

Nov. 29, 1938.

E. G. HALLQUIST

2,138,449

RAILWAY TRUCK STRUCTURE

Filed July 15, 1935

5 Sheets-Sheet 1

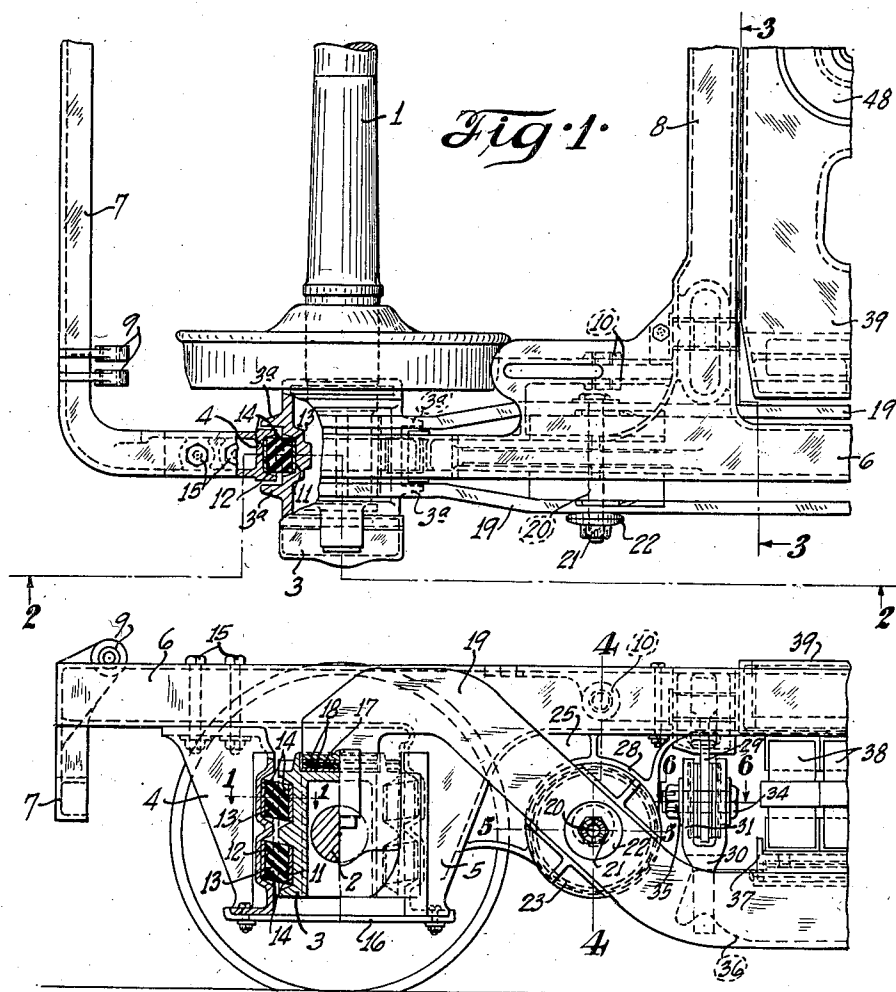


Fig. 2.

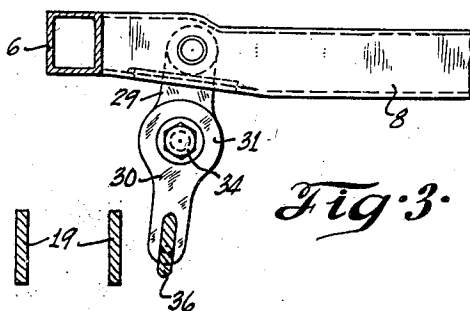


Fig. 3.

