

Oct. 20, 1942.

J. C. TRAVILLA, JR

2,299,560

RAILWAY AXLE JOURNAL LATERAL MOTION DEVICE

Filed Aug. 19, 1940

3 Sheets-Sheet 1

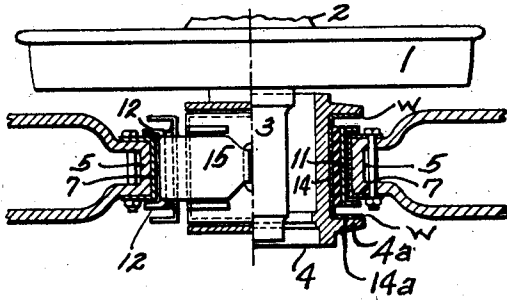


FIG. 3.

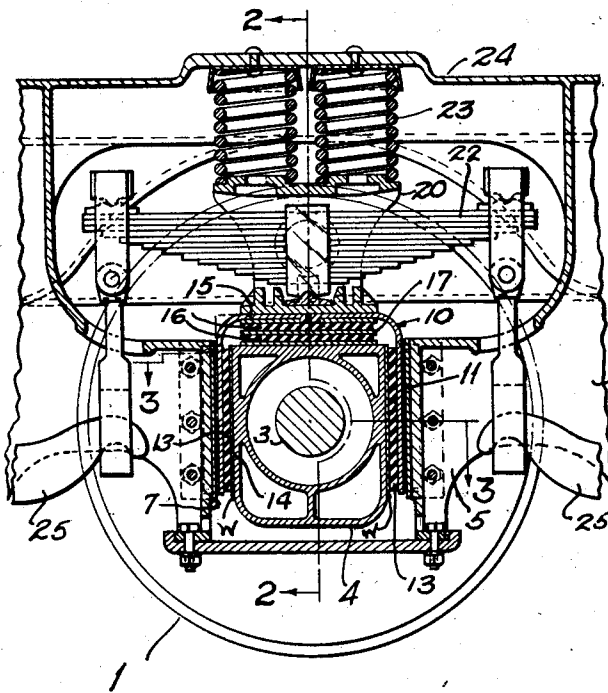


FIG. 1.

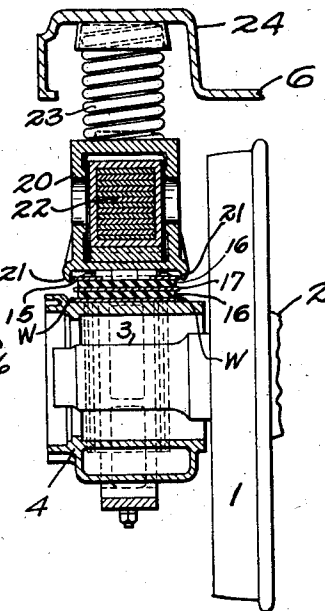


FIG. 2.

INVENTOR:
JAMES C. TRAVILLA JR.
BY *Rodney Bidell*
ATTORNEY

Oct. 20, 1942.

J. C. TRAVILLA, JR

2,299,560

RAILWAY AXLE JOURNAL LATERAL MOTION DEVICE

Filed Aug. 19, 1940

3 Sheets-Sheet 2

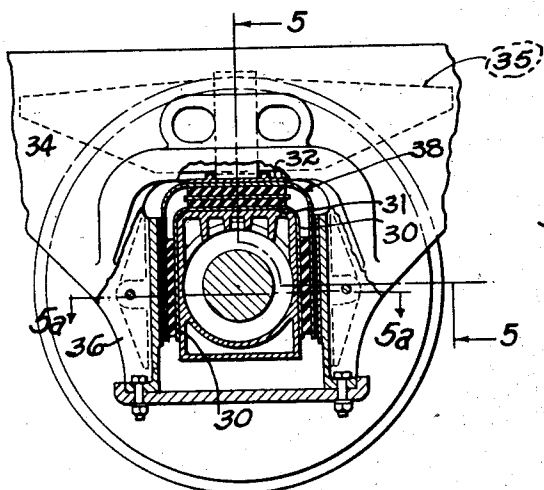


FIG. 4.

