

No. 637,544.

Patented Nov. 21, 1899.

W. S. ADAMS.
PIVOTAL CAR TRUCK.

(Application filed May 27, 1899.)

(No Model.)

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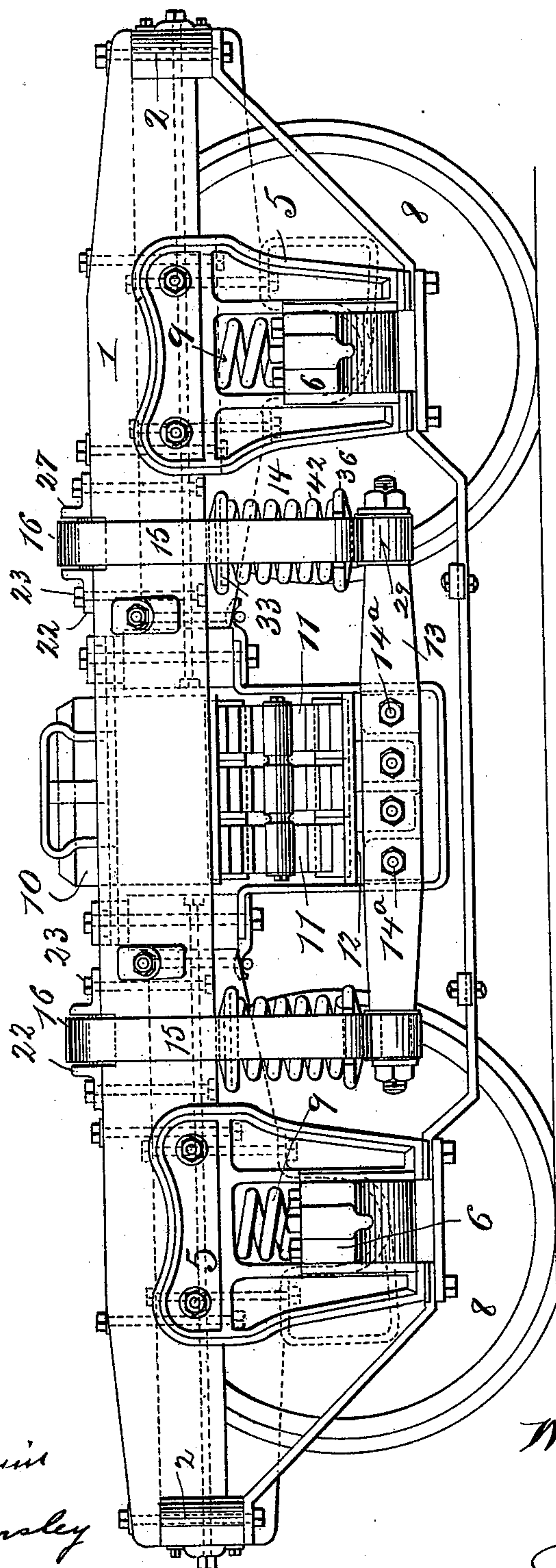


Fig. 1.

WITNESSES

C. W. Benjamin
Chas. G. Hensley

INVENTOR

Walter S. Adams,

BY

Joseph L. Levy

ATTORNEY

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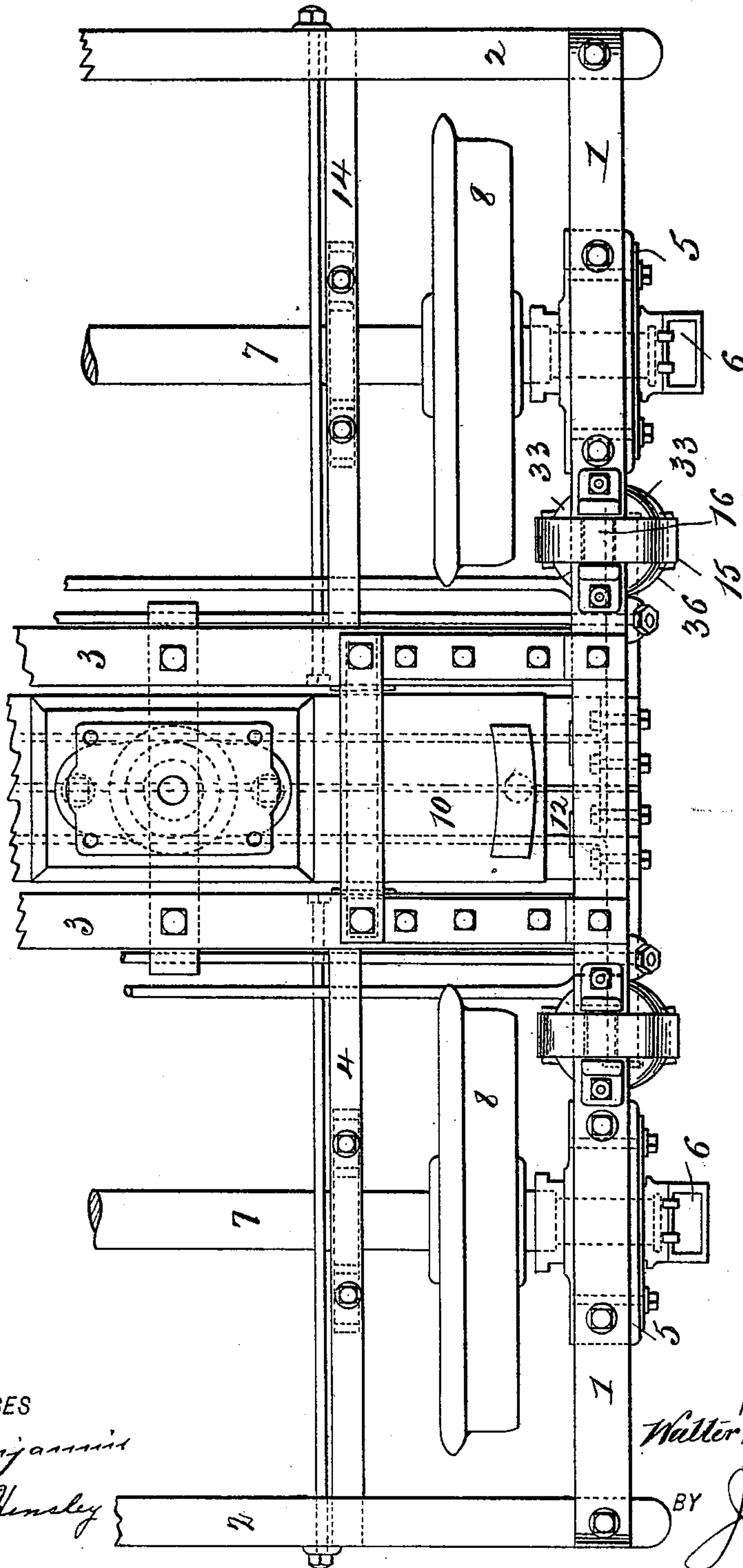


