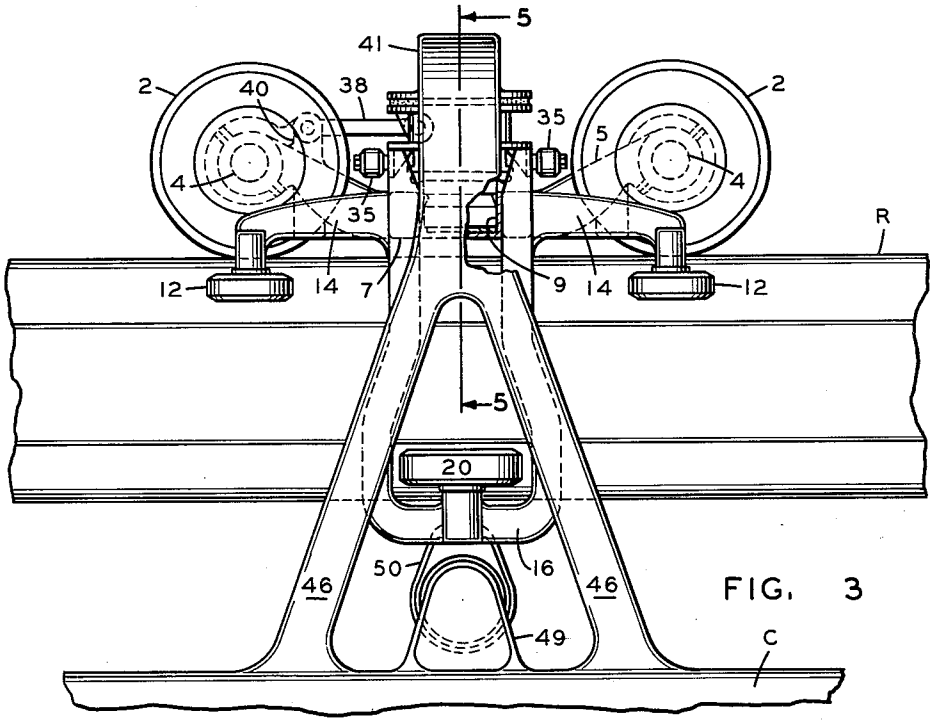


FIG. 3

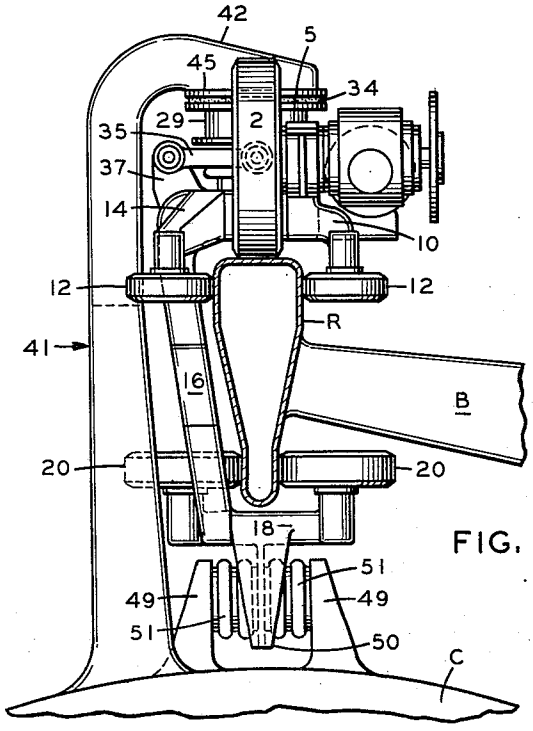


FIG. 4

INVENTOR.
RICHARD L. LICH
BY
Francis T. Burgess
ATTORNEY

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SUSPENDED RAILWAY SYSTEMS

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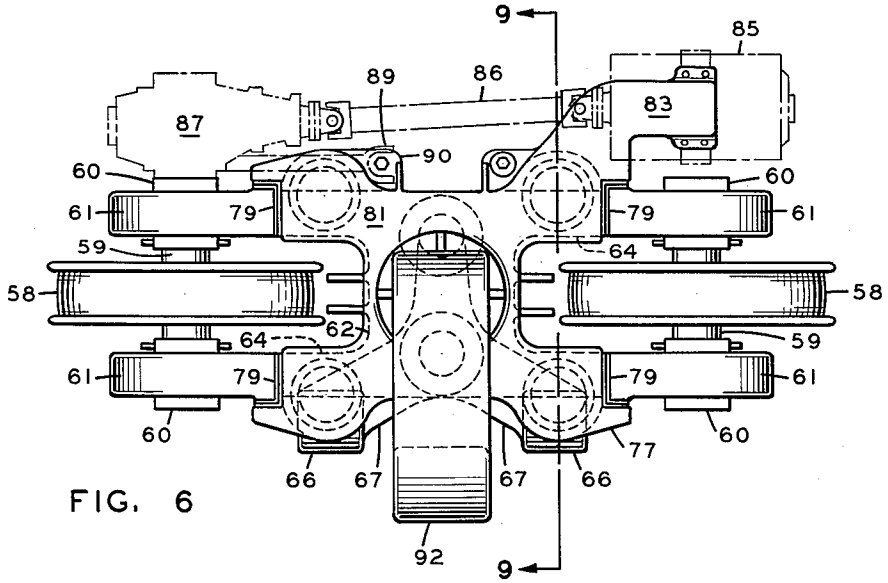