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5 Sheets-Sheet 2

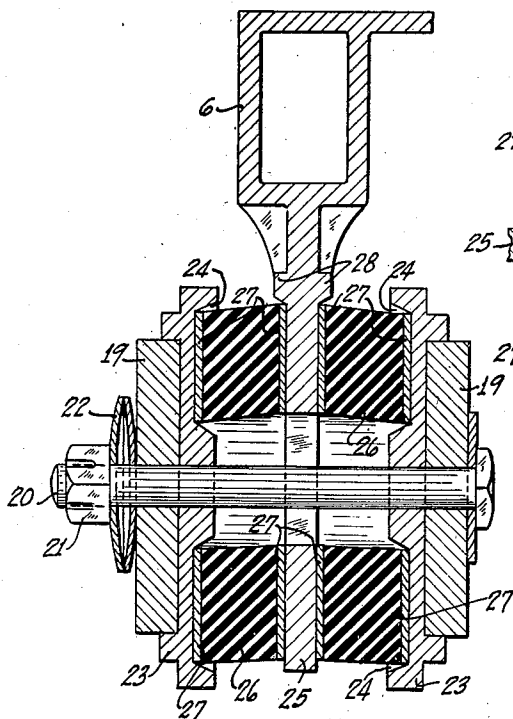


Fig. 4.

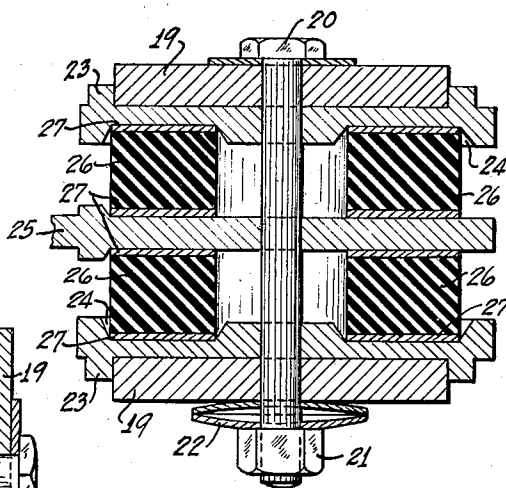


Fig. 5.

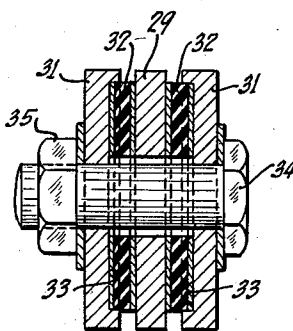


Fig. 6.

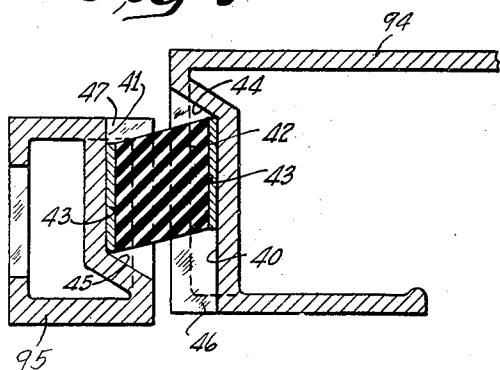


Fig. 7.