Fig. 2.

WITNESSES

C. W. Benjamin
Chas. G. Hensley

INVENTOR

Walter S. Adams

BY

Joseph L. Key

ATTORNEY

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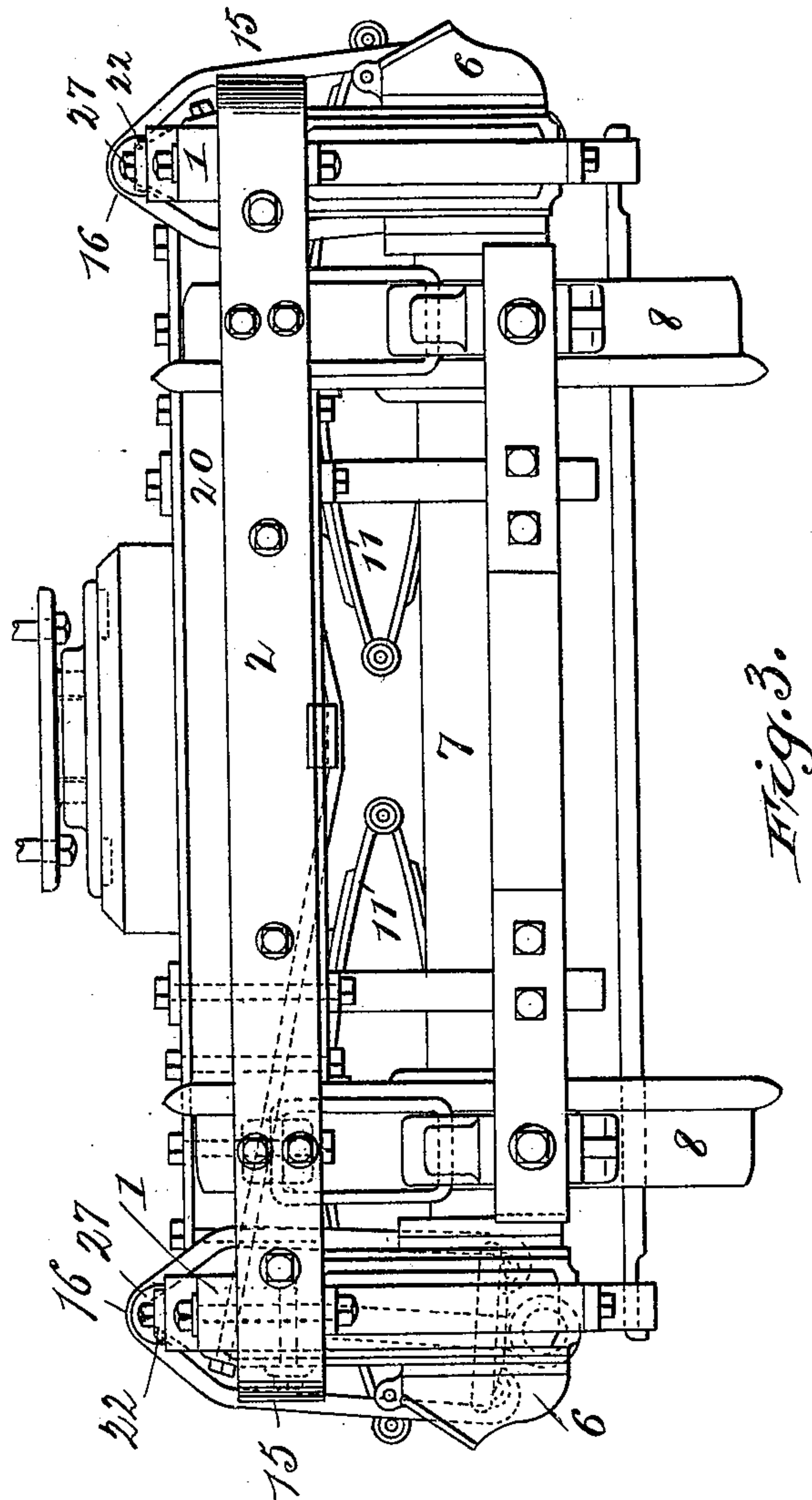


Fig. 3.