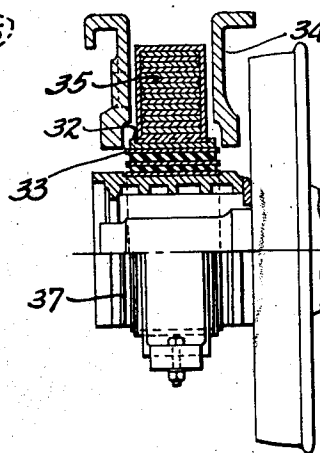


FIG. 5.

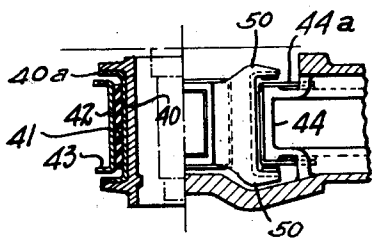


FIG. 8.

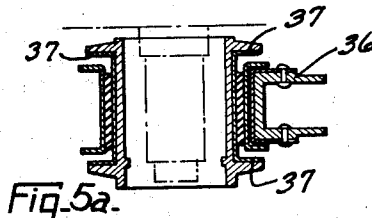


FIG. 5a.

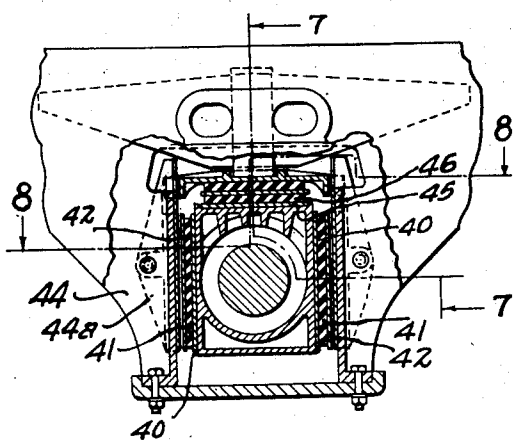


FIG. 6.

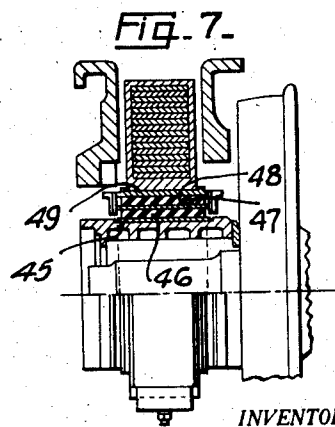


FIG. 7.

INVENTOR:
JAMES C. TRAVILLA JR.
BY *Rodney Badell*
ATTORNEY

Oct. 20, 1942.

J. C. TRAVILLA, JR

2,299,560

RAILWAY AXLE JOURNAL LATERAL MOTION DEVICE

Filed Aug. 19, 1940

3 Sheets-Sheet 3

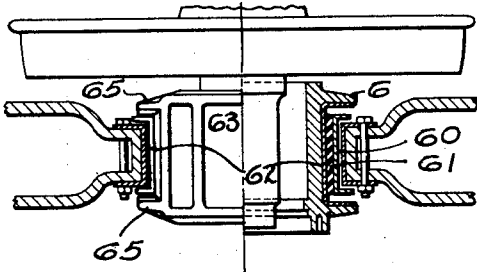


FIG. 11.

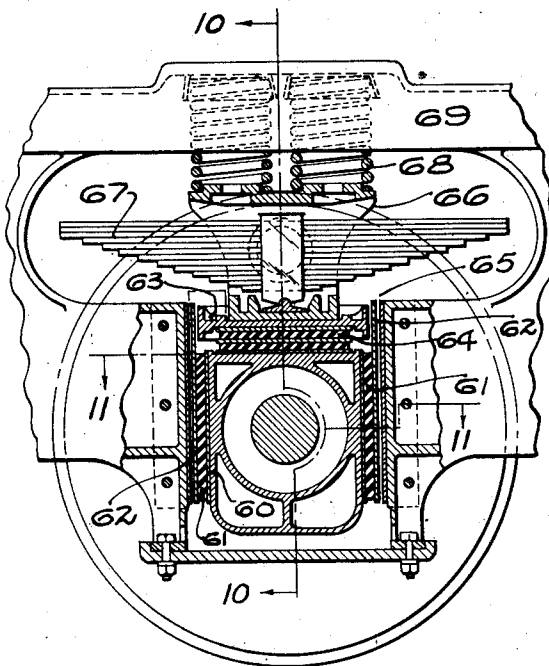


FIG. 9.

