Sept. 6, 1938. A. C. DAVIDSON 2,129,408

TRUCK STABILIZER

Filed July 2, 1936 2 Sheets-Sheet 1

FIG. 1

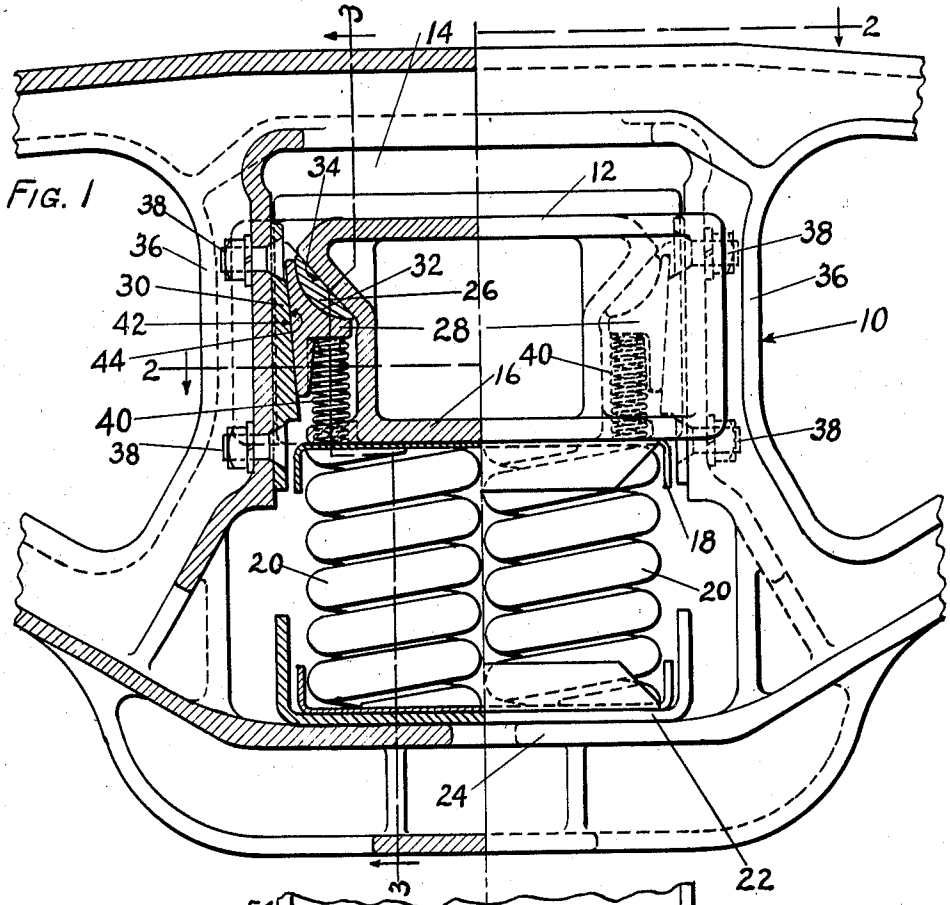

FIG. 2

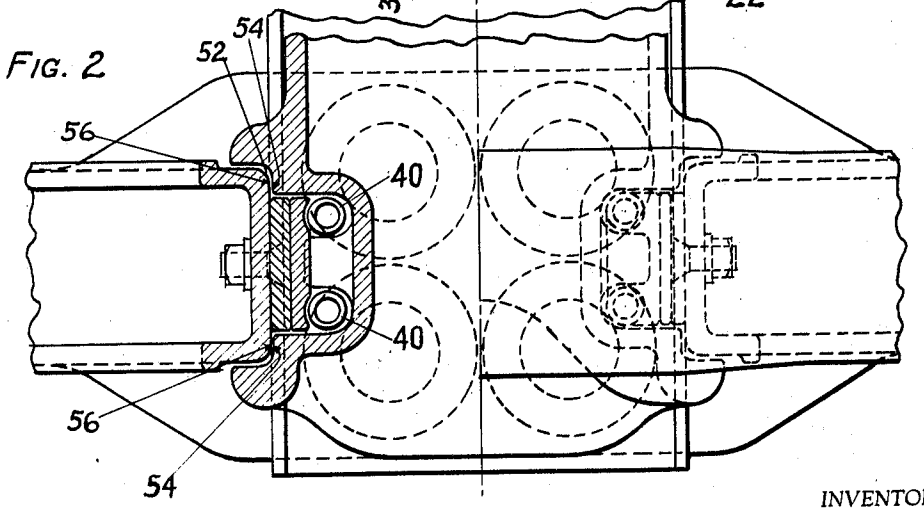

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FIG. 3

