United States Patent

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[54] **MOTORIZED RAILWAY VEHICLE TRUCKS**
16 Claims, 9 Drawing Figs.

[52] **U.S. Cl.** **105/182,**
105/133, 105/197, 105/199, 105/200, 105/208.2
[51] **Int. Cl.** **B61f 3/01,**
B61f 5/10, B61f 5/16
[50] **Field of Search** 105/182,
196, 197, 197D, 198, 199, 200, 202, 208, 208.1,
208.2, 133, 135, 136, 138

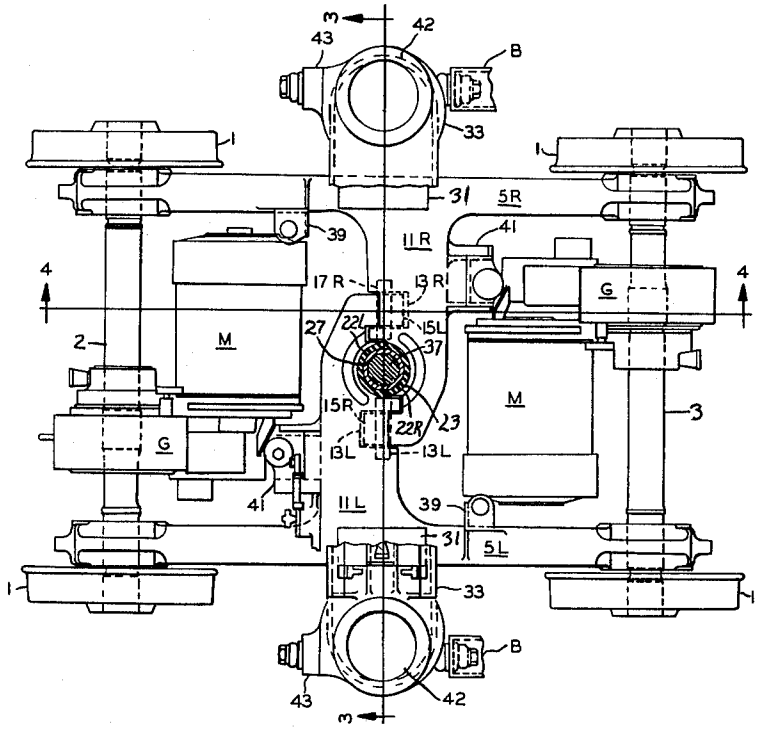
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ABSTRACT: Railway vehicle trucks comprising separate longitudinally extending side frames mounted at their ends on wheeled axles, said side frames being formed respectively with inboard projections offset lengthwise of the truck from each other and connected to each other by transverse pivot-forming means to form a vertical axis pivot recess, a transverse bolster supported on the side frames intermediate the axles and having a depending pivot element pivotally received within said recess, car body support springs mounted on said bolster, and means holding said bolster against substantial rotation relative to the supported car body.



