Oct. 11, 1938. D. S. BARROWS 2,132,382

RAILWAY TRUCK

Filed March 12, 1935 2 Sheets-Sheet 1

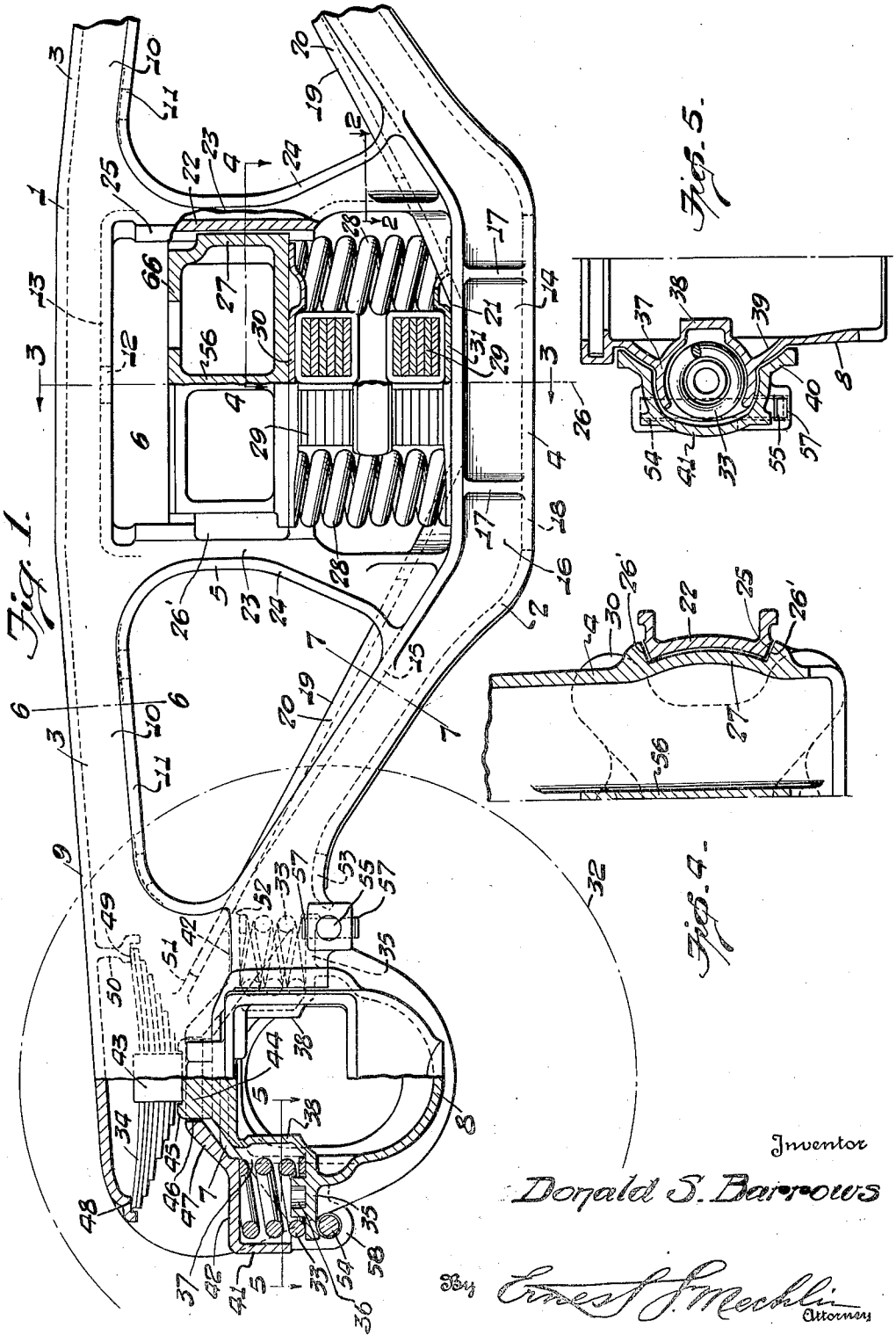


Fig. 1.

Fig. 5.

Fig. 4.

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Oct. 11, 1938. D. S. BARROWS 2,132,382

RAILWAY TRUCK

Filed March 12, 1935 2 Sheets-Sheet 2

Fig. 2.