FIG. 6

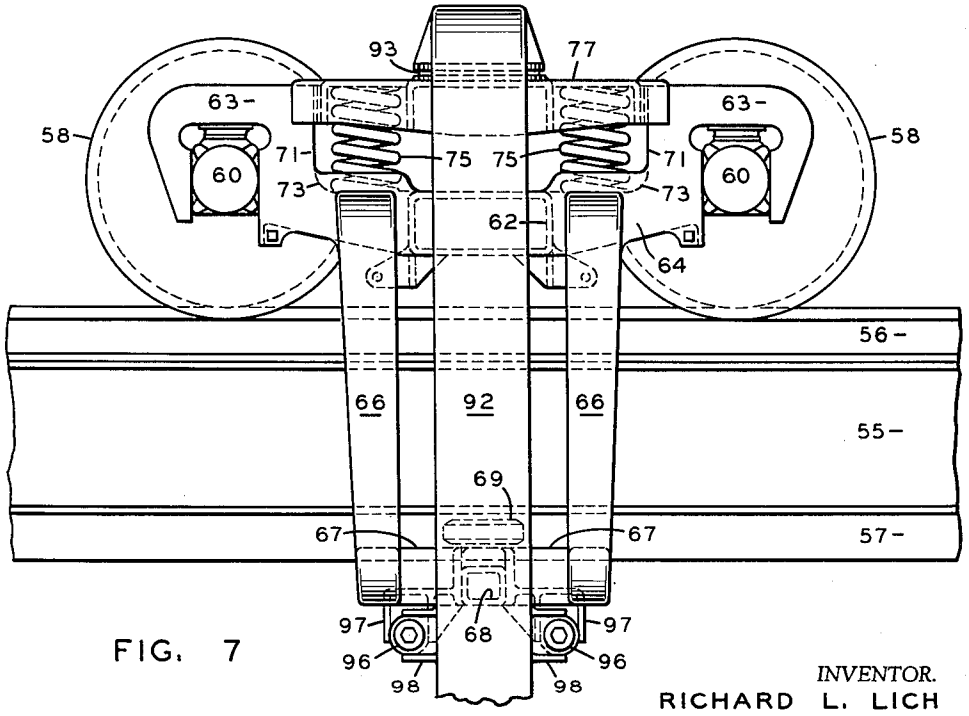


FIG. 7

INVENTOR.
RICHARD L. LICH

BY
Francis T. Burgess
ATTORNEY

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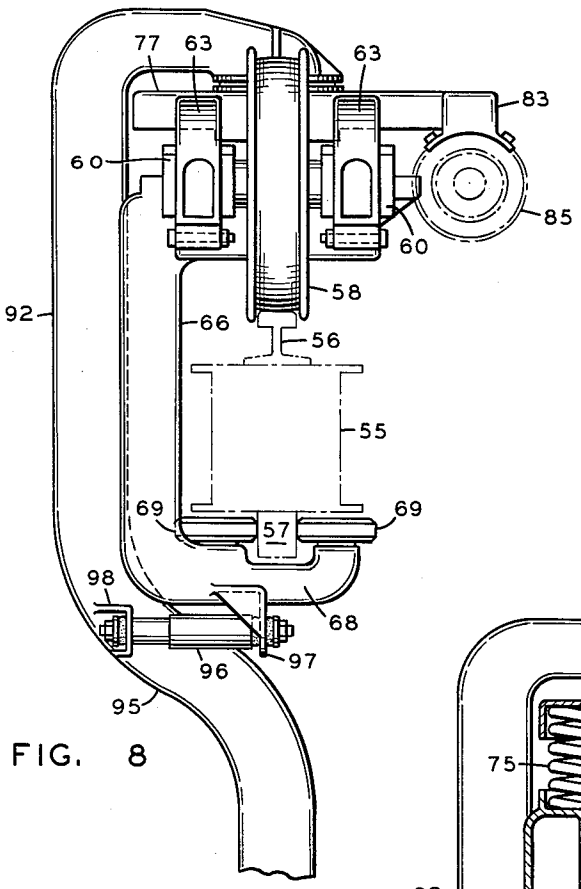


FIG. 8

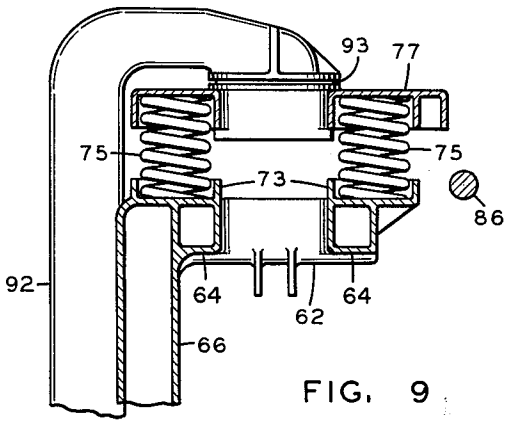


FIG. 9

INVENTOR.
RICHARD L. LICH
BY
Francis T. Burgess
ATTORNEY

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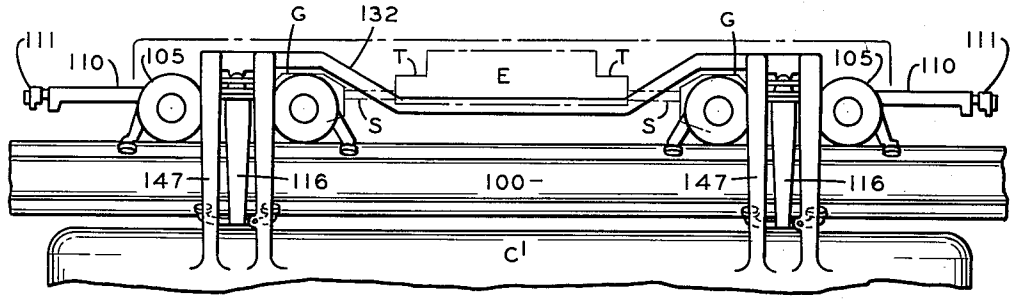