WITNESSES

C. M. Benjamin
Chas. G. Hensley

INVENTOR
Walter S. Adams

BY *Joseph L. Levy*

ATTORNEY

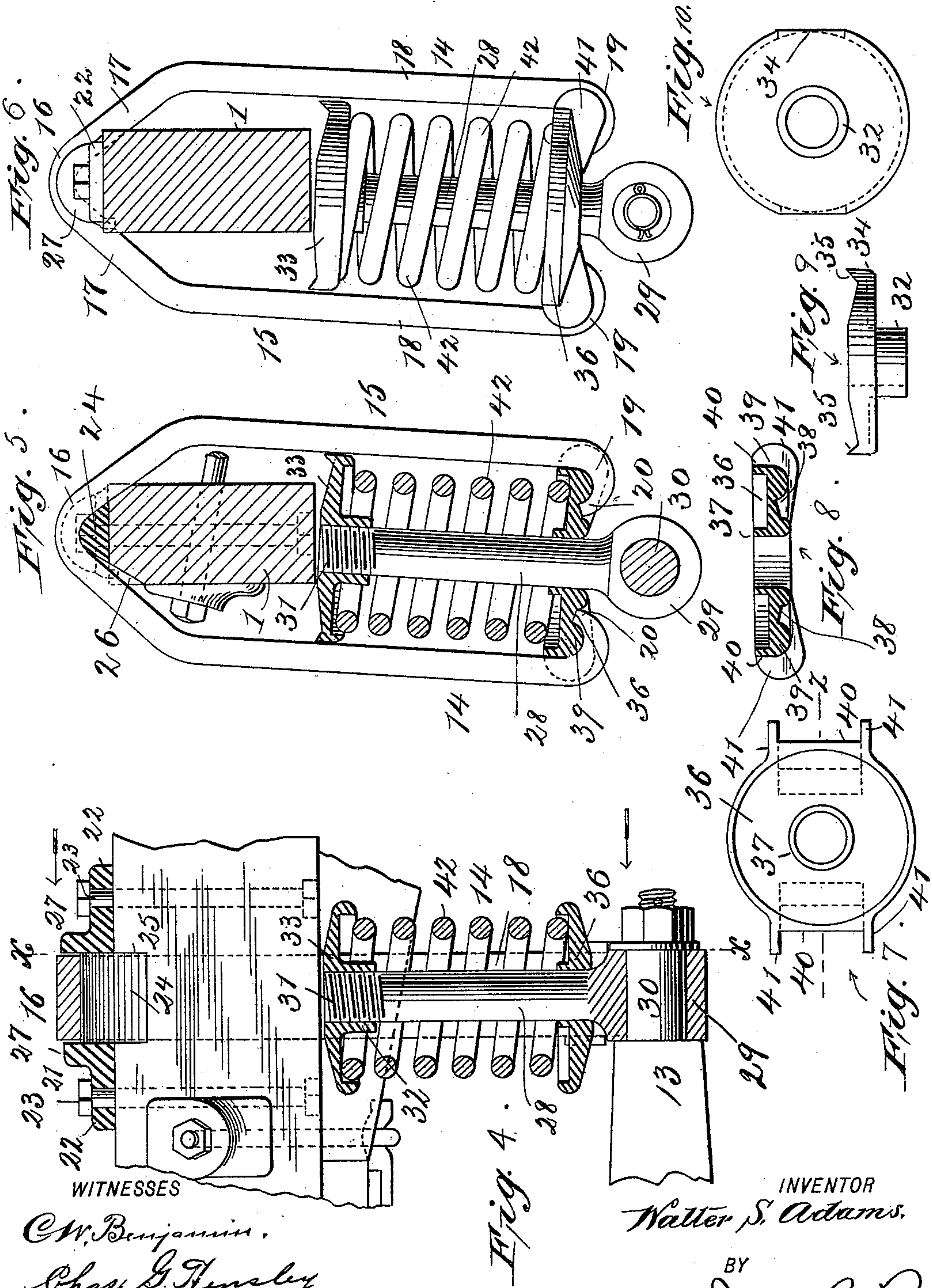
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5 Sheets—Sheet 4.



WITNESSES
C. W. Benjamin,
Chas. G. Hensley

INVENTOR
Walter S. Adams.
BY
Joseph R. Levy
ATTORNEY

No. 637,544.