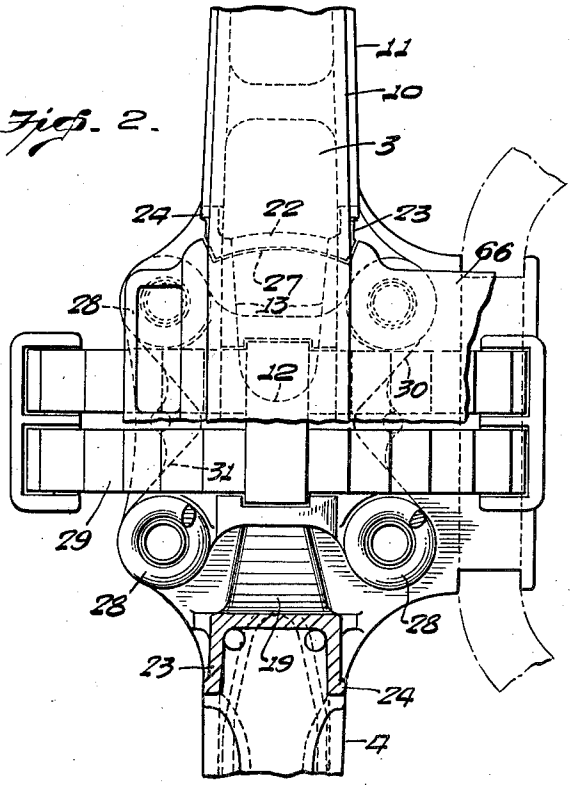


Fig. 6.

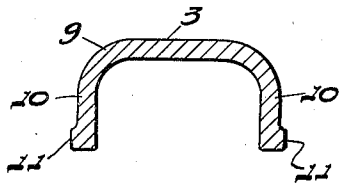


Fig. 7.

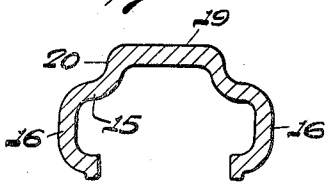
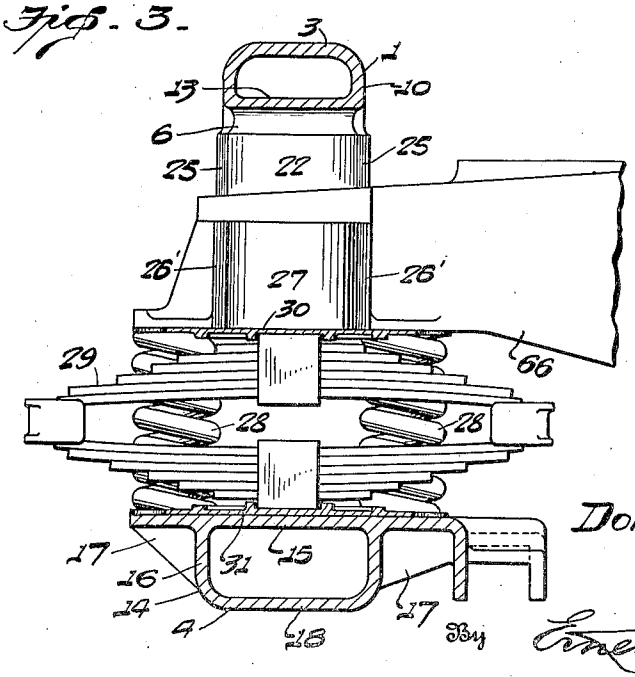


Fig. 3.



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UNITED STATES PATENT OFFICE

2,132,382

RAILWAY TRUCK

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Application March 12, 1935, Serial No. 10,706

34 Claims. (Cl. 105—197.1)

This invention relates to railway vehicles and, more particularly, to trucks and the construction of side frames, bolsters and associated parts thereof.

The principal object of my invention, generally considered, is to improve on the construction of railway trucks, and particularly that of the side frames, bolsters and associated parts in order to allow for adjusting movement between the bolster, frames and journal boxes, to provide for resiliently supporting said bolster, with the provision of a greater amount of vertical movement, and to resiliently mount the journal boxes with respect to the frames, the resilient mounting of the parts being preferably such that the tendency to build up vibrations in the springs due to external impulses is minimized.

Another object of my invention is the provision of a railway truck of improved construction and preferably including the features of having the frames of "double truss" construction, with the omission of spring planks, the relationship between the bolsters and guide columns including cylindrical wearing surfaces to provide the desired flexibility, and the employment of separate journal boxes including the same cylindrical feature with "coil elliptic" springs between the bolster and frames and supplemental springs between the journal boxes and the ends of said frames.

A further object of my invention is the provision of a railway truck in which the bolster springs are full travel, with a higher proportion of elliptic spring capacity than is usual, and supplemental springs are provided between the ends of said frames and associated separate journal boxes, said supplemental springs being arranged in series with the bolster springs to provide for increased vertical movement of said bolster with respect to the supporting truck wheels.

A still further object of my invention is the provision of a truck including side frames having bolster guide columns, the inner faces of which are concave to correspond with the surface of a cylinder whose axis coincides with the vertical axis of the frame, the sides of said columns being radial with respect to said axis.

Another object of my invention is the provision of a truck in which the side frames have downwardly opening pockets receiving journal boxes and associated springs, said journal boxes having upwardly opening pockets defined by ledges extending from the sides thereof, and cylindrically curved flanges uniting the sides of said ledges with the sides of said box, said side frames comprising depending flanges curved to correspond with the journal box flanges and complete the enclosure of the springs supported on said ledges.

Other objects and advantages of the invention relating to the particular arrangement and construction of the various parts will become apparent as the description proceeds.