FIG. 10

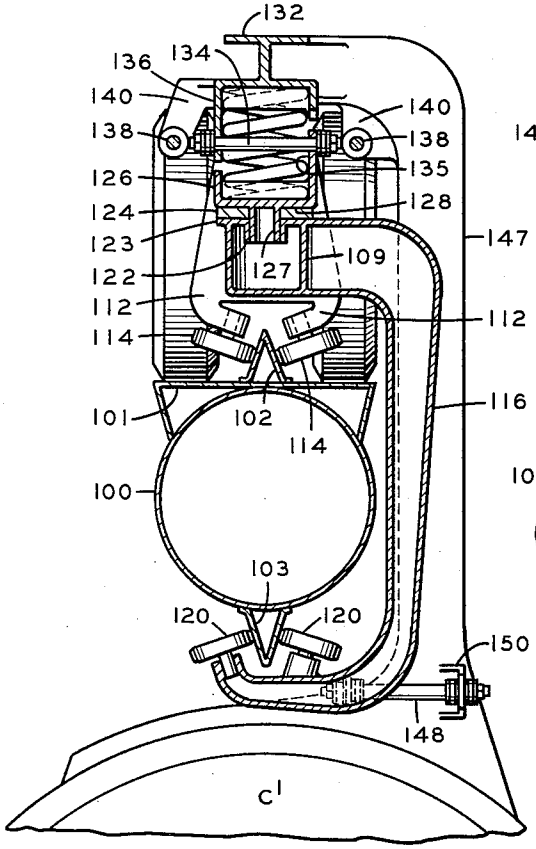


FIG. 13

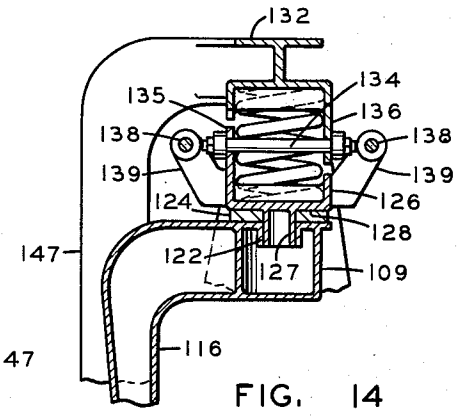


FIG. 14

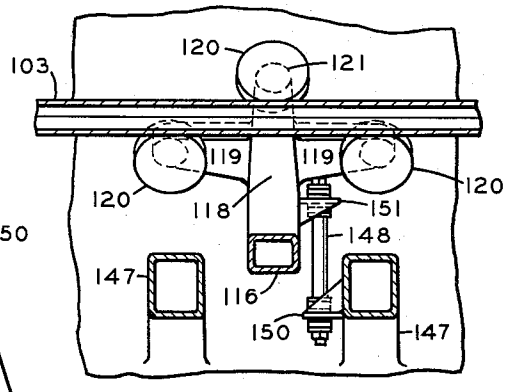


FIG. 15

INVENTOR.
RICHARD L. LICH
BY
Francis T. Burgess
ATTORNEY

June 4, 1963 R. L. LICH 3,092,039

SUSPENDED RAILWAY SYSTEMS

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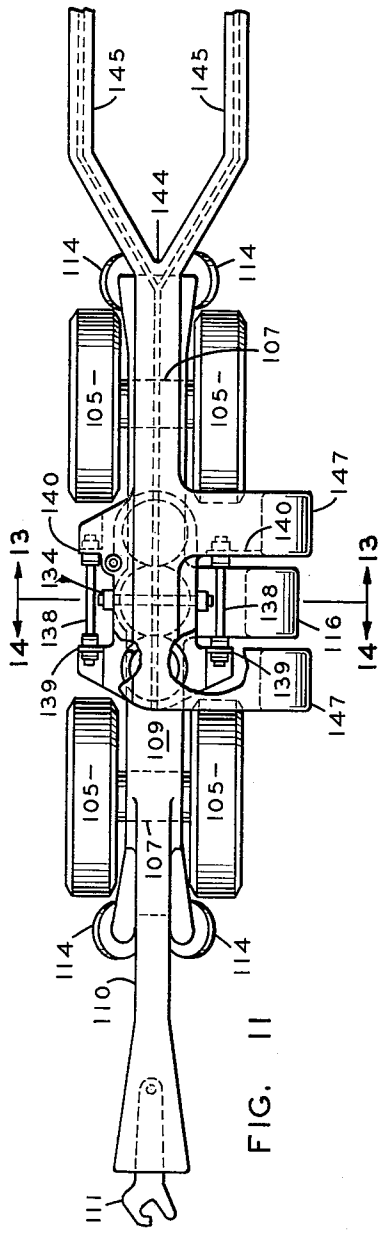


FIG. 11

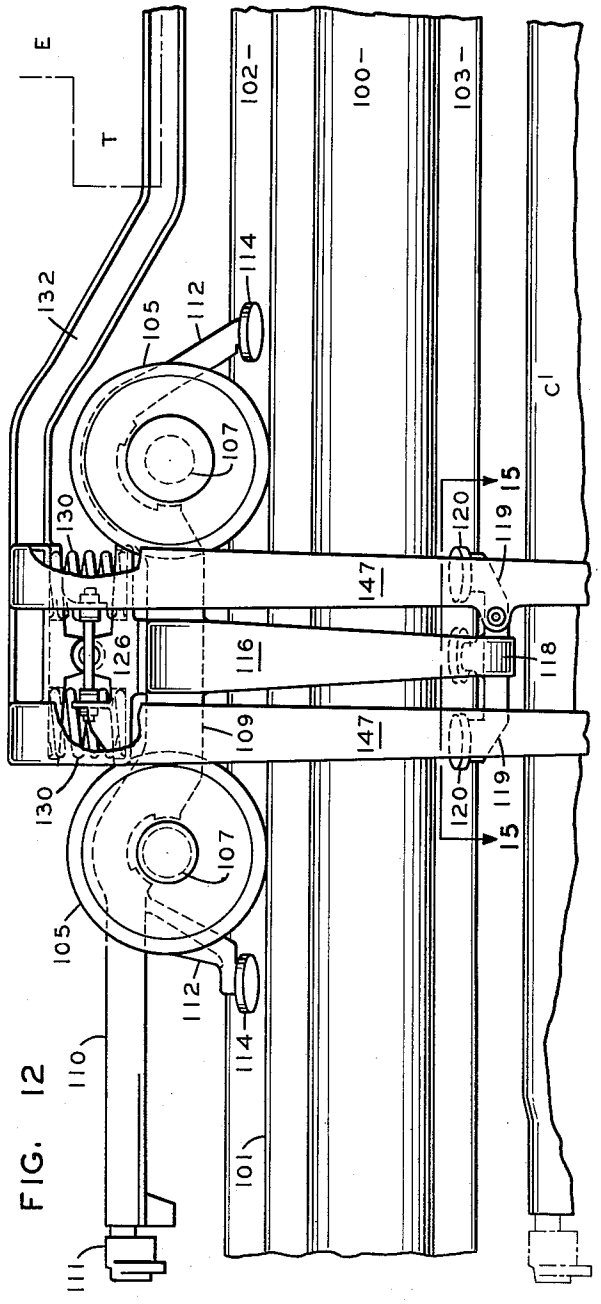


FIG. 12

INVENTOR.
RICHARD L. LICH
BY
Francis T. Burgess
ATTORNEY

June 4, 1963 R. L. LICH 3,092,039

SUSPENDED RAILWAY SYSTEMS

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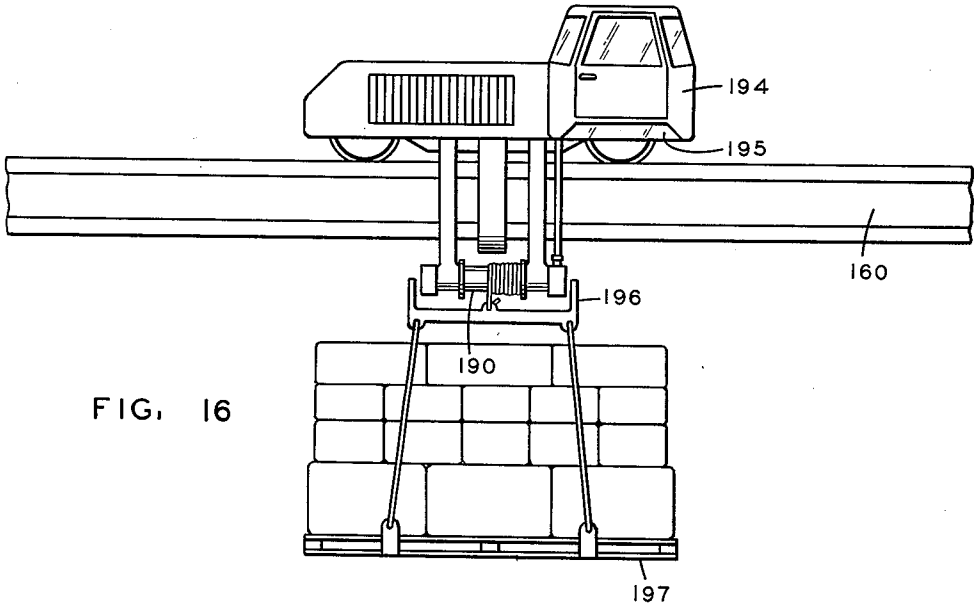


