Nov. 15, 1927. 1,649,352

W. F. KIESEL, JR

CAR AND TENDER TRUCK

Filed Sept. 10, 1924 4 Sheets-Sheet 1

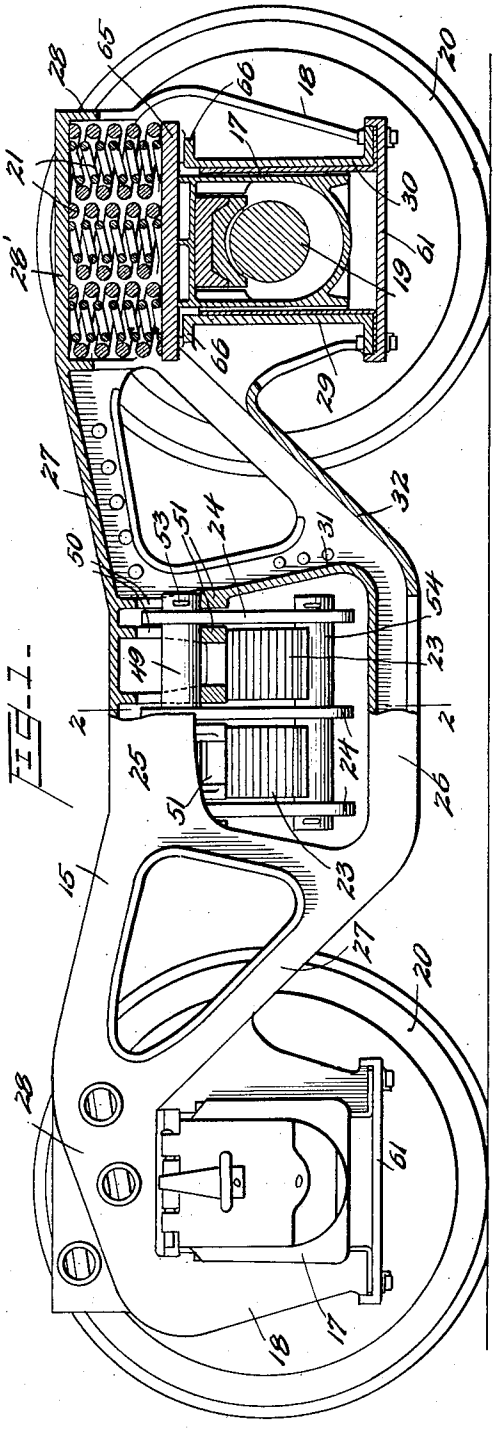

FIG. 1.

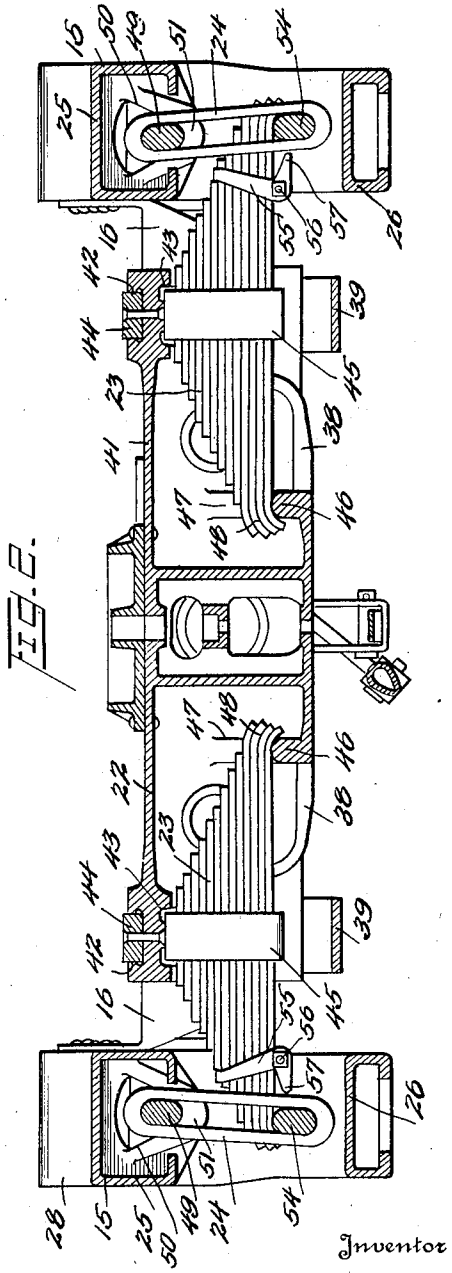

FIG. 2.

