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BOLSTER WITH ABSORPTION MECHANISM

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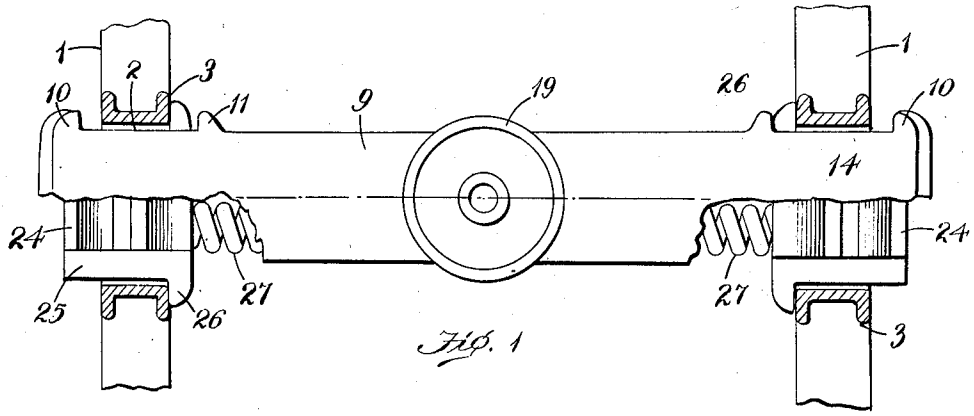


Fig. 1

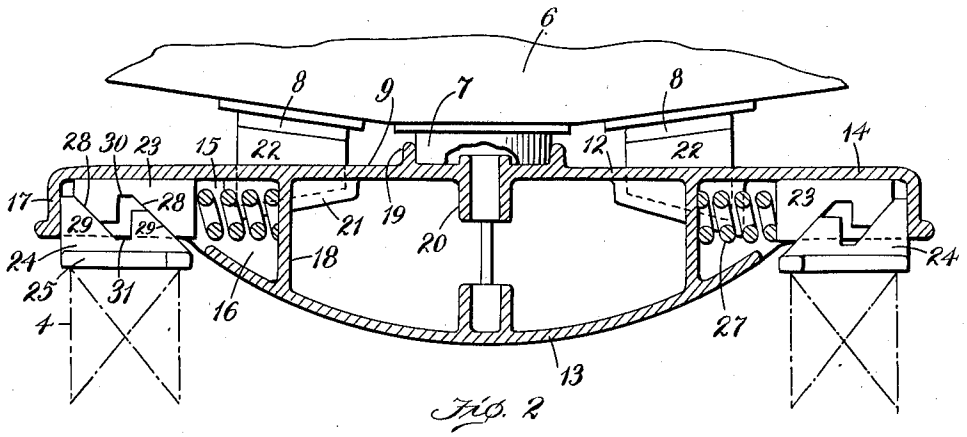


Fig. 2

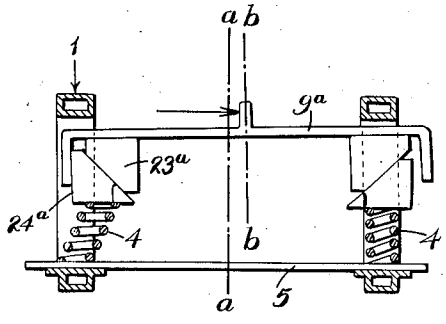


Fig. 3

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BOLSTER WITH ABSORPTION MECHANISM.

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The invention relates to bolster construction for railway car trucks and has special reference to absorption mechanism.

The principal object of the invention, generally stated, is to provide a railway car truck with a bolster embodying not only vertical but also lateral absorption means, both of which will operate and cooperate to counterbalance or neutralize any tendency of the car to develop side sway, car roll or other undesirable action under any and all conditions in service.

An important object of the invention is to provide a bolster structure of this character in which the absorption mechanism will perform the additional function of effecting elevation of the outer end of the bolster when lateral motion thereof occurs from any cause as for instance when passing over curved track, the structure thus accomplishing an automatic banking action which will offset any tendency of the car to develop side sway or roll as the result of the outward swing at a curve with the consequent inward recoil.

A more specific object of the invention is to provide a bolster of this character having a combination of resilient and friction producing means constituting the absorption mechanism which will cushion a sudden downward thrust and therefore relieve the side frames and other truck parts of undue strain resulting from an excess load at either end of the bolster such as might result, for example, from passage of the wheels over a low spot in the rail.

A further object of the invention is to provide a bolster structure of this character in which the combined spring and friction producing means will operate to cushion not only the downward thrusts above described but also the lateral motion of the bolster so that at no time will there occur any severe shocks such as might cause injury to any of the truck parts.

