Jan. 13, 1953 W. VAN DER SLUYS 2,625,117

MOUNTING OF PLANK ON SWING HANGERS FOR RAILWAY TRUCKS

Filed Jan. 23, 1948 2 SHEETS—SHEET 1

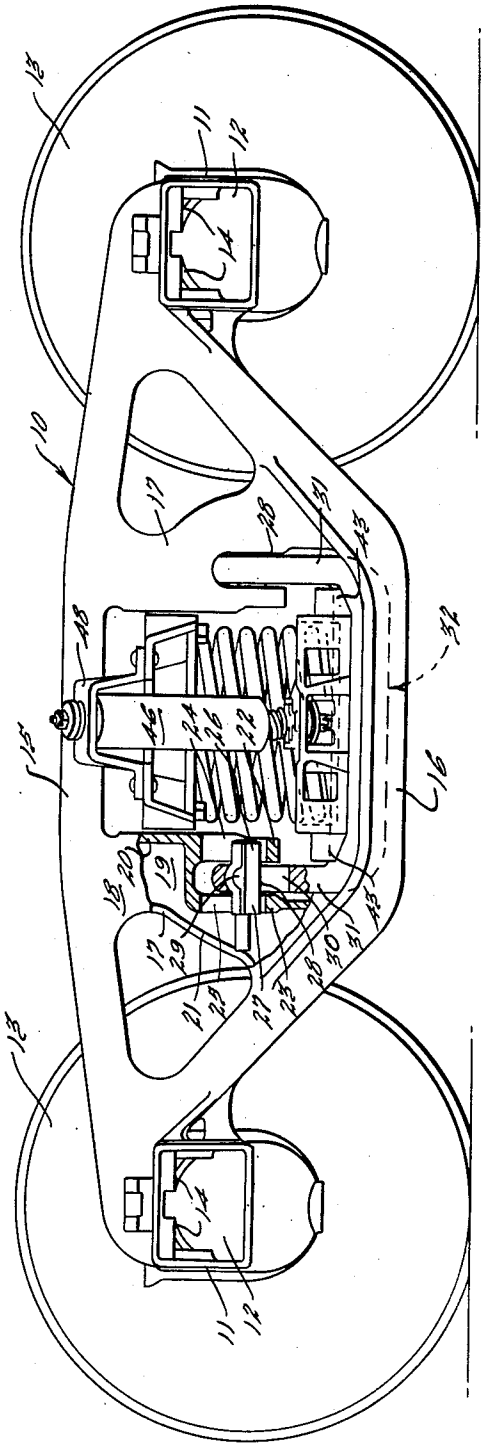


Fig. 1.

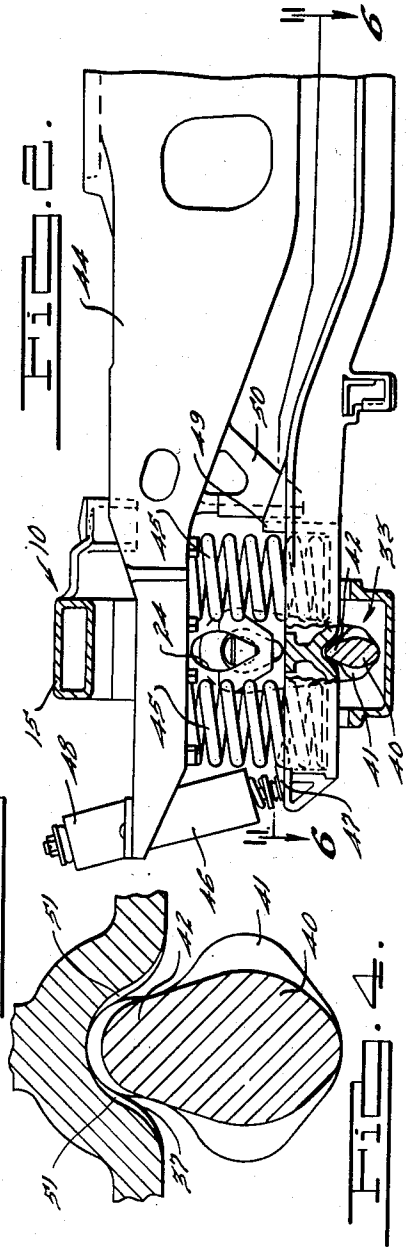


Fig. 2.