Referring to the drawings illustrating my invention, the scope whereof is defined by the appended claims:—

Figure 1 is a fragmentary side elevational view of one embodiment of my truck, portions being shown in vertical section;

Figure 2 is a fragmentary plan of the embodiment of my truck shown in Figure 1, with portions shown in horizontal section on the line 2—2 of Figure 1;

Figure 3 is a transverse sectional view on the line 3—3 of Figure 1, looking in the direction of the arrows;

Figure 4 is a fragmentary horizontal sectional view on the line 4—4 of Figure 1, looking in the direction of the arrows;

Figure 5 is a fragmentary horizontal sectional view on the line 5—5 of Figure 1, looking in the direction of the arrows;

Figure 6 is a sectional view on the line 6—6 of Figure 1, looking in the direction of the arrows; and

Figure 7 is a transverse sectional view on the line 7—7 of Figure 1, looking in the direction of the arrows.

Referring to the drawings in detail, like parts being designated by like reference characters, there is shown a portion of a truck 1 comprising a pair of side frames 2, only one of which is illustrated. Each side frame comprises a compression member 3, a tension member 4, and bolster guide columns 5 spacing intermediate portions of said compression and tension members, and spaced to leave a bolster or window opening 6 therebetween. Each frame has downwardly opening pockets or jaws 7, only one of which is illustrated, at the ends thereof for receiving journal boxes 8, only one of which is shown.

The compression member 3 preferably comprises a web 9, which extends outwardly to overlie each journal box 8, and flanges 10 depending from the sides thereof and desirably formed with beading 11 extending from the lower edges. The central portions of said flanges 10 between the bolster guide columns 5 are desirably connected by a web 12 which flares both ways from the longitudinal center line of the compression member to unite with the lower edge portions of said

member along gradually tapering flanges 13, as shown most clearly in Figure 2.

The tension member 4 has an intermediate normally horizontal spring supporting portion 14, generally box-shaped in section, the upper web 15 of which is extended laterally beyond the depending flanges, or substantially vertical web portions 16 thereof, to provide a spring supporting portion of adequate area. The spring supporting portions beyond the flanges 16 are desirably reinforced by triangular gussets 17. The depth of the flanges 16 along the diagonal end portions of the tension member is generally less than that of said flanges at the horizontal portion thereof, the lower outline of said diagonal portions being first concave downwardly and then convex downwardly to provide a bulge beneath the guide columns where the diagonal portions join the horizontal portion, thereby reinforcing the junctions at the guide columns. The lower web portion 18 beneath the bolster opening 6 desirably terminates beneath the guide columns, leaving the outer portions of the tension member substantially inverted U-shape in section, as shown most clearly in Figure 7.

The side frame shown being desirably of the "double truss" type, in the present embodiment, I show the upper web 15 of said member formed with upper longitudinal convolutions or corrugations 19 which provide auxiliary web portions disposed at an angle to and branching from the main web 15. These auxiliary web portions, which are connected to the main web portion by generally triangular portions 20, as shown in Figure 1, start between the guide columns, as indicated at 21, and extend diagonally upward and outward through said columns to finally merge with the normal plane of the web 15 at approximately the point where the depending flanges 10 of the compression member join said web 15, thereby strengthening the angle between the horizontal and inclined portions of the tension member, as well as providing supplemental or intermediate support for those portions of the tension member between the guide columns. The convolutions 19 result in sections just outwardly of the guide columns, as shown in Figure 7, the depending flanges 16 of which are desirably parallel, the auxiliary portion 19 giving the section an appearance somewhat like that of an inverted hollow T, the lower edges of the flanges 16, however, being desirably strengthened by being first curved inwardly or toward one another, and then extended downwardly a short distance. The portions of the upper web 15 beyond the flanges 16 desirably taper beneath the guide columns to finally merge into the inclined portions of the flanges 16 at approximately the outer edges of said columns, as shown most clearly in Figure 1.

Each guide column 5 desirably comprises a web portion 22 which extends substantially vertically along the guiding portion thereof. The sides of the guide columns are defined by flange portions 23 extending from the side edges of the web 22 and with their free edges preferably reinforced by outstanding beading 24. Said flanges are desirably spaced a greater distance than the width of the convolutions 19 in the tension member, so that they straddle said convolutions and connect with the main web portion 15 of the tension member on either side of the convoluted portion thereof.