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4 Sheets-Sheet 2

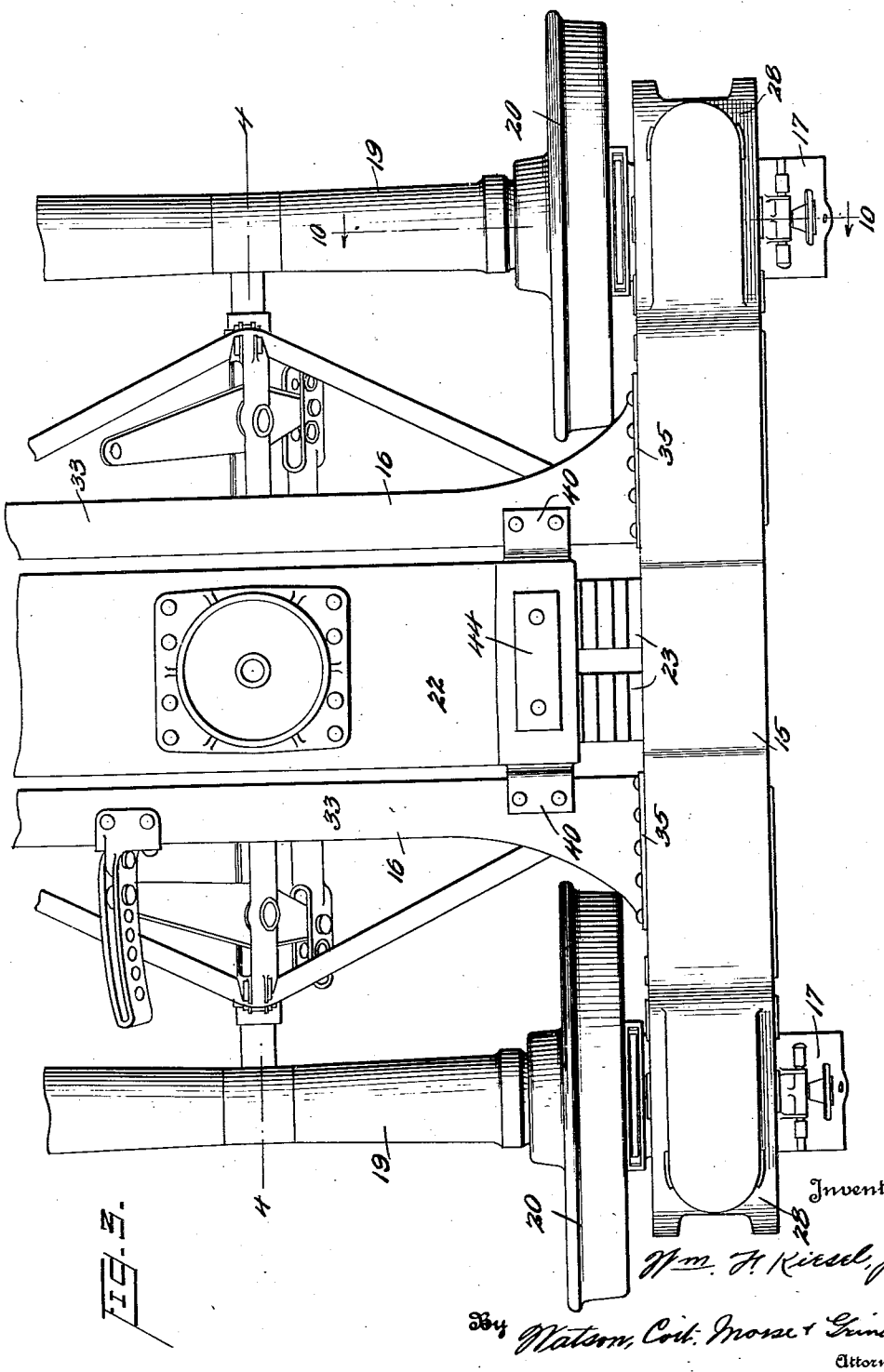

FIG. 2.