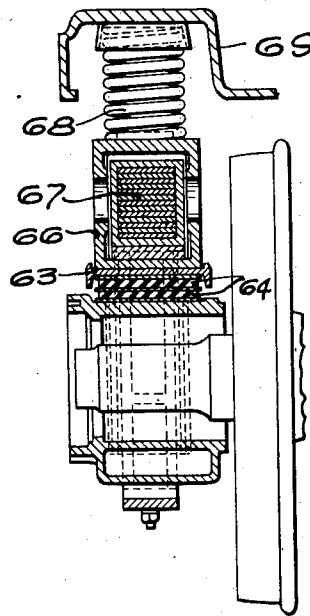


FIG. 10.

INVENTOR:

JAMES C. TRAVILLA JR.

BY

Rodney Bedell
ATTORNEY

UNITED STATES PATENT OFFICE

2,299,560

RAILWAY AXLE JOURNAL LATERAL MOTION
DEVICE

James C. Travilla, Jr., University City, Mo., as-
signor to General Steel Castings Corporation,
Granite City, Ill., a corporation of Delaware

Application August 19, 1940, Serial No. 353,175

18 Claims. (Cl. 105—222)

The invention relates to railway rolling stock and more particularly to axle boxes and pedestal structure and associated parts providing for substantial relative movement of the box and pedestal transversely of the vehicle subject to the yielding resistance of rubber, or like material, which tends to hold the box and pedestal in a normal position and to return them to such position after they have been displaced therefrom.

It is the main object of the present invention to provide cushioning means between the journal box and pedestal of a railway vehicle to control and cushion lateral blows or shocks and to accommodate substantial lateral movement between the axles or boxes, frames, springs, etc. without undesirable or excessive lateral play between the journal box and frame and also to return these parts to normal position when moved therefrom and also to hold the boxes in proper relation to the frame when running on straight track.

Another object of the invention is to avoid too free lateral play of the axle boxes and vehicle frames with resulting noise and wear due to sharp impacts and heavy sliding action.

Another object of the invention is to accommodate tilting of the axle boxes relative to the vehicle frame in a plane extending transversely of the vehicle frame.

Other objects of the invention are to avoid undue stresses in the axles, wheels, springs, boxes, frame and associated parts.

These general objectives and the advantages of the present structures over the structures heretofore in general use correspond to the objects and advantages set forth in my application filed October 15, 1938, Serial No. 235,142, now Patent No. 2,229,429, granted January 21, 1941, the main difference in the present structures being the mounting of the resilient elements, such as rubber or like material on the journal boxes to move vertically with the box in the pedestal instead of mounting the same on the pedestal as in said application, in which the journal box moves vertically relative to said elements. The present arrangement may be more desirable from a manufacturing and assembling standpoint, as the side and top elements may be applied as a unit to the box instead of having the top elements applied to the box and the side elements applied to the pedestal, as shown in said application.

Another object of the present invention is to provide a simple means to hold the frame supporting springs and their saddle in position transversely of the frame and its pedestal, thus eliminating the use of chafing plates or other

means between the sides of the springs or spring saddles and the walls of the truck frame wheel piece. This is accomplished by providing an inverted yoke-like element extending over the box with the rubber elements secured to the inner surfaces of the vertical legs and the horizontal base member and with flanges on the vertical legs of the inverted U-shaped member to slidably engage the pedestal jaws.

These and other detailed objects of the invention are attained by the structures illustrated in the accompanying drawings in which—

Figure 1 is a vertical longitudinal section and elevation through a portion of a locomotive tender frame, and springs and axle box supporting the same and illustrating one of the wheels journaled in the axle box.