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5 Sheets-Sheet 3

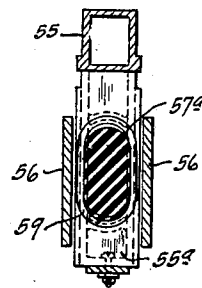
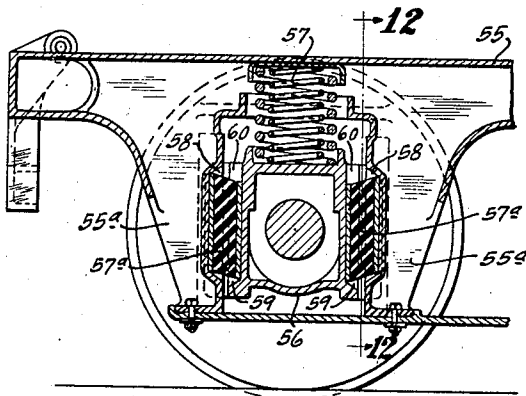
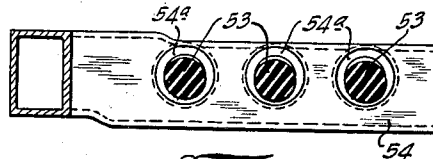
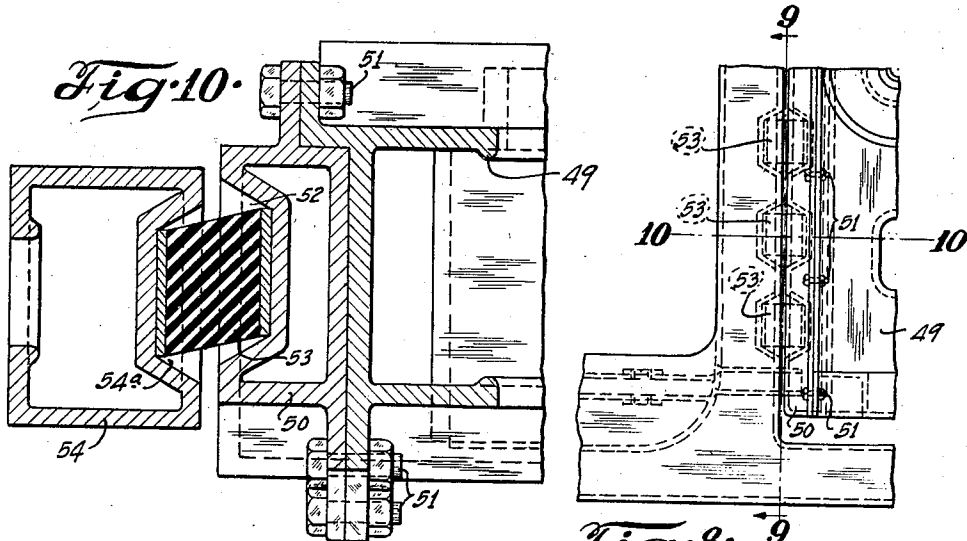


Fig. 11.

Fig. 12.

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RAILWAY TRUCK STRUCTURE

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5 Sheets-Sheet 4

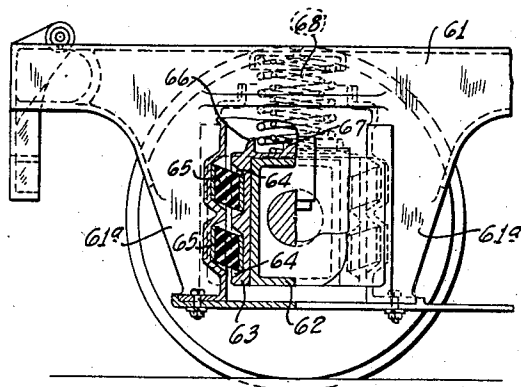


Fig. 13.

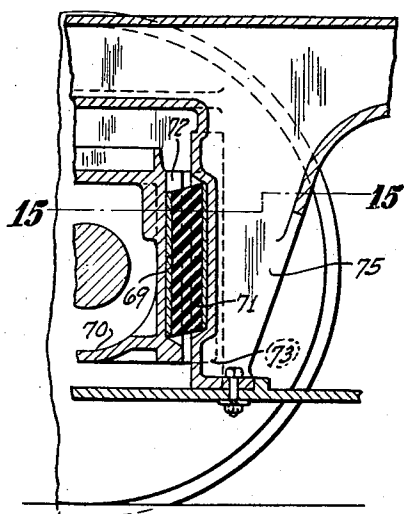


Fig. 14.

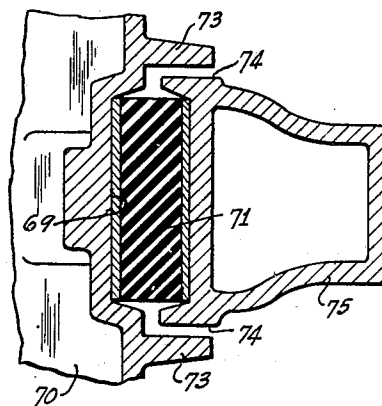


Fig. 15.