Sheet 1 of 4

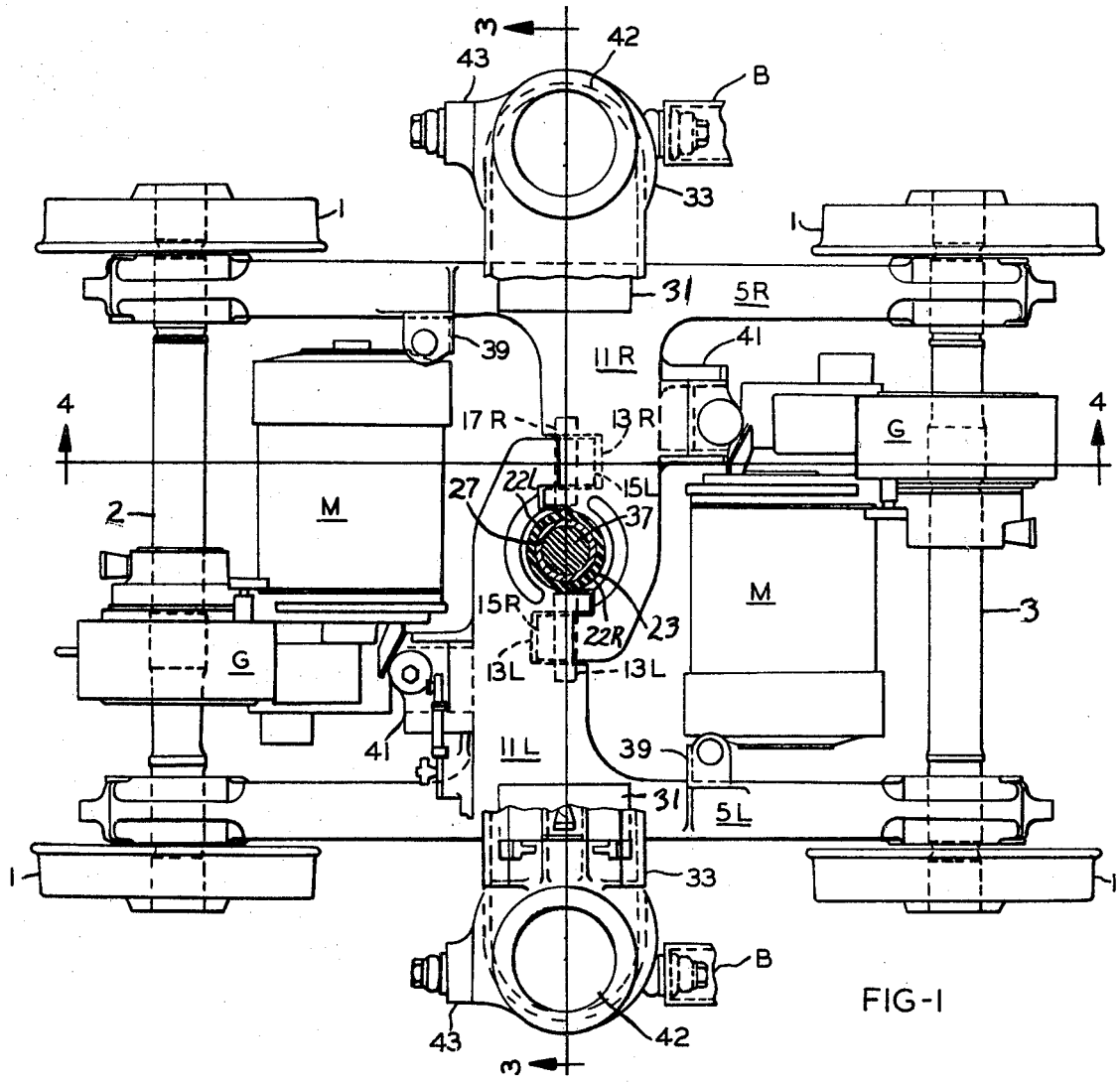


FIG-1

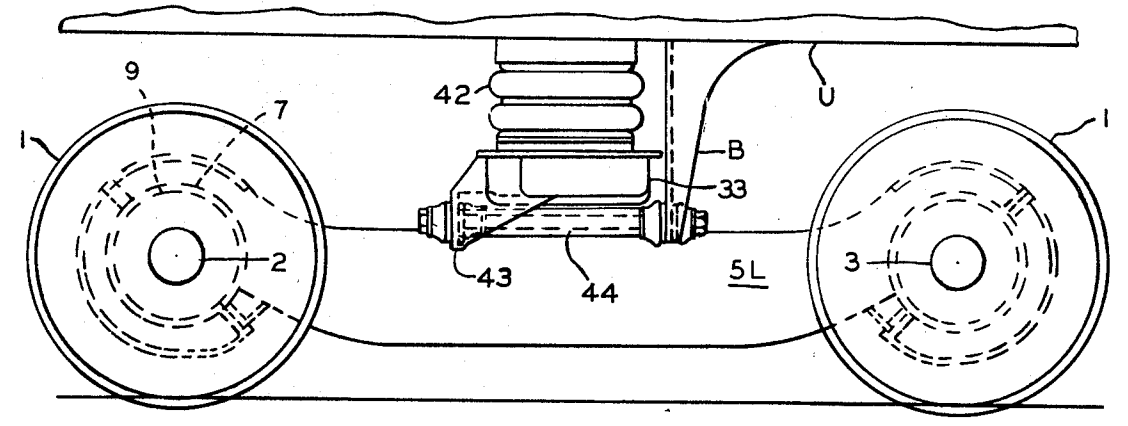


FIG-2

