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O. C. DURYEA

CAR CONSTRUCTION

Filed April 14, 1925

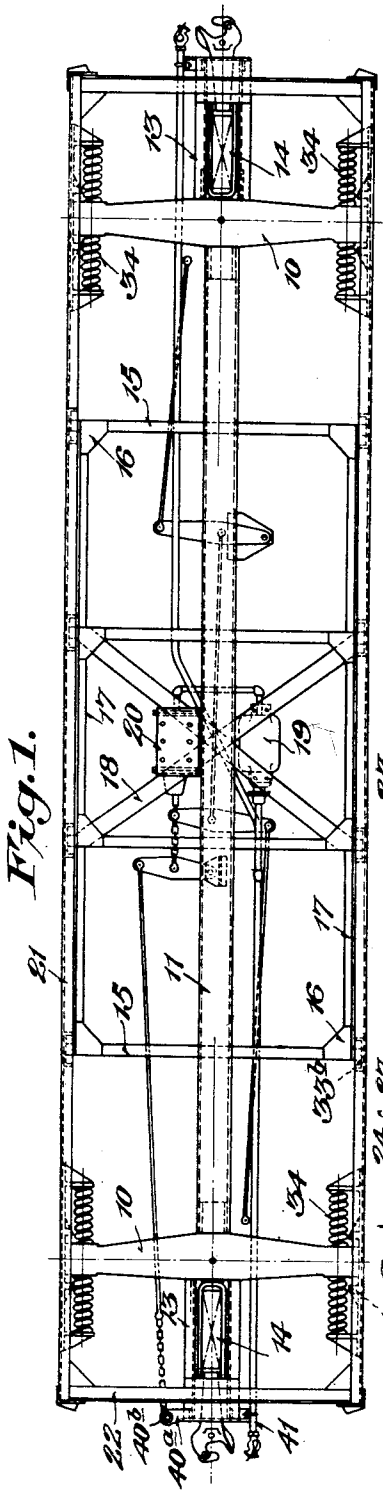


Fig. 1.

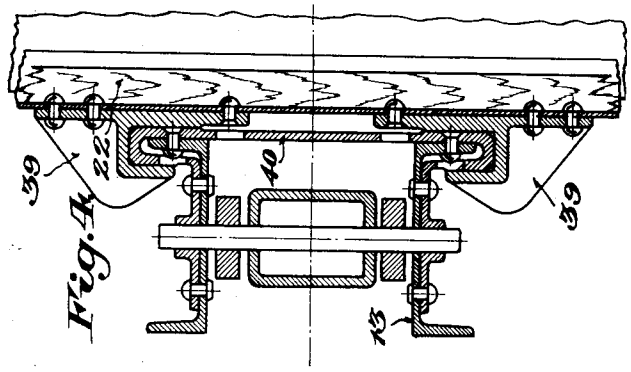


Fig. 4.

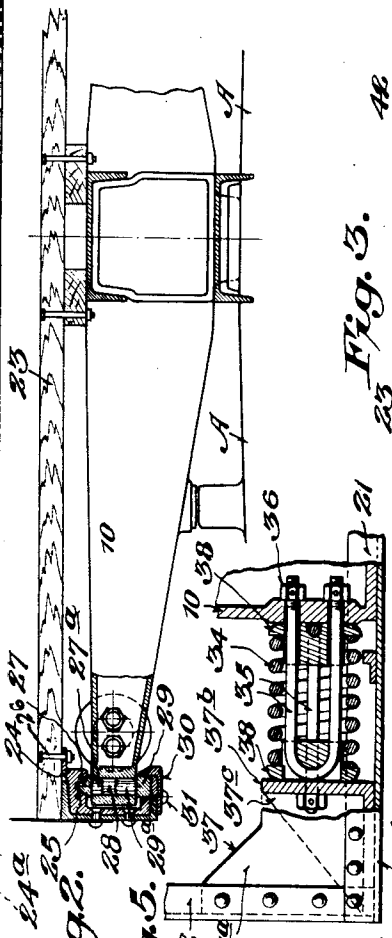


Fig. 2.

Fig. 5.