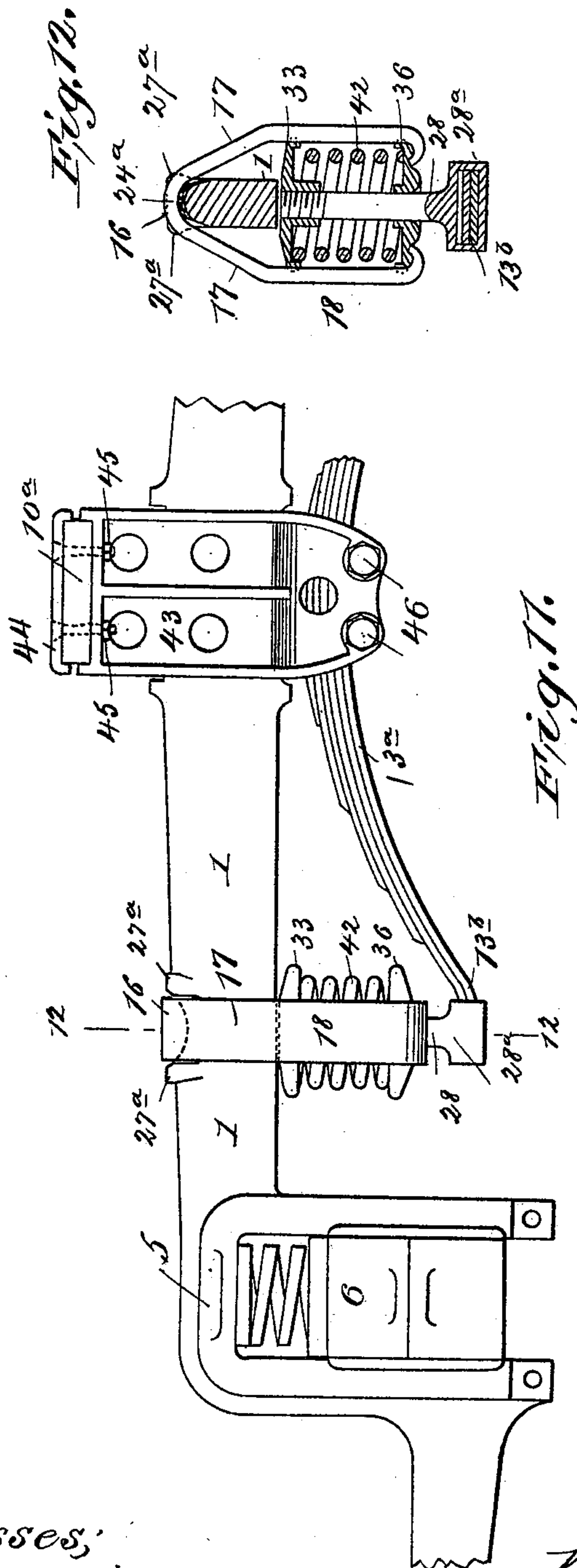
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(No Model.)

5 Sheets—Sheet 5.



Witnesses:
C. V. Benjamin
Chas. S. Hensley

Inventor:
Walter S. Adams
by Joseph L. Levy
att'y

UNITED STATES PATENT OFFICE.

WALTER S. ADAMS, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
JOHN A. BRILL, OF SAME PLACE.

PIVOTAL CAR-TRUCK.

SPECIFICATION forming part of Letters Patent No. 637,544, dated November 21, 1899.

Application filed May 27, 1899. Serial No. 718,506. (No model.)

To all whom it may concern:

Be it known that I, WALTER S. ADAMS, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in Pivotal Car-Trucks, of which the following is a specification.

My invention has reference to improvements, hereinafter recited, in regard to car-trucks, more especially adapted for the purpose of passenger transportation, although the same may be advantageously employed in other relations.

My invention has relation to that class of truck in which an equalizing-bar, either in the form of a rigid and inflexible bar or a longitudinally-disposed semi-elliptic spring, is utilized for the purpose of suspending the bolster from the truck-frame in connection with links supported from the side bars of the truck-frame in which link-springs have been employed.

The constructions to which these improvements have special relation will be found in the patents to Brill and Curwen, Nos. 610,118 and 610,119, dated August 30, 1898, and also in the application for patent filed by George Martin Brill on the 3d day of July, 1897, Serial No. 643,339, Patent No. 627,898, dated June 27, 1899.

Among the many advantages derived from the constructions recited in the above patents and application is the longitudinal extension of the spring-base of the truck, affording considerable advantages in the equalization of the load upon the truck and the increase of the transverse spread of the bolster-support, which materially reduces and eases the transverse swing of the bolster, thereby materially increasing the stability of the car on the truck and causing the latter to ride with an ease and steadiness not heretofore accomplished in rolling-stock of that character.

In the constructions which have preceded my invention which relate more particularly to the construction of the link for the support of the equalizing mechanism, be they either a rigid bar or elliptic springs, the factors of safety, so far as the link-supports are concerned, depend entirely upon the stability of the pins or other means used for connecting

the links with the equalizers and the truck-frame. In my construction I increase this factor of safety by decreasing the number of parts liable to breakage or derangement—as, for example, in the patents to Brill and Curwen two pins or bars or like devices were used in the link construction, and in my present improvements I dispense entirely with the employment of one set of these pins. In other trucks of this class the equalizers have been supported from the side bars by links the upper ends of which have been pivotally secured by knuckle-joints in the upper portion of the side frames of the truck.

In all previous constructions a link-spring much shorter than the one employed in my present improvement was used owing to the necessary interposition of either the pivotal support of the link from the truck side frame or the top of the strap portion of the link in addition to the cap, which was placed upon the top of the link-springs, the result being that the length of the link and the radius of its swing was much smaller than is used in my present improvements. Therefore among the advantages of my present improvements is that a longer link can be used, so as to reduce the speed of the swing or vibration of the bolster, and a longer link-spring may be employed, so that many variations in the character of the link-springs may be employed to advantageously effect the spring-support of the car-body and their combination with the other truck-springs, and the number of connecting parts of the links with the truck-frame and the equalizers is reduced, so as to increase the factor of safety.