Fig. 4.

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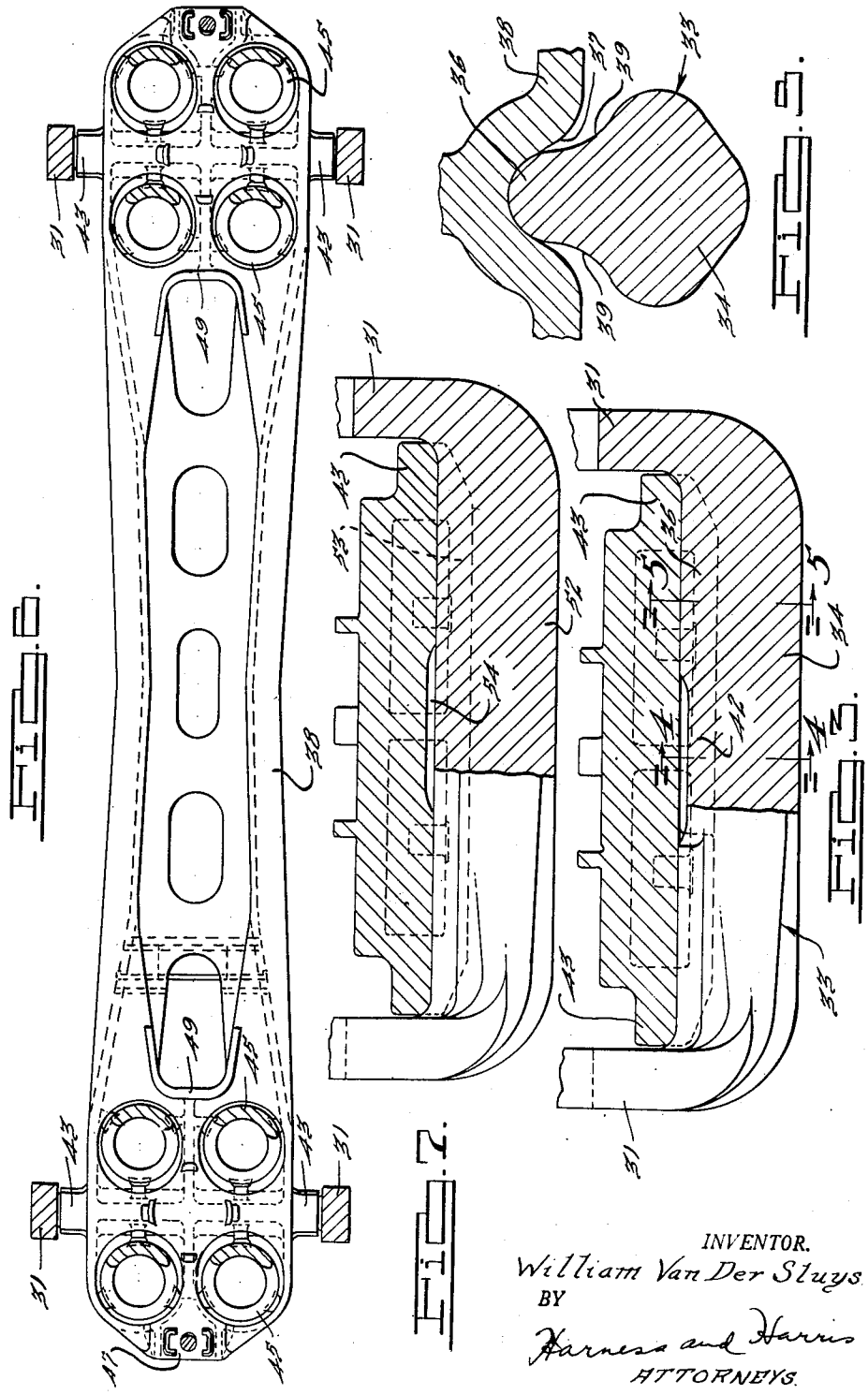


Fig. 6.