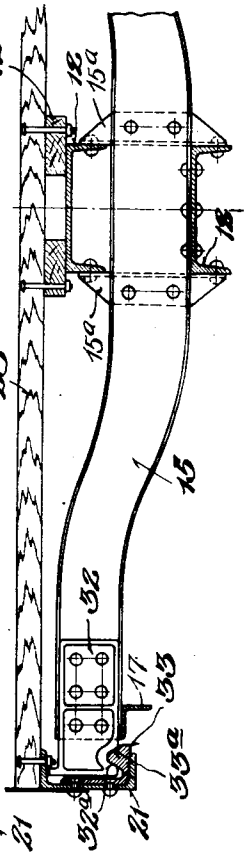


Fig. 3.

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UNITED STATES PATENT OFFICE.

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CAR CONSTRUCTION.

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This invention relates to railway rolling stock, and more particularly to a railway car which is so constructed that the body has longitudinal movement relatively to the car trucks or running gear.

Much damage results to railway cars and lading due to the large amounts of energy which must be absorbed or dissipated when "buffing" a car, when a stationary car is placed in motion, or when sudden changes in speed are imparted to the same. The draft gears employed on railway cars are designed to reduce, as far as possible, the objectionable effects resulting from the aforesaid energy. However, the standard draft gear is limited to a motion of approximately three inches, and, as is well understood in the art, it is practically impossible to entirely dissipate or absorb the large amounts of energy involved with mechanism which is so limited in its travel. Accordingly, it has been proposed to increase the travel or movement of the draft gear in order that the latter may more effectively overcome the inertia or absorb kinetic energy of the car, but any increase in the travel of the draft gear is objectionable since it is essential that the slack between cars be reduced to a minimum, and this is particularly true where a long train of cars is being handled, for reasons well known in the art.

In order to overcome the above objections it has also been proposed to construct railway cars in such a manner that the car body has limited longitudinal movement relatively to the running gear in either direction from a central position, the longitudinal movement being controlled by resilient means. For example, it has been proposed to construct a railway car comprising a heavy under-frame on which is slidably mounted a car body, said under-frame and car body being provided with buffer blocks at the center, and at the opposite ends thereof. Between each pair of buffer blocks were introduced a plurality of groups of spring plates to absorb shocks and changes in speed imparted to the car body, and to normally maintain the body centered on said under-frame. This arrangement of the buffer blocks and spring plates at the opposite ends of the car, require the length of the car body to be materially shortened thereby decreasing its carrying capacity, i. e., cubical contents of the car; or, if the car body is maintained at standard length, the over all length of the car must be increased, which is highly objectionable for reasons well known in the art.

Moreover, the structures of the above type heretofore employed have differed so greatly from the standard car construction, have been so expensive to manufacture, or have required the addition of so many structural elements, thereby greatly increasing the weight of the car, as to render the same unsatisfactory for general use.

An object of the present invention is to provide an improved railway car of the longitudinally movable body type which is so constructed as to overcome the above objections.

Another object of the invention is to provide a railway car of the longitudinally movable body type which conforms closely to the construction at present employed in standard railway rolling stock.

Another object of the invention is to provide novel and simple means for resiliently resisting relative movement between the car body and running gear, the car being so constructed that surface friction is employed for aiding the resilient means in the performance of its functions.

Another object is to provide novel means for mounting the resilient members whereby the latter are readily accessible for inspection or replacement, and are advantageously placed for absorbing the shocks.

Another object is to provide novel means for insuring slidable engagement at all times between the car body and the running gear.

Other objects of the invention are to provide a railway car of the type described which is so constructed as to avoid the duplication of a plurality of parts; one which is so constructed that the longitudinal movement of the body in either direction will not impair the functioning of the brake mechanism; to lighten the elements, for example, the center sills, without reducing the ability of the car to withstand the strains incident to ordinary usage, and one which is particularly adapted for ready assembly. These and other objects will appear more fully hereinafter.

One form which the inventive idea may assume is shown in the accompanying drawings, which drawings, however, are for the purpose of illustration only and are not to be taken as defining the limits of the invention,

reference being had to the appended claims for this purpose.

In the drawing,

Fig. 1 is a top plan view illustrating one form of the present invention;

Fig. 2 is an enlarged detail view partly in section, illustrating one type of means for operatively connecting the bolsters to the car body side sills;

Fig. 3 is an enlarged detail sectional view illustrating one form of connection between the cross-bearers and the side sills;

Fig. 4 is an enlarged sectional view illustrating one manner in which the draft sills may be secured to the end sills; and

Fig. 5 is a detail sectional view illustrating one manner of mounting the resilient members.