FIG. 16

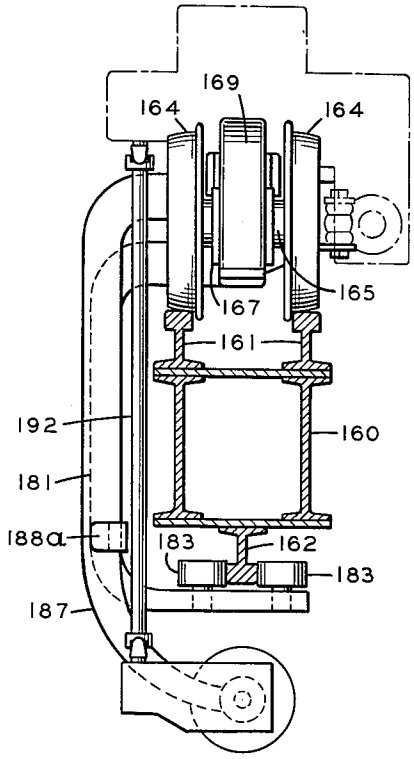


FIG. 19

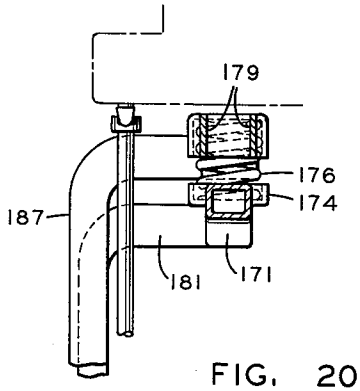


FIG. 20

INVENTOR.
RICHARD L. LICH
BY
Francis T. Burgess
ATTORNEY

June 4, 1963 R. L. LICH 3,092,039

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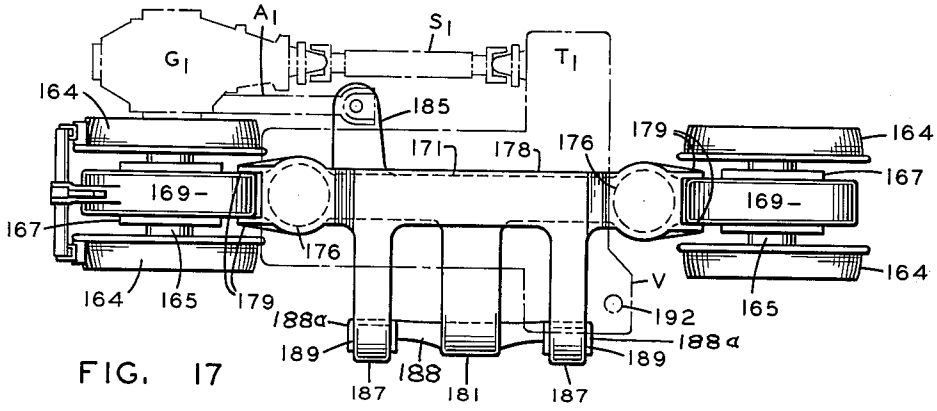


FIG. 17

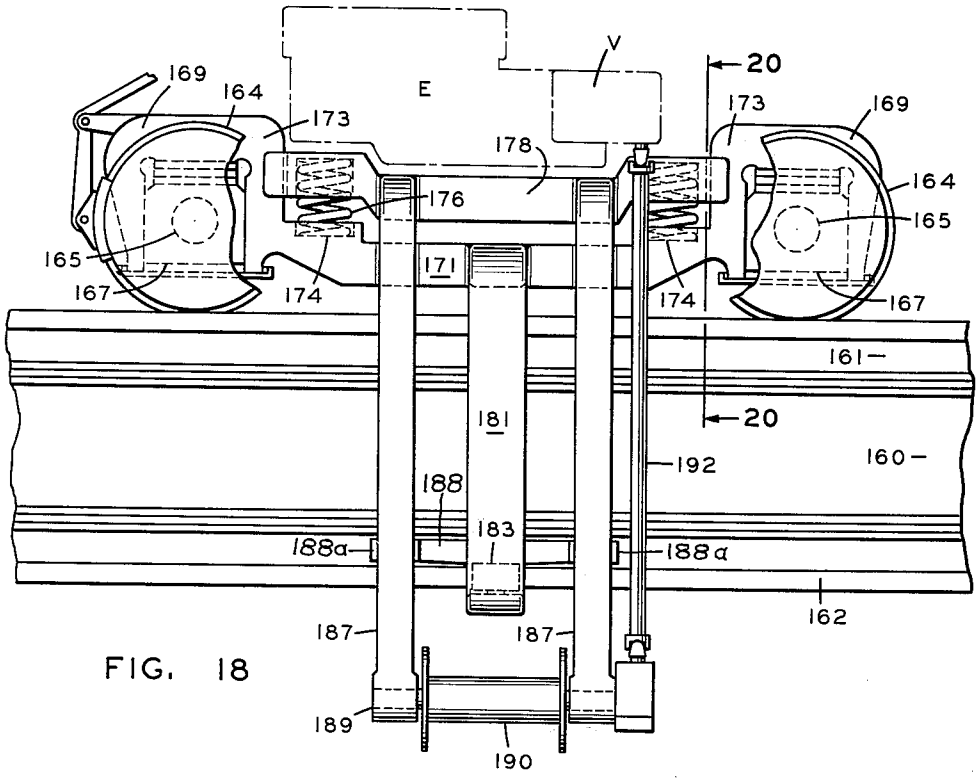


FIG. 18

INVENTOR.
RICHARD L. LICH
BY
Francis T. Burgess
ATTORNEY

United States Patent Office 3,092,039 Patented June 4, 1963

3,092,039

SUSPENDED RAILWAY SYSTEMS

Richard L. Lich, Ferguson, Mo., assignor to General Steel Industries, Inc., a corporation of Delaware

Filed July 28, 1958, Ser. No. 751,413
27 Claims. (Cl. 105—150)

The invention relates to suspended railway systems and consists particularly in novel trucks and body suspension arrangements for railway systems of the type in which the rail is elevated a substantial distance above the ground level and the cars are suspended beneath the rail.

It is a main object of the invention to provide trucks and body-suspension devices for suspended railway systems having lighter weight, better riding qualities and greater safety and stability than have been provided in earlier arrangements.

It is a further object to provide trucks for systems of this type in which the stabilizing and car body supporting functions are performed by separate elements.

It is a further object to provide a truck for this type of railway system in which the stabilizing means are rigid with the truck frame whereas the body-supporting means are spring-supported from the truck frame.