Fig. 5.

Fig. 7.

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MOUNTING OF PLANK ON SWING HANGERS FOR RAILWAY TRUCKS

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Application January 23, 1948, Serial No. 4,007

19 Claims. (Cl. 105—208)

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This invention relates to the provision of means in a railway-car truck for controlling unsquaring of the truck. More specifically, the invention relates to improvements in a truck in which a plank and swing hangers are associated with one another so as to contribute to resisting unsquaring.

Van Der Sluys application, Serial No. 567,573, now U. S. Patent No. 2,483,858, dated October 4, 1949, and Janeway application, Serial No. 567, 603, now U. S. Patent No. 2,584,880, dated February 5, 1952, both filed December 11, 1944, disclose and claim railway trucks in which unsquaring of side members is controlled through a plank, swing hanger carrying the plank, and means mounting the swing hangers in the side members.

The present application relates to improvements over the construction of the above applications involving a novel form of swing hanger and a novel association of swing hangers with a plank for controlling unsquaring.

An object of the present invention is to provide an improved swing hanger for a railway truck that will cooperate with a plank in contributing to controlling unsquaring of the truck.

A further object is to provide an improved arrangement for mounting a plank on swing hangers which will contribute to controlling unsquaring of the truck.

A further object is to provide an improved type of load supporting plank that is adapted to provide for side frame equalizing action while resisting side frame unsquaring.

Other objects will appear from the disclosure.

In the drawings:

Fig. 1 is a side view of a railway truck, with parts broken away, constructed in accordance with the present invention;

Fig. 2 is a transverse sectional view of a portion of the truck of Fig. 1 with parts broken away;

Fig. 3 is a detail view partially in section showing the manner in which a plank is mounted on a swing hanger, according to the present invention;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a sectional view taken along the line 5—5 of Fig. 3;

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 2 and including both ends of the plank; and

Fig. 7 shows a modified arrangement of plank and swing hanger base.

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The reference character 10 designates a side member of a railroad truck. The term "side member" is intended to be generic both to a side frame and to an equalizer member. The side member 10 has at each end a bearing portion 11 engaging a journal box 12 associated with an axle, not shown, upon which a wheel 13 is mounted. The bearing portion 11 of the side member is so arranged with respect to the journal box 12 that pressure is applied between the two at a line designated 14, and any tilting of the side member 10 will take place at this region. The side member 10 has an upper compression part 15, a lower tension part 16, and two columns 17 extending between the compression and tension parts. Each column 17 comprises opposed side walls 18 and 19, an inner end wall 20, and opposed flanges 21 on the side walls 18 and 19 extending toward one another and defining an opening at the outer end of the column. The inner end wall 20 of each column 17 is formed with spaced portions 22 and 23 in which are provided generally elliptical openings 24 and 25 having flat converging sides toward the bottom. The openings 24 and 25 receive end portions 26 and 27 of a mounting pin 28. End portions 26 and 27 of the mounting pin 28 have flat converging regions engaging the flat sided converging regions of the column openings 24 and 25 so that the mounting pin 28 is non-rotatably lodged in the side frame column 17. The mounting pin 28 has a central portion 29 provided with a spherical upper surface engaging a spherical upper surface in an opening 30 formed in a leg 31 of a swing hanger 32. The swing hanger 32 has another leg 31 which is similarly supported on a mounting pin 28 carried in the other column 17.

