April 7, 1964 C. J. W. CLASEN 3,127,850

STABILIZED RAILWAY CAR TRUCK

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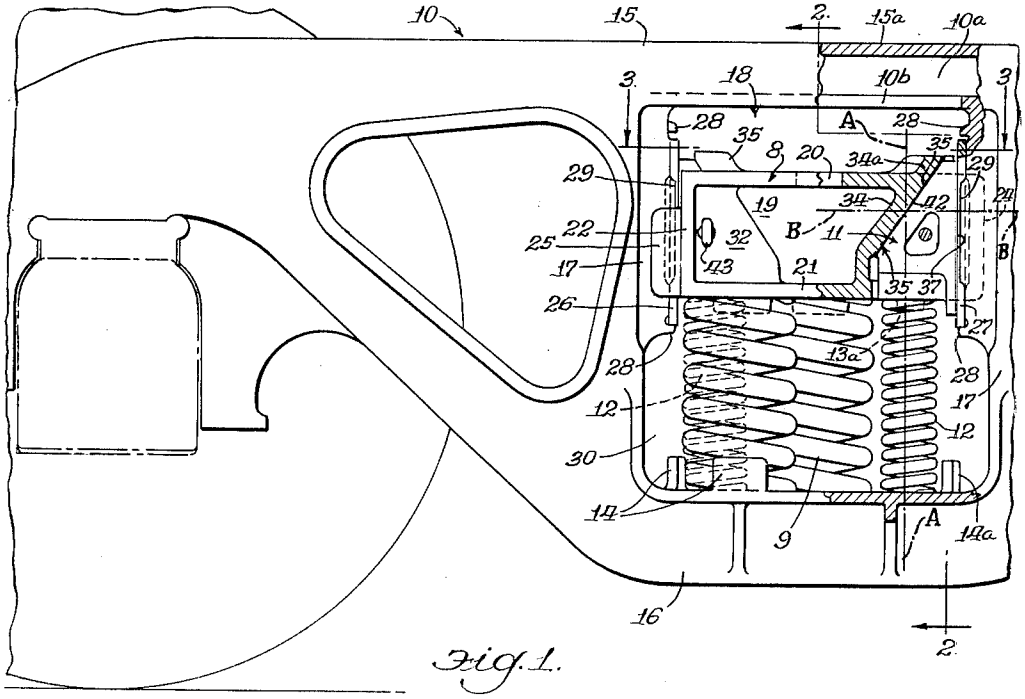


Fig. 1.

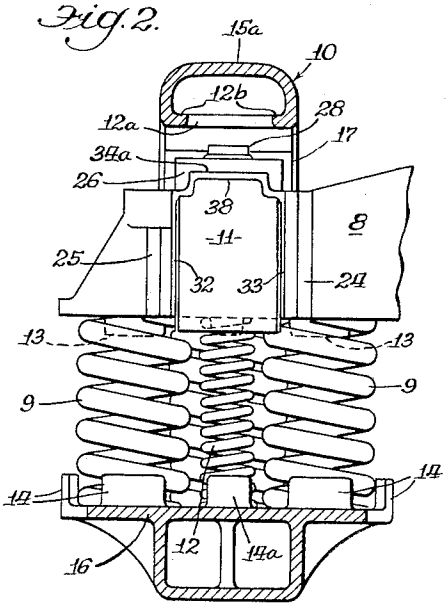


Fig. 2.

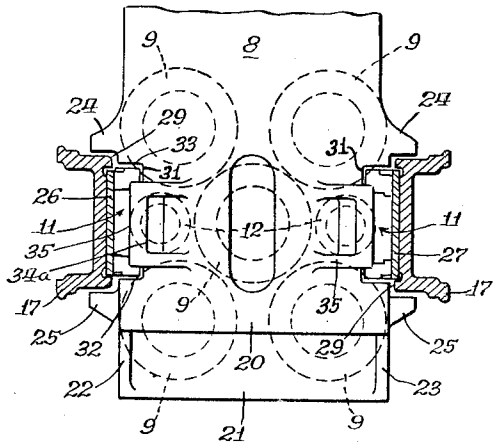


Fig. 3.