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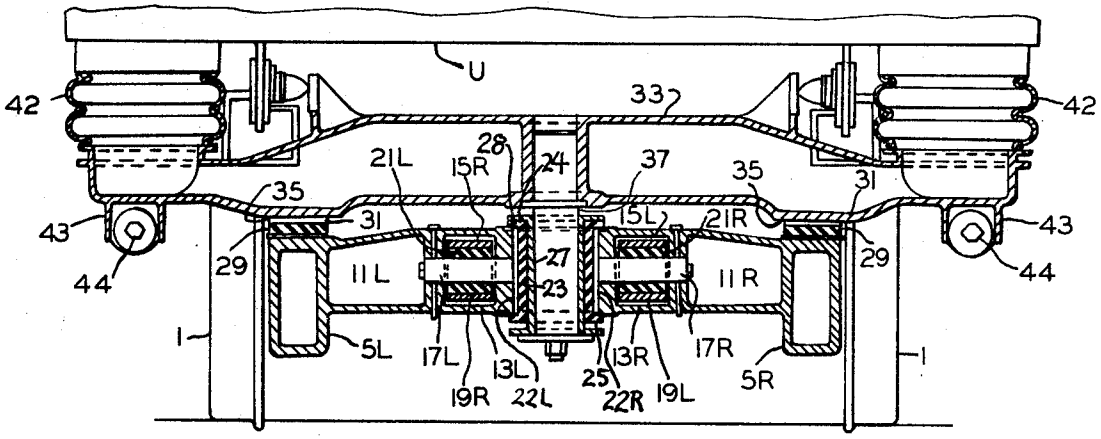


FIG-3

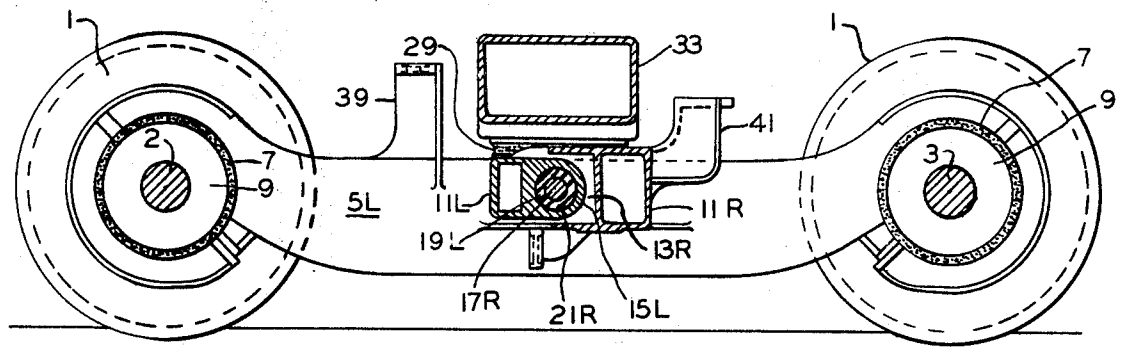