The swing hanger 32 has a base portion 33, which is at least partially contained in the lower portion 16 of the side member 10, which is shown to be U-shaped in cross section in Fig. 2. As shown in Fig. 5, the swing-hanger base 33 has end portions, each provided with a relatively wide lower region 34 and a relatively narrow upper region 36, made arcuate in shape so as to fit in a groove 37 formed in a plank 38 in such a way that the swing hanger base 33 may rock with respect to the plank. Between the regions 34 and 36 of the swing hanger base 33 there are regions 39 reentrant or depressed so that regions 39 will not strike the sides of the plank groove 37 upon rocking of the swing-hanger base 39 arising upon lateral movement of the swing-hanger base with respect to the side member 10. A central region of the swing-hanger base 33 is indicated in Fig. 4

as having a lower region 40 narrower than the lower end regions 34 and an upper relatively narrow region 42, the top of which is depressed or set back from the top of the upper end regions 36 so that at the central region of the swing-hanger base 33 there is clearance between the plank groove 37 and the swing-hanger base, as shown in Figs. 3 and 4. The width of the lower regions of the swing-hanger base 33 changes smoothly from a maximum toward the ends of the base to a minimum at the center thereof. The larger width of the swing-hanger base at the end regions gives a greater section providing greater strength at the end regions where such strength is required.

At the groove 37 the plank has lateral extensions 43, which cause the plank to grip the swing hanger base up to its very ends.

It will be understood that both ends of the plank 38 are engaged by swing hangers. Fig. 6 shows both ends of the plank to have lateral projections 43. Swing hangers are shown at both ends of the plank, only the legs 31 being visible in Fig. 6.

Positioned above the plank 38 is a bolster 44. Each end of the bolster is supported upon an end of the plank by a plurality of coil springs 45 at the region where the plank and bolster go through the window opening in the side member defined by the columns 17 and the compression and tension parts 15 and 16. At each end of the bolster and plank beyond the springs 45 is an inclined damping means 46 connected at its lower end to an inclined portion 47 on the plank and at its upper end to a U-shaped bracket 48 secured to the bolster 44. As shown in Figs. 2 and 6 the plank has at each end inward of the springs 45 an upstanding U-shaped flange or projection 49, and the bolster has a depending projection 50 extending within each plank projection 49. Projections 49 and 50 permit relative movement laterally of the truck of the bolster and plank with respect to one another to a limited extent and thereafter conjoint movement of bolster and plank laterally of the truck.

Only one side member 10 has been described for the truck, but it will be understood that there is a similar side member at the other side of the truck at the location indicated by the swing hanger legs 31 at the right end of the plank 38. There will be two truck wheels 14 adjacent this side member at the right, bringing the total number of truck wheels to four. Unsquaring of one side member 10 with respect to the other side member is controlled by the plank 38, the swing hangers 32, and the mounting pins 28 for the swing hangers. When unsquaring forces are applied to the side members 10, the swing hanger bases 33 try to shift angularly out of the plank grooves 37. This action is resisted by the engagement between the plank grooves, and the swing hanger bases, and the plank extensions 43 increase the effectiveness of the gripping action of the plank upon the swing hanger bases by increasing the length over which gripping takes place. As previously pointed out, the length of gripping is at a maximum, since the plank extensions 43 go almost to the swing hanger legs 31. During operation the truck plank 38 may be subjected to side frame equalizing forces such as those occurring when one wheel in attempting to follow the track drops below or rises above the other wheels, causing a relative tilting and/or twisting between plank 38 and swing hanger bases 33. Such tilting and/or twisting might make the engagement of the plank grooves 37 with the swing hanger bases 33 effective only at the central regions of the swing hanger bases if there were engagement between these central regions and the plank. Thus the length of engagement of the plank grooves, with the swing hanger bases would be reduced, and therewith the effectiveness of the gripping. According to my invention, I have avoided this tendency, by eliminating engagement between the swing hanger base and the plank grooves at the central regions of the swing hanger bases, thereby insuring that engagement is maintained over a considerable length at the end regions of the swing hanger bases.

The tendency toward unsquaring of the side members 10 is also resisted by the mounting pins 28 and their relation with the openings in the swing-hanger legs 31 and the openings 24 and 25 in the side members. As unsquaring forces are applied, the fit of the mounting pins in the openings 24 and 25 is such as to prevent transverse movement of the mounting pins that might otherwise result from a less rigid connection between the pins and columns. Moreover, the ends of the swing-hanger legs 31 cannot move transversely of the truck with respect to the mounting pins 28, because the spherical surfaces engaging one another on the mounting pins and in the openings 30 in the swing-hanger legs prevent such relative transverse movement.