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CAR AND TENDER TRUCK

Filed Sept. 10, 1924 4 Sheets-Sheet 3

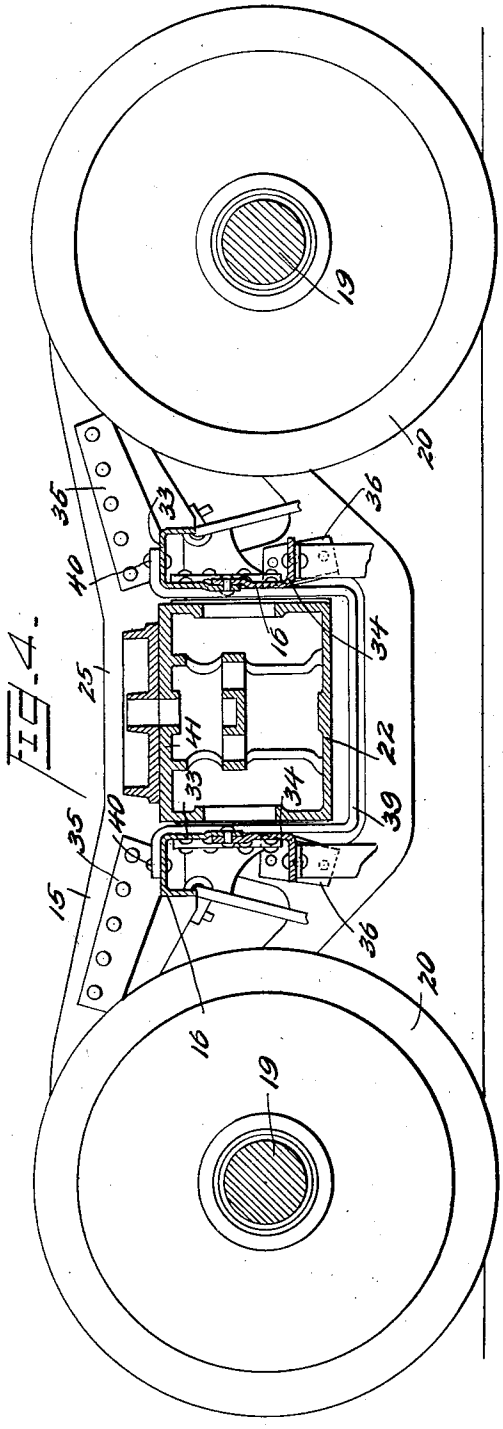

FIG. 4.

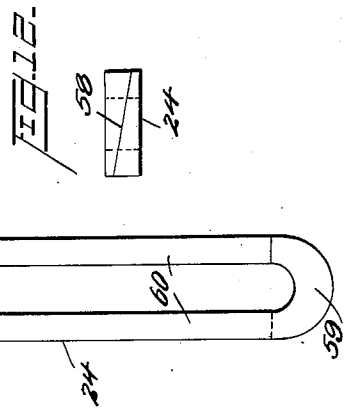

FIG. 11.

FIG. 12.

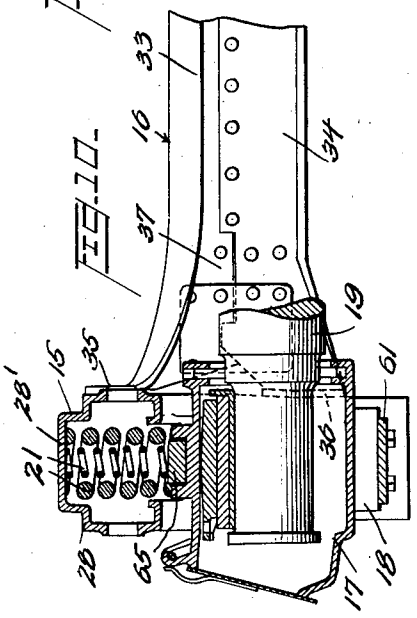

FIG. 10.

