

Feb. 27, 1962

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3,022,748

RAPID TRANSIT TRUCKS

Filed Jan. 8, 1958

4 Sheets-Sheet 1

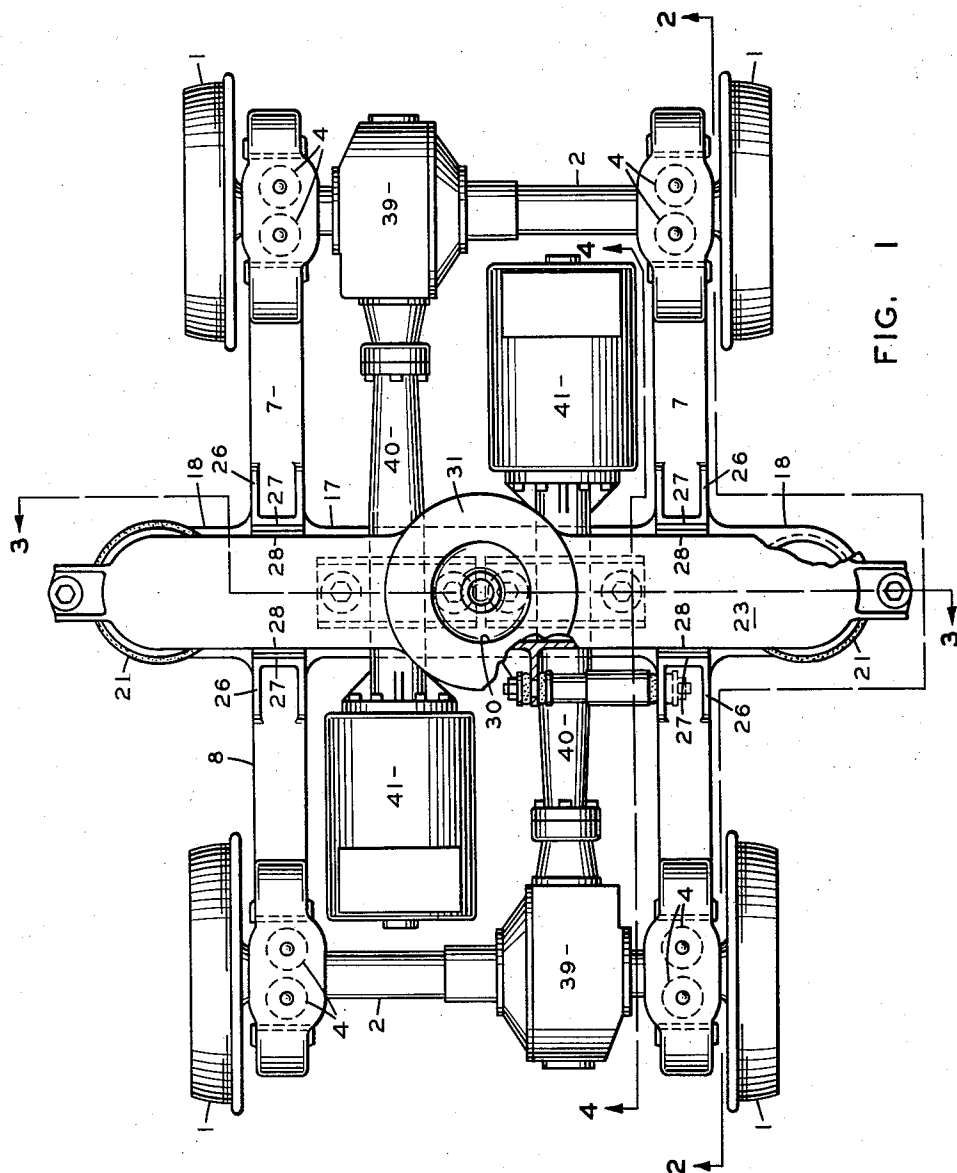


FIG. 1

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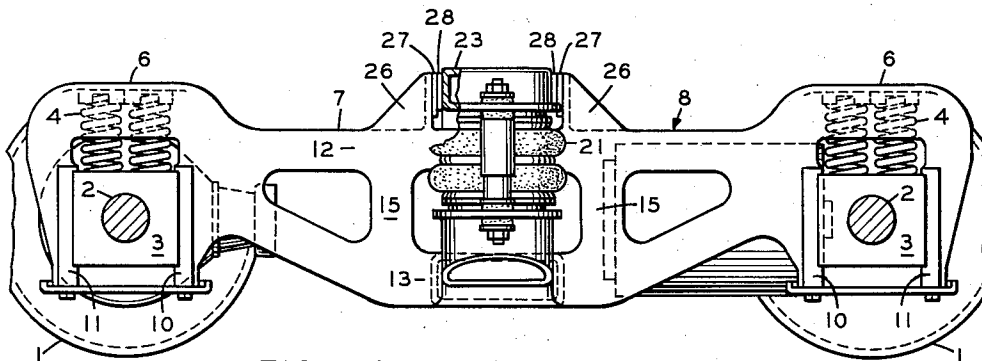


