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**BE - A - 882 533
GB - A - 2 021 061
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US - A - 3 789 770
US - A - 3 862 606
US - A - 4 003 316
US - A - 4 067 261**

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Railroad car bogie

This invention relates to railroad car trucks, i.e. bogies.

Modern railroad car bogies are commonly referred to as three-piece bogies which include spaced side frames resiliently supporting therebetween a transversely positioned bolster. The bolster contains a centerplate which in turn supports a body of the railroad car. The side frames have downward projecting jaws in which axle ends of a front and a rear wheelset are rotatively journaled. Such bogies may also be described as nonsteerable in that the bolster, side frame and wheelsets are purposefully maintained in a squared relationship.

Steerable bogies, on the other hand, are ones having wheelsets which may yaw, for example. Such bogies are well known and one typical type is disclosed in U.S. Patent No. 3,789,770. As disclosed, this bogie allows rotation of each wheelset about its vertical axis so that the wheelset may take an out-of-square position with respect to a longitudinal axis of the bogie. The wheelsets are joined by positive mechanical linkage which controls and maintains the relationship between the wheelsets. Additionally, this linkage is connected to a body of the railroad car so that movement between the car body and the wheelsets is maintained in a fixed relationship.

Providing a flexible connection between the axle ends of the wheelset and the side frame to allow yawing therebetween is also well known and is disclosed in, for example, U.S. Patent No. 3,785,298. In this case, a resilient or elastomeric device interfaces between pedestal jaws of a side frame of the bogie and axle ends of the wheelsets to allow limited movement therebetween which is restrained by the elastomeric device.

U.S. Patent No. 3,528,374 discloses a bogie which is one of the first to adapt steering principles to the modern day three-piece bogie. In this instance, a bolster has its ends resiliently carried by side frames. Ends of the side frames are adapted to allow the wheelsets of the bogie to yaw. Yawing in turn is regulated by parallel elastic bracing members connecting aligned front and rear axle ends and diagonally positioned elastic bracing members connecting opposite front and rear axle ends. A substantially identical concept and structure is utilized in the BARBER-SCHEFFEL High Speed Radial Truck presently being offered for sale by Standard Car Truck Company of Chicago, Illinois.

A further arrangement to provide a bogie with wheelsets which can yaw so as to maintain an aligned relationship with the track on which the bogie is travelling is disclosed by U.S. Patent No. 4,003,316. As so disclosed, holding frames which carry the axle ends of the wheelsets are individually connected to a bolster of

the bogie through a ball bearing socket arrangement enclosed in a pad. Any lateral movement of the bolster effects a rotational movement of the holding frame and thus the wheelsets.

Most recent developments in steerable bogies are perhaps disclosed in U.S. Patents No. 4,067,261 and 4,131,069. U.S. Patent 4,067,261 discloses as its preferred embodiment a bogie quite similar to the commercially available bogie noted above. Particular emphasis is placed on the use of wheels having highly profiled wheel treads to generate steering forces. A pair of U-shaped subframes carries the axle ends of each wheelset and may be interconnected by a pair of diagonally positioned rods. These rods may, in turn, be joined through a dampening device.

U.S. Patent 4,131,069 disclosed a further steerable railroad car bogie wherein resilient means of predetermined stiffness interconnect the axle ends carrying subframes of the bogie at a centrally located point. Additionally, resilient means interconnect the subframes with the side frames of the bogie and the bogie with a body of the car. The DR-1 Steering Assembly Truck commercially available from Dresser Industries, Inc., of Depew, New York, appears to embody many of the teachings found in this patent. British Patent Specification No. GB—A—2,021,061 describes a steerable bogie wherein the wheelsets are interconnected by a connecting means which regulates certain relative movements of the wheelsets so as to reduce wheelset wear and to minimise the possibility of hunting of the bogie.

In that prior disclosure there is provided a railroad car bogie including, a pair of spaced side frames, a bolster having ends supported resiliently in each said side frame, spaced front and rear wheelsets connected to said side frames through a front and rear steering arm respectively connected with each wheelset to form front and rear wheelset-steering arm units, said units being disposed on opposite sides of said bolster, means interposed between said side frames and said steering arms to allow said units to move relative to said frames selectively in multi-directions as a reaction to dynamic forces created by travel of said bogie, and connecting means joining said units and comprising a bracket formed on a middle part of each said steering arm and projecting towards said bolster. According to the invention, each bracket includes a prong arrangement having vertically aligned apertures formed therein, the apertures of each prong arrangement being substantially laterally aligned upon said wheelset-steering arm units being in a squared relationship with said side frames and in that an elongated linkage bar has ends disposed respectively between the prongs of the prong arrangements, bearing means being disposed in

respective apertures formed in the ends of said linkage bar, and pin means being disposed in said prong apertures and extending through said bearing means, such that said connecting means allows said wheelset-steering arm units to pitch and roll independently of one another and inhibits yawing movements of said units which are in the same rotational direction and horizontal lateral movements of said units which are in opposite directions.

The bogie of this invention has several important advantages over conventional steerable and nonsteerable bogies.