My invention therefore resides in the construction and in the combination of parts hereinafter recited, and more fully pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is a side elevation of a truck embodying my improvements; Fig. 2, a plan view of one-half of the truck or one side thereof; Fig. 3, an end view thereof. Fig. 4 is an enlarged sectional elevation, partly in section, of a portion of the side frame, one end of one of the equalizing-bars, and the link connections between the equalizing-bars and the truck-frame. Fig. 5 is a transverse

sectional elevation of the same substantially on the line xx , Fig. 4, looking in the direction of the arrow. Fig. 6 is a like sectional elevation showing the links and allied parts in full. Fig. 7 is a plan view of the lower spring-cap; and Fig. 8 is a sectional elevation substantially on the line zz , Fig. 7. Figs. 9 and 10 are side and plan views, respectively, of the upper spring-cap. Fig. 11 is an enlarged side elevation of a portion of the side frame of another form of truck in which my improvements are applied to a semi-elliptic spring acting as an equalizer; and Fig. 12 is a sectional elevation on line yy , Fig. 1.

Similar numerals of reference indicate like parts throughout the several views.

The particular form of construction of the truck apart from the features recited in the claims constitute no part of my present invention, and the form of truck-frame or construction shown in either of the patents or applications heretofore referred to may be advantageously employed, if desired.

The particular form of truck in which I have embodied my improvements consists, substantially, as to the frame, of the side bars or wheel-pieces 1, connected at the ends by the cross-bars 2 and centrally by the bolster-transoms 3, supplemental or inside wheel-pieces 4 being shown as extending between the transoms and end cross-bars, the pedestals 5 of usual or desired form being secured to the wheel-pieces in which are the axle-boxes 6 for the axles 7 and the wheels 8, and between the axle-boxes and the top of the pedestals are the usual springs or cushions 9, which springs may be specially designed for the purpose of entering into the spring-support of the car-body, as recited in the patents and applications heretofore referred to. Pedestal tie-bars and braces and cross-bars and truss-rods are shown employed in the conventional manner; but, as heretofore stated, this particular kind of truck construction forms no part of my present invention, and I do not therefore describe it in detail.

At 10 is the bolster, 11 the bolster-springs, and 12 the sand-plank. The sand-plank, or "spring-plank," as it is sometimes called, is secured in the construction shown in Figs. 1, 2, and 3 to the equalizing-bars 13 by bolts 14^a, the plank being of any desired form. The equalizing-bar, which in the form as shown in Fig. 1, &c., is a solid bar longitudinally-disposed substantially under the side bars 1 on each side and to which the sand-plank is secured, as shown in Figs. 1 and 2, or in any other desired way, in which the ends of the cross-bars forming the sand-plank are angularly disposed and bolted to the equalizing-bar, or said equalizers may take the form shown in Figs. 11 and 12, in which a semi-elliptic spring is employed, which spring supports the yokes embracing and extending above the side bars, which yokes are tied transversely by and support the bolster, the latter construction eliminating the intermediate

spring-plank and the bolster-springs. In all of the previously-recited constructions considerable scope of variation is allowed to the constructor, as any one of these forms or any other suitable form can be utilized without departing from my invention.

At 14 are the links, constructed so as to be telescopic, or, in other words, extensible in the direction of their length, the links being in two parts, one part engaging directly with the equalizers and the other part (the upper) passing directly over and embracing the wheel-pieces, side bar, or upper chord of the truck-frame, whatever that particular part may be termed and between which parts the link-springs are interposed, as hereinafter described. The upper portion of the link 14 comprises the yoke or strap 15, which, as shown in Figs. 5 and 6, embraces the wheel-piece or side bar 1, the strap being preferably formed of a piece of bar-iron discontinuous between its lower ends and brought together at the top 16 by the upwardly-converging portions 17 to form a pivoting-head, the side portions or bars 18 of the strap being distended to allow free movement about the side bar 1 and to receive the lower section of the link, the ends 19 of the strap being turned inwardly and reduced in diameter to form engaging lips 20.

Each side bar 1 is provided adjacent each pedestal with a block 21, having side flanges 22, through which bolts 23 pass, by which said block is secured to the wheel-pieces 1, and a central pivot-block 24, triangular in cross-section, Fig. 5, and which is rounded at its apex to form a bearing for the bearing-head 16 of the strap, the wheel-piece being recessed, as at 25, to allow of the pivot-block 24 being set down therein to give it a firm bearing, the wheel-piece being cut away, as at 26, to provide for the swing of the strap, the flanges of the block 24, having lips 27, rising up above the pivoting-block, so as to receive the head 16 of the strap between them, as shown in Fig. 4, and prevent displacement of the link.

The lower section of the link comprises the rod or plunger 28, provided with an apertured eye or enlargement 29 at its ends to engage the journaled end 30 of the equalizing-bar 13, as shown in Fig. 4, the upper portion of the bolt or thrust bar being screw-threaded at 31 to receive the apertured and threaded hub 32 of a cap or follower 33. The cap or follower is recessed in its lower face to form a spring-cap and its sides are squared at 34 and provided with lips 35 to form guides in conjunction with the side pieces 18 of the strap to prevent rotation of the plunger therein.