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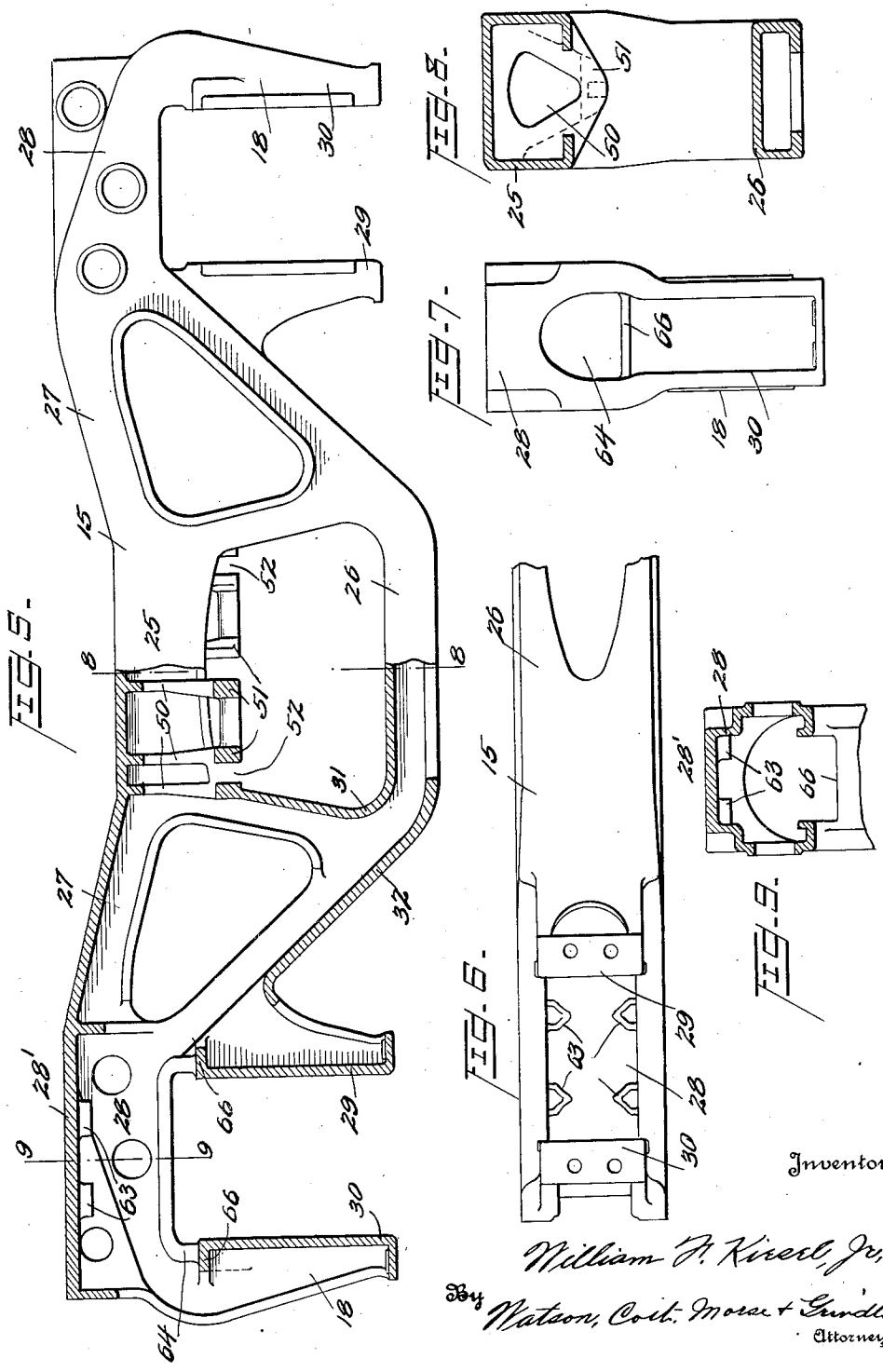
CAR AND TENDER TRUCK

Filed Sept. 10, 1924 4 Sheets-Sheet 4



Patented Nov. 15, 1927. 1,649,352

UNITED STATES PATENT OFFICE.

WILLIAM F. KIESEL, JR., OF ALTOONA, PENNSYLVANIA.

CAR AND TENDER TRUCK.

Application filed September 10, 1924. Serial No. 736,993.

This invention relates to trucks and more particularly to four-wheel trucks for railway cars and tenders.

It is an object of this invention to provide a novel and improved form of truck of simplified construction and having a reduced number of parts.

It is another object of this invention to provide an improved form of bolster support.

Still another object of this invention consists in the provision of improved side frames for use on railway trucks.

A further object of this invention consists in the provision in a railway truck of an improved type of transom for connecting the side frames.

Still further it is an object of this invention to provide a truck in which the bolster is hung from the side frames by means of cantilever springs, means being provided to allow the wheels of the truck to more readily accommodate themselves to unevennesses in the track construction.