Known steerable bogies allow the wheelsets to react to dynamic forces created during the travel of the bogie and to move to a new position in response to these forces. For example, when the bogie encounters a left-hand curve in the track, the forwardmost or front wheelset tends to rotate counterclockwise about its vertical axis, i.e. yaw, while moments later the rear wheelset tends to rotate clockwise about its vertical axis. However, the amount of rotation of each wheelset is equal as the wheelsets move from a parallel to a nonparallel position. This rotational tendency is created by the configuration of the outer surface of the wheels interacting with the track. Because most such curves are also banked to allow higher speed travel, the wheelset also rotates about the longitudinal axis of the bogies, i.e. roll.

In conventional steerable bogies such movements are controlled either solely by some resilient device or by a positive mechanical linkage connecting the front and rear wheelsets and the wheelsets and not restrained from yawing in the same rotation direction. Such yawing can lead to lozengeing of the side frames wherein the side frames remain parallel but move to a longitudinal offset position. Lozengeing reduces the critical speed at which dynamically induced oscillations of the wheelsets about a vertical axis occur i.e. hunting, and therefore reduces the dynamic stability of the bogie, particularly at high speeds.

In nonsteerable bogies yawing movements of the wheelsets are inhibited and therefore lozengeing is inhibited. However, in such bogies, the wheelsets are unable to follow the contours of the track and wearing of the wheelsets is advanced by slippage between the wheelsets and the track which occurs as the bogie traverses a curve.

A bogie of the invention as compared with known bogies, combines a reduction in wear of the wheelsets due to slippage with an increase in dynamic stability at high speeds. The wheelsets can accommodate yawing movements in opposite directions, rolling and pitching, and are thus able to follow the contours of the track slippage being therefore reduced. Yawing movements of the wheelsets in the same direction, however, are inhibited and this provides a reduction in the tendency to lozenge

and corresponding increase in stability, particularly at high speeds.

In a preferred embodiment the steering arms are U-shaped and have side portions carrying bearings in which the axle ends of the wheelsets are journaled. Preferably each side frame has a pedestal jaw formed at each end thereof and the side portions of the steering arms are disposed in the jaws. Advantageously the means interposed between the side frames and the steering arms are elastomeric devices. The elastomeric devices accommodate such movements of the wheelset-steering arm units which are not restrained by the connecting means.

A preferred embodiment of the invention will now be described by way of example only and with reference to the accompanying drawings wherein:

FIG. 1 is a plan view of a railroad car bogie incorporating this invention.

FIG. 2 is a side elevational view in partial section of the bogie of FIG. 1.

FIG. 3 is a detailed plan view of a portion of the steering arm of the bogie of FIG. 1 wherein the arms are joined by a connecting device.

FIG. 4 is a cross-sectional view of the connecting device as generally seen along the line 4—4 of FIG. 3.

A railroad car bogie is shown generally at 10 and includes a front wheelset 12 and a rear wheelset 14. The front wheelset 12 has axle ends 16 journaled in front wheel bearings 18 while in a like manner the rear wheelset 14 has axle ends 20 journaled in rear wheel bearings 22. It should be understood that the bogie 10 is bi-directional, and the terms "front" and "rear" are used to more conveniently describe the bogie 10.

Fitted over a top portion of each bearing 18, 22 is an adapter. Front adapters are designated 24 and rear adapters 26. The adapters 24, 26 each have an annular boss which projects upwardly from an upper side thereof. Supported on the front adapters 24 is a front steering arm 28 while the rear adapters 26 carry a rear steering arm 30.

Each of the front and rear steering arms 28, 30 is generally U-shaped and comprises a middle portion 32 connecting with Z-shaped side portions 34. On an underside of each side portion 34 at its outer end 36 is an annular recess which mates with the boss of the adapters 24, 26 so as to join the steering arms 28, 30 with respective wheelsets 12, 14 into a front and a rear wheelset steering arm unit or combination 35, 37.

On an upper surface of each steering arm side portion outer end 36 is an upwardly facing recess 38 in which is fitted an elastomeric device 40. An upper portion of each elastomeric device 40 in turn fits within a downwardly facing recess 42 formed in a roof portion of a front and a rear pedestal jaw 46, 48 of a pair of spaced left, right side frames 50, 52.

Each side frame 50, 52 has a centrally

located window 54 to receive an end 56 of a transversely positioned bolster 58. The ends 56 of the bolster 58 are resiliently supported on sets of coil springs 60 in a known manner. FIG. 2 shows one such resilient connection between the side frame 52 and the bolster 58, and it should be understood that connection between the bolster 58 on the side frame 50 is similar.

To dampen vertical oscillating related to coil spring suspension, a pair of friction snubbing devices 62 interacts between the bolster ends 56 and vertical wear plates 64 carried on spaced sides 66 of each side frame window 54.

The bolster 58 includes an integrally formed center plate 68 which connects with a body of the railroad car (not shown) in a known manner. Below the centerplate 68 in the bolster 58 is a cavity 70 providing a clear horizontal passage through a center of the bolster 58. One preferred embodiment of such a bolster center cavity 70 is set forth in U.S. Patent No. 4,114,540. The bogie 10 further includes front and rear braking means 72, 74 which is discussed in greater detail subsequently.