FIG-4

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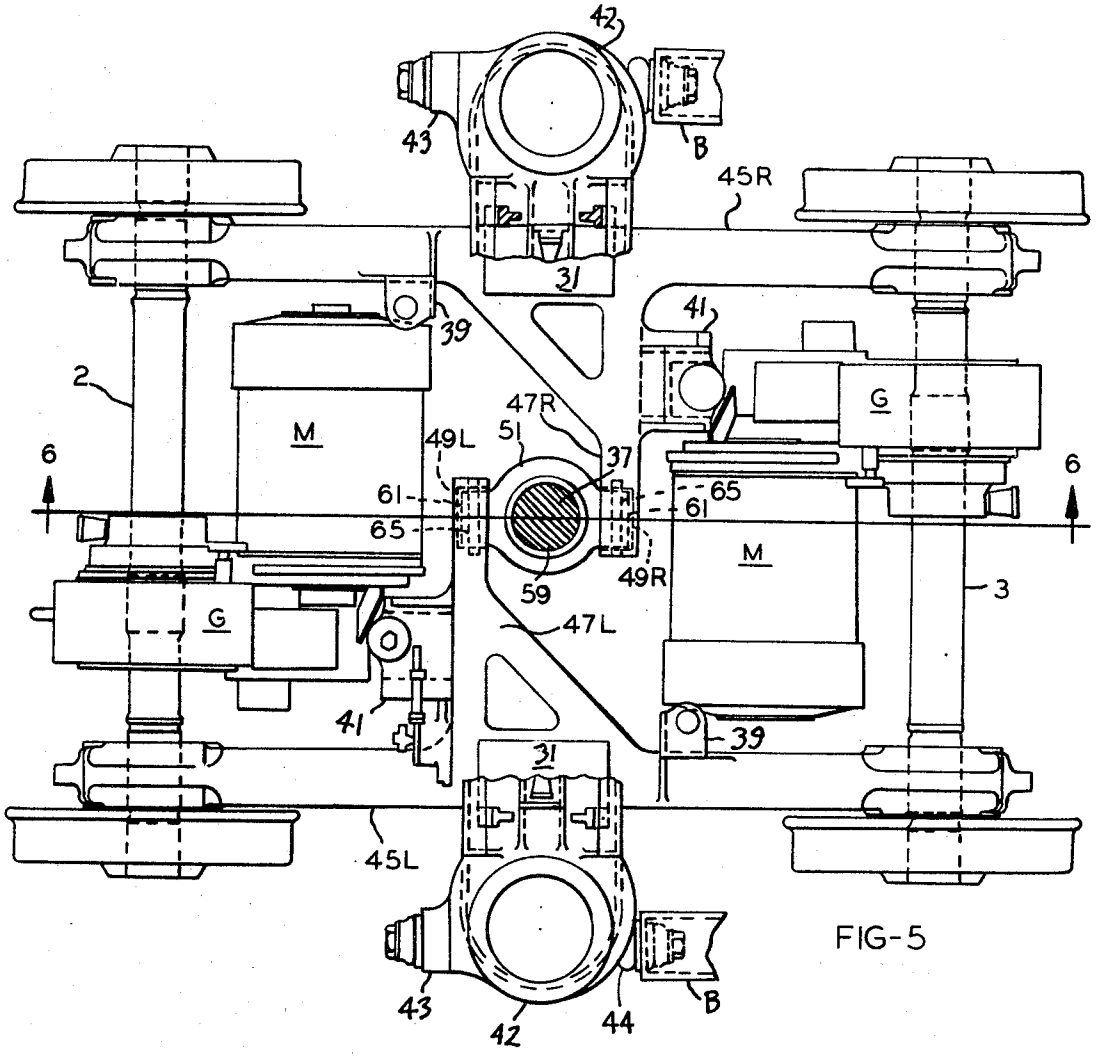