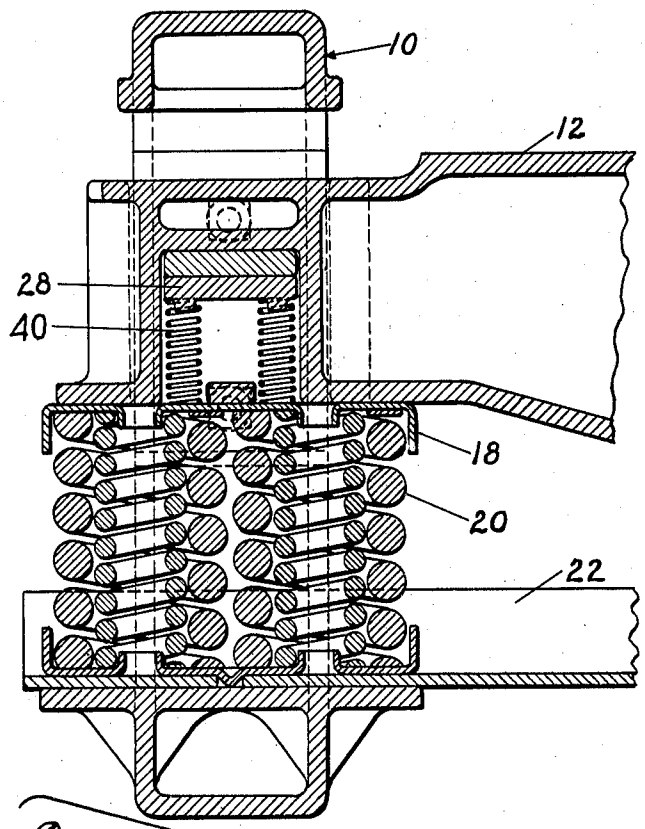
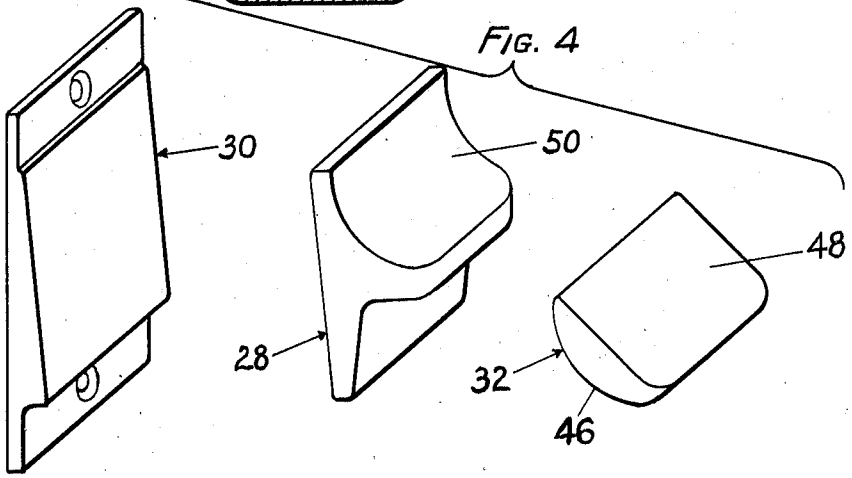


FIG. 4



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Patented Sept. 6, 1938 2,129,408

UNITED STATES PATENT OFFICE

2,129,408

TRUCK STABILIZER

Arthur C. Davidson, Chicago, Ill.