On the middle part 32 of the front and rear steering arms 28, 30 is a bracket 76 which forms part of a connecting means 78 between the front and rear wheelset-steering arm units 35, 37. The brackets 76 project into the bolster centre cavity 70 in an opposing manner as is best understood by viewing FIGS. 1 and 3.

Ends 80 of each bracket 76 lie adjacent to and on opposite sides of a vertical plane passing through a longitudinal axis L_d of the bogie 10. Each bracket end 80 is bifurcated into an upper prong 82 and a lower prong 84. Sets of vertically aligned apertures 86, 88 are formed in each upper and lower prong pair 82, 84 of each bracket end 80. When the front and rear wheelset-steering arm units 35, 37 are in a squared relationship with respect to the side frames 50, 52 and the bolster 58, the aperture pairs 86, 88 align with a vertical plane which passes through a lateral axis L_a of the bogie 10.

Pressed into each of the apertures 86, 88 is a bushing 90. Horizontally disposed between the upper and lower prongs 82, 84 of each bracket end 80 is an elongated linkage bar 92. Apertures 94, 96 are formed adjacent to ends of the bar 92 and are so positioned to align with the apertures 86, 88 in the upper and lower prongs 82, 84 respectively.

In each bar aperture 94, 96 is a spherical bearing set 98 comprising an inner element 100 and an outer element 102. The outer element 102 has a circular outer wall 104 to fit snugly within the bar apertures 94, 96 and a concave spherical inner wall 106. The inner wall 106 engages in a complementary manner with a convex spherical-shaped outer wall 108 of the inner bearing element 100. The inner bearing element further includes an inner circular passage 110.

Disposed through each bushing 90 and through the inner passage 110 of each bearing

set 98 is a pin 112. Each pin 112 has an enlarged head 114 to limit downward movement and a lower cotter pin aperture 116. A cotter pin 118 may be conveniently disposed through lower pin aperture 114 after assembly to limit upward movement of that pin 112.

Dynamic and static forces occurring during operation of the bogie 10 result in the wheelset-steering arm units 35, 37 tending to move rotationally and linearly in all three directions. Because these forces vary in direction and magnitude, the actual movements of the wheelset-steering arm units 35, 37 are largely unpredictable. However, the structure of the bogie 10 is such that these multi-directional movements may be accommodated between sets limited and selectively regulated to the degree that certain movements are predictable.

As may be more easily understood by viewing FIG. 4, either wheelset-steering arm unit 35, 37 may move linearly in a vertical direction, pitch or roll without such movements being impeded by the connecting device 78. Such movements of each unit 35, 37 are independent of each other, that is each unit 35, 37 is not restrained by the other through the connecting device 78. Thus, wheelset 12, 14 of either unit 35, 37 may move aligned position with the track over which the wheelset 12, 14 is in contact to accommodate for variation in track direction and rail height.

However, certain linear horizontal movements and yawing movements of the wheelset-steering arm units 35, 37 are restrained by the connecting device 78. For example, all horizontal movements of the units 35, 37 which are in opposite directions and which align with the lateral axis L_a of the bogie 10 are inhibited by the connecting device 78. Likewise, yawing movements of the units 35, 37 which are in the same rotational direction are inhibited by the connecting device 78. Yawing of the wheelset-steering arm units 35, 37 occurs when the bogie 10 proceeds about a curved section of track. Furthermore, such yawing movements of the units 35, 37 are maintained in opposite rotational directions by the connecting device 78.

Inhibiting yawing movement in the same rotational direction of the units 35, 37 is particularly important to maintain proper dynamic stability of the bogie 10. For example, during travel, the side frame 50, 52 tends to lozenge, i.e. the side frames 50, 52 remain parallel but move to a longitudinally offset position, under dynamically induced forces. For lozengeing to occur both wheelset-steering arm units must yaw in the same rotational direction. Lozengeing reduces the critical speed of the bogie 10 wherein the wheelsets 12, 14 tend to hung, i.e. dynamically induced oscillating about a vertical axis of each wheelset. The connecting device 78 prohibits such yawing in the same rotational direction. Thus, the side frames 50, 52 are inhibited from lozengeing which in turn

maintains the critical speed above that which the bogie 10 and associated railroad car body is expected to travel.

On the other hand, horizontal movements of the units 35, 37 which are aligned with the longitudinal axis Ld of the bogie 10 are not restrained by the connecting device 78. Such movements occur when the front and rear braking means 72, 74 are activated.

The braking means 72, 74 is conventional in nature and includes a brake beam 120 with brake shoes 122 supported from outer ends of such for engagement with the front and rear wheelsets 12, 14. Each brake beam 120 pivotally connects with a lower end 124 of a brake lever 126. A tie rod 128 pivotally joins a center portion 130 of each lever 126. An upper end 132 of one brake lever 126 may be pivotally joined to a body of the railroad car (not shown) while the upper end 132 of the other brake lever 126 is operatively connected to a power device (not shown) by a connecting rod 134.

Movement of the connecting rod 134 in the direction opposite the arrow D in FIG. 1 forces the brake shoes 122 against the wheelsets 12, 14 to move the units 35, 37 slightly apart. These slight movements of the units 35, 37 in opposite directions are not inhibited by the connecting device 78.