Still another object of the invention is to provide a bolster of this type unprovided with lateral motion rollers such as are commonly used, the bolster supporting springs located within the side frames being capable of sufficient rocking movement or distortion to accommodate the lateral motion of the bolster, the natural tendency of the springs to right themselves being sufficient to return the parts to normal or straight track position after the cessation of the forces causing the bolster to move laterally.

Still another object of the invention is to provide a bolster having these desirable characteristics and which may be installed as a replacement part within a truck of standard pattern without involving any alterations or modifications in the structure thereof.

An additional object is to provide a bolster of this type which will be comparatively simple and inexpensive to manufacture, easy to install, positive in action, efficient and durable in service, and a general improvement in the art.

To the attainment of the foregoing and other objects and advantages, the invention preferably consists in the details of construction and the arrangement and combination of parts to be hereinafter more fully described and claimed, and illustrated in the accompanying drawing in which:

Figure 1 is a plan view, partly broken away, of a truck bolster constructed in accordance with my invention, the bolster wear columns of the side frames being shown in section,

Figure 2 is a vertical longitudinal section through the bolster constructed in accordance with my invention, and

Figure 3 is a diagrammatic view illustrating the action when lateral motion of the bolster occurs.

Referring more particularly to the drawing the numeral 1 designates fragments of the side frames of a truck which may be of any ordinary or preferred type inasmuch as it forms no part of the present invention. These side frames are ordinarily formed with window openings 2 defined between bolster wear columns 3, the windows being provided for the reception of the end portions of whatever truck bolster forms part of the truck. Within the lower portions of the window openings are provided suitable springs or nests of springs, indicated at 4, for supporting the load imposed upon the bolster, these springs in turn being suitably mounted upon a spring plank 5, illustrated only in Figure 3, which forms part of the regular equipment.

The numeral 6 designates a portion of the car body bolster which is provided at its underside with a depending center plate 7 at opposite sides of which are depending bearing elements 8 for cooperation with

whatever side bearings may be provided, if any, on the truck bolster. Up to this point there is nothing distinctive or novel disclosed as the parts described are all well known and form part of standard equipment.

In carrying out the present invention I provide a bolster indicated generally by the numeral 9, this bolster being of the usual size and shape in many particulars in order that it may be used to replace one of conventional type without necessitating changes in the construction of the side frames or other truck parts. The bolster is of hollow construction, as is customary, and the end portions have laterally projecting lugs 10 spaced, normally, outwardly beyond the outer faces of the columns 3, the spacing being determined by the contemplated extent of lateral motion of which the bolster may be capable in service. These lugs 10 are of course intended to engage against the columns so as to limit the lateral motion. Inwardly of the ends, the opposite sides of the bolster are formed or otherwise provided with other stop lugs 11 which are normally spaced inwardly an appreciable distance from the inner faces or confronting faces of the columns 3. It is preferable that the arrangement of the lugs 10 and 11 be such that when the lugs 10 at one end are in engagement with the associated columns the lugs 11 at the opposite end will be in engagement with the other columns, the strain developed when these limiting stops come into play being thus distributed.

The bolster is here shown as having a relatively tall or deep central portion and as having a straight top wall 12 and a downwardly curved bottom wall 13, the straight top being probably immaterial but the curved bottom being of importance inasmuch as it provides a truss structure which will possess great strength and rigidity. The end portions 14 are preferably comparatively shallow and are formed with compartments 15 defined between the sides 16, the outer ends 17 and transverse webs or partitions 18 located a considerable distance inwardly from the ends, these compartments or pockets containing the absorption mechanism to be described. At the center of the top 12 I have shown the bolster as provided with a center bearing 19 receiving the center plate 7 and the top and bottom walls are both shown as provided with sleeve-like guides 20 adapted to receive the usual king pin, not shown, though it is conceivable that such might be omitted if preferred. In the present instance the top is also represented, at least in Figure 2, as having bearing recesses or pockets 21 within which are received side bearing rollers 22 cooperating with the bearing elements 8 depending from the body bolster.

Located within the respective compartments 15 are upper and lower wedge members 23 and 24 forming part of the absorption mechanism, the former being entirely enclosed within the compartments and the latter being provided at their bottoms with plate or seat portions 25 resting upon the truck springs 4. The plate or seat portions 25 are of such width as to be received within the window openings 2 and of such length as to project beyond the outer and inner faces of the columns 3. At their inner ends, the plate or seat portions 25 are formed at one or more corners with lateral lugs 26 which overlap the columns 3 and which are normally in engagement therewith. Clearly, outward movement of the members 24 is thus prevented while inward movement, under conditions to be described, is possible.