In the present embodiment, I provide for connections between the bolster 66 and the side frames 2 which correspond somewhat with the bolster-frame connection shown in my application Serial No. 629,953, filed August 22, 1932. For that purpose, the flanges 23 at the bolster guiding portions of the guide columns 5 are formed with outer guiding surfaces 25 disposed on planes radial, or substantially radial, from the vertical axis 26 of the frame, or the line of intersection between the central longitudinal and central transverse planes of said frame. The bolster has flanges or lugs 26' formed on corresponding radial planes for engagement with the guiding surfaces 25 on the columns, the included angle between said surfaces being greater than the included angle of the radial column sides by an amount equal to the angle which the bolster is permitted to swing from one extreme to the other upon departure from the normal right angle relationship with respect to the frame. Instead of forming the webs 22 of the guide columns on parallel planes, I have formed the inner faces concave to the contour of a vertically disposed cylinder whose vertical axis coincides with the axis 26 of the frame, and the bolster has its side webs 27 bulged, as shown most clearly in Figure 4, so that the outer surfaces thereof fit the concave cylindrical inner surfaces of the webs 22 of said guide columns, thereby allowing for angling between said bolster and frames, with the avoidance of line contact upon reaching the limits of angling. The upper and lower webs of the bolster between the side webs 27 thereof are desirably reinforced by a connecting web 56, as shown most clearly in Figures 1 and 4.

I show the bolster 66 supported by means of four helical springs 28 and two elliptic springs or sets of banded leaf springs 29, without the use of any spring plank, said nest of coil and elliptic springs, however being desirably provided with upper and lower spring plates 30 and 31 which may take a form such as described in the Townsend application, 704,958, filed January 2, 1934, or Townsend Patent 2,084,543, granted June 22, 1937, although I do not wish to be limited to either construction. However, it is desirable, although not essential, to have a nest of springs engaging plates which hold the springs in the desired relation with respect to one another, and the complete nest in the desired relation with respect to the associated side frame and bolster.

In order to provide an extra cushioning effect between the journal boxes 8 and bolster 66, in order to further dampen out vibrations and cushion shocks transmitted to the supporting wheels 32 from the track on which they travel, I provide a set of springs between each journal box and the associated end of the frame, said springs, in the present embodiment, comprising two helical springs 33 and one semi-elliptic spring 34 associated with each journal box, and therefore having a period of vibration different from that of the bolster springs.

Each helical spring 33 desirably engages an outstanding ledge 35 at the side of the box and encircles a lug 36 upstanding therefrom to provide for centering said spring. The ledges 35 are desirably disposed substantially at the level of the center of the box and journal (not shown) received therein, as illustrated. The connection between the ledge and box is further reinforced by gussets or side flanges 37 extending between the sides of the ledges 35 and the sides of the boxes 8, said flanges being desirably cylindrical so as to partially surround the springs which, as will

be seen from Figure 5, extend into part of the space provided by the inward convoluting of the sides of the box to provide the brass lugs 38, the flanges at their inner ends desirably merging with said brass lugs, as shown most clearly in Figure 5. In addition to the cylindrical surrounding flanges 37, I desirably bulge the sides of the box outwardly, as indicated at 39, to provide portions merging with intermediate portions of the flanges 37 and cylindrically coaxial with the vertical axis of the box, which portions cooperate with flanges 40 partially defining the jaws 7 which receive the journal box. The flange portions 40 are joined by web portions 41 which extend around the outer portions of the cylindrical webs 37 and complete the enclosure of the springs 33 by box and frame portions. The upper portions of the flanges and webs 40 and 41 are connected by webs or abutment portions 42, which overlie the ledges 35 and provide upper spring engaging surfaces.

The semi-elliptic spring 34 desirably has its band or central portion 43 engage a spring abutment 44 projecting upwardly beyond the top wall or roof of the journal box 8, and desirably formed as a projection on the box and having peripheral upstanding beading or ribbing 45, providing a pocket to receive said spring band 43 and prevent undesired displacement thereof. The projection 44 extends through a corresponding aperture 46 in the web portion 47 of the frame which connects the abutment portions 42, said aperture guidingly receiving said projection 44, but being large enough to provide the desired clearance for allowing relative angling of the box 8 with respect to the frame about its vertical axis, as provided for by the cylindrical portions 39 and 40. The ends of the semi-elliptic springs 34 engage abutments 48 and 49, respectively provided adjacent the end of the compression member web 9 and on a depending flange or transverse web 50 thereof.

The upper web 15 of the tension member extends outwardly beyond the junction with the compression member, but terminates short of the web of the compression member, as shown in Figure 1, in order to avoid interference with the semi-elliptic spring 34, said web, for that purpose, being desirably bifurcated, as indicated at 51, with the separated portions tapering to gradually merge into the sides of the frame. The inner spring abutment portions 42 are desirably connected at their inner ends to, or branch from, the extended web 15, as indicated at 52. In order to strengthen the frame, the lower edges of the flanges 16 are desirably connected by a web 53

In order to hold the springs 33 and 34 under an initial tension, if desired, and prevent undesired removal of the boxes from the frame, said boxes are desirably secured in place by locking means or retainer pins 54, the ends of which pass through flange portions 58 of the frame and underlie the ledges 35 of the boxes. Loss, or undesired removal of said pins, may be prevented in any desired manner, as by means of locking devices 55 which overlie the ends of said pins 54 and are retained in place by bent end portions 57.