Proper mechanical operation of the connecting device 78 is enhanced by placing the device 78 within the protective environment provided by the bolster center cavity 70. Further, by locating the spherical bearing sets 98 of the linkage bar 92 between the upper and lower prongs 82, 84 of each bracket end 80, the bearing sets 78 are shielded from foreign matter associated with railroad car travel.

Likewise, the connecting device 78 may be readily assembled or disassembled to allow periodic maintenance. However, because the connecting device 78 allows each wheelset-steering arm unit 35, 37 to move in a number of directions without regulation of those movements, the connecting device 78 is not unduly subject to the dynamic forces causing those movements. Thus, the connecting device 78 may remain reasonably maintenance free.

A further advantage provided by the connecting device 78 is that it is reasonably fail safe from disassembly. For such disassembly to occur, one of the pins 112 must become disassociated from the linkage bar 92. Downward movement of each pin 112 is limited by the pin head 114. Upward movement of the pin 112 can only occur upon failure of the cotter pin 118 and application of a sufficient force over an opposite gravitational force to cause a lower end of the pin 112 to move above the linkage bar 92. The likelihood of both such events occurring is slight indeed.

While various minor modifications may be suggested by those versed in the art, it should be understood that we wish to embody within

the scope of the patent warranted hereon all such modifications as fall within the scope of the following claims.

5 Claims

1. A railroad car bogie (10) including a pair of spaced side frames (50, 52), a bolster (58) having ends supported resiliently in each said side frame (50, 52), spaced front and rear wheelsets (12, 14) connected to said side frames (50, 52) through a front and rear steering arm (28, 30) respectively connected with each wheelset (12, 14) to form front and rear wheelset-steering arm units (35, 37), said units being disposed on opposite sides of said bolster (58), means (40) interposed between said side frames (50, 52) and said steering arms (28, 30) to allow said units (35, 37) to move relative to said frames (50, 52) selectively in multi-directions as a reaction to dynamic forces created by travel of said bogie (10), and connecting means (78) joining said units (35, 37) for regulating certain relative movements of the wheelsets (12, 14), said connecting means (78) comprising a bracket (76) formed on a middle part (32) of each said steering arm (28, 30) and projecting towards said bolster (58), characterised in that each bracket includes a prong arrangement (82, 84) having vertically aligned apertures (86, 88) formed therein, the apertures (86, 88) of each prong arrangement being substantially laterally aligned upon said wheelset-steering arm units (35, 37) being in a squared relationship with said side frames (50, 52), and in that an elongated linkage bar (92) has ends disposed respectively between the prongs of the prong arrangements (82, 84), bearing means (98) being disposed in respective apertures (94, 96) formed in the ends of said linkage bar (92), and pin means (112, 114, 118) being disposed in said prong apertures (86, 88) and extending through said bearing means (98), such that said connecting means (78) allows said wheelset-steering arm units to pitch and roll independently of one another and inhibits yawing movements of said units (35, 37) which are in the same directional and horizontal lateral movements of said units (35, 37) which are in opposite directions.

2. A railroad car bogie (10) as claimed in claim 1 including bushing means (90) disposed in each of said prong apertures (86, 88), and wherein said bearing means (98) comprises spherical bearing sets (98) disposed one each in said linkage bar apertures, each said bearing set including an outer element (102) having a concave spherical-shaped inner wall (106) mating in a complementary manner with a convex spherical-shaped outer wall (108) of an inner element (100) of said bearing set (98), and wherein said pin means (112, 114, 118) comprises pins (112) disposed one each in said bushing means (90) carried by said prongs in each said bracket (76) and extending through a

circular passage (110) formed in each said spherical bearing inner element (100), each said pin (112) having an enlarged head (114) to limit downward movement of such by engagement with the upper ones (82) of said prongs respectively and a lower detachable retaining device (118) to allow selective upward movement of said pin (112) and provide ready disassembly of said connecting means (78).

3. A railroad car bogie (10) as claimed in claim 1 or 2 wherein said linkage bar (92) is approximately aligned with a lateral axis (La) of the bogie.

4. A railroad car bogie (10) as claimed in any preceding claim wherein said steering arms (28, 30) are U-shaped.

5. A railroad car bogie (10) as claimed in any preceding claim wherein side portions (34) of said steering arms (28, 30) carry bearings (18, 22) in which axle ends (16) of said wheelsets (12, 14) are journaled.

6. A railroad car bogie (10) as claimed in claim 5 wherein each said side frame (50, 52) has a pedestal jaw (46, 48) formed at each end thereof and the side portions (34) of said steering arms (28, 30) are disposed in said jaws (46, 48).

7. A railroad car bogie (10) as claimed in any preceding claims wherein the means interposed between said side frames (50, 52) and said steering arms (28, 30) are elastomeric devices (40).