Figure 2 is a vertical transverse section taken on the corresponding section line of Figure 1.

Figure 3 is a horizontal section taken on the corresponding section line of Figure 1.

Figures 4 and 5 correspond to Figures 1 and 2 respectively but illustrate another form of the invention.

Figure 5a is a horizontal section taken on the line 5a—5a of Figure 4.

Figures 6 and 7 correspond to Figures 1 and 2 and 4 and 5 respectively but illustrate another form of the invention.

Figure 8 is a horizontal section taken approximately on the line 8—8 of Figure 6 with parts of the structure omitted to more clearly illustrate certain details of construction.

Figures 9, 10 and 11 correspond to Figures 1, 2 and 3 respectively but illustrate another form of the invention.

In the structures shown in Figures 1, 2 and 3, an ordinary tender wheel 1 is shown mounted on an axle 2 provided with a journal 3 mounting a journal box 4 which is received between the jaws 5 of pedestal structure formed integrally with the vehicle frame 6. Jaws 5 are provided with ordinary wear plates 7.

The lateral motion device includes an inverted U-shaped plate 10 forming a yoke, receiving box 4 between its legs 11 and having flanges 12 along the side edges of each leg adapted to receive between them the adjacent portions of pedestal jaws 5 with their wear plates 7. Bonded to the inner face of each leg 11 is a pad 13 of rubber or similar material, and bonded to the inner face of each pad 13 is a plate 14 adapted to be welded at its edges to the side of box 4, as indicated at W. Similar plate and rubber pad elements are provided between the top wall of the box and the

base 15 of the inverted U-shaped yoke 10. Preferably this structure includes two rubber pads 16 separated by an intermediate plate 17. This arrangement is adopted because pads 16 carry the vertical load which is of considerable magnitude as compared to the bearing area, and the distortion of the rubber would be excessive if a single pad of double thickness were provided.

A box-shaped spring saddle 20 rests upon the yoke base 15 with depending flanges 21 at front and rear, opposing the adjacent edges of yoke base 15 to limit or prevent relative lateral movement of the yoke and saddle. A leaf spring 22 is seated upon the lower wall of saddle 20, and a pair of coil springs 23 are seated upon the top wall of saddle 20. Springs 23 directly engage the wheel piece 24 of the vehicle frame, and spring 22 supports the adjacent ends of equalizers 25 which are pivoted upon the frame to equalize the action of all of the springs at one side of the frame in an arrangement which is common in the art. Normally springs 22 will support the frame, but in the event of the breakage of a spring 22, springs 23 will support the frame from the box and prevent the box from being relieved of all load with the resulting danger of derailment.

Yoke 10 is held against transverse movement relative to the frame by means of its flanges 12 which slidably engage the pedestal jaws, but the entire lateral motion device may move vertically in the pedestal while accommodating transverse movement of the wheel, axle and box relative to the frame pedestal. Spring 22, which is carried on yoke 10, will have vertical movement relative to the frame the same as yoke 10, but will have no transverse movement relative to the frame and therefore there will be no contact between the spring and the sides of the frame and no need for chafing plates as are ordinarily provided to absorb wear between these parts.

Upon relative lateral movement of the box and pedestal due to the application of lateral forces when rounding curves or other track conditions, the flanges 12 on the vertical legs 11 of the inverted U-shaped member 10 will abut against the adjacent portions of wear plates 7 on the pedestals 5 and place shearing stresses upon the rubber pads 13, which will yieldingly resist movement of the box and pedestal, and when the thrust has terminated, will tend to return the box and pedestal to their normal position. The flanges 14a of plates 14 abut the flanges 4a on the box and these flanges are normally spaced a substantial distance from the flanges 12 of the vertical legs 11 of the inverted yoke to provide for distortion laterally of the rubber pads 13 when under shear, so as to allow substantial relative lateral movement of the box and pedestal. Normally, sufficient clearance or play is provided between flanges 12 and the adjacent portions of the wear plates 7 on the pedestal jaws, and between the vertical legs 11 and the adjacent portion of wear plates 7 to facilitate free vertical sliding movement of the box and pedestal and to avoid initial compression of rubber pad 13, although, obviously, slight relative movement of the box and pedestal jaws longitudinally of the truck will be yieldingly absorbed by the direct compression of the rubber pads.