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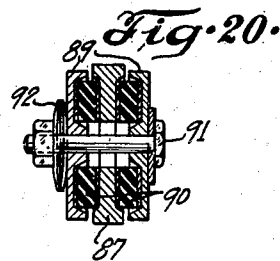
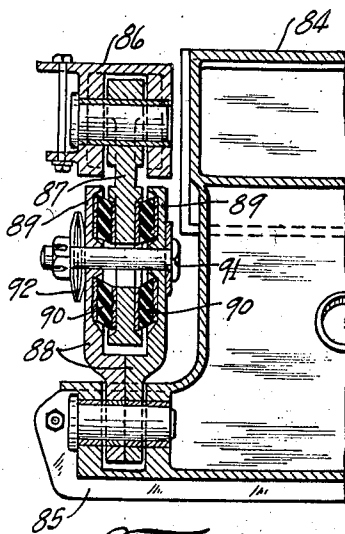
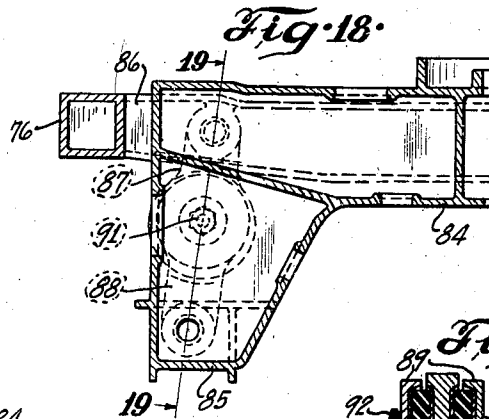
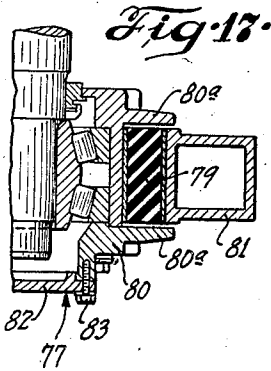
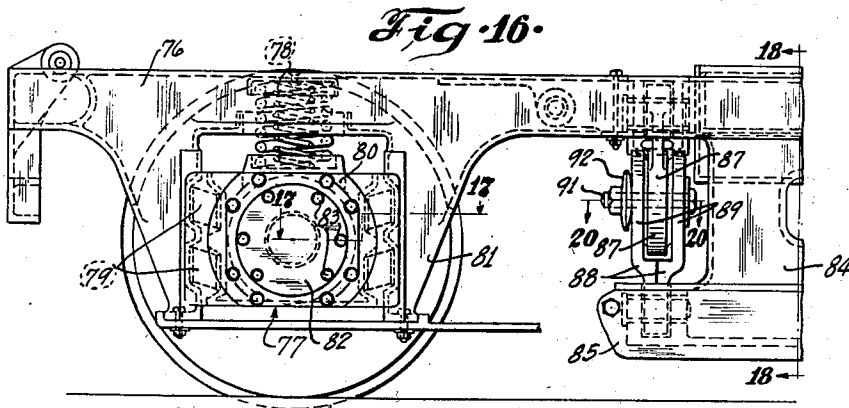
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RAILWAY TRUCK STRUCTURE

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5 Sheets-Sheet 5



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UNITED STATES PATENT OFFICE

2,138,449

RAILWAY TRUCK STRUCTURE

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Application July 15, 1935, Serial No. 31,369

15 Claims. (Cl. 105—190)

This invention relates to railway rolling stock and consists particularly in novel truck structure.

With the substantially increased speed of modern railroad trains, improvement in the riding qualities of the trucks and also lessening of noise are desirable in order to protect the comfort of passengers. Reduction of vibration and shocks during travel, due to the rail joints and other irregularities in the road bed, and running on curves, is also desirable in order to increase the life of the rolling stock and the road, and lessen maintenance expense.