8. A railroad car bogie (10) as claimed in any of the preceding claims including a braking means (72, 74) carryable by said bogie (10) independent of said bogie steering arms (28, 30), said braking means (72, 74) including; a front brake beam (120) having brake shoes (122) carried at outer ends thereof for engagement with said front wheelset (12), a rear brake beam (120) having brake shoes (122) carried at outer ends thereof for engagement with said rear wheelset (14), a front and rear elongated brake lever (126) each having a lower end (124) pivotally connected to said front and rear brake beams (120) respectively, an elongated tie rod (128) disposed between said brake levers (126) and pivotally joined with a middle portion (130) of each said lever (126), and an upper end (132) of said front brake lever (126) prepared for operative connection to a power device and an upper end (132) of said rear brake lever (126) prepared for attachment independent of said bogie (10), whereupon activation of said power device causes said brake shoes (122) to engage said wheelsets (12, 14) and cause said wheelsets (12, 14) to move longitudinally apart, said movement being uninhibited by said connecting means (78).

Revendications

1. Bogie de voiture de chemin de fer (10) comprenant deux longerons espacés (50, 52), une traverse danseuse (58) dont les extrémités

sont supportées élastiquement dans un desdits longerons (50, 52), des essieux avant et arrière espacés (12, 14) reliés auxdits longerons (50, 52) par l'intermédiaire d'un bras de direction ayant et arrière (28, 30) respectivement relié à chaque essieu (12, 14) pour former des unités (35, 37) avant et arrière à essieu et à bras de direction, lesdites unités étant disposées de part et d'autre de ladite traverse danseuse (58), un moyen (40) interposé entre lesdits longerons (50, 52) et lesdits bras de direction (28, 30) pour permettre auxdites unités (35, 37) de se déplacer par rapport auxdits longerons (50, 52) sélectivement dans de multiples directions en tant que réaction à des forces dynamiques créées par le roulement dudit bogie (10) et des moyens de liaison (78) reliant lesdites unités (35, 37) pour régler certains mouvements relatifs des essieux (12, 14), lesdits moyens de liaison (78) comprenant une patte (76) formée sur une partie médiane (32) de chacun desdits bras de direction (28, 30) et s'étendant vers ladite traverse danseuse (58), caractérisé en ce que chaque patte comprend une chape (82, 84) ayant des ouvertures (86, 88) alignées verticalement formées dans cette chape, les ouvertures (86, 88) de chaque chape étant à peu près alignées latéralement sur lesdites unités (35, 37) à essieu et à bras de direction en présentant une relation avec lesdits longerons (50, 52), formant un carré et en ce que les extrémités d'une barre de liaison alongée (92) sont disposées respectivement entre les branches des chapes (82, 84), des moyens formant palier (98) étant disposés dans des ouvertures respectives (94, 96) formées dans les extrémités de ladite barre de liaison (92) et un moyen à broche (112, 114, 118) étant disposé dans lesdites ouvertures (86, 88) et s'étendant à travers lesdits moyens formant palier (98), de telle sorte que ledit moyen de liaison (78) permet auxdites unités à essieu et à bras de direction d'effectuer des mouvements de tangage et de roulis indépendamment l'une de l'autre et d'empêcher les mouvements de lacet desdites unités (35, 37) qui ont le même sens et les mouvements horizontaux et latéraux desdites unités (35, 37) qui ont des sens opposés.

2. Bogie de voiture de chemin de fer (10) suivant la revendication 1, comprenant des moyens formant fourreau (90) disposés dans chacune desdites ouvertures de chape (86, 88) et dans lequel lesdits moyens formant palier (98) comprennent des jeux de paliers sphériques disposés respectivement dans lesdites ouvertures (94, 96) de la barre de liaison (92), chaque jeu de palier comprenant un élément extérieur (102) ayant une paroi intérieure sphérique concave (106) s'ajustant d'une manière complémentaire à une paroi extérieure sphérique convexe (108) d'un élément intérieur (100) dudit jeu de palier (98), et dans lequel lesdits moyens formant broche (112, 114, 118) comprennent des broches

(112) disposées respectivement dans lesdits moyens formant fourreau (90) portés par lesdites chapes dans chacune desdites pattes (76) et s'étendant à travers un passage circulaire (110) formé dans chaque élément intérieur de palier sphérique (100), chaque broche (112) ayant une tête élargie (114) pour empêcher le mouvement vers le bas de la broche par contact avec les branches supérieures (82) desdites chapes respectivement et un dispositif de retenue inférieur amovible (118) pour permettre un mouvement vers le haut sélectif de ladite broche (112) et procurer un démontage facile dudit moyen de liaison (78).

3. Bogie de voiture de chemin de fer suivant la revendication 1 ou 2 dans lequel ladite barre de liaison (92) est approximativement alignée avec un axe latéral (La) du bogie.

4. Bogie de voiture de chemin de fer (10) suivant l'une quelconque des revendications précédentes dans lequel lesdits bras de direction (28, 30) ont une forme en U.

5. Bogie de voiture de chemin de fer (10) suivant l'une quelconque des revendications précédentes, dans lequel des parties latérales (34) desdits bras de direction (28, 30) portent des paliers (18, 22) dans lesquels tourbillonnent les fusées (16) desdits essieux (12, 14).

6. Bogie de voiture de chemin de fer (10) suivant la revendication 5, dans lequel chaque longeron (50, 52) présente un étrier de boîte d'essieu (46, 48) formé à chacune de ses extrémités et les parties latérales (34) desdits bras de direction (28, 32) sont disposées dans lesdits étriers mâchoires (46, 48).