Figures 4 and 5 illustrate another form of the invention in which the plate elements 30 and 31, secured to the box side and top walls respectively, are united to form an inner inverted U-shaped yoke. The spring saddle 32 is riveted to the base 33 of the outer yoke 38, and the side walls 34

of the vehicle frame wheel piece extend abreast of the leaf spring 35 throughout the length of the latter. As with the structure described above, the flanges 37 of the outer yoke legs oppose the pedestal legs 36 to limit movement of the yoke 38, saddle 32 and spring 35 transversely of the frame.

Figures 6, 7 and 8 illustrate a form of the invention which includes plates 40 secured to the side walls of the box, rubber pads 41 bonded to plates 40 and outer plates 42 bonded to the outer faces of rubber pads 41 and having flanges 43 slidably receiving the pedestal jaws 44, and their liners 44a, between them and fitting the jaws so closely that there is no substantial transverse relative play, the lateral movement of the box and pedestal relative to each other being accommodated by the distortion of the rubber pads and the spaces between flanges 40a on plate 40 and flanges 43 on plate 42.

A wholly separate plate 45 is secured to the top of the box and mounts a rubber pad 46, an intermediate plate 47, an upper pad 48, and a spring saddle 49 which includes ears 50 extending longitudinally of the pedestal at opposite sides of the upper ends of pedestal liners 44a to prevent lateral movement of the saddle relative to the frame.

Figures 9, 10 and 11 illustrate another form of the invention in which inner side plates 60 and pads 61 correspond to those shown in Figures 6, 7 and 8 but the outer side plates 62 bonded to the outer faces of rubber pads 61 extend upwardly a substantial distance above the top of the box and the spring seat 63 resting on rubber pads 64 has horizontal jaws 65 which receive the upwardly extending portions of plates 62 to key together the laterally moving elements mounted on the side and top walls of the box. The spring saddle 66 surrounds leaf spring 67 and supports coil springs 68, contributing to the support of the frame wheel piece 69.

Each form of the invention attains the objects set forth in the introductory portion of the specification by accommodating substantial movement of the wheels, axles and boxes transversely of the frame and acting to return these parts to a normal centralized relation, and at the same time yieldingly resists a relative movement and cushions the numerous shocks resulting from the relative movement and absorbs noises resulting from the impact and sliding of metal parts on each other.

It will be understood that the various features may be combined in arrangements other than those illustrated without departing from the spirit of the invention, and the exclusive use of such further modifications as come within the scope of the claims is contemplated.

What is claimed is:

1. In a lateral motion device for railway frame and axle box, rubber-like pad members arranged for attachment to the box, an inverted U-shaped plate secured to said pads and having elements extending longitudinally of the frame and facing transversely of the truck to oppose elements on the frame whereby a lateral force applied between said frame and said box is absorbed by the yielding resistance to shear offered by said pads.

2. In a lateral motion device for a railway frame and axle box, an inverted U-shaped yoke member arranged for engaging the side and top walls of the box, rubber-like pad members secured to the outer faces of the legs of said yoke member, another inverted U-shaped yoke mem-

ber secured to the outer faces of said rubber pads and having its legs flanged outwardly, whereby each leg is arranged to receive between its flanges a vehicle frame member.

3. In combination, a railway axle box having pads of rubber-like material secured thereto and extending alongside the side walls of the box, and an inverted U-shaped yoke extending over said box and pads and having its legs secured to the outer faces of said pads, whereby said pads are placed in shear by any force tending to move said yoke relative to said box in a direction parallel to said walls, said yoke legs having outturned flanges arranged to slide vertically on a vehicle pedestal structure and to prevent movement of said yoke transversely relative to said structure.

4. A structure as described in claim 3 which also includes a spring saddle carried on the base of the yoke member and held against movement transversely thereof.

5. A structure as described in claim 3 which also includes a spring saddle supported on the base of the yoke member and held against movement transversely thereof, there being means between the top of the axle box and the base of the yoke member for accommodating relative lateral movement of the yoke and the box.