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Fig. 4.

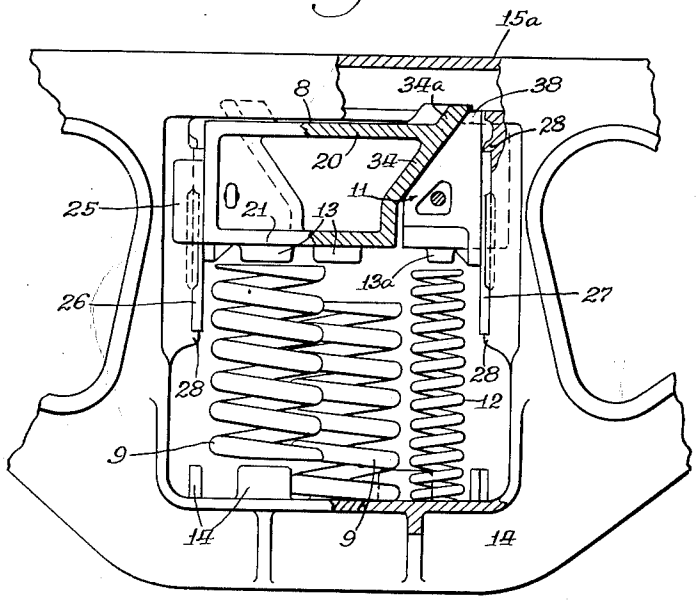


Fig. 6.

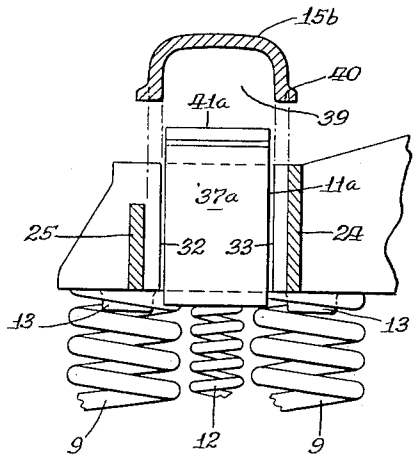
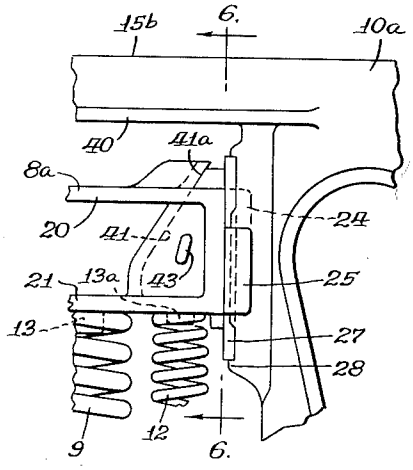


Fig. 5.



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STABILIZED RAILWAY CAR TRUCK

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2 Claims. (Cl. 105—197)

This invention relates to improvements in stabilized trucks for railway cars, especially stabilized trucks of the class in which friction wedges, constituting parts of the truck stabilizing mechanism, are operatively supported in wedge-shaped pockets at opposite sides of a bolster structure of the truck and having sliding frictional contact with wear plates mounted on side frame members of the truck.

In railway car trucks of the above mentioned class, the opposite ends of the truck bolsters extend into openings or windows formed in the truck side frames at opposite sides of the truck and are supported on load springs positioned beneath the bolster ends within the windows. The established clearance requirements for truck side frames are such that, for many types of railways cars, the vertical dimensions of the bolster windows are necessarily limited. This condition operates to correspondingly limit either the vertical thickness of the bolster ends or the length of the springs on which the bolster is supported. In such case, when the bolster ends have vertical thickness sufficient to withstand the stresses normally imposed thereon and "long travel" springs are to be used, for example springs of sufficient length to be deflected 2½" to 3 11/16" under maximum load, it is necessary to elevate the bolster to the extreme tops of the bolster windows to facilitate insertion of the load springs to their operative positions beneath the bolster ends.