The lower ends 19 of the strap detachably support a spring-cup 36, having an apertured hub 37, through which the bolt or thrust bar 28 passes, as shown in Fig. 5, the upper face of the cup being recessed. The lower face of the cup is provided with recesses 38 at each side of the apertured hub 37 to receive the lips 20 of the strap, and at each side of these recesses are outwardly-extending ears 41,

which receive the side bars 18 of the strap between them, rounded lugs 39 being formed between the recesses and the edge of the cup to rest in the cavity of the strap ends 19, the edge of the cup being squared, as at 40, to receive the straight sides of the side pieces 18 of the strap, thereby providing an interlocking joint between the spring-cup 36 and the strap ends 19, preventing the cup from becoming detached horizontally, means whereby the cup can be readily attached or detached from the strap, and a firm and stable support for the link-springs.

Between the cap and the cup and about the thrust-bar are located the link-springs 42, preferably spiral springs, as shown. These link-springs in their normal condition separate the cap 33 and cup 36; but under the stress of load the link-springs are compressed, the load being primarily taken upon the bolster-springs 11 when they are employed, thence to the link-springs 42, through the equalizing-bars to the side frames of the truck, through the axle-box springs 9, if they are employed, and thence to the axle-boxes and axles, &c.

It will be clearly noted from Figs. 4, 5, and 6 that the link comprising both of its parts, which are extensible or depressible in the direction of their length, can swing bodily from a point above the side frames of the truck and that the support of the bolster on the side frame is further articulated through the journaled connection of the equalizing-bars with the thrust-bar 28. In order to provide for stability of the support of the bolster on the truck, the links 14 are splayed outwardly, as indicated in Figs. 5 and 6.

Instead of the pivot being formed of a separate casting, as shown herein, it can be formed on the side bar itself, when the same is made of metal, as shown in Figs. 11 and 12. In this construction a spring-plank, the bolster supported on the spring-plank, and inflexible equalizing-bars are omitted, and in their place yokes 43 are provided, which extend upwardly above and embrace the side bars 1 and downwardly below the side bars are supported by the longitudinally-disposed upturned semi-elliptic springs 13^a, all generally or specifically in manner as shown in the application of John A. Brill, filed May 15, 1899, Serial No. 716,884, the side bars 1, pedestals 5, &c., being of metal.

Instead of using the block or castings 21 the pivot-head is formed on the side bar 1 adjacent to pedestals, as at 24^a, (preferably with a longitudinally-curved seat, as shown, to allow of a longitudinal swing of the links when the spring 38 spreads,) and the strap is restrained from longitudinal displacement by the integrally-formed lips 27^a. The plunger or thrust bar 28 instead of being pivoted to the journal end 30 of the equalizing-bars 13 is formed with a rectangular-shaped block or housing 28^a, having a longitudinal aperture in which the ends 13^b of the semi-elliptic

springs are received. The links otherwise are constructed as previously described. The construction shown in Figs. 11 and 12 may be employed in many cases where the previously-described construction, by reason of cost or otherwise, may be undesirable, the semi-elliptic springs 13^a not only taking the place of the usual bolster-springs, but that of the equalizing-bars 13 as well.

The yokes or saddles 43 which embrace the side bars 1 are tied together transversely by the flat bolster-bar 10^a, on the ends of which are secured the side bearings 44 by bolts 45, which bolts secure the yokes or saddles, the bolster 10^a, and the side bearings 44 together, the opposing yokes 43 (there being one on each side of each bar 1) and the springs 13 being secured together by the bolts 46.

By means of either of the foregoing constructions an exceedingly easily-riding truck is produced. The support of the bolster is had at a point preferably closely adjacent the axles through the medium of the links, so that the longitudinal spread of the bolster-support is increased and the weight more evenly distributed on the axles. Means are provided whereby the lifting of either end of the truck when braking is prevented through the interposition of the link-springs. The transverse spread or spring-support for the bolster is increased, so that the swing of the bolster will be slower. The point of suspension of the links is on or above the side frames, so that a long link, producing a long slow swing is obtained, the construction of the link allowing of the employment of a long link-spring, and by means of the special construction of link and through so disposing it that it embraces the side bar or side frame the factors of safety are increased by decreasing the number of parts therein which are liable to breakage or separation, the prominent feature of the specific construction of the link being that no connecting-pins ordinarily subjected to a shearing strain are employed.

I desire it to be understood that where the word "equalizer" or equivalent expression is employed in the claims either the equalizing-bars, the semi-elliptic springs, or other equivalent construction is included therein.

Having described my invention, I claim—

1. The combination in a car-truck, of side frames having axle-box pedestals and side bars connecting the pedestals, axle-boxes in the pedestals, a bolster, longitudinally-disposed equalizers supporting the bolster, links and spring-supports therefor suspended from and embracing the side bars and supporting the equalizers, substantially as described.

2. The combination in a car-truck, of the side frames each comprising a side bar and pedestals, longitudinally-disposed equalizers arranged below the side bars, a bolster supported by said equalizers, appliances connected to the ends of the equalizers and pivotally supporting them from and embracing the side bars, and spiral springs coacting with

said appliances by which said equalizers are suspended, substantially as described.

3. The combination in a car-truck of side bars, a bolster, longitudinally-disposed equalizers supporting the bolster, inverted - U-shaped and paired links pivotally supported at their upper ends on and embracing the side bars, a spring-plate supported at the lower end of each of the links, a spring on the plate, a follower on the spring, and means for connecting the followers of each pair of links with said equalizers, substantially as described.