It is a further object to provide trucks for systems of this type in which the driving means is mounted directly on the truck structure.

It is a further object to provide means for accommodating and controlling lateral motion of the body relative to the truck structure and thus prevent the transmission of lateral shocks from the track structure to the car body.

These and other objectives as will appear below are attained by the structures illustrated in the accompanying drawings, in which:

FIGURE 1 is a side elevation view of a car including trucks and body-support structure according to the invention.

FIGURE 2 is an enlarged top view of the truck structure shown in FIGURE 1.

FIGURE 3 is a side elevation view of the truck illustrated in FIGURE 2.

FIGURE 4 is an end view of the truck illustrated in FIGURES 2 and 3.

FIGURE 5 is a transverse vertical sectional view of the truck shown in FIGURES 2–4, along the line 5—5 of FIGURE 3.

FIGURE 6 is a top view of a second form of the invention.

FIGURE 7 is a side elevation view of the truck illustrated in FIGURE 6.

FIGURE 8 is an end view of the truck illustrated in FIGURES 6 and 7.

FIGURE 9 is a fragmentary transverse vertical sectional view along the line 9—9 of FIGURE 6.

FIGURE 10 is a side elevation view of a third form of the invention in which the trucks are connected by an engine-supporting span bolster.

FIGURE 11 is a top view of one of the trucks and the adjacent portion of the span bolster illustrated in FIGURE 10.

FIGURE 12 is a side elevation view of the structure illustrated in FIGURE 11.

FIGURE 13 is a transverse vertical sectional view along the line 13—13 of FIGURE 11.

FIGURE 14 is a fragmentary transverse vertical sectional view along the line 14—14 of FIGURE 11.

FIGURE 15 is a horizontal sectional view along the line 15—15 of FIGURE 12.

FIGURE 16 is a side elevation view of a fourth form of the invention in which a winch and an associated pallet is substituted for the passenger car body.

FIGURE 17 is a top view of the truck structure illustrated in FIGURE 16.

FIGURE 18 is a side elevation view of the truck illustrated in FIGURE 17.

FIGURE 19 is an end view of the truck illustrated in the FIGURES 17 and 18.

FIGURE 20 is a transverse vertical sectional view along the line 20—20 of FIGURE 18.

Referring to the drawings, the system shown in FIGURES 1–4 includes a rail R of vertically-elongated cross section having a flat horizontal top and vertical sides adjacent the top, the sides converging intermediate the top and the bottom and terminating in vertical portions forming a relatively narrow bottom portion of the rail. At one side the rail is supported from posts or columns (not shown) by brackets B spaced apart through its length at suitable distances and merging with the sloping sides of the rail intermediate its top and bottom portions.

The truck includes a pair of pneumatic-tired wheels 2 adapted to roll on the upper surface of rail R, axles 4 associated with wheels 2, and a longitudinal frame member 5 mounted on axles 4 at one side of wheels 2 and extending longitudinally therebetween. Frame member 5 is formed with a transversely extending portion 7 between wheels 2, transverse portion 7 being formed with an upwardly open cup-like recess 9 adapted to supportingly receive a spring which will be described below. Adjacent the journal portions, longitudinal frame member 5 is formed with depending brackets 10 each mounting, on a vertical pivot axis, a small pneumatic-tired wheel 12, and at the other side of the truck transverse member 7 is formed with a pair of diagonally extending brackets 14, 14, each similarly mounting a pneumatic-tired wheel 12, wheels 12 being adapted to engage the upright sides of the rail R and thus guide the truck along the rail. Intermediate the ends of the truck, transverse frame member 7 is formed, at the opposite side of the wheels from longitudinal frame member 5, with a depending U-shaped bracket member 16 which supports at its lower extremity a transverse member 18 to the end of which are pivotally secured, on vertical axes, a pair of pneumatic-tired wheels 20 arranged to engage the opposite sides of the narrow base of rail R. From the foregoing it will be seen that the truck is supported on the rail R by means of supporting wheels 2, is guided thereon by guiding wheels 12, and is stabilized against overturning with respect thereto by means of stabilizing wheels 20.

Longitudinal frame member 5 mounts, on its outboard side, a pair of longitudinally extending motors 22 which, through right angle gear boxes 23, drive axles 4 for propulsion of the truck.

A pneumatic spring comprising a lower casing 25 seated in frame recess 9, an intermediate flexible wall member 26, and an upper casing 27, mounts a bolster member 29 which includes a downwardly-open spring cap recess 30 in which upper casing 27 is received, and an upwardly-open cylindrical recess 31 which is adapted to form the pivot portion of a central bearing of the type described in Patent No. 2,655,117 to James C. Travilla. The cylindrical side wall of bolster 29 terminates at its lower and upper ends in horizontal peripheral outward flanges, of which the upper flange 32 forms the horizontal portion of a central bearing as described in the above-mentioned patent, the cylindrical recess being provided with a vertical sleeve 33 of friction material and the horizontal flange 32 being provided with a horizontal annular pad 34 of friction material.

Bolster 29 is restrained against movement transversely

of the truck by a pair of transversely extending links 35 pivotally secured to the bolster at its ends and to upstanding brackets 37 on frame brackets 16. Longitudinal movements of bolster 29 relative to the frame are prevented by a similar longitudinally extending link 38 pivotally secured at one end to the bolster and at the other end to a frame bracket 40.

A body hanger 41 having a generally L-shaped upper portion terminating in a horizontal arm 42, which is provided on its lower surface with an upright depending cylindrical web 44 received within the cylindrical recess 31 of bolster 29, and a flat downwardly facing annular surface 45 surrounding web 44 and seated on friction pad 34, whereby body hanger 41 may pivot relative to bolster 29, pivotal movement being damped by the friction sleeve and pad.

Body hanger 41 includes a delta-shaped lower portion consisting of arms 46 which converge at their upper ends and merge with the lower end of the L-shaped upper portion. The arms 46, 46 of the delta-shaped portion are secured at their lower ends to the roof framing of a car body C.

For controlling and yieldably resisting lateral movements of car body C, its roof framing is formed with a pair of transversely spaced upwardly-extending brackets 49 in transverse alignment with a bracket 50 depending from truck stabilizing bracket transverse member 18, and a closed flexible wall multiple convolution bellows 51 is interposed between adjacent opposing faces of brackets 49 and 50.

A second form of the invention is shown in FIGURES 6–9, in which the track comprises a built-up box girder 55, to the top of which is secured a conventional T-rail 56 and to the bottom of which is secured a depending rail 57 of rectangular cross section.

The truck comprises a pair of double-flanged wheels 58 supported on track 56 and each having an axle 59, axles 59 being journaled at their ends at journal boxes 60. A frame, of H-shape in plan, includes a pair of longitudinally extending side members 61, 61 connected by a transverse transom member 62 intermediate the wheels. Side members 61 each comprise a pair of pedestal jaw portions 63 connected by a longitudinal member 64. Journal boxes 60 are vertically slidably received in the pedestal jaws, there being rubber cushions interposed between the upper surface of the journal boxes and the opposingly downward surface of the pedestal jaws.