In order to provide stabilizing wedges having friction faces of suitable area to provide adequate damping of the "long travel" springs, it has been customary heretofore to utilize wedges having friction faces of the heights equal to or slightly greater than the vertical thickness of the bolster at its ends. In these constructions, the wedge pockets formed in the bolster open through the side walls thereof and also open through the planes of the top and bottom surfaces of the bolster ends. Consequently, the upper end portions of wedges positioned in said pockets protrude from the open upper ends thereof and do not have adequate thrust backing for the end area of their inclined wedging faces. This practice is permissible, since the weight of the car will depress the springs sufficiently to maintain the protruding upper ends of the wedges suitably spaced below the tops of the bolster windows for all operative positions of the bolster.

Because of the limited vertical thickness of the bolster at its ends and the close proximity of these end portions to the tops of the bolster window during the installation of the springs, it was heretofore regarded as impractical to provide thrust or backing supports for the area of the wedge faces which protrude from the upper ends of the wedge pockets. However, the present invention provides improved structure for overcoming the above limitations and thereby distributes the horizontal thrust of the wedges uniformly over the entire area of their friction faces.

According to the present invention, wedge receiving pockets are formed in opposite side walls of the bolster. Each pocket is formed with an inclined inner wall which has a width corresponding substantially to the width of the wedge member positioned therein and projects above the plane of the top wall of the bolster. The said inclined wall, therefore, provides an inclined thrust area substantially equal to that of the engaged portion of the inclined face of the wedge. Accordingly, the large surface areas of the wedging face of the wedge located above and below its horizontal line of maximum thrust against the cooperating surface of the inclined wall of the wedge pocket tends to uniformly distribute the thrust of the wedge over the entire area of the portion of said inclined wall engaged, including the portion thereof which projects above the top face of the bolster. This uniform distribution of thrust eliminates the development of a localized high pressure area in close proximity to the upper end of the inclined wall of the wedge pocket and thereby, as the result of the uniform distribution of the compression force exerted above and below said horizontal line of thrust on the contacted areas of the inclined wall by the hardened metal wedge during downward movements of the bolster, insures uniform wear on the inclined wall of the wedge pocket and on the friction face of the wedge. The said extended wall is preferably rigidified above the top plane of the bolter so as to better resist the lateral thrust imposed thereon by the wedge.

In order to permit the bolster to be elevated to the extreme upper limit of the bolster window and thereby permit insertion or removal of the load spprings and the wedge actuating springs, the portion of the side frame defining the top of the bolster window is formed with a suitable opening therein to temporarily receive the extended wall portions of the wedge pockets together with the upper ends of the wedges associated therewith, when the bolster end is in its elevated position.

Other improvements and advantages of the invention, not at this time enumerated, will become readily apparent as the following description ensues.

A preferred embodiment of the invention is illustrated in the accompanying drawings wherein:

FIG. 1 is a fragmentary side view of the railway car truck side frame together with a truck bolster constructed according to the present invention and assembled in their operative positions; portions of the side frame and the bolster being shown in section to better illustrate the improved constructions;

FIG. 2 is a cross section taken substantially on line 2—2 of FIG. 1;

FIG. 3 is a sectional plan taken along line 3—3 of FIG. 1;

FIG. 4 is a fragmentary sectional view similar to FIG. 1 but showing the improved bolster elevated to the top of its bolster window to facilitate installation of the springs; one of the springs being shown in its partially applied position;

FIG. 5 is a fragmentary view showing, in elevation, modified constructions of the side frame, the bolster, and the wedge elements of a truck assembly; and

FIG. 6 is a fragmentary sectional view taken on line 6—6 of FIG. 5.