FIG. 2

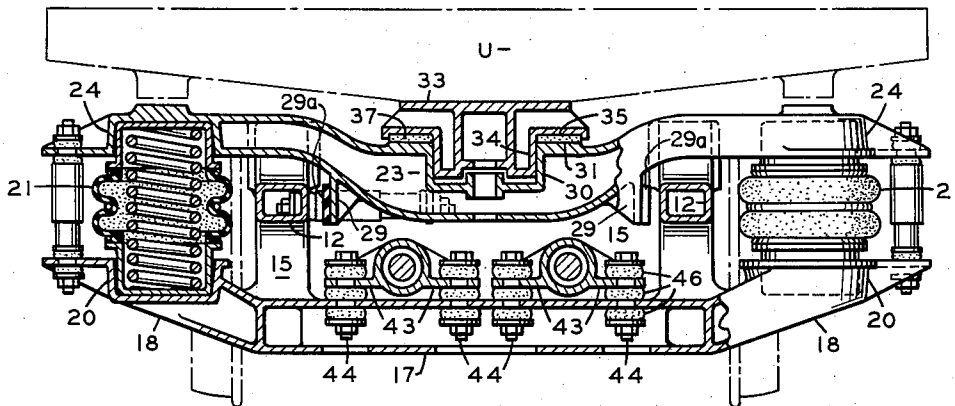


FIG. 3

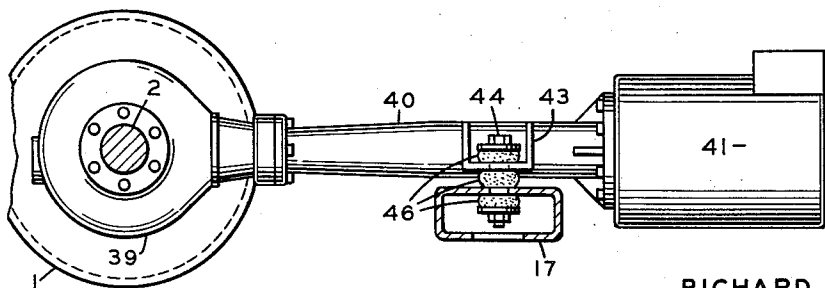


FIG. 4

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