Application July 2, 1936, Serial No. 88,560

12 Claims. (Cl. 105—193)

This invention relates generally to truck stabilizing mechanisms, and more particularly to improvements in mechanisms, for counteracting vertical vibrations to which railroad car bodies are subjected.

As railroad car bodies travel over relatively rough track at various speeds, the trucks thereof are subjected to considerable vertical vibration. Unless means is provided for "breaking-up" or "ironing out" the aforesaid vertical oscillations or vibrations, the car body will experience very rough travel. It is the primary object of the present invention to provide improved means of simple and durable construction for overcoming difficulties heretofore experienced in the travel of car bodies over relatively rough trackage. To this end I propose to provide in combination with a car truck a stabilizing device which is more simple in design and more economical to produce than stabilizing devices which have heretofore been commercially employed by railroads.

It is an important object of the present invention to provide a stabilizing device, as set forth above, which may be attached to any standard railroad equipment, and which will require only one change in such equipment, namely a slight change in the end construction of the bolster.

It is also an object of the present invention to provide a stabilizer which is self-adjustable to accommodate any normal variation in the spacing and alinement such as occurs normally in the manufacture of side frame castings, and, to accomplish this, I propose to provide a new and improved spring and wedge arrangement.

My invention also contemplates the provision of a stabilizer device, the operating effectiveness of which will not be impaired as a result of any weaving or twisting action of the bolster relative to the side frame.

Still more specifically, my invention contemplates a wedge and chafing plate arrangement in combination with the bolster, wherein the inclination of the contacting surfaces of said parts with respect to the direction of imposed vibrations is such as to make for maximum efficiency in breaking up harmonics or vibrations to which the car truck is subjected.

The foregoing and numerous other objects and advantages will be more apparent from the following detailed description when considered in connection with the accompanying drawings, wherein—

Figure 1 is a fragmentary side elevational view of a truck side frame in the vicinity of the bolster, a portion of the bolster and a portion of the side frame positioned in the vicinity thereof being shown in section to more clearly illustrate the disposition of my improved wedge and chafing plate structure;

Figure 2 is a plan view of the device shown in Figure 1 with the left portion thereof shown in section, said view being taken along the line 2—2 of Figure 1;

Figure 3 is a vertical transverse sectional view taken substantially along the line 3—3 of Figure 1; and

Figure 4 is an exploded view of the elements which constitute the wedge and chafing plate structure.

Referring now to the drawings wherein I have employed like numerals to designate similar parts throughout the various figures, it will be seen that my invention is illustrated in combination with a side frame designated generally by the numeral 10, and a bolster 12, the outer end of which extends within a chamber or recess 14 within the side frame. Each truck comprises a pair of side frames and a bolster extending between said side frames, and, inasmuch as the same mounting structure is employed at each end of the bolster, a disclosure of one end of said bolster will be sufficient for a clear understanding of the present invention.

The lower frame section 16 of the bolster 12 rests upon a suitable plate or apron 18 which, in turn, is supported by heavy coiled bolster springs 20. The lower extremities of these coiled springs 20 rest upon a suitable spring plank or plate 22, which is supported directly by the lower section 24 of the side frame 10. Thus forces tending to urge the bolster 12 downwardly are yieldably resisted by the heavy duty coiled springs 20. It has been found in practice that the mere provision of these coiled springs alone will not sufficiently dampen the vibrations experienced by the bolster.

The means for checking or dampening vibrations set up by the reaction of the bolster springs comprises a dampening mechanism designated generally by the numeral 26, which mechanism includes a wedge 28, a chafing plate 30, and an adjusting block 32 interposed between the wedge 28 and an inclined surface 34 of the bolster 12. These mechanisms 26 are provided in pairs, one being positioned on each side of the end of the bolster positioned within the chamber 14. The chafing plates 30 are suitably secured to vertical sections 36 of the side frame 10 as by means of suitable bolts 38. Interposed between the underside of each wedge member 28 and the upper surface of the plate or apron 18 is a pair of coiled

springs 40, which are considerably lighter in construction than the heavy duty bolster springs 20.