The wedge members 23 and 24 may be of more or less block-like form and the former are urged outwardly toward the bolster ends 17 by resilient means such as the coil springs designated by the numeral 27. In the present instance the coacting wedge members are represented as each having a plurality of inclined surfaces which are in constant engagement. The surfaces on the members 23 are designated by the numeral 28 while those on the members 24 are indicated at 29. The intermediate portions of these wedge members are of course cut away as at 30 and 31 to permit the necessary relative movement which occurs in service.

In the diagrammatic view, Figure 3, the wedge members 23^a and 24^a corresponding to the wedge members 23 and 24 are shown as each having a single inclined face or surface instead of two as above described. Furthermore, in this view the bolster 9^a is simply diagrammatic and the springs 27 are omitted.

In the operation, it is of course apparent that under ordinary circumstances the parts will be in the position illustrated in Figure 2. However, in case of a sudden downward thrust upon either end of the bolster, such as might be occasioned by passage of the truck wheels over a low spot in a rail, or a sudden undue pressure upon one of the side bearing rollers, such as would occur if the car body sways or rocks toward one side, the wedge member 23 at said end may yield inwardly against the resistance of the spring or springs 27 against which it abuts, the wedge member 24 thereupon moving upwardly with respect to the wedge member 23, this movement, or relative movement of the wedge members, producing friction at the coacting surfaces 28 and 29, the undue force exerted being absorbed by this friction so that the parts will be relieved of the strains and breakage thereof avoided. At the other end of the bolster, where there is a corresponding decrease in the downward thrust, the spring or springs 27 will force or tend to force the wedge member 23 outwardly. When this happens the

inclined surfaces 28 riding upwardly along the surfaces 29 will cause the end of the bolster to be elevated so that upon the recoil, that is when the car body swings or rocks back, the swinging movement will be checked as the wedge member 23 will then be forced inwardly against the resistance of the spring or springs 27, friction occurring between the surfaces 28 and 29 and absorbing the shock.

A very important feature of the invention is the action that occurs upon lateral motion of the truck bolster. In regard to this feature reference is had particularly to Figure 3 wherein the dot and dash line *a*—*a* represents the normal vertical center line of the car. When the car passes over curved track so that centrifugal force tends to throw it outwardly or whenever anything else occurs which tends to move the car body laterally of the track, it is apparent that inasmuch as the center plate 7 fits closely within the center bearing 19 the truck bolster 14 will be moved in accordance with the movement of the car body, this movement being known as lateral motion. In view of the fact that the wedge members 24 are restrained against outward movement with respect to the side frames, owing to the engagement of the lugs 26 with the inner faces of the columns 3, it is apparent that when lateral motion of the truck bolster occurs the wedge member 23 at the outer end will move upwardly as the surfaces 28 thereon slide over the inclined surfaces 29 on the wedge member 24. As the wedge member 23 is in engagement always with the underside of the top wall of the bolster this outer end of the bolster will consequently be elevated as clearly indicated in Figure 3. However, as the wedge member 23 at the inner end of the bolster (outer and inner as used herein mean with reference to the outer and inner rails of curved track) is free to move inwardly or toward the vertical axis of the bolsters or the center line of the car, it will do so inasmuch as the lateral motion of the bolster will reduce the spring pressure on this wedge member 23 at the inner end of the bolster. Furthermore, as the wedge member 24 is always in engagement with the end of the bolster, it will be carried along by it, the result being that the spring 4 at the inner end of the bolster will be distorted or slewed over at its upper end as clearly illustrated in Figure 3. When the lateral motion occurs and the outer end of the bolster is elevated while the inner end is lowered as above described, it is apparent that the vertical center line of the car will rotate about some fixed point and will assume the position indicated by the line *b*—*b*. There is thus a very clearly defined automatic banking action. Inasmuch as the spring 4 at the low or inner end of the bolster is distorted or slewed, it has a natural tendency to right itself and will do so upon the cessation of the force tending to move the bolster laterally, and this natural tendency of the spring will cause the parts to be restored to their normal position they occupy when the car is travelling along straight track. When reference is made to "the spring 4" it should of course be understood that it is hardly likely that a single spring would be used, the practice being to employ several arranged in a nest or group. A single one is referred to only for convenience in explanation. It may also be remarked that no means has been disclosed for maintaining the spring or springs 27 and the spring or springs 4 in position with respect to the elements engaged thereby inasmuch as any mechanical means whatsoever may be employed for this purpose, various different expedients being commonly resorted to as is well known in the art.

From the foregoing description and a study of the drawing it will be apparent that I have thus provided an absorption mechanism which will possess unusual efficiency in that it takes care not only of the excessive vertical thrusts but also the horizontal thrusts to which the parts are subjected under varying conditions of service. I have discovered that when a truck is equipped with a bolster embodying the invention side sway or roll of a car is practically, if not entirely, eliminated, resulting in a great increase in the life of the car body on account of the avoiding of "weaving" and a great decrease in the strain coming upon all the truck parts. Furthermore, a bolster embodying the invention may be installed to replace one of the usual type without involving the employment of any other new parts. It is really believed that the construction, operation and advantages will be readily apparent to one skilled in the art without further explanation.