FIG-5

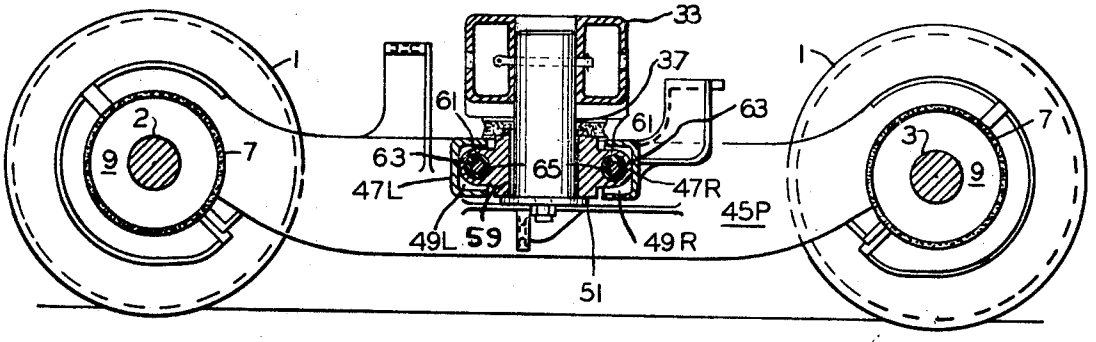


FIG - 6

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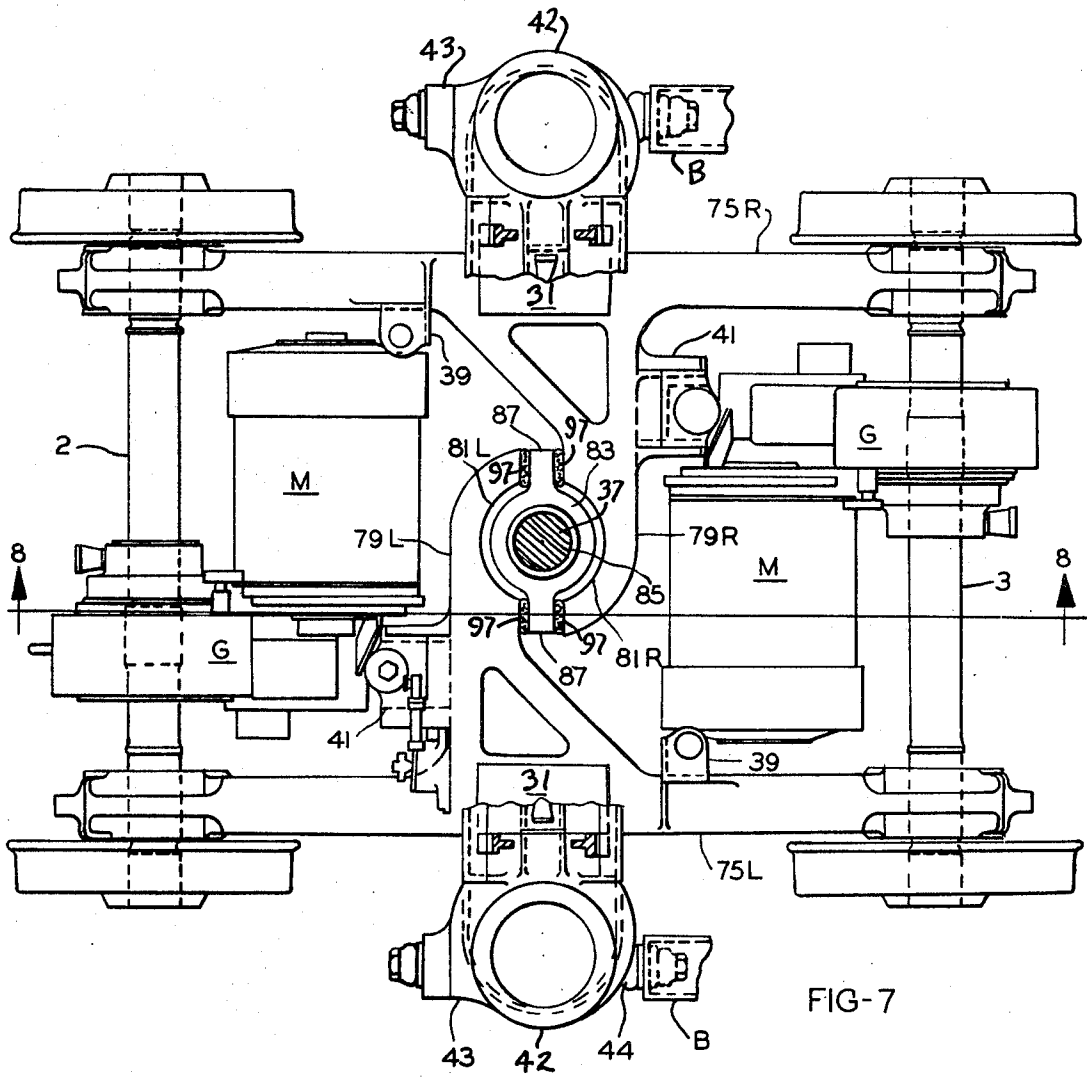


FIG-7

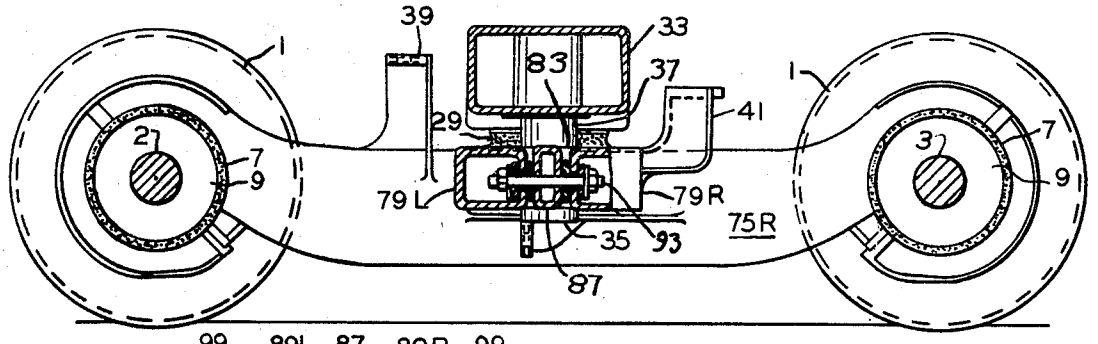


FIG-8

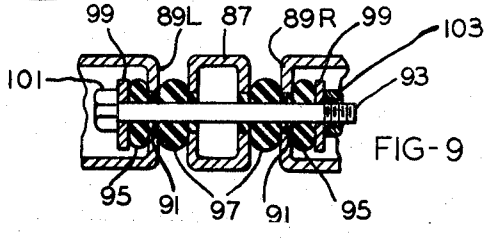


FIG-9

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MOTORIZED RAILWAY VEHICLE TRUCKS

FIELD OF THE INVENTION

The invention relates to railway rolling stock and consists particularly in four wheel trucks of the separate side frame type, in which a bolster is swivelly mounted on the truck framing and is arranged to resiliently support a car body.

SUMMARY OF THE INVENTION

The invention solves the problem of tramming a separate side frame truck of the type referred to above, by providing the side frames with inboard projections slightly offset from each other longitudinally of the truck, connecting the projections to each other by pivot elements extending transverse of the truck, and providing facing concave semicylindrical recesses in the longitudinally opposing faces of the side frame projections to accommodate relative tilting of the two side frames in their longitudinal planes.