A further object of this invention consists in the provision of means for hanging the bolster from the compression member of the side frames along the central plane thereof and to allow limited swinging motion of the bolster in respect thereto.

Other and further objects of the invention will become apparent as the description proceeds.

For an understanding of this invention, reference should be had to the following specification taken together with the accompanying drawings, wherein is disclosed by way of example one embodiment of the invention, with the understanding that various changes in the size, construction and arrangement of parts may be made such as fall within the scope of the appended claims.

In said drawings:

Figure 1 is a side elevation with the side frame partly in longitudinal vertical section.

Figure 2 is a transverse vertical section through the truck on line 2—2 of Figure 1.

Figure 3 is a partial plan view.

Figure 4 is a longitudinal vertical section on line 4—4 of Figure 3.

Figure 5 is a side elevation partly in longitudinal vertical section of one of the side frames.

Figure 6 is a partial bottom plan thereof.

Figure 7 is an end elevation thereof.

Figure 8 is a section on line 8—8 of Figure 5.

Figure 9 is a section on line 9—9 of Figure 5.

Figure 10 is a partial transverse vertical section on line 10—10 of Figure 3.

Figure 11 is a side elevation of a spring hanger link, and

Figure 12 is a plan view thereof.

In the drawings a number of subsidiary parts of the truck, not forming a part of this invention, such as the brakes, brake rigging, brake equalizers, etc., have been omitted for the sake of clearness, only the essential parts of the invention being included.

The present invention is directed particularly to four-wheel trucks for use on cars or tenders. Referring to the drawings, it will be seen that the truck comprises the following essential elements: the one-piece side frames 15, connected together by the transversely extending transoms 16 riveted thereto; the journal boxes 17, vertically slidable in the side guides of the pedestals 18 forming integral parts of the side frames, which journal boxes are supported by the axles 19 carrying the wheels 20 and serve to support the side frames through the helical springs 21 interposed between the tops of the boxes and the undersides of the pedestal covers; the bolster 22 is supported by the semi-elliptic springs 23 carried thereby and hung by means of the spring hanger links 24 in the upper central portions of the side frames, thereby supporting the load of the car entirely from the upper or compression member of the side frames.

The side frames 15, as previously explained, serve to carry the load applied by the bolster entirely from the top or compression members, considering each side frame to be a simple beam supported at the ends by the two journal boxes and carrying the load in the center. In order that each side frame may be sufficiently rigid and have the proper strength for the purpose described, it is constructed as a casting, as best shown in Figure 5, and includes the upper central portion or compression member 25 and the lower central portion or tension member 26, each formed, as clearly shown in the sectional view in Figure 8, hollow and rectangular, a portion of the lower side of each section being removed for the sake of lightness and to simplify the removal of the

core. These two central portions are parallel to each other and connected by the triangular parts 27 to the end sections 28 carrying the pedestals 18. The members of these triangular portions are also of box-like cross section, having one side completely eliminated, as shown in the sectional portions of Figure 5.

The pedestal legs 29 and 30 depend from the portions 28, and each are rectangular in horizontal cross section and open on the outer sides, whereas the top portion 28 over the opening between the pedestal legs is of box-like formation having the lower side removed, as shown best in Figure 9, in order to receive and retain therein the helical springs 21 which are interposed between undersides of the pedestal heads 28′ and the tops of the journal boxes. It should be noted that the walls 31 and 32 are continuous without any webs or brackets, thus eliminating entirely the most frequent source of shrinkage cracks while casting. The side frames are cast entirely of one piece with suitable fillets and openings for the sake of lightness where they can be introduced without sacrificing the strength thereof.

The two side frames are identical in structure, oppositely disposed, and spaced apart by means of the transoms 16 arranged parallel to the axles and having their centers slightly above the centers of the axles. These transoms are each built up of two pressed sections, as best shown in Figure 4, the upper one 33 being channel shaped with one flange longer than the other, and the lower one 34 L-shaped with the long leg of the L offset and riveted to the offset longer flange of the channel. These transoms are disposed with the open sides facing toward the ends of the truck, the channel members being at the top, and the ends are expanded and provided with the portions 35 and 36 bent up at right angles to the direction of the transom and adapted to be riveted to the side frames, as shown best in Figure 4. The transoms are shallow in section with the joined legs of the L and channel in the same plane, owing to the offset along their meeting line, and are each provided with sections 37 near the ends where there is no overlapped portion, for a purpose to be later described. The transoms are made shallow to allow them to be sufficiently flexible to permit a certain amount of weaving between the side frames in order to take up slight unevenness in the track.