At one side, side member 61 is formed with a pair of depending legs 66 each formed with a horizontal extension 67 at its lower end, which merge in a single transverse bracket 68 underlying the track structure and supporting, at either side of bottom rail 57, a pair of small pneumatic-tired wheels 69, on vertical pivot axes, wheels 69 being adapted to engage the opposite sides of bottom rail 57 for stabilizing truck frame 61, 62, 63, 64 against transverse tilting.

The longitudinally inwardly facing surface 71 of pedestal jaw portions 63 of the frame side members 61 are upright, and immediately adjacent them the longitudinal beam portions 64 of the frame side members are formed with upwardly facing spring seats 73, in which are seated upright coil springs 75. A bolster member 77 of generally H-shape is mounted on coil springs 75 and is provided with right angle surfaces 79 at the terminals of its longitudinally extending side portions 81, for engagement with adjacent upright transverse surfaces 71 and longitudinal outer surfaces of side members 61 whereby to prevent relative longitudinal or transverse movements of the bolster relative to the frame while freely accommodating vertical movement of the bolster on the supporting coil springs 75. At one side bolster 77 is formed with an outboard bracket 83 from which is supported a traction motor 85. A Cardan shaft 86 connects motor 85 to a right angle driving gear box 87, which is operatively connected to the adjacent axle 59, torque reactions on the driving gear box 87 being taken by a torque arm 89 connected at one end to the gear box and at the other end to a bracket 90 on bolster 77.

A body-supporting hanger 92 is pivotally supported on top of bolster 77 by a central bearing generally indicated at 93 and of substantially identical construction to the central bearing illustrated 31, 32, 44, 45 in FIGURE 5. To provide for symmetrical loading of the truck, the lower portion 95 of body hanger 92 curves inwardly and terminates directly below the track center line. For damping lateral movements of the body hanger 92 and the car body relative to the truck a pair of transverse frictional snubbers 96 of conventional design are connected at their one end to brackets 97 depending from stabilizing bracket 68 and at their other end to brackets 98 on body-supporting hanger 92.

The third embodiment of the invention, illustrated in FIGURES 10–15 includes a beam 100 of circular cross section, supporting, on its top a horizontal roadway 101 provided with a central guiding rail 102 of inverted V cross section. A similar guiding rail 103 is provided on the bottom of beam 100. The truck comprises two pairs of pneumatic-tired wheels 105, each pair being mounted on an axle 107, and a longitudinally extending single-beam frame 109 supported on axles 107 between the wheels at opposite sides of the truck. At one end frame 109 is formed with a draft gear extension 110 which mounts a coupler 111 for coupling the truck and associated structure to an adjacent truck and its associated car structure. At its ends frame 109 is formed with a pair of diverging and depending brackets 112, each of which supports a small wheel 114, the axes of which are parallel to the opposite sides of V-shaped guiding rail 102 whereby the guiding wheels 114 are adapted to engage the opposite faces of rail 102 and guide the truck along the track. For stabilizing the truck against overturning, frame 109 is formed at one side with a hook-like bracket 116 which terminates in a trifurcated end portion 118 underlying the rail 100. Two of the trifurcations 119, 119 lie on one side of the bottom stabilizing V-shaped rail 103 and support, on pivot axes parallel to the adjacent inclined face of rail 103, a pair of small stabilizing wheels 120 similar to guiding wheels 114. The central trifurcation 121 extends to the opposite side of stabilizing rail 103 and similarly pivotally mounts a stabilizing wheel 120 adapted to engage the adjacent face of rail 103. Thus the truck frame is supported, guided, and stabilized against tilting on track structure 100, 101, 102.

Truck frame 109 is formed intermediate its ends with a central bearing comprising a vertical cylindrical recess 122 and a substantially flat horizontal annulus 123 surrounding recess 122, there being a pad of friction material 124 seated on horizontal surface 123. A bolster member 126 is formed with a co-operating cylindrical element 127 pivotally received within cylindrical recess 122, and a downwardly facing annular surface 128 surrounding cylinder 127 and seated on pad 124 whereby to permit pivotal movement of the bolster relative to the truck frame while at the same time damping any tendencies of the bolster to oscillate on the truck frame. Bolster 126 is elongated longitudinally of the truck and is provided at its ends with seats for longitudinally spaced coil springs 130. A span bolster 132 is supported on springs 130 of a pair of similar trucks, as best seen in FIGURE 10. For preventing relative lateral movement between span bolster 132 and truck bolster 126, a transverse anchor 134 of the type described in Reissue Patent No. 21,987, is connected at its one end to an upstanding bracket 135 on bolster 126 and at its other end to a depending bracket 136 on span bolster 132. For preventing relative longitudinal movements between span bolster 132 and truck bolster 126 a pair of longitudinally-extending anchors 138 of similar design are connected at their one end to

upstanding transverse brackets 139 on bolster 126 and depending transverse brackets 140 on span bolster 132. Intermediate the trucks, span bolster 132 is depressed and is widened by diverging it as at 144 into a pair of parallel transversely-spaced side sills 145, between which an engine E with suitable transmissions T may be supported, transmissions T being connected to the adjacent axles 107 by suitable driving shafts S and right angle gear boxes G. Adjacent the spring locations span bolster 132 is provided with a pair of depending L-shaped arms 147 at one side, arms 147 being attached at their lower end to the roof framing of a car body C'. For stabilizing the car body against excessive lateral movements a transverse anchor 148 is secured to body hanger 147 by means of a bracket 150 and at its other end is secured by means of a bracket 151 to the horizontal lower portion of stabilizing arm 116.

A fourth embodiment of the invention, illustrated in FIGURES 16–20 includes a beam 160 of box section on the top of which is supported a pair of transversely-spaced T-rails 161 and from the bottom of which depends a single central T-rail 162. The truck comprises two longitudinally-spaced pairs of laterally-spaced flanged wheels 164 and associated axles 165, a journal box 167 rotatably mounted on each of said axles between the wheels and a frame comprising a pair of longitudinally-spaced pedestal jaws connected to each other by a depressed longitudinally extending box section beam 171. The frame 169, 171 is supported on the journal boxes 167 by means of rubber cushions whereby to cushion some of th track shocks and reduce noise. Adjacent inboard upright legs 173 of pedestal jaws 169, spring seats 174 are formed on beam portion 171. Upright coil springs 176, seated in seats 174, support longitudinally-extending drop center bolster 178, the ends of which are provided with flanges 179 engageable with the sides of pedestal legs 173 whereby to prevent lateral movement of the bolster relative to the truck means. For stabilizing the truck frame against tilting on its longitudinal axis, it is provided at one side with a downwardly-extending U-shaped bracket 181, the lower horizontal leg of which supports, on vertical pivotal axes, a pair of laterally-spaced stabilizing wheels 183, which are adapted to engage opposite sides of the head of inverted stabilizing rail 162.