7. Bogie de voiture de chemin de fer suivant l'une quelconque des revendications précédentes, dans lequel les moyens interposés entre lesdits longerons (50, 52) sont des dispositifs élastomères (40).

8. Bogie de voiture de chemin de fer (10) suivant l'une quelconque des revendications précédentes comportant des moyens de freinage (72, 74) pouvant être supportés par ledit bogie (10) indépendamment desdits bras de direction (28, 30) du bogie, lesdits moyens de freinage (72, 74) comprenant une traverse de frein avant (120) ayant des patins de frein (122) portés à ses extrémités extérieures pour coopérer avec ledit essieu avant (12), une traverse de frein arrière (120) ayant des patins de frein (122) pour coopérer avec ledit essieu arrière (14), des leviers de frein allongés avant et arrière (126) ayant chacun une extrémité inférieure (124) articulée auxdites traverses de frein avant et arrière (120) respectivement, un tirant allongé (128) disposé entre lesdits leviers de frein (126) et articulé à une partie médiane (130) de chaque levier (126), et une extrémité supérieure (132) dudit levier de frein avant (126) étant agencé pour être connectée à un dispositif d'actionnement et une extrémité supérieure (132) dudit levier de frein arrière (126) étant agencées pour être connectée indé-

pendamment dudit bogie (10), de sorte que l'activation dudit dispositif d'actionnement serre lesdits patins de frein (122) sur lesdits essieux (12, 14) et provoque l'écartement longitudinal de ceux-ci, ledit mouvement n'étant pas gêné par ledit moyen de liaison (78).

Patentansprüche

1. Reisezugwagenfahrgestell (10) mit einem Paar beabstandeter Seitenrahmen (50, 52), einem Drehgestellschemel (58) mit elastisch in jedem der Seitenrahmen (50, 52) gehaltenen Enden, beabstandeten vorderen und hinteren Radsätzen (12, 14), die mit den Seitenrahmen (50, 52) über einen vorderen und einen hinteren Lenkerarm (28, 30) verbunden sind, welche jeweils mit jedem Radsatz (12, 14) zur Bildung von vorderen und hinteren Radsatz-Lenkerarm-Einheiten (35, 37) verbunden sind, wobei die Einheiten an einander gegenüberliegenden Seiten des Drehgestellschemels (58) angeordnet sind, einer Einrichtung (40), die zwischen den Seitenrahmen (50, 52) und den Lenkerarmen (28, 30) angeordnet ist, damit sich die Einheiten (35, 37) relativ zu den Seitenrahmen (50, 52) wahlweise in mehreren Richtungen als Reaktion auf die durch die Fahrt des Fahrgestells (10) erzeugten dynamischen Kräfte bewegen können, und mit einer Verbindungseinrichtung (78), die sich an die Einheiten (35, 37) zur Regulierung bestimmter Relativbewegungen der Radsätze (12, 14) anschließt, wobei die Verbindungseinrichtung (78) einen Ausleger (76) aufweist, der an einem Mittelteil (32) jeden Lenkerarms (28, 30) gebildet ist und sich in Richtung auf den Drehgestellschemel (58) erstreckt, dadurch gekennzeichnet, daß jeder Ausleger (76) eine Gabelanordnung (82, 84) mit darin gebildeten vertikal fluchtenden Öffnungen (86, 88) besitzt, wobei die Öffnungen (86, 88) jeder Gabelanordnung im wesentlichen seitlich auf den Radsatz-Lenkerarm-Einheiten (35, 37) fluchten, welche in einer quadratischen Beziehung mit den Seitenrahmen (50, 52) stehen, und daß ein verlängertes Verbindungsglied (92) Enden besitzt, die jeweils zwischen den Gabeln der Gabelanordnung (82, 84) angeordnet sind, wobei in den jeweiligen Öffnungen (94, 96), die in den Enden des Verbindungsglieds (92) gebildet sind, eine Lagereinrichtung (98) angeordnet ist, und wobei eine Bolzenanordnung (112, 114, 118) in den Gabelöffnungen (86, 88) angeordnet ist und sich so durch die Lagereinrichtung (98) erstreckt, daß die Verbindungseinrichtung (78) den Radsatz-Lenkerarm-Einheiten ein Neigen und Schlingern unabhängig voneinander erlaubt und Pendelbewegungen der Einheiten (35, 37) in die selben Richtungen und horizontale seitliche Bewegungen der Einheiten (35, 37) in entgegengesetzte Richtungen hemmt.