DESCRIPTION OF THE PRIOR ART

Prior trucks in which the body-supporting bolster is pivotally supported on the framing have been of the rigid frame type as exemplified by applicant's patent 2,877,719, or of separate side frame type in which the side frames are fixed to the axle boxes and have opposing inboard projections with concave openings in their opposing longitudinal faces, in which a pivot boss from the bolster is received and prevents relative longitudinal movement between the side frames. In the latter type of truck, tram is maintained by the rigid triangular relationship of the central pivot and the axle boxes.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of a truck embodying the invention, partially horizontally sectionalized along line 1-1 of **FIG. 3**.

FIG. 2 is a side elevational view of the truck illustrated in **FIG. 1**.

FIG. 3 is a transverse vertical sectional view along line 3-3 of **FIG. 1**.

FIG. 4 is a longitudinal vertical sectional view along line 4-4 of **FIG. 1**.

FIG. 5 is a plan view of a truck embodying a modification of the invention, pivotally horizontally sectionalized like **FIG. 1**.

FIG. 6 is a fragmentary longitudinal vertical sectional view along line 6-6 of **FIG. 5**.

FIG. 7 is a plan view of a truck embodying a further modification, partially horizontally sectionalized like **FIGS. 1** and 5.

FIG. 8 is a fragmentary longitudinal vertical sectional view taken along line 8-8 of **FIG. 7**.

FIG. 9 is an enlarged fragmentary longitudinal vertical sectional view at the center of the truck, taken along line 8-8 of **FIG. 7**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

In the embodiment illustrated in **FIGS. 1-4**, the numeral **1** indicates flanged wheels arranged in spaced pairs respectively on each of axles **2** and **3**, which are spaced apart from each other longitudinally of the supporting track. Transversely inboard of wheels **1**, a pair of transversely spaced longitudinally extending side frames **5L** and **5R**, are clamped at their ends through resilient grommets **7** to journal boxes **9** rotatably mounted on axles **2** and **3** such that the axles and side frames are permitted to tilt slightly in vertical planes longitudinally and transversely of the truck with respect to each other but are restrained against relative movement in the horizontal plane.

For tying side frames **5L** and **5R** to each other, maintaining them and axles **2** and **3** in squared relation (in tram) with each other in plan, and providing a swivel center for the truck, side frames **5L** and **5R** are formed intermediate their ends with rigid transverse inboard projections **11L** and **11R** respectively constituting a transom. Projections **11L** and **11R** are partially

offset from each other longitudinally of the truck and their inboard end portions are in lapped relation with each other transversely of the truck, i.e., both extend transversely beyond the center of the truck and having transverse surfaces opposing each other longitudinally of the truck. Projections **11L** and **11R** are formed with pockets **13L** and **13R** in their opposing transverse faces on the same side of the truck as their respective side frames and the extremities of projections **11L** and **11R** form bosses **15L** and **15R** projecting longitudinally of the truck into pockets **13R** and **13L** respectively. To permit tipping of side frames **5L** and **5R** about a common transverse axis to accommodate to differing vertical irregularities in the opposite track rails, a pair of aligned tranversely extending trunnion pins **17L** and **17R** are fixed to projections **11L** and **11R** respectively and extend across pockets **13L** and **13R**. Bosses **15R** and **15L** are transversely cylindrically apertured at **19R** and **19L** respectively to pivotally receive trunnion pins **17L** and **17R**, which are surrounded by rubber bushings **21L** and **21R** to eliminate metal-to-metal contact between the trunnion pins and the boss apertures and to permit slight transverse tilting of the side frames with respect to each other.

Between pockets **13L** and **13R** and bosses **15L** and **15R**, the opposing transverse faces of projections **11L** and **11R** are formed respectively with upright concentric nearly semicylindrical recesses **22L** and **22R**, which supplement each other to form a vertical cylindrical aperture at the center of the truck.

A cylindrical bushing **23** of elastomeric material is fitted into the aperture **22L - 22R** and is formed with top and bottom annular flanges **24** and **25** engaging the top and bottom surfaces of projections **11L** and **11R** surrounding apertures **22L** and **22R**, and a cylindrical metal bearing sleeve **27** is fitted within bushing **23**. Sleeve **23** is formed with an annular flange **28** at its upper end to support it on upper flange **24** of bushing **23**. Bushing **23**, by its yieldability, accommodates pivotal movements of side frame projections **11L** and **11R**, about pivots **17L** and **17R**, with respect to each other and to metal bearing sleeve **23**.