Intermediate the spring-supported end portions, bolster 178 is depressed and an engine E, provided at one side with a longitudinally-extending transmission T_1 which in turn is connected by a Cardan shaft S_1 to an axle mounted driving gear box G_1 on one of the axles 165, gear box G_1 being held against rotation by the usual torque arm A_1 connected to a bracket 185 on frame member 171. Bolster 178 is provided with a pair of longitudinally spaced transversely-extending and depending arms 187, the lower ends of which are curved inwardly so as to immediately underlie the center of the track supporting beam 160. For preventing excessive swinging transversely of the truck by arms 187, bracket 181 is provided, near its lower end, with a horizontal, longitudinally-extending element 188 which terminates in vertically disposed channel-like ends 188*a*, in which arms 187 are vertically slidably received. The lower terminals of members 187 include bearings 189, for the journal portions of a longitudinally-extending winch 190 which is power-operated by means of a vertical Cardan shaft 192 connected to a vertical transmission V on the engine E. As best seen in FIGURE 16 this truck is adapted to operate as a single unit and is provided with a small operator's cab 194 having windows 195 in its floor portion as well as 360 degrees of horizontal vision. Winch 190 may be utilized to support, by means of a yoke 195, a load-supporting pallet 197. This embodiment of the invention is chiefly adapted for use in industrial plants and for general freight haulage where the lading may be picked up from a lower level surface, transferred to another location and set down with the minimum of effort, all operations except the attachment of the pallet to the yoke being performed by the operator with ease by virtue of the full visibility afforded by the cab structure.

The invention may be modified in various respects as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claims is contemplated.

What is claimed is:

1. In a railway truck, spring-supporting structure including wheels spaced apart longitudinally of the truck and adapted to roll on an upper surface of a rail and a rigid truck frame having an upper portion supported from said wheels and adapted to overlie the rail and a depending portion adapted to underlie the rail, first means on said spring-supporting structure at approximately the level of said wheels and arranged for engagement with opposite sides of the rail, and second means carried by said depending portion at a level substantially lower than said wheels and arranged for constant engagement with opposite sides of the rail, and rigid load-supporting structure spring-supported at a level higher than the rail on said frame upper portion and extending transversely outwardly and downwardly therefrom and having a portion adapted to underlie the rail for rigid connection to a car body.

2. In a railway truck, spring-supporting structure including wheels spaced apart longitudinally of the truck and adapted to roll on an upper surface of a rail and a rigid truck frame having an upper portion supported from said wheels and adapted to overlie the rail and a depending portion adapted to underlie the rail, first means on said spring-supporting structure at approximately the level of said wheels and arranged for engagement with opposite sides of the rail, and second means carried by said depending portion at a level substantially lower than said wheels and arranged for constant engagement with opposite sides of the rail, and rigid load-supporting structure spring-supported at a higher level than the rail and pivoted on a vertical axis on said frame upper portion and extending transversely outwardly and downwardly therefrom and having a portion adapted to underlie the rail for rigid connection to a car body.

3. In a railway truck, spring-supporting structure including wheels spaced apart longitudinally of the truck and adapted to roll on an upper surface of a rail and a rigid truck frame having an upper portion supported from said wheels and adapted to overlie the rail and a depending portion adapted to underlie the rail, first means on said spring-supporting structure at approximately the level of said wheels and arranged for engagement with opposite sides of the rail, and second means carried by said depending portion at a level substantially lower than said wheels and arranged for constant engagement with opposite sides of the rail, rigid load-supporting structure spring-supported at a level higher than the rail on said frame upper portion and extending transversely outwardly and downwardly therefrom and having a portion adapted to underlie the rail for rigid connection to a car body, and means restraining said load-supporting structure against lateral and longitudinal movement relative to its support on said frame upper portion.

4. In a railway truck, wheels spaced apart longitudinally of the truck and adapted to roll on an upper surface of a rail, a rigid truck frame having an upper portion supported from said wheels and adapted to overlie the rail and a depending portion adapted to underlie the rail, said depending portion mounting antifriction devices adapted for constant engagement with opposite sides of the rail, load-supporting structure spring-supported at a level higher than the rail on said frame upper portion and extending transversely outwardly and downwardly therefrom and having a portion adapted to underlie the rail for rigid connection to a vehicle body, and means restraining lateral movement of the lower end of said load-supporting structure relative to said truck and rail.

5. Structure according to claim 4 in which said lateral

restraining means are yieldable transversely of the truck whereby to permit and yieldingly resist lateral movement of the lower end of said load-supporting structure relative to said truck.

6. In a railway truck, flangeless wheels spaced apart longitudinally of the truck and adapted to roll on an upper surface of a rail, a rigid truck frame having an upper portion supported from said wheels and adapted to overlie the rail and mounting, at each side, antifriction devices adapted for engagement with opposite sides of the rail for guiding the truck on the rail, said frame having a depending portion adapted to underlie the rail and mounting similar antifriction devices adapted for constant engagement with opposite sides of the rail at a substantially lower level than said first-named antifriction devices for stabilizing the truck against tilting about a longitudinal axis, and rigid load-supporting structure spring-supported at a level higher than the rail on said frame upper portion and extending transversely outwardly and downwardly therefrom and having a portion adapted to underlie the rail for connection to a car body, said load-supporting structure and said frame depending portion being connected to each other transversely of the truck at a lower level than the bottom of the rail.

7. In a railway truck, wheels spaced apart longitudinally of the truck and adapted to roll on an upper surface of a rail, axles rigid with each of said wheels, a rigid truck frame having an upper portion supported at its ends from said axles and adapted to overlie the rail and a transversely extending portion intermediate said wheels at the same level as said wheels, structure rigidly mounted on said transversely extending portion at one side only of the truck and depending therefrom to provide a lower portion adapted to underlie the rail and mounting antifriction devices adapted for constant engagement with opposite sides of the rail, a spring seated on said transversely-extending portion, a cap carried by said spring, a rigid load-supporting structure supported on said cap and pivoted thereto about a vertical axis, said load-supporting structure extending transversely and downwardly from said cap and having a portion adapted to underlie the rail for rigid connection to a vehicle body.

8. In a railway truck according to claim 7, means restraining relative lateral and longitudinal movement between said spring cap and said truck frame while permitting reltaive vertical movements therebetween.

9. In a railway truck according to claim 8, said means comprising, respectively, longitudinally and laterally extending links pivotally connected at their ends to said frame and said spring cap.