Referring to the drawings wherein like reference numerals refer to like parts throughout the several views, the running gear forming a part of the subject matter of the present invention is mounted in any suitable manner on trucks of the usual type, the truck bolster being diagrammatically represented at A, Fig. 2. Preferably the running gear comprises a plurality of body bolsters 10 to which is secured a center member or sill 11. If desired, the center sill may extend the entire length of the car but preferably it terminates at the inner faces of the bolsters, and may be formed of a pair of upper and lower U-shaped channel members 12 which are secured in spaced relation to the bolsters with the flanged portions of said members extending downwardly. Projecting longitudinally from the outer faces of the bolsters, in alignment with the center sill 11, are draft sills 13 which support draft gears 14, of any suitable type. In the form shown the draft sills are constituted by U-shaped channel members which are vertically disposed with the flanges of the same turned outwardly. It is to be expressly understood, however, that the center member or sill 11 may be continuous throughout the length of the car instead of terminating at the bolsters.

If desired, the running gear may also comprise one or more cross-bearers 15 which are preferably rigidly attached at the centers thereof to the center sill 11 by means of angle members 15a which angle members also constitute spacing members for the channel members 12 of the center sill 11. To further strengthen the structure the cross-bearers 15 may be connected by means of gusset plates 16 to longitudinally extending angle bars 17. The cross-bearers 15 and angle bars 17 may be further braced by diagonally disposed members 18, the elements 15, 16, 17, 18 constituting a rectangular framework for supporting the valve and air chamber 19 and cylinder 20 of the usual brake mechanism. It will be understood, however, that the brake mechanism may be entirely supported by the center sill 11, and that the cross-bearers may constitute a part of the car body instead of the running gear.

Mounted for relative longitudinal movement on the running gear is a car body of any desired type which preferably includes side sills 21, formed of the usual channel bars, end sills 22, and flooring 23, but it is to be expressly understood that the invention is not limited to any specific type of body other than is indicated in the claims. Preferably the car body side sills 21 have sliding engagement with the ends of the bolsters 10 and the cross-bearers 15.

Means are provided for operatively connecting the ends of the body bolsters and cross-bearers to the side sills whereby the car body is permitted relative longitudinal movement but is held against movement in any other direction. As shown, a substantially L-shaped casting 24 is secured to the inner surface of the side sills 21 adjacent the ends of the bolsters 10, the upper horizontal leg of said casting being provided with a longitudinal groove 25 on its lower face, and being secured as by means of bolts 26 to the car flooring 23. A bearing member is interposed between the casting 24 and the ends of the bolsters 10 which permits sliding engagement between said car body and bolsters, and which is so constructed as to properly function even when the bolsters are warped or accidentally sprung out of shape. In the form shown, the bearing member comprises a wedge-shaped portion 27 which slidably engages the groove 25 formed in the casting 24. Preferably, a cylindrical shank 27a formed integrally with the portion 27, extends into a substantially vertical opening 28 formed in the outer ends of the bolsters, thus permitting pivotal movement between the bolsters and the side sills. In order to facilitate assembly of the parts and to prevent other than relative longitudinal movement between the side sills 21 and the bolsters there is preferably provided locking means which, in the form shown, comprises a square headed member 29 that is provided with a cylindrical shank 29a projecting upwardly into the lower end of opening 28. The square headed member 29 has engagement on its outer face with the lower inner edge of the casting 24 and is securely held in place by an L-shaped member 30 which is preferably riveted as at 31 to the lower flange of the side sills 21.

Suitable connecting means is provided between the outer ends of each of the cross-bearers 15 and the side sills 21. In the form shown this means comprises a casting 32 which is secured, as by means of rivets, to the outer ends of the cross-bearers 15. The outer end of the casting 32, which projects beyond the end of the cross-bearer, is provided on the lower side thereof with a longitudinally extending groove 32a into which extends, for

sliding engagement, the wedge-shaped portion 33ª of a casting 33 which is rigidly secured in any suitable manner to the inner surface of the side sills 21. Castings 24 and 33 may be provided with inwardly projecting portions 24ª and 33ᵇ (Fig. 1), respectively, which portions constitute stops for limiting the relative longitudinal movement of the car body and running gear, but this is not essential.