The bolster 22 is a single casting of box-like formation at the central portion, as clearly shown in Figure 2, and is partly open at the bottom near the ends as shown at 38. The bolster is of a width slightly less than the distance between the two transoms and is adapted to fit therebetween and be retained in position against longitudinal movement by means of the bolster guides or safety hangers 39, which are in effect U-shaped straps, each arm of which is bent over and riveted to the top members of the transoms as at 40 and depending and passing beneath the bolsters, closely engaging the sides thereof to prevent relative longitudinal movement in the direction of motion of the car between the bolsters and the transoms and thus between the bolster and the side frames. These safety hangers or bolster guides pass downwardly along the inner faces of the transoms at the non-overlapping portions 37 provided for that purpose. These safety hangers, aside from providing guides to allow for vertical movement between the bolster and transoms, also serve as safety members in the case of the breaking of a spring, to support the bolster from the transoms, and prevent it from dropping down onto the track.

The upper member 41 of the bolster is thickened at the ends and provided with the transverse grooves 42 and 43, the grooves 42 serving to accommodate the side bearings 44 to support the body of the car when it sways, whereas the grooves 43 serve as fulcrums to accommodate and retain the spring bands 45 which surround the various leaves of the semi-elliptic springs 23 which have their centers supported beneath the outer ends of the members 41. The inner ends of the semi-elliptic springs are prevented from moving downwardly in relation to the bolster by means of the abutments 46 formed integral with the lower member of the bolster and being rigidly reinforced by means of the webs 47. A vertical center partition serves to space the two springs provided at either end of the bolster and prevents them from rotating in a horizontal plane about a vertical axis through their centers. The inner ends of the springs are almost completely housed by the box-like bolster, the upward reaction thereof being taken by the top member of the bolster and the downward reaction by the shorter lower member.

The ends of the main leaves of the springs are bent downward as shown at 48, such curved portions preventing, at the inner ends thereof, their slipping off of the abutments 46, and at the outer ends serving to restrain the hanger gibs from moving outwardly in respect to the springs.

The outer ends of the semi-elliptic springs are hung from the upper members of the side frames by means of the hanger links 24, three being provided for each side frame. These hanger links are supported at their upper ends by the gibs 49, one being provided for each hanger frame and passing longitudinally through the openings 50 in the transverse webs connecting the side flanges of the upper member 25 of each side frame. These gibs are supported in the cradles 51 having the transverse slots 52

therein for the passage of the hanger links. Each gib is elliptical in section and has a fairly close fit within the end of the hanger link and is restrained against longitudinal motion by means of keys 53 passed through the transverse key ways therein. By thus hanging the gibs in a series of parallel cradles, each arranged transversely of the upper members of the side frames, the load of the bolster is distributed across those members and thus more equally applied throughout the frames. Similar gibs 54 hang in the lower ends of the hanger links 24 and are restrained against longitudinal motion in the same manner.

Upon these lower gibs, between the links, rest the outer curved ends 48 of the semi-elliptic springs 23, which are thus supported from the side frames by a linkage enabling transverse swinging movement of the bolster without imparting such movement to the side frames, the suspension, however, being in stable equilibrium so that the normal tendency of the bolster is to remain spaced centrally of the side frame. The links 24 are inclined slightly from the vetrical and away from each other to quickly damp out any such swings. In order to prevent the hangers and the lower gibs from moving toward the center of the springs, the hanger stops 55 are provided, which comprise the right angled side members connected across the top by a strap and retained on the springs by the bolts 56. The strap abuts against the end of one of the spring leaves and is thus prevented from sliding inward, whereas the right angled lower arms press against the hanger links as shown at 57 and prevent them from moving inwardly.

The hanger links 24 are specially constructed, as shown best in Figures 11 and 12, in order to provide a thickened portion at either end to better withstand the wear incident to the swinging upon the gibs. These links are formed somewhat after the manner of a welded chain link with the difference that there is provided a scarf weld at each end of the link, the weld being made across a line such as 58, shown in the plan view of the link, and thus the ends, as shown at 59, are thicker than the side members 60 of these links. Furthermore, this welding provides for a working and compressing of the metal to give it additional strength to resist the wear.