The main object of the present invention is to provide a railway truck which operates unusually smoothly and quietly, particularly at high speeds.

A more detailed object is to facilitate the application of rubber cushions to various parts of the truck which ordinarily transmit shocks and vibration and produce noise.

Another object is to provide means for cushioning the movement between the frame pedestals and the journal boxes, which means permit limited lateral, as well as vertical, movement of the boxes in the pedestals.

Another object is to provide means for cushioning a swinging bolster in its movements vertically, longitudinally and transversely of the truck.

Still another object is to provide substantially noiseless and vibrationless mounting of the truck frame upon equalizers extending between the journal boxes.

These objects and others hereafter appearing are attained by the structures illustrated in the accompanying drawings, in which—

Figure 1 is an approximately one-quarter top view of a truck embodying the invention, a portion being broken away and illustrated in section on the line 1—1 of Figure 2.

Figure 2 is a side view and section of the same taken on the line 2—2 of Figure 1.

Figure 3 is a vertical transverse section taken on the line 3—3 of Figure 1.

Figure 4 is a vertical transverse section taken on the line 4—4 of Figure 2.

Figures 5 and 6 are detail horizontal sections taken on the corresponding section lines of Figure 2.

Figure 7 is a detail vertical longitudinal section taken through a truck transom and bolster and showing a modification.

Figure 8 is a top view showing parts of a railway truck embodying a modification.

Figure 9 is a vertical transverse section taken on the line 9—9 of Figure 8.

Figure 10 is a vertical longitudinal section taken on the line 10—10 of Figure 8.

Figure 11 is a vertical longitudinal section showing a modified form of journal box, pedestal, and truck frame assembly.

Figure 12 is a detail transverse section taken on the line 12—12 of Figure 11.

Figure 13 is a partial side view and section corresponding to Figure 2 and illustrating another modification.

Figure 14 is a partial vertical section corresponding to Figure 11 and showing another modification.

Figure 15 is a horizontal section taken on the line 15—15 of Figure 14.

Figure 16 is a side view of a longitudinal half of a truck illustrating still another form of the invention.

Figures 17 and 20 are detail horizontal sections taken on the corresponding section lines of Figure 16.

Figure 18 is a vertical transverse half section taken on the line 18—18 of Figure 16.

Figure 19 is a substantially vertical section taken on the corresponding section line of Figure 18.

The truck in Figures 1 to 6 includes a pair of wheeled axles, a portion of one of the axles being shown at 1, Figures 1 and 2, and having at its extremity a journal portion 2 and journal box 3 received between the pedestals 4 and 5 depending from the side frames or wheel pieces 6. The side frames are rigidly connected at the ends, by end sills 7, and intermediate the ends by transoms 8. Brake hanger brackets 9 and 10 project from the framing adjacent the intersections of the side frame and end sill and transoms, respectively.

Recesses 11 and 12 are provided in the opposing faces of each journal box and the corresponding pedestals, and seated in these recesses are rubber cushions 13 having steel liner plates 14 vulcanized to the surfaces thereof and abutting the box and pedestal. Cushions 13 are formed substantially rectangular in horizontal section and are inclined downwardly and towards the journal box on their upper and lower surfaces. The weight of the truck frame applies both shear and compressive forces to cushions 13, flexing the same and tending to move the liner plates 14 into horizontal alignment.

In order to facilitate assembly of the journal box, cushions, and pedestals, one of the pedestals 4 is separately formed and secured to the side frame by bolts 15, the other pedestal being con-

veniently formed integral with the frame. Extending between the lower extremities of pedestals 4 and 5 is the usual tie bar 16.

Projecting outwardly from the sides of the journal box and slightly spaced from the inner and outer faces of the pedestals are the ribs 3a which limit relative lateral movement of the box and pedestal. In order to permit lateral and vertical flexing of the rubber cushions, the sides, tops, and bottoms of recesses 11 and 12 diverge outwardly from the inner surfaces thereof which snugly receive liners 14 for positioning the cushions.