From the foregoing description, taken in connection with the accompanying drawings, it will be seen that I have devised a truck involving a novel form of side frame adapted to be connected to and disconnected from an associated bolster and associated journal boxes, said bolster and boxes and the engaging portions of said frame being so constructed that a limited amount of horizontal angling therebetween is permitted with the maintenance of contacting areas of substantial extent regardless of relative angularity. It will also be seen that I have provided non-harmonic groups of springs, not only for supporting the bolster from the side frame, but also for supporting the frame from the boxes. If, because of the short travel of the journal box springs and their period of high frequency, the matter of synchronization of these particular springs is not found to be of serious consequence, then three coils could be used for each box instead of two coils and a semi-elliptic spring, because the bolster spring group through which the entire load passes is fully non-harmonic. It might be added that while the nest of bolster supporting springs desirably has a full standard bolster spring travel of one and eleven sixteenths inches, the nest of springs for each journal box need only have a travel of about one-half inch.

Although a preferred embodiment of my invention has been disclosed, it will be understood that modifications may be made within the spirit and scope of the appended claims, and that a full-elliptic or other form of leaf spring may be substituted for the semi-elliptic spring 34.

I claim:—

1. In a railway truck, in combination, a side frame having a bolster opening, downwardly opening journal box receiving jaws at the ends thereof having curved surfaces, a bolster with an end portion received in said opening, resilient means mounted on said frame for supporting said bolster, journal boxes received in said jaws and provided with correspondingly curved surfaces engaging said jaw surfaces to allow said journal boxes to angle horizontally with respect to said side frame each box having shelves outstanding from the sides thereof, springs disposed between said shelves and abutments on said frame, and other spring means engaging said journal boxes between said shelves, and abutment means on said frame for cooperating with the last-named spring means.

2. In a railway truck, in combination, a side frame having a bolster opening, downwardly opening journal box receiving jaws at the ends thereof, a bolster with an end portion received in said opening, coil and leaf springs mounted on said frame within said opening for supporting said bolster, journal boxes received in said jaws and each having shelves outstanding from the sides thereof, springs disposed between said shelves and abutments on said frame, and other spring means engaging said journal boxes between said shelves, and abutment means on said frame for cooperating with said last-named spring means.

3. In a railway truck, in combination, a side frame having a compression and a tension member joined intermediate their ends by spaced guide columns to form a bolster opening, a spring seat formed on the tension member of said side frame at the bottom of said bolster opening, a bolster with an end portion received in said opening, cooperating arcuate surfaces on said bolster end portion and guide columns to allow the bolster to angle horizontally with respect to the side frame, coil and elliptic springs mounted on said spring seat within said opening and acting in parallel for supporting said bolster, the end portions of said frame having downwardly opening pockets provided with cylindrical surfaces, journal boxes received in said pockets having cylindrical surfaces engaging said pocket surfaces, and

springs acting between said journal boxes and the end portions of said frame in series with said bolster springs and providing a further increment of the total travel of the bolster.

4. In a railway truck, in combination, a side frame having a bolster opening defined by guide columns having interior faces cylindrically concave about the vertical axis of said frame, a vertically movable bolster with an end portion received in said opening and slidably engaging said guide columns, said bolster end portion being formed with outer cylindrically convex surfaces cooperating with said concave surfaces on the columns to allow for angling therebetween, said frame having depending jaws at the ends thereof and journal boxes embraced between said jaws, said journal boxes having outer side wall surfaces coaxial with the vertical axes thereof, and said jaws having corresponding cylindrically concave surfaces cooperating therewith for holding said boxes in place while allowing angling therebetween about said axes.

5. In a railway truck, in combination, a side frame having a bolster opening defined by guide columns having interior faces cylindrically concave about the vertical axis of said frame, a bolster vertically movable with respect to the side frame and provided with an end portion received in said opening and formed with side walls bulged to provide outer cylindrically convex surfaces nesting with said concave surfaces on the columns to allow for angling therebetween, said frame having jaws at the ends thereof, and journal boxes, mounted for vertical movement between said jaws.

6. A side frame comprising a tension member formed with a main web, the intermediate portion of which is substantially horizontal and the end portions of which are substantially inclined, auxiliary web portions disposed intermediate the vertical planes of the edge portions of said main web and reinforcing the angles between said horizontal and inclined portions of said main web, the ends of said auxiliary web portions merging into said main web portions intermediate the ends of the horizontal portion and adjacent the outer ends of the inclined portions, and flange portions depending from the edge portions of said main web laterally beyond said auxiliary portions and extending for substantially the full length of said frame, said frame having jaws at the ends thereof for the reception of journal boxes.

7. A side frame comprising a tension member formed with a main web and flanges depending from the edge portions thereof, said frame having a bolster opening and said tension member beneath said bolster opening being substantially horizontal with the portions on either side of said opening sloping upwardly and outwardly substantially therefrom toward the ends of the frame, auxiliary web portions disposed intermediate the planes of said flanges, joined to said main web by substantially vertical web portions, and each extending in an approximately straight line to merge with intermediate parts of the horizontal portion of said tension member main web at its inner ends and with outer parts of said sloping web portions at its outer ends, those portions of the tension member flanges beneath said opening having their lower edge portions joined by a web, said web being bifurcated beneath the guide columns and extended outwardly and upwardly as inturned beading along the lower edges of the tension member flanges on the inclined portions thereof.