Unsquaring of the side members 10 is permitted to the extent that the elasticity of each swing hanger provides for relative angular movement of the swing-hanger legs 31 about the base 33.

The pivot axis for each swing hanger 32 on a side member 10 lies in the mounting pins 28 at a level below the lines 14 at the journal boxes 12, at which the side-member bearing portions 11 rest upon the journal boxes and this tends to prevent tilting of side members in such a way as to make them unstable. Thus it is unnecessary to provide tilt-preventing ties between the side members, which ties would interfere with limiting the control of unsquaring of the side members to the plank 38, the swing hangers 32, and the mounting pins 28.

Fig. 4 shows the central region of each plank groove 37 to be slightly relieved as indicated at 51. These reliefs are provided so that machining can be limited to the end regions of the plank groove 37 where engagement with the end portions of the swing hanger base 33 takes place.

Fig. 7 shows a modified construction in which a swing hanger base 52 has a relatively straight upper line with no central depression as in the arrangement of Fig. 3, and the plank groove 53 is provided with a depression or relief 54 which eliminates engagement between the plank groove and the swing hanger base at the central region of the swing hanger base.

I claim:

1. In a railway truck comprising spaced side members and a pair of relatively rigid swing hangers, each hanger having a pair of spaced legs and a connecting base, means pivotally mounting the legs of one swing hanger on each side member, a plank extending between the side members and having near its ends transversely extending grooves engaged by the spaced end portions of the swing-hanger bases and formed so as to be free of engagement with the central portions of the swing-hanger bases, the plank, the swing hangers, and the means mounting the swing-hanger legs on the side members prevent-

ing substantial unsquaring of the side members and constituting the only means for this purpose, the plank being free of any association with the side members tending to prevent unsquaring thereof except by way of the swing hangers and the mounting means for the swing-hanger legs on the side members, said plank further being of less width across its mid-length than across its end portions to provide a relatively low torsional rigidity in the plank to improve side frame equalizing action.

2. In a railway truck comprising a pair of spaced side members, swing hangers each having spaced legs and a connecting base, means pivotally mounting the legs of the swing hangers on the side members, a plank extending between the side members and engaging the spaced end portions of the swing-hanger bases and being free of engagements with the mid portions of the swing-hanger bases, the plank, the swing hangers, and the means mounting the swing-hanger legs on the side members preventing substantial unsquaring of the side members and constituting the only means for this purpose, the plank being free of any association with the side members tending to prevent unsquaring thereof except by way of the swing hangers and the mounting means for the swing-hanger legs on the side members, said plank further being of less width across its mid-length than across its end portions to provide a relatively low torsional rigidity in the plank to improve side frame equalizing action.

3. In a railway truck comprising a pair of spaced side members, swing hangers each having spaced legs and a connecting base, means pivotally mounting the legs of the swing hangers on the side members so as to prevent movement of the mounted portions of the swing hangers in a direction transverse of the side members, a plank extending between the side members and having near its ends transverse grooves engaged by spaced end portions of the swing hanger bases and free of engagement with the central portions of the swing-hanger bases, the plank, the swing hangers, and the means mounting the swing-hanger legs on the side members preventing substantial unsquaring of the side members and constiuting the only means for this purpose, the plank being free of any association with the side members tending to prevent unsquaring thereof except by way of the swing hangers and the mounting means for the swing-hanger legs on the side members, elastic deformation of the swing hangers providing limited unsquaring of the side members, said plank further being of less width across its mid-length than across its end portions to provide a relatively low torsional rigidity in the plank to improve side frame equalizing action.