Referring to the drawings: the improvements of the present invention are shown embodied in a railway car stabilized truck which comprises, in its general organization, a bolster 8 supported at its opposite ends on load springs 9 seated on side frames 10 of the truck, friction wedges 11 carried by the bolster and frictionally engaging parts of the side frames, and wedge actuating springs 12 on which the wedges 11 are supported. The load springs are maintained in position by upper centering lugs 13 found on the bottom face of the bolster and by lugs 14 found on the frame. There are also similar centering lugs 13*a*, 14*a* associated with the wedge actuating springs 12.

Inasmuch as the opposite sides of the truck herein shown include identical parts, the drawings and the description of the improved constructions and arrangements of parts, for the sake of brevity, will be confined to the constructions and arrangements at one side of the truck; it being understood that a complete truck includes like parts at both sides thereof.

Each side frame 10 comprises a top compression mem-

ber 15, a lower tension member 16, and a pair of spaced apart vertically extending columns 17, 17. These columns connect the said compression and tension members at opposite sides of their transverse centers and cooperate with said members to define a window opening 18 for receiving a box end portion 19 of the bolster 8. The compression and tension members 15 and 16 converge toward their extremities and are united with each other to provide a unitary pedestal portion 20. Guide columns 22, 22 depend from the portion 20 into embracing engagement with opposite side faces of a journal bearing housing shown in dotted lines in FIG. 1. The specific form of journal bearing housing and the specific form of attachment of the side frame 10 therewith are not important insofar as the principal improvements herein shown are concerned. Obviously the journal bearing housing may be of any conventional shape and the terminal ends of the frame 10 can be cast integrally with such housing in accordance with conventional practice. In fact, the construction of said frame 10 may follow conventional practice except in respect to the portion designated 15*a* which defines the top of the window opening 18. This portion of the frame is formed with one or more openings 10*a* in its bottom face adapted, during conditions hereinafter described, to temporarily receive portions of the bolster 8 and also portions of the friction wedges 11. In the drawings, a single opening 10*a* is shown and the said portion 15*a* of the frame is therefore a channel configuration in cross-section, the lower edges of the side walls being turned inwardly as indicated at 10*b* to rigidify the structure.

The box end portion 19 at opposite ends of the bolster 8 projects into an associated bolster window 18 in an adjacent side frame. Each box end portion includes top and bottom walls 20, 21 and forward and aft side walls 22, 23, the latter of which are each provided with inboard and outboard guide lugs 24, 25 which embrace the inboard and outboard side faces, respectively, of the vertically extending column 17, 17 of the frame 12. Wear plates 26, 27 of hardened steel are interposed between the wedges 11, 11 and the vertical columns 17, 17 of the side frame, the wear plates being suitably secured by welding or other means to the opposed inner faces of the said vertical columns. The said wear plates are maintained properly centered on the said column 17, 17 by means of upper and lower parapet lugs 28, 28 formed on the columns and by similar side lugs 29, 29. The said lugs also function as retainers to prevent the loss of a wear plate in the event that it becomes separated from its associated column 17.

In order to facilitate the assembly of a bolster end 19 in a side frame 10 of a truck, the lower portion 30 of the bolster window 18 (FIG. 1) is made of sufficient width to permit the outboard lugs 25, 25 on the bolster to pass therethrough. Preferably, the upper ends of the lugs 25, 25 stop short of the top face of the bolster so that the enlarged portion 30 of the bolster window 18 may be made of minimum height.

After the outboard lugs 25, 25 clear the outer faces of the columns 17, 17, the bolster may be elevated to the top of the window 18 (see FIG. 4) so as to provide sufficient distance between the upper and lower centering lugs 13, 14 and 13*a*, 14*a* to permit the upper and lower ends of the springs 9 to pass between said lugs 13, 14 as shown in FIG. 4, and to permit the springs 12 to clear their associated centering lugs. The springs 9, as illustrated in the drawings, are so-called "long travel" springs, since they have capacity for a maximum compression travel of 2½" to 3 11/16" under maximum load. They are shown compressed in FIGS. 1 and 2 to substantially the positions which they assume when they are subjected to the weight of an empty car. With this compression of the springs, it will be observed that there is a substantial clearance between the top face 20 of the bolster and the top of the bolster window 18. However, when the said springs are free of compression their extended lengths are such that it is necessary to elevate the bolster 8 to the top of the bolster window 18, as shown in FIG. 4, to permit the springs to be installed.