At their midpoints side frames **5L** and **5R** mount resilient upwardly facing side bearings comprising flat elastomeric pads **29** and bearing plates **31**, and a transverse bolster **33** has downwardly facing side bearing surfaces **35** slidably seated on plates **31** to form the sole vertical supports of the bolster. The resiliency of side bearing pads **29** permits the side frames to tilt individually longitudinally of the truck without interference by the bolster and without separation of the bolster and side frame side bearing surfaces.

At its center, bolster **33** mounts a depending vertical cylindrical pivot element **37** which is pivotally received within and extends through bearing sleeve **23** in the cooperating side frame projection **11L** and **11R**.

With the arrangement described above, the side frames are permitted to tilt about a common transverse axis with respect to each other, to accommodate to vertical irregularities in the opposite track rails, by yieldability of grommets **17** surrounding the axle boxes, side bearing pads **29**, trunnion pins **17L** and **17R** and their bushings **19L** and **19R**, and main pivot bushing **23**.

The truck may include traction motors M connected to axles **2** and **3** by gear boxes G. For supporting the motor and gear box assemblies, side frames **5L** and **5R** are formed with inwardly extending brackets **39** and the side frame projections are formed with brackets **41**.

At its ends, outboard of side frames **5L** and **5R**, bolster **33** mounts upright air springs **42**, which in turn support the sides of a car underframe U. For transmitting longitudinal forces (draft and braking) between the bolster and car underframe, the bolster ends are formed with depending brackets **43**, to which are pivotally connected longitudinally extending anchor links **44**, the opposite ends of which are connected by brackets B to underframe U.

In the embodiment of the invention illustrated in **FIGS. 5** and 6, axles **2** and **3** support side frames **45L** and **45R** as in the first described embodiment. For tying side frames **45L** and

45R to each other, maintaining them and axles 2 and 3 in tram, and providing a swivel center for the truck, side frames 45L and 45R are formed intermediate their ends with rigid transverse inboard projections 47L and 47R respectively. The inner ends of projections 47L and 47R are parallel to and offset from each other a substantial distance lengthwise of the truck and are formed with pockets 49L and 49R in their opposing transverse faces. At the center of the truck, between the spaced end portions of projections 47L and 47R is positioned a pivot block member 51 having a central vertical cylindrical recess 59 and longitudinally extending ears 61, 61 which extend into projection pockets 49L and 49R respectively. Ears 61 are transversely cylindrically apertured at 63 and transverse pivot pins 65 mounted in projections 47L and 47R, and surrounded by elastomeric bushings 65, extend through apertures 63 to pivotally connect pivot block members 51 to each of side frame projections 47L and 47R and thus connect the latter to each other. It will be evident that, with this arrangement, side frame projections 47L and 47R will be held against movement longitudinally of the truck with respect to each other so that, by virtue of the connection of axles 2 and 3 to the side frames, a pair of triangles rigid in plan are formed by pivots 63 and the axle connections to the side frame, by which the truck framing is maintained substantially rigid in plan, but free to flex vertically to accommodate to vertical irregularities in the track rails.

As in the first embodiment, a transverse bolster 33 has a central depending pivot element 37 pivotally received in pivot aperture 59, and bolster 33 is supported on side frames 45L and 45R by resilient side bearings 29, 31.

In the embodiment illustrated in FIGS. 7and 8, side frames 75L and 75R are supported on axles 2 and 3 as in the previously described embodiments. For tying side frames 75L and 75R to each other, maintaining them and axles 2 and 3 in tram, and providing a swivel center for the truck, side frames 75L and 75R are formed intermediate their ends with rigid transverse inboard projections 79L and 79R respectively. The inner ends of projections 79L and 79R are offset longitudinally of the truck from each other and are spaced from each other a short distance lengthwise of the truck. Their opposing transverse faces are formed with opposed arcuate recesses 81L and 81R respectively concentric with the center of the truck, and a circular pivot block member 83 is positioned between recesses 81L and 81R. Pivot block 83 is of annular shape in plan with a central vertical cylindrical recess 85 and transversely extending ears 87 interposed between the opposing transverse webs 89L and 89R of side frame projections 79L and 79R. Webs 89L and 89R at both sides of recesses 81L and 81R are circularly perforated at 91 and ears 87 of pivot block 83 are similarly perforated. Bolts 93 of substantially less diameter than the perforations extend through the aligned perforations on both sides of the pivot block and mount on their protruding ends annular rubber pads 95 abutting adjacent surfaces of webs 89L and 89R and additional elastomeric pads 97 between webs 89L and 89R respectively and the opposing transverse faces of ears 87. Washers 99 between the bolt head 101 and nut 103 respectively and the adjacent pads 95 hold all the pads under compression provided by nut 103. To space bolt 93 from the perforation surfaces pads 95 and 97 are formed with annular ribs 91 around their central openings, which extend into the perforations and function as bushings therein. By means of bolt 93 and the associated pads side frame projections 79L and 79R are connected to each other and to pivot block 83 against relative movement longitudinally of the truck and pivot block 83 is supported from projections 79L and 79R, while tilting movements of the side frame projections and the side frames longitudinally of the truck is permitted in accordance with vertical irregularities in the track rails.