While I have shown and described the preferred embodiment of the invention, it should be understood that the disclosure is merely an exemplification of the principles involved as the right is reserved to make all such changes in the details of construction as will widen the field of utility and increase the adaptability of the device provided such changes constitute no departure from the spirit of the invention or the scope of the claims hereunto appended.

Having thus described the invention, I claim:

1. In combination, a body bolster having a center plate, a truck bolster having a center bearing closely receiving the center plate, said truck bolster being mounted for lateral motion within a truck, supporting springs beneath the truck bolster, outwardly spring pressed wedge members located within the truck bolster, and wedge members engaged upon the truck springs and cooperating with said first named wedge members.

2. In combination, a body bolster having a

center plate, a truck bolster having a center bearing closely receiving the center plate, said truck bolster being mounted for lateral motion within a truck, supporting springs beneath the truck bolster, outwardly spring pressed wedge members located within the truck bolster, and wedge members engaged upon the truck springs and cooperating with said first named wedge members, said second named wedge members being restrained against outward movement with respect to the truck.

3. In combination, a body bolster having a center plate, a truck bolster having a center bearing closely receiving the center plate, said truck bolster being mounted for lateral motion within a truck, supporting springs beneath the truck bolster, outwardly spring pressed wedge members located within the truck bolster, wedge members engaged upon the truck springs and cooperating with said first named wedge members, and means restraining the second named wedge members against outward movement with respect to the truck and permitting inward movement.

4. In combination with a body bolster having a center plate and depending bearing elements, a truck including side frames with window openings therein and having truck springs within the window openings, a truck bolster located within the window openings for lateral motion with respect to the side frames, side bearings carried by the truck bolster and cooperating with said depending bearing elements, means limiting lateral motion of the truck bolster in both directions, outwardly urged wedge members within the end portions of the truck bolster, and means engaged upon the truck springs and coacting with said wedge members, said means being restrained against movement in one direction with respect to the adjacent side frames.

5. In combination with a body bolster having a center plate and depending bearing elements, a truck including side frames with window openings therein and having truck springs within the window openings, a truck bolster located within the window openings for lateral motion with respect to the side frames, side bearings carried by the truck bolster and cooperating with said depending bearing elements, means limiting lateral motion of the truck bolster in both directions, outwardly urged wedge members within the end portions of the truck bolster, and means engaged upon the truck springs and coacting with said wedge members, said means being restrained against movement in one direction with respect to the adjacent side frames, said means comprising wedge members having stop elements thereon coacting with the inner faces of the side frames.

6. In combination with a body bolster, a truck including side frames with truck springs, a truck bolster swivelly connected with the body bolster and mounted for lateral motion therewith with respect to the side frames, the truck bolster being supported upon said truck springs, and wedge means coacting with the bolster and the side frames for banking the bolster upon the occurrence of lateral motion.

7. In combination with a body bolster, a truck including side frames with truck springs, a truck bolster swivelly connected with the body bolster and mounted for lateral motion therewith with respect to the side frames, the truck bolster being supported upon said truck springs, and wedge means coacting with the bolster and the side frames for banking the bolster upon the occurrence of lateral motion, said wedge means acting to cushion horizontal thrusts.

8. In combination with a body bolster, a truck including side frames with truck springs, a truck bolster swivelly connected with the body bolster and mounted for lateral motion therewith with respect to the side frames, the truck bolster being supported upon said truck springs, and wedge means coacting with the bolster and the side frames for banking the bolster upon the occurrence of lateral motion, said wedge means acting to cushion horizontal thrusts and coacting with the truck springs for cushioning vertical thrusts.

9. In the combination of a body bolster and truck including a bolster mounted for lateral motion with the body bolster and with respect to the truck side frames, the truck bolster being equipped with spring means and wedge means for cushioning vertical thrusts, means cooperating with the side frames and the wedge means for raising or lowering the ends of the truck bolster when lateral motion thereof occurs.

10. In the combination of a body bolster and truck including a bolster mounted for lateral motion with the body bolster and with respect to the truck side frames, the truck bolster being equipped with spring means and wedge means for cushioning vertical thrusts, means cooperating with the side frames and the wedge means for raising or lowering the ends of the truck bolster when lateral motion thereof occurs and applying lateral distorting force upon the truck springs whereby the truck springs will operate to restore the parts to normal position upon cessation of a force tending to produce lateral motion.

In testimony whereof I affix my signature.

PERCY R. DRENNING.