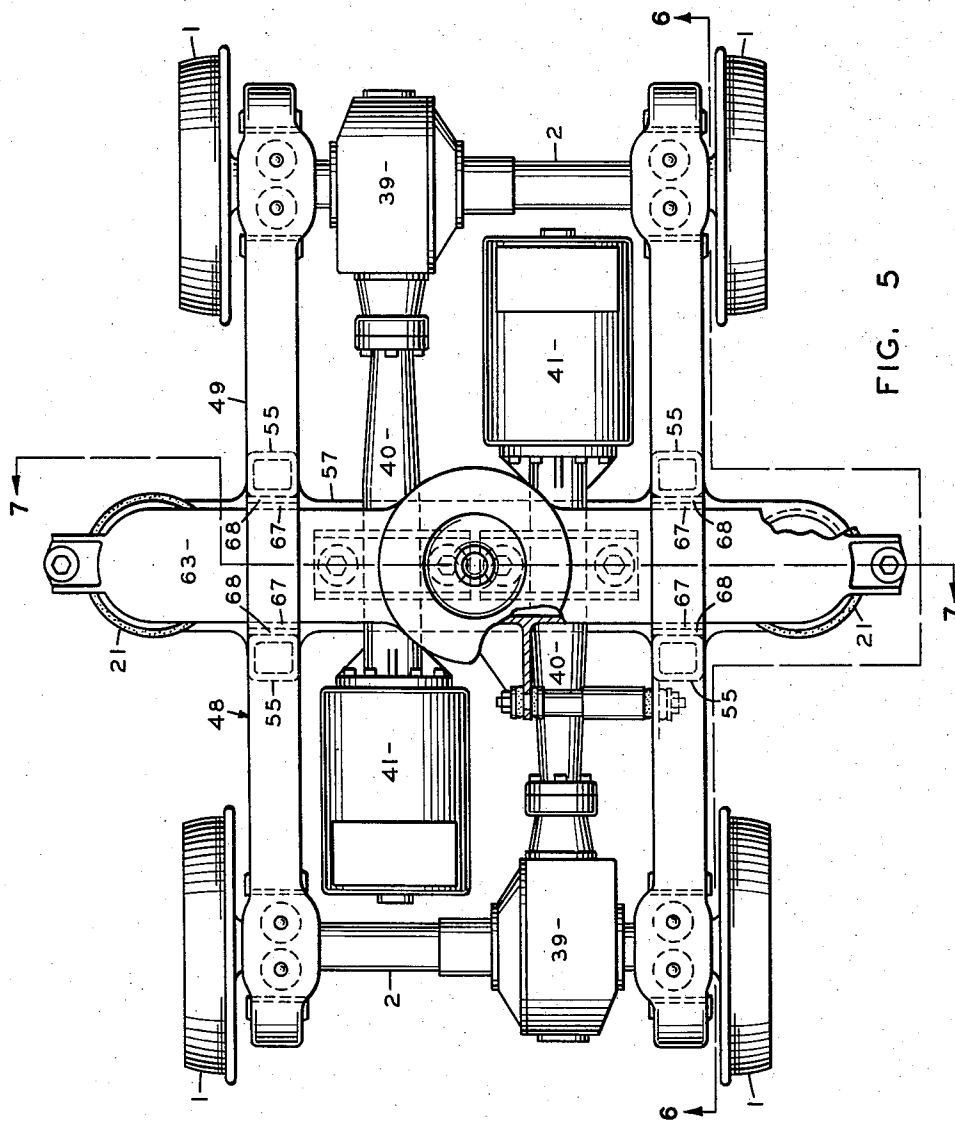


FIG. 5

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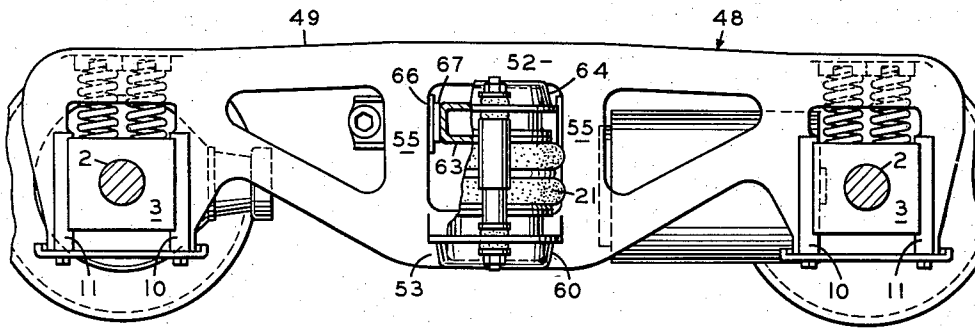