8. A side frame comprising a compression member, a tension member, bolster guide columns spacing intermediate portions of said members and spaced to leave a window opening therebetween, said tension member comprising a main web portion with flanges depending from the edges thereof, said web portion being substantially horizontal beneath the window opening and inclined upwardly toward the ends of the frame beyond said guide columns, the end portions of said web being bifurcated and tying together the side walls of said frame adjacent the junctions between the compression and tension members and substantially horizontal portions serving as abutments for journal box springs.

9. A side frame comprising a compression member, a tension member, bolster guide columns spacing intermediate portions of said members and spaced to leave a window opening therebetween, the end portions of said frame beyond the junctions between said compression and tension members being provided with pockets for receiving separable journal boxes and journal box springs, said compression member having a web terminating in spring abutments, and flanges depending from said web and provided with transverse webs forming other spring abutments for journal box springs.

10. A side frame comprising a compression member, a tension member, bolster guide columns spacing intermediate portions of said members and spaced to leave a window opening therebetween, said compression and tension members uniting adjacent the ends of the frame, the end portions of said frame being formed with downwardly opening pockets for receiving journal boxes and journal box springs, said pockets being each defined by substantially horizontal webs adapted to serve as spring abutment portions, and flanges depending from the edge portions of said webs for housing associated springs, portions of said flanges being cylindrically coaxial to cooperate with corresponding portions on associated journal boxes, said spring abutment portions being joined to upwardly converging web portions terminating in a substantially horizontal portion apertured to receive a projection from the top of an associated journal box.

11. A journal box for a railway truck comprising side walls with substantially horizontal shelves extending therefrom and adapted to seat side frame supporting springs, the connection between said shelves and side walls being reinforced by flanges extending between the edge portions of said shelves and portions of the journal box thereabove, said flanges being spaced to receive associated springs and having their inner ends merging with portions of said box forming brass lugs, the side walls of said box beyond said flanges being bulged outwardly to form coaxial cylindrical portions merging with intermediate portions of said cylindrical flange portions and adapted to nest with corresponding portions on an associated side frame for allowing horizontal angling therebetween.

12. In a railway truck, in combination, a side frame having a bolster opening, a bolster with an end portion received in said opening, resilient means mounted on said frame for supporting said bolster, the end portions of said frame having downwardly opening pockets, journal boxes received in said pockets, springs acting between said journal boxes and the end portions of said

frame in series with the resilient means which support said bolster and providing for a further increment of the total travel of the bolster, said journal box springs having a different period of vibration from the resilient means supporting said bolster so as to minimize the tendency to build up oscillations in said springs due to external impulses, said frame portions defining the upper walls of said pockets being apertured, said boxes each having an abutment portion, said abutment portions projecting through said apertured portions, and spring means acting between said abutment portions and those portions of the frame thereabove.

13. In a railway truck, in combination, a side frame having a bolster opening, a bolster with an end portion received in said opening and supported therein, said frame having pockets at the ends thereof, and vertically movable journal boxes received in said pockets, said journal boxes having outer side surfaces cylindrically convex about the vertical axes thereof to allow for horizontal angling with respect to said frame, and spring abutting portions projecting from the tops of said boxes and guidingly received in apertures in portions of said frame thereabove.

14. In a railway truck, in combination, a side frame having a bolster opening defined by guide columns, a bolster with an end portion received and supported in said opening, said frame having pockets at the ends thereof and journal boxes mounted therein, the surfaces of said frame defining the inner sides of portions of each pocket being concavely curved substantially coaxially with respect to each other, so as to allow for horizontal angling of the journal boxes received therein, portions of said frame, defining said pockets, and adjacent side wall portions of said boxes, having complementary portions for housing frame-supporting springs.

15. In a railway truck, in combination, a side frame having a compression member, a tension member, bolster guide columns spacing intermediate portions of said members to form a bolster opening, a bolster with an end portion received in said opening, a non-harmonic nest of springs mounted on said tension member for supporting said bolster end portion, the end portions of said frame having downwardly opening pockets, journal boxes received in said pockets, said journal boxes having curved side wall surfaces for engaging correspondingly formed surfaces associated with said side frame to allow horizontal angling of said boxes with respect to said frame and a non-harmonic nest of springs acting between each journal box and the corresponding end portion of said frame, in series with the nest of springs supporting the bolster end portion for providing a further increment of the total travel of the bolster, the springs forming the journal box nests having a period of vibration different from that of the springs forming the bolster supporting nest in order to minimize the tendency to build up oscillations in said springs due to external impulses.