4. The combination in a car-truck of side bars, a bolster, longitudinally-disposed equalizers supporting the bolster, inverted - U-shaped and paired links having open lower ends, said links being pivotally supported at their upper ends on the side bars, a spring-plate detachably supported on and at said open ends, a spring on the plate, a follower on the spring, and means for connecting the followers of each pair of links with said equalizers, substantially as described.

5. The combination in a car-truck, of side bars, a bolster, longitudinally-disposed equalizers supporting the bolster, inverted - U-shaped and paired links having lower open ends, said links being pivotally supported at their upper ends on the side bars, a perforated spring-plate detachably supported by and at said open ends, a spring on the plate, a follower on the spring, and a plunger connecting the follower with the end of the equalizer and passing through the plate, substantially as described.

6. The combination in a car-truck, of the side frames, springs suspended from the side frames by straps which embrace said frames and are pivotally supported thereon, longitudinally-disposed equalizers suspended by said springs, and a cross-bolster resting on said equalizers, substantially as described.

7. The combination in a car-truck, and the side frames, of the equalizers movably and resiliently suspended from the side frames by devices which embrace the said frames and which are pivotally supported thereon, and a bolster secured to said equalizers, substantially as described.

8. The combination in a car-truck, of the truck-frame, spring-links depending from the truck-frame, which links embrace and are pivotally supported upon the side frames of said truck-frame, longitudinally-disposed equalizers connecting the links, and means for connecting said equalizers with the car-body, substantially as described.

9. The combination in a car-truck and its running-gear, of the side frames supported outside of the wheel-gage, extensible spring-links depending from the side frames and supported therefrom by means which embrace the side frames and which means are pivotally supported thereon, longitudinally-disposed

equalizers supported by said links, and a bolster on and transversely connecting said equalizers, substantially as described.

10. The combination in a car-truck, of the side frames having axle-box pedestals, each frame having an upper longitudinal side bar, longitudinally-disposed equalizers suspended below said side bars, a spring suspension for the ends of said equalizers from the side bars, said spring suspension including a strap link-section embracing and which is pivotally supported on the side bars, and a bolster supported on said equalizers and tying them together, transversely, substantially as described.

11. In a car-truck, the combination with the side frames having axle-box pedestals, the bolster, longitudinally-disposed equalizing-supports for the bolster and resilient connections between the ends of said supports and the side frames, said resilient connections including a strap link-section pivotally supported on the side frames and embracing them, substantially as described.

12. The combination in a car-truck, of the side frames comprising pedestals, side bars between the pedestals, axle-boxes in the pedestals, springs between the axle-boxes and the tops of the pedestals, a bolster, equalizers supporting a bolster, and spring-supporting links which embrace the side bars and are supported therefrom at their upper ends, substantially as described.

13. In a car-truck, the combination with the side frames, each comprising two pedestals, side bars connecting the pedestals, a car-body-supporting bolster, equalizers supporting said bolster and located below the side bars and appliances for suspending said equalizers comprising a link having a strap link upper section embracing each of the side bars and pivotally supported thereon, substantially as described.

14. In a car-truck, the combination with the side frames, each comprising two pedestals, side bars connecting the pedestals, of a car-body-supporting bolster, equalizers located below said side bars, and link appliances secured to the ends of said equalizers embracing the side bars and movably suspended on the top of said side bars, substantially as described.

15. In a car-truck, the combination with the side frames, each comprising two pedestals, side bars connecting the pedestals, of a car-body-supporting bolster, equalizers connected to the ends of said bolster and supporting the same, and elastic link appliances secured to the ends of said equalizers embracing the side bars and suspended from the top of the same, substantially as described.

16. In a car-truck, the combination with the side frames, each comprising two pedestals, the side bars connecting the pedestals, of a car-body-supporting bolster, equalizers upon

which the ends of said bolsters rest, and links suspended from above the side bars and supporting the ends of said equalizers for the purpose of permitting lateral displacement of said springs with relation to the side frames, said links in part embracing the side bars, substantially as described.

17. In a car-truck, the combination with the side frames, each comprising two pedestals and a side bar, of a car-body-supporting bolster, and spring-actuated appliances on which the ends of the bolster rest, said appliances embracing the side bars and which are suspended thereon above the bottom of said side bars, substantially as described.

18. In a car-truck, the combination with the side frames, each comprising two pedestals and a connecting side bar, of a car-body-supporting bolster, equalizers upon which the ends of said bolsters rest and suspending appliances for the ends of said equalizers, one portion of which suspending appliances embraces the side bars, and which are pivotally supported on and within the plane of the sides of the side bars, substantially as described.

19. In a car-truck, the combination with the side frames, of a car-body-supporting bolster elastically suspended from the side bars of said frames by appliances which embrace the sides of said side bars and permit said bolster to move transversely with reference to the side frames, substantially as described.

20. In a car-truck, the combination with the side frames, of a car-body-supporting bolster suspended from said side frames by appliances which embrace the element of the side frames which support it and which permit it to move transversely with reference to said side frames, and elastic appliances for yieldingly resisting such movement, substantially as described.