FIG. 6

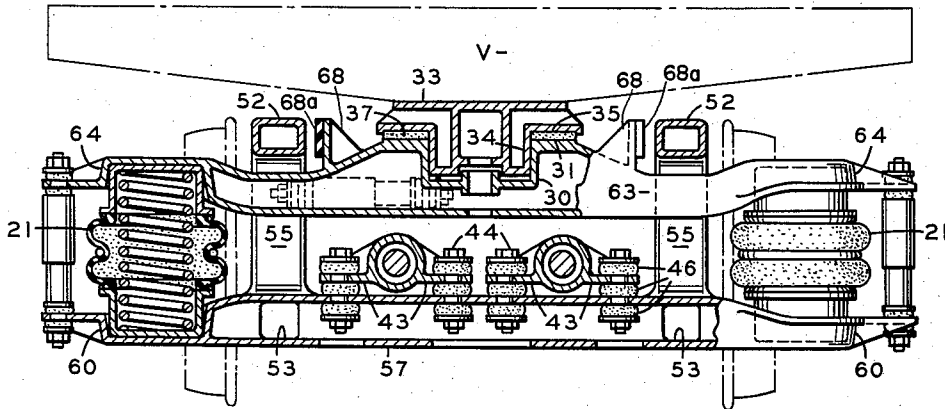


FIG. 7

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RAPID TRANSIT TRUCKS

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7 Claims. (Cl. 105—192)

The invention relates to railway rolling stock and consists particularly in four-wheel trucks especially adapted for rapid transit service.

For rapid transit service, inside frame four-wheel trucks having truss-like side members connected by rigid transverse transoms and supporting, on their lower chords, bolster-mounting coil or air springs, have been provided. Trucks of this general type are disclosed in J. C. Travilla Patent 2,811,114. A principal disadvantage of this type of truck is the narrow transverse spacing of the bolster springs necessitated by supporting them on the lower chords of the frame side members. A further disadvantage is the limitation on the size of the springs in accordance with the maximum size of the openings, or windows, between the upper and lower chords of the side members, the width of the windows being, of course, governed by the wheel base of the truck and proportions of the trusses.

It is accordingly a main object of the invention to provide a short wheel base inside frame truck in which the bolster springs are located outboard of the wheel pieces so as to increase roll stability.

It is a further object to provide a truck of this type which is of lighter and simpler construction than present trucks.

An additional object is to provide a simplified and novel motor and gear box assembly mounting.

I achieve these and more detailed objects by providing a four-wheel truck in which the frame includes a pair of laterally spaced longitudinally extending side members of truss shape and comprising a top compression chord, a bottom tension chord merging at its ends with the top chord and vertically spaced from the top chord intermediate its ends by a longitudinally-spaced pair of upright members forming, with the vertically-spaced top and bottom chords, a rectangular opening, or window. The side members are spring-supported on the axles inboard of the wheels. The lower chords of the side members are rigidly connected by a single transverse center transom having its end portions projecting outwardly from each of the side members. Bolster-mounting springs are supported on the outboard transom extensions so as to increase the lateral spacing of the springs and at the same time permit the use of larger springs than would be permitted if they were placed within the side member windows. By utilizing a single center transom at substantially the same level as the outboard spring seats, lighter framing is permitted since the offsets which would be present between the low-level spring seats and the conventional top transoms, and the consequent stress concentrations are eliminated, the single bottom transom and its spring-supporting outboard extensions constituting a simple, substantially straight, transverse beam loaded at its ends and supported by the frame side members.

The foregoing and other objects and advantages of the invention will be apparent to those skilled in the art from a study of the following description and the accompanying drawings, in which:

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FIGURE 1 is a plan view of a truck embodying the invention.

FIGURE 2 is a side elevation view along the line 2—2 of FIGURE 1.

FIGURE 3 is a transverse vertical sectional view along the line 3—3 of FIGURE 1.

FIGURE 4 is a partial longitudinal vertical sectional view along the line 4—4 of FIGURE 1.

FIGURE 5 is a plan view of a modified truck embodying the invention.

FIGURE 6 is a side elevation view along the line 6—6 of FIGURE 5.

FIGURE 7 is a transverse vertical sectional view along the line 7—7 of FIGURE 5.