Seated on top of each journal box 3 is a rubber cushion 17 having hardened metal liners 18, and resting on these cushions are the ends of equalizers 19 located on each side of the side frame. Secured to the opposing faces of the adjacent inclined portions of the equalizers by means of a bolt 20, nut 21, and spring washer 22, are the metal discs 23 each having an annular recess 24 in its inner face. Extending between the discs 23 is a bracket 25 depending from the side frame and integral therewith, and interposed between the discs 23 and bracket 25 are annular doughnut-shaped rubber cushions 26 having metal liners 27. The inner and outer circumferential surfaces of cushions 26 at the tops and bottoms thereof are inclined outwardly and downwardly from bracket 25 whereby the weight of the truck frame applied through bracket 25 tends to bring liner plates 27 on each cushion into horizontal alinement. The spring washer 22 permits slight lateral separation of cushion seating discs 23. Annular recesses 24 in discs 23 and also the under surfaces of the curved ribs 28 on bracket 25 are tapered and the apertured portions of bracket 25 and cushions 26 are spaced from bolt 20 to permit flexing of the cushions.

Pivoted to each transom 8 adjacent each end thereof is a swing hanger including the separately formed upper and lower members 29 and 30, the latter having a clevis 31 in its upper portion receiving between the forks thereof the lower portion of member 29 (see Figure 6). Interposed between forks 31 and member 29 are rubber cushions 32 having metal liners, the outer of which are seated in recesses 33 in the forks 31, and the inner of which abut the member 29. Upper and lower hanger members 29 and 30 and cushions 32 are maintained assembled by a bolt 34 and nut 35, the bolt closely fitting the aligned apertures in forks 31 and being slightly spaced from the apertured portions of cushions 32 and upper member 29 to permit slight yielding of the hanger structure when submitted to longitudinal forces.

A pair of the longitudinally resilient hangers is provided at each side of the truck and these support the longitudinal bars 36, spring plank 37, elliptic springs 38, and a bolster 39 which is slightly spaced at its ends from the side frames 6 and at the sides from the transoms 8 in order to permit swinging of the bolster in the usual manner.

The underframe is supported at four points from the equalizers through brackets 25 and rubber cushions 26 and also by means of the cushions 13, sixteen of which are provided, interposed between the journal boxes and pedestals. The equalizers are resiliently supported on the journal boxes through cushions 18. Thus shocks and vibration transmitted through the truck wheels are substantially dampened or eliminated before reaching the bolster center

bearing 48 which supports the vehicle body (not shown). The cushioning also substantially reduces noise produced in operation of an ordinary truck due to chafing and clashing of metal parts having relative movement, such as the pedestals and journal boxes.

Figure 7 illustrates a modification of the structure shown in Figures 8, 9, and 10 and includes recesses 40 and 41 formed in the opposing side surfaces of the bolster 94 and the transom 95 for receiving the cylindrical rubber cushions 42 having metal liners 43. The bolster and transom recesses are tapered as at 44 and 45 to permit vertical and lateral flexing of the cushions 42. The cylindrical shaping of these cushions similar to those shown in Figure 9 also facilitates flexing thereof. Vertically opposite portions of these recesses are extended, as at 46 and 47, so as to open through the under surface of the bolster and the upper surfaces of the transoms, respectively, to facilitate assembly of the bolster and cushions with the transoms. In this form, the bolster springs, spring plank and hangers may be omitted.

Figures 8, 9, and 10 illustrate a modified form of bolster including body portion 49 and separately formed members 50 at the sides thereof and secured thereto by bolts 51. Each member 50 is recessed, as at 52, for receiving the rubber cushions 53, each of which is seated at its outer extremity in a recess 54a in transom 54. The upper and lower and side portions of recesses 52 and 54a are inclined in order to permit vertical and lateral flexing of cushions 53. Removable member 50 facilitates assembling of the bolster and cushions with the transoms. In this form, cushions 53 are shaped cylindrically, as in Figure 7, but the tapering recesses in the bolster and transom pockets need not be extended through the top or bottom walls of these members in order to facilitate assembly.