The use of semi-elliptic springs, as described in the above paragraphs, provides for a deflection at the hanger ends of the springs equal to the sum of the deflections of the two ends of the springs, which is as much as that of a full elliptic spring, as commonly used in trucks of the type described. The above construction is considerably simpler than that commonly used and results in much better clearance under the truck and in the elimination of the commonly used spring plank, it being rendered useless on account of the manner of supporting the hangers close to the longitudinal center line of the frames. The transoms also can be made of lesser strength and greater flexibility because they are not stressed by bolster supports removed from the center line of the frames, and on account of this greater flexibility of the transoms, the truck will follow irregular track alignment with less stress in these parts and less tendency to derailment. This construction furthermore provides swinging side motion for the bolsters with the least possible complication of design.

The journal boxes, which may be of the usual construction, fit between the inner faces of the pedestal legs 29 and 30, and are adapted in the usual manner to slide vetrically therebetween, being held in position under unusual conditions by means of the bottom plates 61. The journal boxes support the side frames through the series of helical springs 21 interposed between the underside of the pedestal heads 28′ and the top of the journal boxes. Three sets of these helical springs are shown above each journal box, the spacing lugs 63 being cast integral with the pedestal covers to maintain these springs in their proper positions. Above the pedestal legs, there is provided an opening 64 through which the plain bar 65 may be introduced under the triple helical springs over the boxes, which bar rests upon the flanges 66 under conditions when the springs are not compressed, in order to prevent the springs from being displaced in case the side frames should be lifted from the journal boxes. This construction materially simplifies the placing of the helical springs and the replacement of journal boxes and axles when such becomes necessary.

In the above specification but one embodiment of this invention has been shown and described, it being understood however that various modifications may be made therein, including the arrangement of parts, material and size of construction, etc., without departing from the scope of the invention as pointed out in the following claims.

Having thus described my invention what I claim as new and desire to secure by U. S. Letters Patent is:

1. In a truck, in combination, side frames, a box-like bolster, a semi-elliptical spring partially housed in each end of said bolster and having two bearings thereon, said springs supporting said bolster from the side frames.

2. In a truck, in combination, box type side frames, transoms connecting said side frames, a bolster and a semi-elliptic spring carried by each end of said bolster, one end of each spring supporting said bolster from

substantially the center plane of one of said side frames.

3. In a truck, in combination, side frames, axles supporting said side frames, transoms connecting said side frames, a bolster between said side frames and extending below said axles, a semi-elliptic spring at each end of said bolster above the bottom thereof, said springs each having one end only suspended from a side frame.

4. In a truck, in combination, side frames, flexible transoms connecting said side frames, a bolster between said side frames, a semi-elliptic spring at each end of said bolster and partially housed therein, said springs each having two points of support in said bolster, and means supporting said springs from said side frames.

5. In a truck, in combination, side frames, transoms connecting said side frames, a bolster therebetween, semi-elliptic springs at each end of said bolster and parallel thereto and links supporting said springs from said side frames, said links being substantially in the center plane of said side frames.

6. In a truck, in combination, side frames, a compression member and a tension member on each frame, transoms connecting said side frames, a bolster between said side frames, semi-elliptic springs, said bolster being hung from the transverse centers of the compression members of said side frames by said semi-elliptic springs.

7. In a truck, in combination, side frames, a compression member and a tension member on each frame, transoms connecting said side frames, a bolster between said side frames, a semi-elliptic spring at each end of said bolster and between the planes defining the top and bottom of said bolster and a link supporting each end of said bolster entirely from one of said compression members through one of said springs.

8. In a truck, in combination, side frames having upper and lower members, transoms connecting said side frames, a bolster therebetween, a semi-elliptic spring carried at each end of said bolster having two fixed bearing points thereon and projecting between said upper and lower members and a link supporting one end of each spring and the bolster from said upper members.

9. In a truck, in combination, side frames, transoms connecting said side frames, a bolster parallel to and between said transoms, said bolster being spring supported from said side frames, and bolster guides carried by said transoms and passing directly beneath said bolster.