As in the other embodiments, a transverse bolster 33 has a central pivot element 37 pivotally received in pivot aperture 85 and is supported on side frames 75L and 75R by resilient side bearings 29, 31.

I claim:

1. In a railway vehicle truck, a pair of wheeled axles, separate transversely spaced longitudinally extending side frames at each side of the truck supported at their opposite ends on said axles, each of said side frames having a transversely extending inboard projection, said inboard projections being offset from each other longitudinally of the truck and having portions in lapped relation with each other transversely of the truck, pivotal connections between the lapped portions of said side frame inboard projections permitting said projections to pivot relative to each other substantially about a common transverse axis, said side frame projections cooperating to provide a vertical axis pivot bearing at the center of the truck between said lapped portions, a transverse bolster slidably supported on said side frames and having a pivot element cooperating with said bearing to form a swivel center for said bolster with respect to said truck, upright spring means carried by said bolster ends for supporting a vehicle body, and means for connecting said bolster to a supported vehicle body for preventing swivel movements between said bolster and the body but permitting vertical and transverse action of said spring means.

2. In a railway vehicle truck according to Claim 1, the lapped portions of said side frame projections having transverse faces opposing each other longitudinally of the truck and concentric arcuate recesses in said opposing faces.

3. In a railway vehicle truck according to Claim 2, the pivotal connection between said projections comprising transversely extending pivot members disposed at both sides of said arcuate recesses.

4. In a railway vehicle truck according to Claim 3, each of said side frame projections having a pocket in its opposing surface at one side of said arcuate recesses and a boss at the other side, said boss on each of said transverse projections being received in said pocket on the other projection, said transverse pivot members extending across said pockets and through the bosses received therein.

5. In a railway vehicle truck according to Claim 4, elastomeric bushings surrounding said pivot members within said bosses.

6. In a railway vehicle truck according to Claim 2, said bolster pivot element comprising a cylindrical element depending from said bolster and pivotally received within the space formed between said side frame projections by said concentric recesses.

7. In a railway vehicle truck according to Claim 6, there being a cylindrical bearing sleeve around said bolster pivot element, and an elastomeric bushing between said sleeve and said arcuate recesses to accommodate tilting of said projections with respect to each other about said transverse pivot elements.

8. In a railway vehicle truck according to Claim 2, a pivot bearing block received in said arcuate recesses and having ears at its sides interposed between the opposing faces of said side frame projections.

9. In a railway vehicle truck according to Claim 3, longitudinally extending elements connecting each of said ears to the adjacent opposing transverse surfaces of said projections at both sides of said recesses.

10. In a railway vehicle truck according to Claim 9, elastomeric pads interposed between both of said ears and the opposing transverse surfaces of said projections to accommodate their relative tilting.

11. In a railway vehicle truck according to Claim 10, additional elastomeric pads in the end connections of said longitudinally extending elements to said side frame projections.

12. In a ralway vehicle truck according to Claim 11, said longitudinally extending elements comprising rods extending through aligned perforations in said projections and said ears, said rods being of less diameter than the perforations, elastomeric elements surrounding said rods within said perforations.

13. In a railway vehicle truck according to Claim 1, the inner ends of said projections being spaced apart a substantial

distance lengthwise of the truck, a vertically cylindrically apertured pivot block being positioned between said projection inner ends, said transverse pivotal connections being between the longitudinally disposed ends of said pivot block and said projections respectively.

14. In a railway vehicle truck according to Claim 13, said pivotal connections comprising longitudinally extending ears on said pivot block and transverse pivot elements connecting said ears to said projections.

15. In a railway vehicle truck according to Claim 14, transverse cylindrical apertures in said ears and transverse pivot elements mounted on said projections and pivotally received in said apertures.

16. In a railway vehicle truck according to Claim 15, said transverse pivot elements having elastomeric bushings surrounding them within said apertures.