Particular attention is directed to the fact that the complementary friction surfaces of each wedge member 28 and chafing plate 30, namely the surfaces 42 and 44, respectively, are slightly inclined with respect to a vertical plane. In fact, this inclination is preferably not greater than 15 degrees. It should also be noted that the lighter coiled springs 40 are not interposed between the wedge members 28 and the side frame 10, but are interposed between said wedge members 28 and the plate 18 supported at the upper extremity of the bolster springs 20. This arrangement of the springs combined with the inclined disposition of the complementary surfaces 42 and 44 provides a most effective dampening means for preventing the transmission of deleterious jars or vibrations to the car body.

It will be apparent from the foregoing description that the springs 40 positioned beneath the wedge members 28 are placed under compression when the bolster 12 occupies its normal position as shown in Figure 1. As the bolster travels downwardly, forces are set up by the gradual slope or inclination of the complementary friction surfaces 42 and 44, which cause the wedge members 28 to move downwardly and inwardly with respect to the bolster. This combined inward and downward movement of the wedge members 28 is yieldably resisted by the coiled springs 40. Therefore, it will be apparent that the amount of travel experienced by the wedge members 28 and the springs 40 therebeneath is only a fraction of the entire vertical movement or travel experienced by the bolster 12. Thus forces acting downwardly against the wedge members set up frictional resistance between the slightly inclined friction surfaces 42 and 44, and, due to the slight inclination of said surfaces with respect to the vertical, the springs 40 may be considerably lighter than the corresponding springs which have heretofore been employed in combination with chafing plates having friction surfaces in absolute parallelism with the vertical. In other words, if the complementary friction surfaces 42 and 44 were absolutely vertical, a spring having considerably greater capacity or strength than the springs 40 would necessarily be employed. However, this slight inclination, as aforesaid, sets up increased resistances, with a consequent requirement for less yieldable resistance by the springs positioned beneath the wedges, and the resulting structure makes for increased efficiency in ironing out undesirable harmonics or vibrations.

Each adjusting block or shoe 32 is provided with an arcuate surface 46 oppositely disposed from a bearing surface 48, which is complementary to the inclined surface 34 on the bolster 12. The arcuate surface 46 rests within a complementary arcuate surface 50 in the wedge member 28 (Figure 4). These arcuate surfaces 46 and 50 permit the shoe 32 to rock within the wedge 28 and thus render said wedge self-adjustable to any normal variation in the spacing and alinement, such as occurs in the normal manufacture of the side frame castings. Should the inclination of the surfaces 34 slightly vary, the shoes 32 automatically adjust themselves to accommodate such variations. In instances where this self-adjustment feature is not required, the use of the blocks or shoes 32 may be dispensed with and the wedge member 28 designed to directly engage the surface 34. Attention is directed to the fact that suitable clearance 52 (Figure 2) is provided between the bolster and side frame structures to accommodate relative movement of these parts. In the present embodiment of my invention I have shown a bolster and side frame construction wherein no auxiliary means is provided to permit of lateral motion between the bolster and side frames transversely of the truck. Where it is desired to use means for permitting of such lateral motion, this may be employed. The present invention, however, is not concerned with the question of lateral motion, but rather with the matter of compensating for vertical vibrations experienced by the car truck.

From the foregoing it will be apparent that my invention contemplates the provision in combination with the bolster, bolster spring, and side frame structure, of an effective stabilizing means. The slight inclination of the wedge means and complementary chafing surface, coupled with the fact that the wedge means or member is adapted to move both downwardly and inwardly, presents a very effective mechanism for ironing out harmonics. Were it not for the fact that the wedge means could move inwardly as well as downwardly, this relatively slight inclination might cause the complementary friction surfaces to bind or freeze. However, this difficulty is positively precluded by providing a wedge means which moves inwardly and downwardly against the yieldable resisting force of the springs 40. By having the springs 40 interposed between the bolster spring structure and the wedge, the utmost efficiency in operation is obtained.