The wedges 11, 11 of the stabilizing mechanism are housed in pockets 31, 31 formed integrally with the side walls 22, 23 of the bloster. Each pocket opens outwardly toward an adjacent wear plate 26 or 27 and also opens through the planes of the top and bottom faces 20, 21 of the bolster. Each said pocket is defined by perpendicular opposed side walls 32, 33 and an upwardly and outwardly inclined wall 34. The said opposed walls 32, 33 terminate at the plane of the top surface of the upper wall 20 of the bolster and function as flat guide surfaces for the opposite sides of the wedge 11 positioned in the pocket. The inclined wall 34 provides a flat face 35 extending the entire width of the pocket and provides an inclined backing or thrust surface of substantial area for the entire width of an inclined face 36 of the associated wedge 11. While the perpendicular walls 32, 33 of the said pockets terminate at the plane of the upper face of the top wall 20 of the bolster, inclined wall 34 projects a substantial distance above the top wall 20 of the bolster as shown at 34*a* and is rigidified by reinforcing flanges 35 shown best in FIGS. 1 and 2. The extension 34*a* together with its rigidifying flanges 35 project into the opening 10*a* of the side frame when the bolster is elevated to the position shown in FIG. 4 of the drawing. This construction makes it practical to provide adequate backing for the upper end portions 36 of the wedges 11 which protrude from the upper ends of the pockets 31.

The wedges are provided, in each case, with an upwardly and outwardly inclined face 36 which wedgingly engages the correspondingly inclined wall 34 of its associated pocket 31. Each such wedge has an overall length somewhat greater than the distance between the planes of the top and bottom walls 20, 21 of the bolster so as to provide it with a friction face 37 of suitable area to adequately damp long travel springs 9. This is made practical, since the extended portion 34*a* of the pocket wall 34 provides adequate backing for the upper end portion 38 of the associated wedge and thereby insures uniform distribution of the thrust of the wedge against the entire area of the wall 34—34*a* and thereby effects uniform distribution of frictional pressure of the entire area of the friction face 37, including the end portion 38 against the wear plate 26 or 27, as the case may be.

It will be observed that the upper ends 38 of each wedge, as shown in FIGS. 1 to 4, inclusive, is of reduced width. This construction makes it practical to form the lower portion of the friction face 37 of the wedge of maximum width and at the same time permit the upper portion 38 of the wedge to move into the opening 10*a* of a side frame of current transverse thickness.

According to the modification shown in FIGS. 5 and 6 of the drawings, the maximum width of each wedge 11*a* extends through the entire height of the friction faces 37*a* thereof and thereby provides the friction face 37*a* with greater area than the friction face 37 shown in FIGS. 1 to 4, inclusive. The interior of the portion 15*b* of the frame shown in FIGS. 5 and 6 may be of the same width as the portion 15*a* shown in FIG. 2, but the effective width of the opening designated 39 in FIG. 6 is somewhat greater than the opening 10*a* of FIG. 2. This result is obtained by forming the side walls of the portion 15*b* of the frame member with lateral rigidifying beads 40 which project outwardly from the side walls of the frame adjacent the opening 39.

The inclined inner wall of each wedge pocket 31*a* of the modified bolster 8*a* shown in FIGS. 5 and 6 is designated 41 and projects above the top of the bolster as indicated at 41*a*. This extended portion of the wall is of the same width as the width of the pocket and thereby provides a thrust surface that has greater area than the projecting portion 34*a* of the wall 34 shown in FIGS. 1 to 4,

inclusive. In other respects, the elements of the truck assembly shown in FIGS. 5 and 6 may be the same as shown in FIGS. 1 to 4, inclusive.