4. In a railway truck comprising a pair of spaced side members, a pair of swing hangers each having spaced legs and a connecting base, means pivotally mounting the legs of each of the swing hangers on one of the side members, a plank extending between the side members and having a pair of lateral projections on opposite sides of the plank near each end thereof and a transverse groove formed in each pair of the projections and in the portion of the plank between each pair of projections, the grooved portions engaging end portions of a swing-hanger base while leaving a central portion of the base free of engagement with the plank, the plank, the swing hangers, and the means mounting the swing-hanger legs on the side members preventing substantial unsquaring of the side members and constituting the only means for this purpose, the plank being free of any association with the side members tending to prevent unsquaring thereof except by way of the swing hangers and the mounting means for the swing-hanger legs on the side members, said plank further being of less width across its mid-length than across its end portions to provide a relatively low torsional rigidity in the plank to improve side frame equalizing action.

5. In a railway truck comprising a pair of spaced side members, swing hangers each having legs and a base, means pivotally mounting the legs of the swing hangers on the side members, a plank extending between the side members and having a pair of lateral extensions on opposite sides of the plank near each end thereof, each end of the plank being engaged by a swing-hanger base at each set of lateral extensions and at portions of the swing-hanger base therebetween except at a central region of the swing-hanger base, the plank, the swing hangers, and the means mounting the swing-hanger legs on the side members preventing substantial unsquaring of the side members and constituting the only means for this purpose, the plank being free of any association with the side members tending to prevent unsquaring thereof except by way of the swing hangers and the mounting means for the swing-hanger legs on the side members, said plank further being of less width across its mid-length than across its end portions to provide a relatively low torsional rigidity in the plank to improve side frame equalizing action.

6. In a railway truck comprising a pair of spaced side members, swing hangers each having spaced legs and a base extending therebetween, means pivotally mounting the legs of the swing hangers on the side members so as to prevent movement of the mounted portions of the swing hangers in a direction transverse of the side members, a plank extending between the side members and having a pair of lateral extensions on opposite sides of the plank near each end thereof and a transverse groove formed in each pair of the extensions and in portions of the plank between each pair of extensions the grooved portions at each end of the plank engaging end portions of a swing-hanger base while leaving a central portion of the swing hanger base free of engagement therewith, the plank, the swing hangers, and the means mounting the swing-hanger legs on the side members preventing substantial unsquaring of the side members and constituting the only means for this purpose, the plank being free of any association with the side members tending to prevent unsquaring thereof except by way of the swing hangers and the mounting means for the swing-hanger legs on the side members, said plank further being of less width across its mid-length than across its end portions to provide a relatively low torsional rigidity in the plank to improve side frame equalizing action.

7. A railway truck comprising a pair of spaced side members, a plank having transverse grooves adjacent its ends and extending between the side side members, a pair of swing hangers each having legs and a base, means pivotally mounting the swing hangers in the side members by the ends of the legs of the swing hangers away from the bases thereof, each swing-hanger base having toward each end a shape having a relatively nar-

row and arcuate side at the inside of the swing-hanger base so as to engage spaced portions of a transverse groove in the plank and a relatively wide region spaced from the relatively narrow side and intermediate reentrant regions, each swing-hanger base having at a central portion a shape having a relatively narrow side at the inside of the swing-hanger base depressed or set back from the aforesaid relatively narrow arcuate side so as to be free of engagement with the said transverse groove in the plank and having a region spaced from the side wider than the relatively narrow arcuate side but narrower than the relatively wide region, the plank, the swing hangers, and the means mounting the swing-hanger legs on the side members preventing substantial unsquaring of the side members and constituting the only means for this purpose, the plank being free of any association with the side members tending to prevent unsquaring thereof except by way of the swing hangers and the mounting means for the swing-hanger legs on the side members.

8. The railway truck specified in claim 7, the width of the relatively wide regoins of each swing-hanger base varying progressively from a maximum at the ends of the swing-hanger base to a minimum at a mid region in the length thereof.