6. In a railway vehicle, a frame including a pedestal, an axle with an axle box received in said pedestal and arranged for substantial lateral motion relative to said pedestal to accommodate curved track or other conditions resulting in substantial lateral motion of the box and the frame, rubber-like pads secured to said box, an inverted U-shaped yoke extending over said box and pads with its legs secured to the outer face of said pads and having upright flanges on its legs receiving the legs of said pedestal between them, said yoke and pads being constructed and arranged to yieldingly resist said relative movements of the frame and box by the shear value of said pads.

7. A structure as described in claim 6 which also includes a saddle carried on the base of the inverted U-shaped yoke, and a spring seated on said saddle and supporting the vehicle frame, said saddle and spring and yoke being movable with said frame transversely of the vehicle relative to the axle box but subject to the resistance to shear of said pads.

8. In a railway vehicle, a wheeled axle, a journal box thereon, a vehicle frame with a pedestal receiving said journal box and movable vertically thereon, an element carried by said box and supporting said frame, a rubber pad arranged between an upright wall of said box and pedestal with one face secured against movement relative to the adjacent box wall, a member secured to the other face of said rubber pad, there being elements on said member and said pedestal respectively opposing each other transversely of the truck and arranged to provide sliding engagement of said member with said pedestal for substantially free relative vertical movement of said member and pedestal, there being a substantial clear space between the upright edges of said rubber pad and adjacent box parts whereby relative movement of said box and pedestal transversely of the frame is yieldingly resisted by the shear value of said rubber pad while their relative vertical movement is accommodated, there being mounting structure between said box and said frame supporting element accommodating relative movement of said box and element transversely of the vehicle.

9. In combination, a railway vehicle wheeled

axle, an axle box with a side wall extending transversely of the vehicle and provided with a flange extending longitudinally of the vehicle, a frame including a pedestal in which said box plays for a substantial distance transversely of the vehicle, a rubber-like pad extending across said box wall and having one side fixed relative thereto, a metal plate secured to the other side of said pad and slidable vertically over the pedestal but engaged by said pedestal to prevent their relative movement transversely of the vehicle, said plate being spaced from said box wall flange whereby maximum movement of said box transversely of the vehicle relative to said pedestal is determined by abutment of elements on said pedestal, box and plate facing transversely of the vehicle and is yieldingly resisted by the shear value of said pad.

10. A lateral motion device for insertion between the wall of a railway axle box and an adjacent pedestal leg comprising a rubber-like pad corresponding substantially in size and shape to the box wall, and plates bounded to opposite sides of said pad, one of said plates being constructed and arranged to be applied to the box wall and having flanges extending outwardly therefrom, and the other of said plates being arranged to extend alongside of the adjacent pedestal face and provided with flanges to oppose said first-mentioned plate flanges and the inner and outer sides of the pedestal, there being an unobstructed space between the adjacent flanges on said plates respectively whereby relative movement of said plates transversely of the truck will be resisted by the shear value of the material in said pad without compressing the pad.

11. In combination, a railway vehicle wheeled axle, an axle box thereon, a frame with a pedestal receiving said box, structure between said box and pedestal comprising inner and outer plates extending transversely of the vehicle with a rubber-like pad between them, said inner plate having a flange opposing a portion of said box facing transversely of the vehicle and said outer plate having a flange opposing a portion of said pedestal facing in the opposite transverse direction, there being a substantial unobstructed space between said flanges whereby when the axle and box tilt relative to the frame said flanges may maintain contact throughout their length with the corresponding box and pedestal faces because of the twisting of said pad.

12. In combination, a railway vehicle frame including a pedestal jaw structure having spaced legs the upper ends of which are spaced below the top of the jaw opening, a journal box slidable vertically in said jaw and movable relative thereto transversely of the frame, renewable liners applied to said legs and held against sliding movement on said legs and extending upwardly above the upper ends of the legs, a spring seat member carried by said box and movable relative thereto transversely of the frame and having guide brackets slidably engaging the upper portions of said liners whereby said seat is held against movement transversely of the frame, there being rubber-like pads between said box and jaw structure yieldingly resisting their relative movement laterally of the frame.