21. In a car-truck, the combination with the side frames, each comprising two pedestals, side bars connecting the pedestals, of a pair of transoms arranged transversely of the truck-frame and secured to the side bars, the car-body-supporting bolster arranged to operate between said transoms, equalizers supporting said bolster and located below the side bars and suspending appliances connected to the ends of said equalizers and to the side bars, one element of said suspending appliances embracing the side bars and being constructed to swing transversely of the truck, substantially as described.

22. The combination in a car-truck, of side frames comprising pedestals and connecting side bars, axle-boxes in the pedestals, a bolster, equalizers disposed below the side bars and supporting the bolster, links, the upper element of which embraces the side bar, springs on the upper link element for supporting the lower link element, the lower link element being connected to the equalizers, substantially as described.

23. The combination in a car-truck, of side frames, each comprising upper and lower longitudinal bars and pedestals, equalizers arranged below the top side bars, a bolster supported thereby, the ends of the equalizers being supported from the side bars by spring-equipped appliances, a portion of which embraces and which is pivotally mounted on the side bars, substantially as described.

24. The combination in a car-truck, of the side frames, each comprising side bars and pedestals, equalizers arranged beneath the side bars, a bolster supported by the equalizers, and appliances connected to the ends of said equalizers and supporting them from the side bars, said appliances being pivotally supported from and embracing the side bars, and spiral springs coacting with said appliances by which the said equalizers are suspended, substantially as described.

25. The combination in a car-truck, of side frames, each comprising side bars and pedestals with equalizers arranged beneath the side bars, the car-body-supporting bolster supported by said equalizers and adapted to carry the weight of the car-body at its center, the ends of said equalizers being suspended from the side bars by spring-equipped appliances, said appliances, embracing the side bars and which are pivotally supported thereon, substantially as described.

26. In a car-truck, the combination with a bolster, transversely-disposed equalizers supporting the bolster, and links suspending the equalizers from the truck-frame, each comprising a lower section secured to the respective ends of the equalizers, and an upper section embracing its respective truck side bar and a compression-spring interposed between the upper and lower link elements, substantially as described.

27. The combination with the side bars, bolster and equalizers, of the link comprising the upper strap link-section, a pivot-block on the side bars interposed between the latter and the strap, an apertured spring-seat detachably connected to the lower ends of the strap-section, a bolt passing through said aperture and carrying at its upper ends a follower lying between the sides of the strap and having at its lower end means for connecting it to the equalizers, and a spring surrounding said bolt and extending between said seat and follower, substantially as described.

28. The combination, in a car-truck, of the side bars, the bolster, and equalizers supporting the bolster, of link-supports for the equalizers comprising an upper strap-section continuous except at its lower horizontal portion, a spring-seat detachably supported upon the said lower horizontal portion, the upper portion of the strap being pivotally supported on the side bars, a bolt passing through said spring-seat and carrying a follower within the strap, a spring inserted between the follower

and the spring-seat, and means for connecting the equalizers with the lower end of the bolt, substantially as described.

29. The combination with the strap having
5 intumed ends or lips, and a spring-seat having recesses for receiving said ends or lips, substantially as described.

30. The combination with the bars of the strap, the lower termini of which are turned
10 inwardly to form lips, and the spring-seat having recesses to receive said lips, and outwardly-extending lips embracing the sides of the straps, substantially as described.

31. The combination of the side bars having
15 a pivot-block, of the strap link-section embracing the side bar, the upper portion of said link being supported on said pivot-block, said link diverging outwardly from its point of pivotal support and downwardly and embracing the side bar, a spring embraced within
20 said strap and supported thereby, a follower on the spring in the strap, a bolt secured to the follower and extending through the spring and strap, substantially as described.

25 32. The combination with the side bar of a truck-frame, of the link-section comprising the strap having upwardly-converging portions forming an angular bearing and depending side portions, an angular pivot-block
30 on the side bar to receive said angular bearing, a spring supported by said strap, a bolt supported on the said spring, and car-supporting means connected with said spring, substantially as described.

35 33. The link-section comprising the strap having upwardly-converging portions forming an angular bearing, the angular pivot-block having upwardly-extending lips bearing against the sides of the converging portions of the strap, a spring supported within
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the side bars of the strap, a follower on said spring, and a bolt secured to said follower, substantially as described.

34. The combination with the side bar of the pivot-block having flanges bolted to the
45 side bar, upwardly-extending lips on the pivot-block, the angular pivot-block below and between the lips, the link-strap having upwardly-converging sections forming an angular bearing resting on the bearing-block, the
50 pendent side portions of the strap, the spring suspended by and within said side portions, a follower on the spring, and a bolt on the follower, substantially as described.

35. The combination with the spring-cup
55 36 having the recesses 38 and rounded lugs 39, of the side bar 1, the strap 15 pivotally supported on the side bar, the said strap having rounded ends 19 ending in lips 20, the rounded
60 ends engaging the lugs 39, the lips engaging the recesses, a spring on the cup, a cap or follower on the spring, a bolster, and means for connecting the cap with said bolster, substantially as described.

36. The combination in a car-truck, of the
65 side bar, a strap 15 pivotally supported from the side bar, the spring-cup detachably supported on said strap, means for preventing displacement of said cup thereon, a bolster, and means for resiliently connecting the
70 spring-cup and bolster together, substantially as described.

Signed at the city and county of Philadelphia, State of Pennsylvania, this 8th day of May, 1899.

WALTER S. ADAMS.

Witnesses:

FRANCIS RAWLE, Jr.,
HENRY C. ESLING.