2. Reisezugwagenfahrgestell nach Anspruch 1, dadurch gekennzeichnet, daß eine

Buchsenanordnung (90) in jeder der Gabelöffnungen (86, 88) angeordnet ist, wobei die Lagereinrichtung (98) sphärische Lagersätze (98) besitzt, die jeweils in den Verbindungsgliedöffnungen angeordnet sind, wobei jeder Lagersatz ein äußeres Element (102) mit einer konkaven sphärischen Innenwandung (106) besitzt, die in komplementärer Weise mit einer konvexen sphärischen Außenwand (108) eines Innenelements (100) des Lagersatzes (98) paßt, und wobei die Bolzenanordnung (112, 114, 118) Bolzen (112) aufweist, die jeweils in der von jeder Gabel in jedem Ausleger gehaltenen Buchsenanordnung (90) angeordnet sind und sich durch einen ringförmigen Durchlaß (110) erstrecken, der in jedem sphärischen Innenlagerelement (100) gebildet ist, wobei jeder Bolzen (112) einen vergrößerten Kopf zur Begrenzung der Abwärtsbewegung desselben durch Eingriff mit den jeweiligen oberen (82) Gabeln und eine untere entfernbare Rückhalte-einrichtung (118) besitzt, die wahlweise die Aufwärtsbewegung des Bolzens (112) erlaubt und eine leichte Demontage der Verbindungseinrichtung (78) vorsieht.

3. Reisezugwagenfahrgestell nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß das Verbindungsglied (92) annähernd mit einer seitlichen Achse (La) des Fahrgestells fluchtet.

4. Reisezugwagenfahrgestell nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die Lenkerarme (28, 30) U-förmig sind.

5. Reisezugwagenfahrgestell nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die Seitenabschnitte (34) der Lenkerarme (28, 30) Lager (18, 22) tragen, in denen Achsenden (16) der Radsätze (12, 14) drehbar gelagert sind.

6. Reisezugwagenfahrgestell nach Anspruch 5, dadurch gekennzeichnet, daß jeder Seitenrahmen (50, 52) an jedem seiner Enden eine Achslagerklaue (46, 48) besitzt, und daß die

Seitenabschnitte (34) der Lenkerarme (28, 30) in den Achslagerklauen (46, 48) angeordnet sind.

5 7. Reisezugwagenfahrgestell nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die zwischen der Seitenrahmen (50, 52) und den Lenkerarmen (28, 30) angeordneten Einrichtungen elastomere Vorrichtungen (40) sind.

10 8. Reisezugwagenfahrgestell nach einem der vorangehenden Ansprüche, gekennzeichnet durch eine Bremseinrichtung (72, 74), die von dem Fahrgestell (10) unabhängig von den Lenkerarmen (28, 30) des Fahrgestells tragbar ist, wobei die Bremseinrichtung (72, 74) einen
15 vorderen Bremsträger (120) mit Bremsbacken (122), die an dessen äußeren Enden zum Eingriff mit dem vorderen Radsatz (12) gehalten werden, einen hinteren Bremsträger (120) mit Bremsbacken (122), die an dessen äußeren
20 Enden zum Eingriff mit dem hinteren Radsatz (14) gehalten werden, einen vorderen und einen hinteren verlängerten Bremshebel (126), dessen unteres Ende (124) jeweils schwenkbar mit dem vorderen und dem hinteren Bremsträger (120)
25 verbunden ist, eine verlängerte Verbindungsstange (128), die zwischen den Bremshebeln (126) angeordnet und schwenkbar mit einem mittleren Abschnitt (130) jeden Hebels (126) verbunden ist, ein oberes Ende (132) des
30 vorderen Bremshebels (126), das für die funktionelle Verbindung mit einer Antriebseinrichtung vorgesehen ist, und ein oberes Ende (132) des hinteren Bremshebels (126) aufweist, das zur Anbringung unabhängig von dem Fahrgestell (10) vorgesehen ist, wobei die Betätigung der Antriebseinrichtung die Bremsbacken (122) in Eingriff mit den Radsätzen (12, 14) bringt und die Radsätze (12, 14) veranlaßt,
35 sich in Längsrichtung voneinander wegzubewegen, wobei diese Bewegung nicht durch die Verbindungseinrichtung (78) verhindert wird.