Means are provided for yieldingly resisting any longitudinal movement of the body relative to the running gear and to normally maintain the body in central position on said gear, said means being mounted in such a manner as to effectively absorb the large amounts of excess energy involved, thereby preventing damage to the car structure and lading. In the form shown this means comprises a plurality of springs 34 so mounted as to operatively engage the bolsters 10 and side sills 21. Eight or more springs 34 may be employed as is indicated in Fig. 1 but it is to be expressly understood that the invention is not limited to the number of springs shown in the drawings since a smaller number, for example, four, may be employed with satisfactory results by increasing the size of said springs.

It is desirable that the springs 34 be so mounted as to oppose relative movement of the car body in either direction on the running gear. To this end pairs of yokes or U-shaped members 35, are slidably secured as by means of nuts 36, to the bolsters 10 and the side sills 21. Preferably one yoke 35 of each pair is connected to the side sills 21 by means of a gusset plate 37 which is provided with an upper surface 37ª, a downwardly extending portion 37ᵇ, and a lower web portion 37ᶜ, said plate being secured to the side and end sills, and the yoke being slidably secured to the portion 37ᵇ of said plate 37 as is clearly shown in Fig. 5. Slidably mounted on each of the yokes 35 is a spring bearing member or follower provided with shoulders 38 which shoulders are engaged by the opposite ends of the resilient members 34.

In order to provide relative longitudinal movement between the car body and the draft sills 13 and to rigidly prevent movement between said sills and car body in any other direction, there are preferably provided jaw members 39 which may be secured as by means of rivets to the end sills 22, and which have sliding engagement with a striking plate 40 surrounding the draft sills 13 as is indicated in Fig. 4. The usual brake air line 41 may be secured in any desired manner to the striking plate 40 on one side thereof, and a projection 40ª on the opposite side of said plate may be employed for securing the brake mast in position as is indicated at 40ᵇ. If desired, strengthening beams 42 which are preferably formed of wood may be secured to the lower surface of the car flooring 23 in such a position as to have sliding engagement with the upper surface of the center sill 11.

Operation: Any energy exerted on the car for placing it in motion or changing its rate of motion is absorbed in part by the draft gear or gears 14. As previously pointed out, when this energy is sufficiently great it is impossible for said draft gears to absorb the entire amount of the same. Any unabsorbed energy tends to produce relative longitudinal movement between the running gear and the car body. A large portion of the weight of the lading and the car flooring is transferred through beams 42, center sill 11 and cross-bearers 15 to the side sills 21 and practically the entire weight of the car body and lading is accordingly supported at the points of engagement between the bolsters 10 and the side sills 21. Any force tending to cause relative longitudinal movement of the car body is therefore resisted by the friction between beams 42 and the upper surface of the channel member 12 of center sill 11, by the friction between the ends of the cross-bearers 15 and the side sills 21, and by the friction between the bearing members 27 pivotally mounted in the ends of the bolsters 10 and said side sills 21. The major portion of the force tending to cause relative longitudinal movement of the body is absorbed by the resilient members 34 which latter are so mounted as to resist movement in either direction. The absorption of the excess energy by the springs 34 and the friction between the bearing surfaces prevents this excess energy from damaging the lading and the elements of the car. Moreover, the springs 34 act to maintain or to return the car body in its central position relatively to the running gear.

It will be seen that there is provided a railway car of the longitudinally movable body type which conforms very closely to the construction at present employed in standard railway cars in that bolsters, side sills, a center sill and cross-bearers of the type now employed are used in the structure of the present invention. The springs 34 are mounted in such a manner that they may be easily replaced, if desired, and are so mounted as to prevent disruptive forces from being thrown on the relatively weak end sills. Moreover, surface friction between the elements of the car body and the running gear aid the resilient means in the performance of its functions. The means employed for insuring operative engagement between the bolsters and cross-bearers and the side sills may be easily constructed and installed and are so formed as to limit the relative movement of the body to a longitudinal direction. The standard parts now employed in car construction are not duplicated and because of the manner in which the excess forces incident to buffing, etc., are absorbed, the center sill

and other parts may be made relatively light without reducing the ability of the car to withstand the strains incident to ordinary usage. The relative longitudinal movement of the body, moreover, does not interfere with the proper functioning of the brake mechanism, the brake mast (not shown), which is provided with a suitable connection as at 40^b, having sufficient resiliency to prevent any difficulty in operating the brakes from the top of the car. The car is relatively light, is particularly adapted for ready assembly, and is inexpensive to manufacture. Various changes may be made in the details of construction without departing from the scope of the invention defined in the following claims.