The said wedge actuating springs **12** cooperate with the inclined walls of the wedge pockets to press the wedges laterally into frictional engagement with the wear plates **26, 27**. The said springs **12**, it will be observed, are seated within the bolster window on the lower tension member **16** of the truck frame. Consequently they exert progressively increasing force against the wedges **11** during downward movement of the bolster **8** and therefore exert damping force on the load springs **9** in proportion to the weight of the cargo and the amplitude of the compression of said springs.

The composition of the wedges **11** is somewhat harder than the metal of the walls **34** of the wedge pockets, but the compression of the metal in the latter, incident to the horizontal thrust of the wedges, is minimized by reason of the increased area of contact provided by the extensions **34***a* of said inclined walls. It will be also observed that the center line A of each wedge spring **12** intersects the inner face of the inclined wall **34** of a wedge pocket at a location substantially midway between the upper and lower extremities of the wall **34** and thereby establishes the horizontal line B of maximum lateral thrust of the wedge against said point of intersection and divides the inner face of said inclined wall into substantially equal bearing areas above and below said line B of horizontal thrust of said wedge. This construction, therefore, insures substantially equal distribution of the wedging pressure against the wall **34** at locations above and below the said horizontal thrust line B and consequently insures uniform distribution of wear on the friction face **37** of the wedge. However, the hardness of the metal of the wedges **11** is less than the hardness of the wear plates **26, 27**. Consequently the wear-down or thinning of the wedges **11** permits them to move upwardly in the pockets. This condition shifts the center line of the spring thrust through the wedge since the wedge moves slightly outwardly from the initial position indicated at **42** in FIG. 1, but because of the extension **34***a* of the wall **34** the said point of spring thrust will always remain substantially below the upper end of the extended wall **34**. Consequently there will be no appreciable tilting of the wedges in a manner to concentrate the wedging pressure on small localized areas in the region of the upper end of the wall **34**. On the contrary the extension **34***a* provides adequate bearing area to prevent such tilting of the wedge and the resultant compression of the metal in the wall **34** of the wedge pocket.

When the wedges **11** are inserted into the pockets **31** they are retained loosely therein by means of a cotter key **43**. These keys extend through opposite side walls **32, 33** of the wedge pockets **31** and through relatively large openings **44** through the wedges so as to permit adequate movement of the wedges in the wedge pockets but will retain the wedges therein when the springs **12** are removed.

I claim:

1. A stabilized car truck including a side frame having a bolster window therein, a bolster having a box end portion projecting into said window and formed with a wedge-shaped pocket which opens through one side face and through the top and bottom walls of said box end portion and is defined by parallel side walls and a rear wall having an upwardly and outwardly inclined portion which extends above and below the top wall of the bolster, load springs interposed between the bolster and a subjacent portion of said frame to support the bolster, each load spring being of such length that it can be installed, when free of compression, only when the bolster is elevated to the top of the window, means for damping the vertical oscillations of said load springs comprising a wedge positioned in said pocket and having an inclined face in wedging engagement throughout its length at all times with the inclined portion of the rear wall of said pocket including the portion thereof extending above the top wall of the bolster and having also a vertical face frictionally engaging an opposing vertical face of the side frame, and a wedge supporting helical spring reacting between said wedge and a subjacent portion of the side frame; the said wedge spring being so arranged that its longitudinal axis intersects the midpoint of said inclined face of the wedge, whereby the horizontal thrust of the wedge is substantially uniformly distributed to areas of the inclined wall at locations above and below said midpoint of said inclined face of the wedge to prevent turning of the wedge in said pocket and thereby insure uniform wear on the bolster and on the friction face of the wedge, and the portion of the frame defining the top of the bolster window being formed with an opening for receiving the upper end portion of the wedge and the extended upper end portion of the inclined rear wall of said pocket when the bolster is elevated to the upper end of the bolster window.

2. A stabilized car truck according to claim 1 wherein the entire area of said inclined wall of said wedge receiving pocket, including the portion thereof which projects above the top wall of the bolster, constitutes a continuous flat thrust surface corresponding in width to the width of the wedge pocket.

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