Figures 11 and 12 illustrate a portion of a form of truck in which framing 55 is supported on journal boxes, one of which is shown at 56, by means of coiled springs 57 seated on top of the boxes and engaging the under surface of the top wall of the side frame. Rubber cushions 57a are interposed between opposing side surfaces of the boxes and pedestals 55a and assist in supporting the framing. The cushion recesses in the pedestal jaws and the sides of the boxes are tapered, as at 58 and 59, and the box recesses are extended upwardly through the top of each box, as at 60, to facilitate assembly of the box and cushions with the pedestal. Cushions 57a are arcuate on their upper and lower surfaces, as shown in Figure 12, in order to facilitate flexing thereof.

Figure 13 illustrates a portion of a truck, in general similar to that in Figures 11 and 12, including pedestals 61a integral with framing 61. Between the pedestal jaws is a journal box 62 having extending along the sides and top thereof angular members 63. The side portions of members 63 are provided with recesses 64 receiving rubber cushions 65 seated at their outer extremities in similar recesses in the pedestal jaws. The upper portions of members 63, which meet at the center of the box, include ribs 66 and bosses 67 forming a seat for coiled springs 68 supporting framing 61. Separately formed members 63 facilitate assembly of the journal boxes and cushions with the pedestals.

Figures 14 and 15 are enlarged views illustrating a pedestal and journal box assembly similar

to that in Figures 11 and 12. Recesses 69 in the sides of journal box 70, seating rubber cushions 71, are extended upwardly, as at 72, through the top of the box to facilitate assembly of the box and cushions with the pedestals. Box 70 has side ribs 73 cooperating with opposing faces 74 on pedestals 75 to limit relative lateral movement of the box and pedestals.

In Figures 16 to 21, truck framing 76 is supported on roller bearing journal boxes, one of which is shown at 77, through coiled springs 78 seated on top of the boxes, as in Figures 11 and 12. Interposed between the sides of each box and the corresponding pedestal jaws are rubber cushions 79 seated in suitable recesses in the opposing faces of the box and pedestal jaws. Sidewardly extending ribs 80^a integral with the box and a separately formed annular member 80 bolted to the front of the box, receive therebetween pedestal jaws 81. A removable cover 82 is secured to member 80 by bolts 83.

Bolster 84 has downwardly and laterally projecting arms 85 at its extremities supported directly by resilient swing hangers pivoted to transoms 86, no spring plank being provided. Each resilient hanger includes an upper member 87 pinned to one of the transoms 86 and separately formed lower members 88 which, when assembled, form forks 89 in their upper portions receiving therebetween the lower portion of member 87 and rubber cushions 90. A bolt 91 extends through aligned apertures in forks 89, cushioning rings 90, and member 87 for maintaining the assembly. Bolt 91 is slightly spaced from the apertured portions of cushions 90 and member 87 whereby the hanger is longitudinally resilient, and a spring washer 92 is provided, as in Figures 4 and 5.

In each of the forms, rubber cushions are ingeniously located so as to absorb vibrations normally passing between the wheels and the bolster center bearing, and also to dampen or eliminate shocks and noise due to rubbing or clashing together of metal parts. The truck, therefore, operates unusually smoothly and quietly and is well adapted for use in modern high speed trains.

The invention is not limited to the exact details of the various forms illustrated but may be modified in other respects without departing from the spirit of the invention and exclusive use of all such modifications coming within the scope of the appended claims is contemplated.

I claim:

1. In a railway truck, a framing member having depending pedestal jaws, a journal and a journal box between said jaws, and cushioning members compressed between opposing faces of said box and jaws, there being elements on said box and jaws facing upwardly and downwardly, respectively, and engaging said cushioning members to support said framing member and its load through said jaws, one of said jaws being formed separately from said frame member and the other jaw and removably secured to said frame to facilitate application of said cushioning members to the assembly.