16. In a railway truck, in combination, a side frame comprising a compression member, a tension member, bolster guide columns spacing intermediate portions of said members and spaced to leave a window opening therebetween, a non-harmonic nest of springs interposed between said bolster and tension member, the end portions of said frame being provided with pockets having curved wall portions for receiving separable journal boxes and also provided with curved wall portions engaging the said wall portions of said pockets, said compression member having a main web terminating in spring abutments, and flanges depending from said main web connected by transverse webs underlying said main web, said transverse webs forming other spring abutments, and a nest of springs interposed between said journal boxes and spring abutments.

17. A journal box for a railway truck comprising side walls with substantially horizontal shelves extending therefrom and adapted to form seats for side frame supporting springs, the connections between the side walls and shelves being reinforced by flanges extending between the edge portions of said shelves and portions of the journal box, said flanges having cylindrical coaxial portions serving to center associated coil springs, the side walls of said box outwardly of said flanges being bulged to form coaxial cylindrical portions merging with intermediate portions of said cylindrical flange portions and adapted to nest with corresponding portions on an associated side frame thereby allowing horizontal angling therebetween.

18. In a railway truck, in combination, a side frame having a compression member, a tension member, bolster guide columns spacing intermediate portions of said members to form a bolster opening and downwardly opening journal box receiving jaws at the ends thereof, a bolster with an end portion received in said opening, resilient means mounted on said frame for supporting said bolster, journal boxes received in said jaws and each having shelves outstanding from the sides thereof, springs disposed between said shelves and side frame, other springs engaging portion of said journal boxes above said shelves and portions on said side frame, and spaced means removably secured to said side frame and extending transversely thereof, said means underlying each of said shelves in order to prevent the undesired removal of the journal boxes from the side frame.

19. In a railway truck, in combination, a side frame having a bolster opening and downwardly opening journal box receiving jaws at the ends thereof, a bolster received in said opening, resilient means mounted on said frame within said opening for supporting said bolster, vertically movable journal boxes received in said jaws and each having cylindrically convex side surfaces projecting outwardly of the respective vertical planes of the side walls of said boxes and being adapted to cooperate with corresponding cylindrical concave surfaces on said jaws to allow for horizontal angling between said boxes and frame in any vertical position of the boxes, resilient means interposed between a roof portion of said boxes and said side frame, and transversely spaced means extending outwardly from side walls of said boxes to limit the angling movement of said boxes.

20. In a vertically movable journal box for a railway truck comprising a roof and side walls, said side walls having an intermediate portion provided with an inwardly convoluted surface forming a brass lug and end portions provided with outer surfaces cylindrically convex and coaxial with the vertical axis of said box adapted to cooperate with correspondingly formed coaxial concave surfaces on an associated side frame, and an abutment on said roof disposed intermediate said side walls forming a seat for an associated spring.

21. A side frame having the end portions there-

of formed with downwardly opening pockets for receiving journal boxes and journal box springs, said pockets being defined by substantially horizontal webs adapted to serve as spring abutment portions, and substantially vertical laterally spaced webs extending downwardly from lateral edges of said abutment webs, each of said vertical webs terminating in a cylindrical flange adapted to cooperate with correspondingly formed side walls on an associated journal box to allow horizontal angling therebetween.

22. A side frame having pockets in the end portions thereof provided with cylindrical surfaces, vertically movable journal boxes positioned in said pockets, shelves extending outwardly of said journal boxes, said boxes having cylindrical faces engaging and in surface bearing relation with said pocket surfaces to allow horizontal angling between said journal boxes and side frame, and springs acting between said journal box shelves and the end portions of the side frame.

23. A journal box for railway trucks comprising side walls with substantially horizontal shelves extending therefrom and adapted to form seats for side frame supporting springs, said side walls having coaxial cylindrical portions adapted to engage correspondingly formed surfaces on an associated side frame to allow horizontal angling therebetween.

24. A journal box for railway trucks comprising an abutment on the roof portion thereof adapted to form a seat for side frame supporting spring means, side walls having coaxial cylindrical portions adapted to engage correspondingly formed surfaces on an associated side frame to permit horizontal angling therebetween, and shelves extending outwardly of said side walls to form seats for side frame supporting springs.

25. A journal box for a railway truck comprising a roof and side walls, each of said side walls having spaced projecting portions provided with outer surfaces which form a cylindrically convex member adapted to cooperate with correspondingly curved surfaces carried by an associated side frame to allow said box to angle with respect to said frame, and an abutment upstanding from said roof and disposed intermediate said side walls forming a seat for an associated spring.

26. A side frame having downwardly opening jaws at the end portions thereof, said jaws being provided with cylindrical surfaces adapted to cooperate with an associated journal box to allow horizontal angling therebetween, and spaced removable tie means extending transversely of the frame between and connecting opposite portions of said jaws adjacent the lower ends thereof to underlie a portion of said journal box.

27. A side frame comprising a compression and a tension member, said members being formed of webs and flanges depending from the edge portions thereof, said flanges being joined adjacent the outer ends of said side frame, longitudinally spaced spring abutments underlying said compression member web outwardly of said junction, said tension member web extending outwardly beyond said junction to overlie one of said spring abutments.