10. In a railway truck, wheels spaced apart longitudinally of the truck and adapted to roll on an upper surface of a rail, axles rigid with said wheels, a rigid truck frame having an upper portion supported at its ends from said axles on one side of said wheels and adapted to overlie the rail and a transversely-extending portion intermediate said wheels, said transversely-extending portion including a depending extension having a lower portion adapted to underlie the rail and mounting antifriction devices adapted for constant engagement with opposite sides of the rail, brackets extending transversely from said frame upper portion, and mounting, at either side of said wheels, additional antifriction devices engageable with opposite sides of the rail at a higher level than said first named antifriction devices, and rigid load-supporting structure spring-supported at a level higher than the rail on said frame upper portion and extending transversely outwardly and downwardly therefrom and having a portion adapted to underlie the rail for connection to a car body, said load-supporting structure and said depending extension being connected to each other at a level substantially below the bottoms of said wheels.

11. In a railway truck, pairs of pneumatic-tired wheels spaced apart longitudinally and adapted to roll on an upper surface of a rail, axles mounted on said wheels, a rigid frame comprising a single longitudinally-extending beam supported on said axles between said wheels and adapted to overlie the rail and a transversely-extending and depending element rigid with said beam and having a lower portion adapted to underlie the rail, said depending element mounting antifriction devices adapted for constant engagement with opposite sides of the rail at a level substantially lower than the bottoms of said wheels, a bolster member pivotally supported on said beam on a vertical axis intermediate said wheels, upright springs spaced apart longitudinally of the truck and seated on said bolster member, and rigid load-supporting structure supported on said springs and extending transversely outwardly in one direction and downwardly therefrom and having a portion adapted to underlie the rail for rigid connection to a car body.

12. A railway truck according to claim 11 in which the load-supporting structure includes a longitudinally-extending span bolster adapted to be similarly supported on a similar truck on its other end and to support driving means intermediate said trucks.

13. A railway truck according to claim 12 in which said depending element is substantially midway between said axles and said load-supporting structure comprises a pair of upright members spaced apart longitudinally of the truck on either side of said first-named depending element.

14. A railway truck according to claim 13 in which a transversely-extending anchor is resiliently connected at its ends to the lower end portions of said depending element and said load-supporting structure.

15. A railway truck according to claim 11 in which said beam is provided at each end with diverging brackets supporting inclined guiding wheels adapted to engage upwardly and inwardly inclined surfaces of the rail above the load-supporting horizontal portion thereof.

16. A railway truck according to claim 11 in which said beam is formed with a longitudinally-extending draft extension.

17. A railway truck according to claim 11 in which longitudinally and transversely-extending links are pivotally connected at their one ends to said bolster member and at their other ends to said load-supporting structure for preventing relative longitudinal and lateral movement therebetween while accommodating vertical movements of said load-supporting structure on said springs.

18. In a railway truck, pairs of flanged wheels spaced apart longitudinally and adapted to roll on the upper surface of a rail, axles rigid with said wheels, a rigid frame comprising a single longitudinally-extending beam having end portions supported on said axles between said wheels and adapted to overlie the rail and a transversely-extending and depending element rigid with said beam and having a lower portion adapted to underlie the rail, said depending element mounting antifriction devices adapted for constant engagement with opposite sides of the rail, and a rigid member spring-supported directly on said frame and including a pair of longitudinally-spaced transversely extending and depending elements having a load-supporting lower portion adapted to underlie the rail.

19. A truck according to claim 18 in which the axle supported end portions of said frame are higher than the intermediate portion of said frame, said end portions having substantially upright transverse surfaces adjacent the intermediate portion, said spring-supported member having ends formed with upright recesses and vertically slidably receiving therein the upright surfaces of the end portions of said frame whereby to accommodate vertical movement of said load-supporting structure on said springs while preventing movement of said load-supporting structure transversely and longitudinally relative to said truck frame.

20. A railway truck according to claim 19 in which said load-supporting lower portions of said elements pivotally

support a winch on a horizontal axis and an engine is mounted on said spring-supported member and includes vertical and longitudinal transmission devices, said horizontal transmission device being connected to one of said axles and said vertical torque transmission device being connected to said winch.

21. A railway vehicle comprising a pair of trucks spaced apart longitudinally and pivotally and resiliently mounting a span bolster, each of said trucks including laterally spaced wheels, axles, a frame between said laterally-spaced wheels, said frame having a draft extension and a depending element intermediate the wheels thereof adapted to underlie the rail and mounting at its lower end portion anti-friction devices adapted to engage opposite sides of the rail, body-supporting structure extending transversely outwardly in one direction from said span bolter and depending therefrom and supporting a car body at its lower end, and a transverse connection between said body-supporting structures and said depending elements for preventing relative lateral movement therebetween.

22. In a railway vehicle, a truck comprising wheels spaced apart longitudinally and adapted to roll on an upper surface of a rail, a truck frame supported from said wheels and having a depending portion adapted to underlie the rail, said depending portion mounting anti-friction devices adapted for engagement with opposite sides of the rail, load-supporting structure spring-supported on said frame and extending transversely outwardly and downwardly therefrom, a car body rigidly secured to the lower ends of said load-supporting structures and including a pair of laterally-spaced upright members beneath said truck frame depending portion, a bracket depending from said truck frame depending portion intermediate said upright members, and resilient means interposed between said brackets and each of said upright members.

23. In a railway truck according to claim 22 in which each of said resilient means comprises a closed transversely extending flexible wall chamber of bellows-like construction.

24. In a railway truck, a pair of double-flanged wheels spaced apart longitudinally of the truck and adapted to roll on an upper surface of a rail, axles rigid with each of said wheels, a truck frame including transversely-spaced longitudinally-extending side members supported at their ends from said axles, a transverse member connecting said side members intermediate said wheels, said side members being relatively high at their axle-mounted end portions and each including a substantially straight portion at a lower level than said end portions and above the bottoms of said wheels connecting said axle-mounted end portions, the surfaces of said axle-mounted end portions adjacent said low-level portions being substantially upright, one of said low-level portions being formed with depending structure adapted to underlie the rail and mounting anti-friction devices adapted to engage opposite sides of the rail, springs seated on said low-level portions, a bolster member supported on said springs and rectangularly recessed at the portions adjacent said upright surfaces of said side member end portions for vertical slidable engagement therewith, and load supporting structure supported on said bolster and pivoted on a vertical axis relative thereto, said load-supporting structure extending transversely outwardly in one direction and downwardly from said bolster.

25. A railway truck according to claim 24 in which a transversely-extending shock absorber connects said load-supporting structure and said depending frame portion below the level of said rail for damping swing movements of said load-supporting structure relative to the other truck structure.

26. A railway truck according to claim 24 in which a motor is supported from said bolster outboard of the end of one of said axles and a right angle drive gear box is journaled on the opposite axle, there being a Cardan shaft connecting said motor and said gear box.

27. A railway truck according to claim 24 in which said side member depending structure comprises a pair of upright members spaced apart longitudinally of the truck, and said load-supporting structure consists of a single upright member normally centered longitudinally of the truck between said first-named upright members.

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