2. Structure as specified in claim 1 in which said cushioning members are seated in recesses in the opposing faces of said jaws and said box.

3. In a railway truck, a frame having pedestal jaws, a journal box between said jaws, rubber cushioning members interposed between opposing upright faces of said jaws and said box, there being elements on said jaw faces and said box

faces facing downwardly and upwardly, respectively, and opposing said cushioning members, a rubber cushion member on top of said box, and an equalizer seated on said latter mentioned member, said members cooperating to support said frame and its load.

4. In a railway truck, spaced journals and journal boxes on the same side of the truck, equalizer structure extending between and carried on said journal boxes and having spaced opposing vertical faces, framing having a part between said boxes and extending between said faces, and rubber cushioning means compressed laterally between said faces and said framing part, there being elements on said equalizers and framing part facing upwardly and downwardly, respectively, and engaging said cushioning means to support said framing from said equalizer structure.

5. The combination of elements specified in claim 9 in which said cushioning means is in the shape of a ring and including a securing element extending through said equalizer structure, said framing, and the center of said cushioning ring, said frame part being normally spaced from said securing element.

6. In a railway truck, spaced journal boxes on the same side of the truck, equalized structure extending between and carried on said boxes and having transversely spaced parts, a framing wheel piece having a bracket extending between said equalizer parts and spaced therefrom, there being elements on said bracket and equalizer parts facing downwardly and upwardly, respectively, and spaced from and opposing each other, and rubber cushions compressed between said bracket and said equalizer parts and engaging said elements to support said bracket and wheel piece from said equalizer structure.

7. In a railway truck, framing, a bolster, a swing hanger connection between said framing and said bolster and comprising separate upper and lower parts overlapping each other, a rubber cushion between the overlapping portions of said parts, said portions having upwardly and downwardly facing shoulders engaging said cushion to place the same in shear under the hanger load, a bolt-like element passing through apertures in said parts and said cushion to hold the same in assembled relation, the aperture in at least one of said parts being enlarged so that the side of said element normally is free of contact with said part.

8. A bolster hanger comprising separately formed upper and lower members, one of said members having transversely spaced parts and the other member having a part extending between said spaced parts, and rubber cushions compressed laterally between said parts and thereby forming a supporting connection between said upper and lower members.

9. Hanger structure as specified in claim 8 in which said cushions are ring-shaped, said structure including a securing element extending between said hanger parts and through the centers of said cushion rings.

10. Hanger structure as specified in claim 8 including a bolt extending transversely through said hanger parts and having a nut and a spring washer yieldingly securing together said hanger members and said cushions.

11. Hanger structure as specified in claim 8 in which said spaced parts of one of said hanger members which receive the other member and

said cushions therebetween are formed separately to facilitate the assembly.

12. In a railway truck, framing, swing hangers depending therefrom and each including a rubber cushion as a part thereof whereby the hanger is resilient longitudinally, a bolster carried on said hangers, and rubber cushions between opposing side faces of said framing and said bolster and assisting in supporting said bolster.
13. A railway swing bolster hanger comprising separately formed upper and lower members, one of said members including transversely spaced parts and the other member having a tongue extending between said parts, and rubber cushions between said tongue and each of said parts, said parts, tongue and cushions being apertured, a bolt extending through the apertures and compressing said cushion between said tongue and parts, the aperture in one of said members being enlarged so that said bolt does not contact

with the corresponding member whereby the support of one of said members by the other is effected solely through said compressed cushions.

14. In a railway truck, framing, a bolster, a swing hanger carrying said bolster from said framing and comprising a link secured at its upper end to said frame and a link secured at its lower end to said bolster, portions of said links overlapping each other and having downwardly and upwardly facing shoulders, respectively, and a rubber cushion compressed between said overlapping portions and seated against said shoulders whereby said hanger is longitudinally resilient.

15. Structure as specified in claim 1 in which the cushioning members are substantially wholly received in recesses formed in the opposing faces of the pedestal jaws and journal box.

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