28. A side frame comprising a compression member, a tension member, bolster guide columns spacing intermediate portions of said members and spaced to leave a bolster opening therebetween, the end portions of the side frame each having journal box receiving jaws, portions of the inner surface of each jaw being cylindrically curved, each of said jaws being formed to provide a spring pocket adjacent said cylindrical surface, said cylindrical surface being adapted to engage correspondingly formed surfaces on a cooperating journal box whereby the journal box may angle horizontally with respect to the side frame.

29. In a railway truck, in combination, a side frame having journal box receiving pockets adjacent each end thereof, a journal box positioned in each pocket and movable vertically therein, said pockets having side walls which are adapted to maintain the box against movement longitudinally of the side frame, each of said journal boxes having a roof portion and side walls depending therefrom, vertically extending cylindrically convex surfaces on said journal box side walls for engagement with correspondingly formed concave surfaces on said pocket side walls so as to allow each journal box in all positions to angle horizontally with respect to the side frame, an abutment upstanding from the roof portion of each box and extending into the portion of said side frame above each box, and spring means acting between each abutment and side frame.

30. In a railway truck, in combination, a pair of spaced side frames each having a bolster opening defined by guide columns, said guide columns each having interior faces cylindrically concave about the vertical axis of the associated side frame, a bolster extending between and vertically movable with respect to the side frames, said bolster having an end portion positioned in each bolster opening and formed with side walls having outer cylindrically convex surfaces nesting with said concave surfaces on the guide columns to allow for a horizontal angling movement between the bolster and each side frame, said side frames each having jaws at the ends thereof, a vertically movable journal box positioned in each jaw, said journal boxes being arranged for horizontal rotative movement with respect to said side frames.

31. In a railway truck, in combination, a side frame having a pocket adjacent each end thereof, a vertically movable journal box positioned in each pocket, cylindrical surfaces on side walls of each journal box for engagement with correspondingly formed surfaces on said side frame in order to permit each journal box to angle horizontally with respect to the side frame about its vertical axis, substantially horizontal shelves extending from the sides of said boxes, spring means interposed between said shelves and side frame and positioned substantially on the longitudinal axis of said frame, said spring means being of such character and being disposed and arranged so as to allow the shelves on each box, upon deviation of said box from its normal right-angle relationship with the side frame, to freely follow an arcuate path with respect to the vertical axis of the said journal box.

32. A journal box including a roof and spaced vertically disposed side walls, shelves extending outwardly from said side walls forming seats for associated spring means, arcuate flanges extending outwardly of the side walls substantially coaxial with the vertical axis of the corresponding spring means and merging with said shelves to form housings for the spring means, cylindrical convex surfaces on said side walls outwardly of said housing and adjacent said flanges, said surfaces being adapted to engage correspondingly formed surfaces on an associated side frame to permit the journal box to rotate in a horizontal plane relative to said side frame, and means asso-

ciated with said shelves to retain the spring means in operable position.

33. In a railway truck, in combination, a side frame having a compression member and a tension member joined adjacent one end of the side frame and forming a journal box receiving pocket at said end, said compression member having a web extending longitudinally of the side frame, a transversely extending web below and in spaced relation to the compression member web and defining the upper extremity of said pocket, a vertically movable journal box positioned in said pocket and arranged to angle horizontally with respect to the side frame, an aperture in said transverse web positioned in vertical alignment with said journal box, spring means acting between said compression member web and journal box, said spring means being supported on said journal box to allow the horizontal angling movement of the box, and means on said compression member web for retaining the spring means in operable position.

34. In a railway truck, in combination, a side frame having a compression member, a tension member, a bolster opening defined by guide columns joining said members and having interior faces cylindrically concave about the vertical axis of said frame, a bolster with an end portion received in said opening and formed with outer cylindrically convex surfaces cooperating with said concave faces to allow for angling between said bolster and side frame, coil and elliptic spring means mounted on said frame and acting in parallel for supporting said bolster, the end portions of said frame having downwardly opening pockets, a journal box received in each pocket, each journal box having side walls formed with outer surfaces cylindrically convex about its vertical axis and said pockets being defined by cylindrically concave surfaces cooperating with said convex surfaces for holding said boxes in place while allowing angling thereof in a horizontal plane, each box having side walls with substantially horizontal shelves extending therefrom, abutments on said frame overlying said shelves, said shelves and boxes being reinforced by spaced flanges extending between said shelves and portions of the journal box thereabove, coil springs seated on said shelves between said flanges, the upper ends of said springs cooperating with said overlying side frame abutments, said flanges merging with said side walls adjacent said outer convex surfaces of the latter, said frame having web portions spaced at their inner edges to form apertures between them, said web portions being connected to said abutments and overlying said journal boxes, each box having an abutment portion projecting through the corresponding aperture, and a leaf spring with its central portion seated on each journal box abutment portion, the compression member of said frame having downwardly facing abutment portions normally engaged by the end portions of said leaf springs.

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