13. In combination, a railway vehicle frame having a pedestal including spaced depending legs, a journal box slidable vertically in said legs and also having substantial movement relative thereto transversely of the frame, a lateral motion device associated with said box and pedestal comprising a rubber pad at the side of the box

having inner and outer plates attached to its opposite faces respectively, the inner plate being secured to the side of the box and the outer plate having flanges for engaging the inner and outer faces of the adjacent pedestal leg to prevent relative movement of said outer plate and pedestal leg transversely of the frame while permitting their relative vertical movement, a spring seat supported upon said box so as to be movable relative thereto transversely of the frame, there being interengaging elements on said spring seat and on said outer plate to hold said spring seat against movement transversely of the frame relative to said plate.

14. A device as described in claim 1 which also includes rubber-like pad structure between the top of the axle box and the cross piece of the inverted U-shaped plate to support the latter, and a frame carrying spring board mounted on said plate cross piece, said structure being deformable to provide relative movement of the box and plate transversely of the vehicle.

15. In a lateral motion device for application as a unit to a railway frame and axle box, a plate member arranged for attachment to the side wall of the box, a rubber-like pad secured at one side to said member, a plate member secured to the other side of said pad, said plate members having spaced apart opposing elements facing transversely of the frame with the space between said elements unobstructed to permit relative lateral movement of said members, said members comprising means for transmitting lateral thrusts from said frame to said box and vice versa through said pad but freely accommodating relative vertical movement of said frame and box, and such lateral thrusts being yieldingly resisted by the shear value of said pad.

16. In combination, a railway vehicle frame pedestal structure, an axle box received in said structure, said pedestal and box having elements facing transversely of the vehicle but spaced apart to accommodate substantial movement of said box and pedestal transversely of the vehicle, a plate extending transversely of the vehicle with one face applied to the side of said box, a rubber-like pad secured at one side to the other face of said plate, a plate secured to the other side of said pad and having upright faces arranged to engage said pedestal elements, said plates being movable relative to each other transversely of the vehicle subject only to the resistance of said pad to shear, whereby said plates and pad provide yielding resistance to said relative transverse movement, and said plates and said pedestal structure having substantially free vertical movement relative to each other.

17. In combination with a railway vehicle wheeled axle and an axle box thereon, a vehicle frame with a pedestal receiving said box, a pad of rubber-like material having opposite faces directed longitudinally of the vehicle with one of said faces fixed relative to a side wall of the box, a metal member secured to the other of said faces, there being opposing elements on said box and member facing each other transversely of the vehicle but being spaced apart normally to provide for their substantial relative movement transversely of the vehicle before engaging each other, the faces of said box and pedestal facing towards each other longitudinally of the vehicle being spaced apart to avoid compression of said pad between them when they are in their normal positions whereby said member is freely slidable vertically along the pedestal, but said member element and pedestal opposing each other to prevent substantial relative movement between them transversely of the vehicle, whereby relative bodily movement of the box and pedestal transversely of the vehicle will be resisted by the shear value of said pad without creating resistance to the relative vertical movement of the box and pedestal by compressing said pad between box and pedestal parts.

18. In combination, a railway vehicle wheeled axle, an axle box thereon, a vehicle frame with a pedestal receiving said box and providing for substantial lateral movement of said box in said frame, a rubber pad having opposing faces directed longitudinally of the vehicle with one of said faces fixed relative to a side wall of said box, a metal member secured to the other of said faces, there being opposing elements on said box and member facing transversely of the vehicle and spaced apart to accommodate their substantial relative movement transversely of the vehicle, said member and pedestal having parts slidable substantially freely on each other vertically and opposing each other to prevent their substantial relative movement transversely of the vehicle, whereby said box and frame may move freely relative to each other vertically and relative movement of said box and pedestal transversely of the vehicle will be resisted by the shear value of said pad without compressing any part of said pad between said parts, a seat for a frame supporting spring, means on said box carrying said seat and accommodating relative movement of the box and seat transversely of the vehicle, and opposing cooperating elements on said seat and pedestal preventing movement of said seat transversely of the frame.

JAMES C. TRAVILLA, JR.