Referring to Figure 2, it will be seen that the bolster 12 is provided with shoulders 54 which are adapted to engage the adjacent sections or shoulders 56 of the side frame 10. If, for example, the emergency brakes are suddenly applied to the car equipped with the aforementioned stabilizer, resulting in a tendency for the bolster 12 to shift longitudinally of the car, the stabilizer means 26 would be subjected to a severe load, were it not for the presence of the co-acting shoulders or stops 54 and 56. Under normal operating conditions the space or clearance 52 is maintained between the shoulders 54 and 56 as clearly shown in Figure 2, but if the bolster is shifted longitudinally of the car sufficient to take up this clearance, said shoulders will then engage each other. In addition to preventing excess loads to be applied to the stabilizer means 26, the presence of the shoulders or stops 54 or 56 also prevent excess movement to be experienced by the wedge member 28.

The presence of the adjustable shoe or block 32 also compensates for any weaving or twisting action of the bolster relative to the side frame.

Obviously the invention is not limited to the specific structural features disclosed herein, but contemplates further modifications and changes without departing from the spirit and scope of the appended claims.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:

1. In combination with a bolster, said bolster having an inclined friction surface, a bolster spring, and side frame, stabilizing means cooperatively arranged with the bolster including means on said side frame providing a chafing surface slightly inclined from the vertical with respect to the side frame, wedge means having a complementary surface engaging said chafing surface and cooperatively disposed with respect to

said inclined friction surface, said wedge means being adapted to be forced downwardly and laterally with respect to the bolster in response to downward movement experienced by the bolster, and resilient means cooperatively arranged with respect to said wedge means and the bolster spring to yieldably resist downward movement of said wedge means.

2. In combination with a bolster, said bolster having an inclined friction surface, a bolster spring, and side frame, stabilizing means cooperatively arranged with the bolster including means on said side frame providing a chafing surface slightly inclined from the vertical with respect to the side frame, wedge means having a complementary surface engaging said chafing surface and cooperatively disposed with respect to said inclined friction surface, said wedge means being adapted to be forced downwardly and laterally in response to downward movement experienced by the bolster, and resilient means cooperatively arranged and interposed between said wedge means and the bolster spring structure to yieldably resist downward movement of said wedge means.

3. In combination with a bolster, said bolster having an inclined friction surface, a bolster spring, and side frame, stabilizing means cooperatively arranged with the bolster including means on said side frame providing a chafing surface inclined from the vertical with respect to the side frame an amount not to exceed fifteen degrees, wedge means having a complementary surface engaging said chafing surface and cooperatively disposed with respect to said inclined friction surface, said wedge means being adapted to be forced downwardly and laterally with respect to the bolster in response to downward movement experienced by the bolster, and resilient means cooperatively arranged with respect to said wedge means and the bolster spring to yieldably resist downward movement of said wedge means.

4. In combination with a bolster, a bolster spring, and side frame, stabilizing means cooperatively arranged with the bolster including means providing a chafing surface slightly inclined from the vertical with respect to the side frame, wedge means having a complementary surface engaging said chafing surface, said bolster having a section provided with an inclined bearing surface for resting upon said wedge means, said wedge means being adapted to be forced downwardly and laterally in response to downward movement experienced by the bolster, and resilient means cooperatively arranged with respect to said wedge means and the bolster spring to yieldably resist downward movement of said wedge means.

5. In combination with a bolster, said bolster having an inclined friction surface, a bolster spring, and side frame, stabilizing means cooperatively arranged with the bolster including means on said side frame providing a chafing surface slightly inclined from the vertical with respect to the side frame, wedge means including a member having a complementary surface engaging said chafing surface and cooperatively disposed with respect to said inclined friction surface and an adjustable member adapted to accommodate itself to the position occupied by the bolster structure, said wedge means being adapted to be forced downwardly and laterally with respect to the bolster in response to downward movement experienced by the bolster, and resilient means cooperatively arranged with respect to said wedge means and the bolster spring to yieldably resist downward movement of said wedge means.