Referring now to FIGURES 1 to 3, the truck comprises the usual flanged wheels 1, a pair of axles 2, journal boxes 3 rotatably mounted on axles 2 inboard of wheels 1, coil springs 4 seated on journal boxes 3 and supporting the end portions 6 of longitudinally extending side members 7 of truck frame 8. The usual longitudinally spaced vertical pedestal legs 10 and 11, between which are vertically slidably received journal boxes 3, depend from side member end portions 6. The inner pedestal legs 10 are connected by a truss structure comprising a top chord 12, a bottom chord 13 having a horizontal center portion and inclined end portions, and vertical columns 15 spaced apart longitudinally of the truck and extending between bottom chord 13 and top chord 12. The horizontal portions of bottom chords 13 are connected by a single transversely extending box section transom 17, the end portions 18 of which extend outboard of bottom chords 13 and terminate in upwardly-open cup-like spring seats 20. An upright spring unit 21 preferably of the combined coil and air type disclosed in my co-pending application, Serial No. 688,492, filed October 7, 1957, is seated in each of the seats 20.

A transversely extending bolster 23, also of box section and terminating in downwardly open cup-like spring caps 24, in vertical alignment with spring seats 20, is supported through spring caps 24 on spring units 21 for vertical and limited lateral movements with respect to the truck frame. Bolster 23 extends over side member top chords 12.

For preventing longitudinal movements of the bolster relative to the frame and for transmitting draft forces from the frame to the bolster, at each side of the bolster, on frame side member top chords 12, are formed a pair of upstanding brackets 26 to which are secured hardened steel wear plates 27 for slidable engagement with opposing wear plates 28 on the sides of the bolster. For limiting transverse movements of the bolster relative to the frame, the bolster is formed with depending brackets 29, having vertical surfaces mounting rubber pads 29a opposing and spaced transversely from the inner surfaces of frame side member top chords 12.

Intermediate the side members, bolster 23 is depressed and is formed with a central upright cylindrical recess 30 and on its upper surface has a horizontal annular surface 31, surrounding the cylindrical recess. A cooperating member 33 secured to the bottom of vehicle underframe U includes a cylindrical projection 34 pivotally received within recess 30 and a surrounding horizontal annular surface 35 supported on upwardly facing annular surface 31 by a friction pad 37, whereby to dampen lateral oscillations of the truck relative to the vehicle underframe about the axis of cylindrical members 30 and 34.

On each of the axles 2 a gear box 39 is journaled; the

gear boxes 39 are connected through longitudinally extending tubes 40 to traction motors 41. For taking driving torque from the gear box into the frame, in lieu of the usual torque arm, tube 40 is provided, in the area in which it overlies transom 17, with a pair of lateral brackets 43, 43. Brackets 43 are secured to the upper surface of transom 17 by bolts 44, and to permit such slight tilting of tubes 40, both in a longitudinal vertical plane and a transverse vertical plane as may be required by vertical and tilting movements of the associated axle, rubber pads 46 are mounted on bolts 44 above brackets 43, between brackets 43 and the upper web of transom 17, and below the upper web of transom 17, and are compressed between washers at both ends of the bolts.

In the second embodiment of the invention, shown in FIGURES 5-7, corresponding reference characters will be used to indicate parts identical or substantially identical to those in the first embodiment. In this embodiment, the frame 48 comprises side members 49 with the usual spaced pedestal legs 10 and 11, between each pair of which a journal box 3 is slidably received, the inner pedestal legs 10 being connected by a top chord 52, and a bottom chord 53 having a central horizontal portion and inclined end portions; upright columns 55 spaced apart longitudinally of the truck extend between the horizontal portions of top and bottom chords 52 and 53. The horizontal portions of bottom chords 53 are connected by a transversely extending transom 57 which extends outboard of the side members 49 and terminates in upwardly facing cup-like spring seats 60. Spring units 21 of the type referred to in connection with the first embodiment are seated in spring seats 60. A transversely extending bolster 63 having downwardly facing cup-like spring cap members 64 at its ends, in vertical alignment with seats 60, is mounted by means of caps 64 on spring units 21. In this embodiment, instead of extending over the top chord 52, bolster 63 extends through the windows formed in the side members by top chords 52, bottom chords 53, and columns 55, 55. For preventing longitudinal movements of the bolster relative to the frame and for transmitting draft forces from the frame into the bolster, adjacent opposing faces of columns 55 and the bolster are provided respectively with relatively slidable wear plates 66 and 67, which accommodate both vertical and lateral movements of the bolster on the supporting springs. For limiting transverse movements of the bolster relative to the frame, the bolster is formed with upstanding brackets 68, having vertical surfaces mounting rubber pads 68a opposing and spaced transversely from the inner surfaces of frame side member top chords 52. Bolster 63 and underframe V are provided with cooperating central bearing structures as described in connection with the first embodiment. Mounting of the motors is the same as in the first embodiment and accordingly is not described further.