9. A railway truck comprising a pair of spaced side members each having a top compression portion, a lower tension portion, and spaced columns joining the tension and compression portions and defining therewith a window, each column having inner and outer spaced portions adapted to receive the ends of a pivot pin, a pair of swing hangers each having a base and a pair of legs with ends positionable between the spaced portions in the columns of a side member, four pivot pins each passing through a swing-hanger leg and resting in the spaced portions of a column in a side member, a plank extending between the side members and into the windows formed therein and having a transverse groove toward each end engaging a swing-hanger base except at a mid region thereof with portions of the plank having the transverse groove extending beneath the inner of the pivot-pin-receiving portions of the columns in the side members, the plank, the swing hangers, and the means mounting the swing-hanger legs on the side members preventing substantial unsquaring of the side members and constituting the only means for this purpose, the plank being free of any association with the side members tending to prevent unsquaring thereof except by way of the swing hangers and the mounting means for the swin-hanger legs on the side members.

10. A railway truck comprising a pair of spaced side members each having a top compression portion, a lower tension portion, and spaced columns joining the tension and compression portions and defining therewith a window, each column having inner and outer spaced portions adapted to receive the ends of a pivot pin, a pair of swing hangers each having a base and a pair of legs with ends positionable between the spaced portions in the columns of a side member, four pivot pins each passing through a swing-hanger leg and resting in the spaced portions of a column in a side member, a plank extending between the side members and into the windows formed therein and having a pair of lateral extensions on opposite sides of the plank near each end and a transverse groove formed in each pair of the projections and the portion of the plank between each pair of projections and engaging end portions of a swing-hanger base while leaving a central portion of the base free of engagement, each pair of projections being positioned beneath the inner of the spaced pivot-pin-receiving portion in the columns in the side members.

11. A swing hanger comprising legs and a base having a relatively narrow arcuate side at the inside of the swing-hanger base and a relatively wide region spaced from the relatively narrow arcuate side and intermediate reentrant regions, each swing-hanger base having at a central portion a shape having a relatively narrow side set back from the aforesaid relatively narrow arcuate side and having a region spaced from the relatively narrow side wider than the relatively narrow arcuate side but narrower than the relatively wide region.

12. A swing hanger as specified in claim 11, the width of the relatively wide regions of the base varying progressively from a maximum at the ends of the base to a minimum at a mid region in the length thereof.

13. A swing hanger comprising a base portion and a pair of spaced apart legs connected to and extending transversely of the base portion, said legs including means at the free ends thereof adapted to be pivotally connected to a supporting member, said base portion in transverse cross section including a relatively narrow, arcuately shaped, portion on one side and a relatively wide portion on the opposite side with intermediate reentrant portions connecting the opposed sides, said base portions in longitudinal cross section being relatively narrow in width through the mid-length region and relatively wide along the end regions.

14. In a railway truck comprising a pair of spaced side members each of which includes a top compression portion, a lower tension portion, and spaced columns joining the tension and compression portions and defining therewith a window, each column having inner and outer spaced portions provided with pin receiving openings, a pair of swing hangers each having a base portion and a pair of spaced legs, each leg having a pin receiving opening therein positionable between the spaced portions of a column, a pivot pin rigidly mounted in the openings in the spaced portions of each column and extending through the opening in the swing hanger leg mounted between the associated spaced portions, a plank extending between the side members having end portions positioned in the side member windows, said plank having a groove extending transversely thereof at each end of the plank engaging a swing-hanger base portion except at a mid region thereof with portions of the plank having the transversely extending groove positioned beneath the inner of the pivot-pin-receiving portions of the columns in the side members, the plank, the swing hangers, and means mounting the swing-hanger legs on the side members preventing substantial unsquaring of the side members and constituting the only means for this purpose, the plank being free of any association with the side members tending to prevent unsquaring thereof except by way of the swing hangers and the mounting means for the swing-hanger legs on the side members.

15. In a railway truck comprising spaced side members and a swing hanger pivotally mounted in each of said side members for swinging movement transversely of the side members, a plank member extending between and mounted on the

spaced swing hangers so as to provide the only means connecting the side members and resisting unsquaring thereof, said plank member having longitudinally spaced apart, transversely extending formations at each end thereof adapted to be engaged with mating formations on the swing hangers to provide for relative pivotal movement therebetween while resisting relative sliding movement therebetween, said plank member being shaped to provide a relatively narrow central portion and relatively wide end portions so as to have a relatively low torsional rigidity to thereby provide a means for readily permitting side frame equalizing action, the shape of said plank member further being such that the thickness of the plank at the end portions is of such size that the plank provides a high resistance to transverse shear and bending moments resulting from forces applied to the plank adjacent the ends thereof whereby the plank member resists unsquaring of the side members and provides a relatively rigid support for vertical loads applied to the ends of the plank member.