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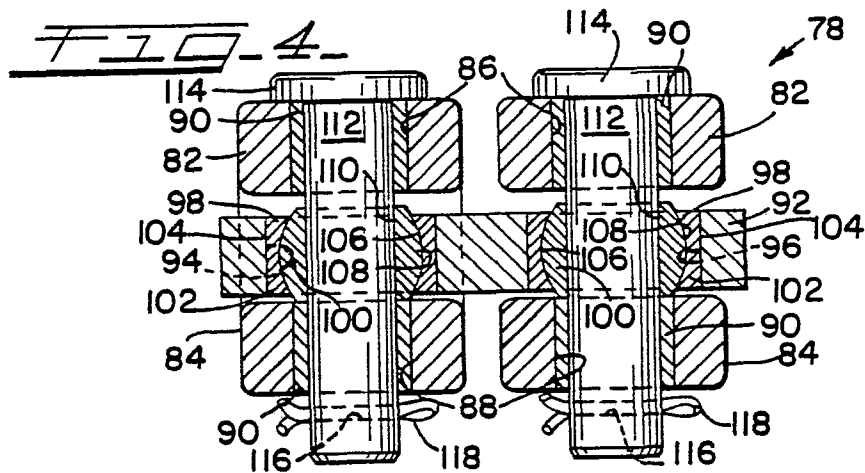
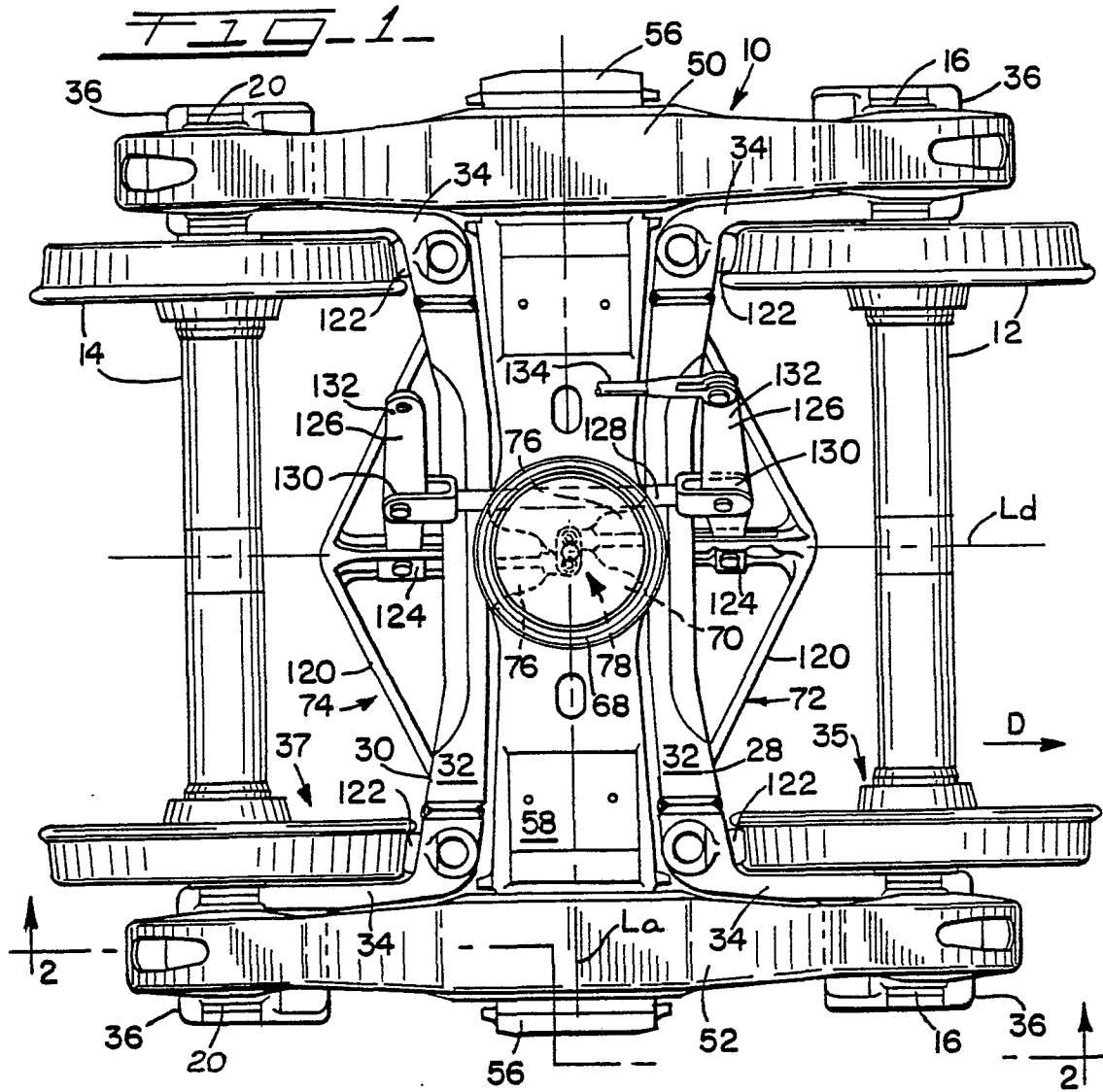
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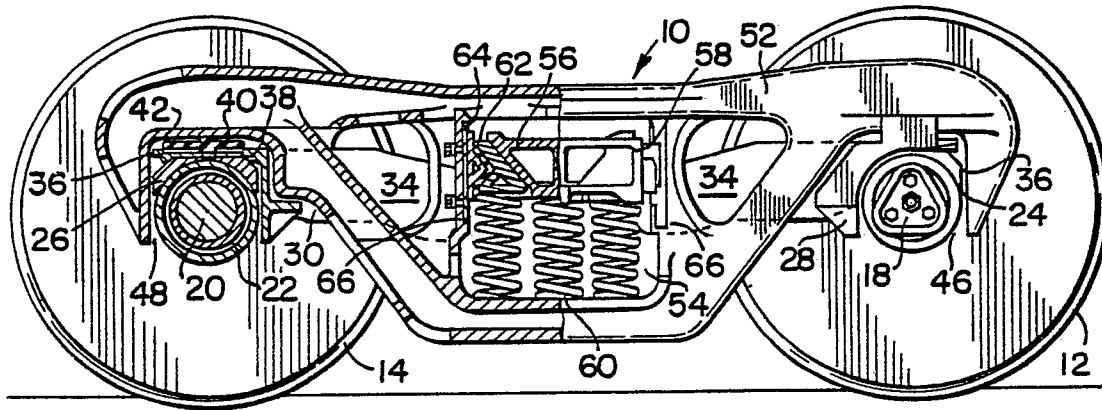
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