The details of the structure may be varied substantially without departing from the spirit of the invention and the exclusive use of those modifications as come within the scope of the appended claims is contemplated.

What is claimed is:

1. In a railway truck, wheel and axle assemblies, a frame comprising a pair of longitudinally extending rigid side members resiliently supported from said assemblies and each having vertically spaced top and bottom chords, a rigid transverse member connecting said bottom chords and terminating laterally outboard of each of said bottom chords, said transverse member and said bottom chords having merging substantially vertical side walls and common top and bottom walls, substantially upright springs seated on said transverse member entirely outboard of said frame side members, and a transverse load-carrying bolster supported on said springs.

2. A railway vehicle truck according to claim 1, in which said bolster overlies the top chord of said frame side members.

3. In a railway truck having wheels, an axle, framing supported from said axle and including a transverse member spaced longitudinally of the truck from said axle, a driving gear box journaled on said axle, a longitudinally extending motor, and a rigid longitudinally extending tubular member rigidly secured at its ends to said gear box and said motor and supported intermediate its ends on top of said transverse member, said tubular member forming the sole support of said motor from said frame, and a drive shaft extending through said tubular member and operatively connected at one end to said motor and at its other end, within said gear box, to said axle.

4. A railway truck according to claim 3, in which said tubular member and said transverse member have opposing vertically-spaced horizontal surfaces, there being a pad of resilient material between said surfaces, and an upright bolt passing through said pad and the opposed portions of said transverse member and said tubular member and clamping them together, the resilient pad being distortable to permit limited pivoting of said tubular member about its axis and about said transverse member as a fulcrum, whereby to accommodate vertical and transverse tilting movements of said framing relative to said axle.

5. A railway truck according to claim 3, in which said tubular member is widened above said transverse member to form transversely-spaced horizontal surfaces vertically spaced from and opposing the top surface of said transverse member, there being transversely-spaced pads of resilient material between said surfaces of said tubular member and the upper surface of said transverse member, and transversely-spaced upright bolts passing through said pads and the opposed portions of said transverse member and said tubular member and clamping them together, the resilient pads being distortable to permit limited pivoting of said tubular member about its axis and about said transverse member as a fulcrum, whereby to accommodate vertical and transverse tilting movements of said framing relative to said axle, the lateral spacing of said pads and bolts resisting tendencies of said tube, and with it of said motor, to rotate responsive to motor torque.

6. A railway truck according to claim 3 including means connected to said tubular member and said transverse member and securing said tubular and transverse members against substantial transverse, vertical, and longitudinal movement relative to each other but permitting limited pivoting of said tubular member about its axis and about said transverse member as a fulcrum whereby to accommodate vertical and transverse tilting movements of said truck framing relative to said axle.

7. In a railway truck, wheel and axle assemblies, a rigid frame comprising a pair of longitudinally extending side members resiliently supported from said assemblies and each having vertically spaced top and bottom chords, a rigid transverse member rigidly connecting said bottom chords and terminating laterally outboard of each of said bottom chords, substantially upright spring units seated on the outboard end portions of said transverse member and disposed wholly outboard of said side members, a transverse load-carrying bolster extending laterally outwardly from said side members and supported at its ends on said spring units, said spring units forming the sole support of said bolster on said frame, driving means comprising an axle mounted gear box, a motor, a drive shaft operatively connected to said motor and to said axle, a longitudinally extending tube rigidly connected at its ends to said gear box and said motor and surrounding said shaft, said tube underlying said bolster and being supported intermediate its ends on top of said frame transverse member and forming the sole support of said motor from said frame.

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