16. In a railway truck comprising spaced side members and a swing hanger pivotally mounted in each of said side members for swinging movement transversely of the side members, a plank member extending between and mounted on the spaced swing hangers so as to provide the only means connecting the side members and resisting unsquaring thereof, said plank member having longitudinally spaced apart, transversely extending groove-like formations across the underside at each end thereof providing the only plank portion adapted to be engaged with mating formations on the swing hangers to provide for relative pivotal movement therebetween while resisting relative sliding movement therebetween, said plank member having relatively wide transversely extending end portions and a relatively narrow transversely extending medial portion so as to have a relatively low torsional rigidity to thereby provide a means for readily permitting side frame equalizing action, the shape of said plank member further being such that the thickness of the plank at the end portions is of sufficient size so that the plank provides a high resistance to transverse shear and bending moments resulting from forces applied to the plank adjacent the ends thereof whereby the plank member resists unsquaring of the side members and provides a relatively rigid support for vertical loads applied to the ends of the plank member.

17. An integrally formed spring plank adapted to be suspended between a pair of spaced swing hangers comprising an elongated member having a relatively narrow, transversely extending, centrally disposed, body portion and having relatively wide transversely extending end portions adapted to be pivotally mounted on the spaced swing hangers, said relatively narrow. centrally disposed, body portion permitting twist of the plank end portions about an axis extending longitudinally of the plank, said end portions each including a downwardly facing, concavely arched, bearing surface that extends transversely of the end portion and is adapted to pivotally receive a base portion of a swing hanger, the plank end portion bearing surfaces and the pivotally engaged base portions of the swing hangers each being formed such that the base portions of the swing hangers are each pivotally engaged along opposite sides of the relatively wide plank end portions and free of engagement with the plank in the region intermediate the sides of the end portions.

18. An integrally formed spring plank adapted to be suspended between a pair of spaced, side frame mounted, swing hangers comprising a member having an elongated relatively narrow, transversely extending centrally disposed, body portion and having relatively wide transversely extending end portions adapted to be pivotally mounted on the spaced swing hangers, said relatively narrow, centrally disposed, body portion permitting twist of the plank end portions about an axis extending longitudinally of the plank, said end portions each including a downwardly facing, concavely arched, bearing surface that extends transversely of the end portion and is adapted to pivotally receive a portion of a swing hanger, the plank end portion bearing surfaces intermediate the opposite sides of the relatively wide end portions having portions thereof removed such that the swing hanger base portions are each pivotally engaged along opposite sides of the relatively wide plank end portions and free of engagement with the plank in the region intermediate the sides of the end portions.

19. An integrally formed spring plank adapted to be suspended between a pair of spaced, side frame mounted, oscillatable swing hangers comprising an elongated member having a relatively narrow, transversely extending centrally disposed, body portion and having relatively wide transversely extending end portions adapted to be pivotally mounted on the spaced swing hangers for movement about axes parallel to the hanger axes, said relatively narrow, centrally disposed, body portion permitting twist of the plank end portions about an axis extending longitudinally of the plank, said end portions each including a downwardly facing, concavely arched, bearing surface that extends transversely of the end portion and is adapted to pivotally receive a base portion of a swing hanger, the plank end portion bearing surfaces intermediate the opposite sides of the relatively wide end portions having portions thereof removed such that the base portions of the swing hangers are each pivotally engaged along opposite sides of the relatively wide end portions and free of engagement with the plank in the region intermediate the sides of the end portions, the end portions each including transversely extending side projections that extend the width of the swing hanger bearing surfaces of the plank member.

WILLIAM VAN DER SLUYS.

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