10. In a truck, in combination, side frames, flexible transoms connecting said side frames, a bolster parallel to and between said transoms, a semi-elliptic spring carried by each end of the bolster and having an end supporting said bolster from each side frame and U-shaped bolster guides carried by said transoms and passing directly beneath said bolster.

11. In a truck, in combination, side frames each having a central horizontal opening, transoms connecting said side frames, a hollow bolster therebetween, semi-elliptic springs partially housed at each end of said bolster and passing through said openings, means hanging said springs from said side frames and means to prevent rotation of said springs about a vertical axis.

12. In a truck, in combination, side frames each having a central horizontal opening, transoms connecting said side frames, a hollow bolster therebetween, semi-elliptic springs partially housed at each end of said bolster and passing through said openings, means hanging said springs from said side frames and means integral with said bolster forming other spring supports.

13. In a truck, in combination, side frames having upper and lower members, transoms connecting said side frames, a bolster between said side frames, semi-elliptic springs carried by said bolster and projecting between the members of said side frames, longitudinal gibs cradled in said upper frame members, gibs beneath the ends of said springs, and hanger links connecting said gibs.

14. In a truck, in combination, side frames having upper and lower members, transoms connecting said side frames, a bolster between said side frames, semi-elliptic springs carried by said bolster and projecting between the members of said side frames, longitudinal gibs cradled in said upper frame members, the outer ends of said springs resting on similar gibs, hanger links connecting the upper and lower gibs and means to prevent relative horizontal movement between said springs and lower gibs.

15. In a truck, in combination, side frames having upper and lower members, transoms connecting said side frames, a bolster between said side frames, semi-elliptic springs carried by said bolster and projecting between the members of said side frames, longitudinal gibs cradled in said upper frame members, the outer ends of said springs resting on similar gibs, hanger links connecting the upper and lower gibs and means surrounding said springs to prevent inward movement of said lower gibs.

16. In a truck, in combination, side frames having upper and lower members, transoms connecting said side members, semi-elliptic springs each having one end hung from an upper member, a hollow bolster between said side frames, upper and lower members thereon, said upper member at its ends resting on and forming fulcrums for said springs, the inner ends of said springs resting on said lower member of said bolster.

17. In a truck, a one piece side frame of box-section form including a pair of pedestals, upper and lower members connecting said pedestals, and means to support a bolster from said upper member only.

18. In a truck, a one piece side frame of box-section form including a pair of pedestals, upper and lower connecting members parallel at their centers and converging toward said pedestals, members joining said connecting members at the ends of said parallel sections, and means in said upper member to support a bolster.

19. In a truck, a one piece side frame of box-section form including upper and lower parallel central members, pedestals and triangular members connecting said central members to said pedestals, and cradles integral with said upper central member and adapted to have a bolster supported therefrom.

20. In a truck in combination, a one piece side frame of box-section form including upper and lower members, joining members outlining with said upper and lower members a central aperture, a bolster having its end adjacent said aperture, a spring carried by said bolster and having an end passing into said aperture, and means on said upper member from which said spring is supported.

21. In a truck, a one piece side frame of box-section form including a compression member and a tension member, pedestals joined thereby and means to apply the whole load to said compression member.

22. In a truck, a transom of substantially channel section formed of two pressed sections, being shallow to promote flexibility, the ends of said sections being gradually widened vertically, and longitudinally to form fastening means.

23. In a truck, a transom including two members, one of channel section, and one of L-section having a leg joined to a flange of said channel.

24. In a truck, a transom formed of two sections, one an uneven channel and the other of L-shape, the long flange of each section being offset, overlapped and joined.

25. In a truck, a transom formed of two sections, one an uneven channel and the other of L-shape, the long flange of each section being offset, overlapped and joined, said transom being shallow in section to promote flexibility.

26. In a truck, in combination, side frames, transoms connecting said frames, a bolster between said frames, a center plate and side bearings on said bolster, a semi-elliptic spring partially housed at each end of said bolster and extending longitudinally thereof, each spring having two bearings on said bolster, the centers of said springs being substantially under said side bearings and the outer ends of said springs being supported by said side frames.

27. In a truck, in combination, side frames, transoms connecting said frames, a hollow bolster between said frames, a side bearing at each end of said bolster, a semi-elliptic spring partially within each end of said bolster with the center thereof directly beneath the side bearing, the outer ends of said springs being supported by said side frames.

In testimony whereof I hereunto affix my signature.

WILLIAM F. KIESEL, JR.