6. In combination with a bolster, said bolster having an inclined friction surface, a bolster spring, and side frame, stabilizing means positioned on opposite sides of said bolster including means on said side frame providing a chafing surface slightly inclined from the vertical with respect to the side frame, wedge means having a complementary surface engaging said chafing surface and cooperatively disposed with respect to said inclined friction surface, said wedge means being adapted to be forced downwardly and laterally with respect to the bolster in response to downward movement experienced by the bolster, and resilient means cooperatively arranged with respect to said wedge means and the bolster spring to yieldably resist downward movement of said wedge means.

7. In combination with a bolster, said bolster having an inclined friction surface, a bolster spring, and side frame, stabilizing means cooperatively arranged with the bolster including means on said side frame providing a chafing surface slightly inclined from the vertical with respect to the side frame, wedge means having a complementary surface engaging said chafing surface and cooperatively disposed with respect to said inclined friction surface, said wedge means being adapted to be forced downwardly and laterally with respect to the bolster in response to downward movement experienced by the bolster, and resilient means including a coil spring structure cooperatively arranged with respect to said wedge means and the bolster spring to yieldably resist downward movement of said wedge means.

8. In combination with a bolster, said bolster having an inclined friction surface, a bolster spring, and side frame, stabilizing means cooperatively arranged with the bolster including a chafing plate secured to said side frame and providing a chafing surface slightly inclined from the vertical with respect to the side frame, wedge means having a complementary surface engaging said chafing surface and cooperatively disposed with respect to said inclined friction surface, said wedge means being adapted to be forced downwardly and laterally in response to downward movement experienced by the bolster, and resilient means cooperatively arranged with respect to said wedge means and the bolster spring to yieldably resist downward movement of said wedge means.

9. In combination with a bolster, said bolster having an inclined friction surface, a bolster spring, and side frame, stabilizing means cooperatively arranged with the bolster including means on said side frame providing a chafing surface slightly inclined from the vertical with respect to the side frame, wedge means having a complementary surface engaging said chafing surface and cooperatively disposed with respect to said inclined friction surface, said wedge means being adapted to be forced downwardly and laterally in response to downward movement experienced by the bolster, resilient means cooperatively arranged with respect to said wedge means and the bolster spring to yieldably resist downward movement of said wedge means, and abutment means for enabling engagement of the bolster and side frame structures to prevent excessive loads to be experienced by said wedge means.

10. In combination with a bolster, said bolster having an inclined friction surface, a bolster spring, and side frame, stabilizing means cooperatively arranged with the bolster including means on said side frame providing a chafing

surface slightly inclined from the vertical with respect to the side frame, wedge means including a member having a complementary surface engaging said chafing surface and an adjustable member having an arcuate surface engaging said wedge member and another bearing surface engaging said inclined friction surface of the bolster structure, said wedge means being adapted to be forced downwardly and laterally in response to downward movement experienced by the bolster, and resilient means cooperatively arranged with respect to said wedge means and the bolster spring to yieldably resist downward movement of said wedge means.

11. In combination with a bolster, said bolster having an inclined friction surface, a bolster spring, and side frame, stabilizing means cooperatively arranged with the bolster including means on said side frame providing a chafing surface slightly inclined from the vertical with respect to the side frame, wedge means having a complementary surface engaging said chafing surface and cooperatively disposed with respect to said inclined friction surface, said wedge means being adapted to be forced downwardly and laterally in response to downward movement experienced by the bolster, a support member carried by the upper extremity of the bolster spring, and resilient means interposed between said support member and said wedge means to yieldably resist downward movement of said wedge means.

12. In combination with a bolster, said bolster having an inclined friction surface, a bolster spring, and side frame, stabilizing means cooperatively arranged with the bolster including means on said side frame providing a chafing surface slightly inclined from the vertical with respect to the side frame, wedge means having a complementary surface engaging said chafing surface and cooperatively disposed with respect to said inclined friction surface, said wedge means being adapted to be forced downwardly and laterally in response to downward movement experienced by the bolster, a support member carried by the upper extremity of the bolster spring, and resilient means including a pair of spring members interposed between said support member and said wedge means to yieldably resist downward movement of said wedge means.

ARTHUR C. DAVIDSON.