What is claimed is:

1. A device of the class described comprising running gear including bolsters, a car body having side sills mounted for movement on said bolsters, the ends of the latter having sliding engagement with said sills, and resilient means for controlling the relative movement of the body in either direction, said resilient means having operative engagement with said bolsters and side sills.

2. A device of the class described comprising running gear including bolsters, a car body having side sills mounted for movement on said bolsters, the ends of the latter having sliding engagement with said sills, and means for yieldingly resisting the relative movement of the body in either direction.

3. A device of the class described comprising running gear including bolsters and a center sill connected to said bolsters, a car body having flooring and side sills mounted for movement on said bolsters, the ends of the latter having sliding engagement with said sills, and means for resisting the relative movement of the body in either direction, the friction between said flooring and center sill cooperating with said means for resisting the relative movement of said body.

4. A device of the class described comprising running gear including a plurality of bolsters and a center sill, a car body having side sills mounted for movement on said bolsters, the ends of the latter having sliding engagement with said sills, resilient means for controlling the relative movement of the body in either direction, and cross-bearers having engagement with said side sills and with said center sill for transferring a portion of the weight of the body and lading to said side sills.

5. A device of the class described comprising running gear including a plurality of bolsters and a center sill, a car body having side sills mounted for movement on said running gear, the ends of said bolsters having sliding engagement with said sills, cross-bearers secured to said center sill and having sliding engagement with said side sills, and resilient means for resisting the relative movement of the body in either direction.

6. A device of the class described comprising running gear including a pair of bolsters, a car body having side sills mounted for movement on said bolsters, means secured to said side sills adjacent the ends of said bolsters, means pivotally engaging said bolsters and having sliding engagement with said first named means, and means for yieldingly resisting the relative movement of the body in either direction.

7. A device of the class described comprising running gear including bolsters, a car body having side sills mounted for movement on said bolsters, means interposed between the ends of said bolsters and side sills and secured to the latter, means pivotally engaging said bolsters and having sliding engagement with said first named means, and resilient means operatively secured to said bolsters and said side sills for controlling the relative movement of the body in either direction.

8. A device of the class described comprising a plurality of bolsters having openings adjacent the opposite ends thereof, bearing members pivotally mounted in said openings, a car body having side sills, members secured to the inner side of said side sills in operative engagement with the bearing members, and resilient means for resisting the relative movement of the side sills in either direction.

9. A device of the class described comprising bolsters having openings adjacent the ends thereof, a car body having side sills, members rigidly secured to the inner surface of said side sills, means extending into the openings in said bolsters and having sliding engagement with said members, and resilient means for resisting the relative movement of the body in either direction.

10. A device of the class described comprising a plurality of bolsters, a center sill secured to said bolsters, a car body having side sills, means secured to said bolsters and having sliding engagement with said sills, said means constituting a supporting member for said sills, locking means operatively engaging said sills and bolsters, a plurality of cross-bearers secured to said center sill and having sliding engagement with said side sills, and means including springs for resisting the relative movement of the body in either direction.

11. A device of the class described comprising running gear, a car body having side sills mounted for movement on said running gear, and means for resisting the relative movement of the body in either direction, said means including yokes slidably secured to said bolsters and side sills, and resilient means associated with said yokes.

12. A device of the class described com-

prising a plurality of bolsters, a car body having side sills mounted for movement on said bolsters, gusset plates secured to said side sills, and means for resisting the relative movement of the body in either direction, said means including yokes having engagement with said gusset plates and said bolsters, shouldered members slidably engaging said yokes, and coil springs surrounding said yokes and having engagement at the opposite ends thereof with said shouldered members.

13. A device of the class described comprising running gear including bolsters and draft sills, a car body having side sills and end sills mounted for relative movement on said running gear, means for resisting relative movement of the car body, and members operatively secured to said end sills and draft sills permitting relative longitudinal movement between the same and resisting movement in any other direction.

14. A device of the class described comprising running gear including bolsters, a center sill, draft sills and a cross-bearer, a car body having side sills and end sills mounted for relative movement on said running gear, and means for yieldingly resisting relative movement of the car body on said running gear.

15. A device of the class described comprising running gear including bolsters, a center sill and a plurality of cross-bearers secured to said center sill, a car body including side sills and flooring mounted for relative longitudinal movement on said running gear, resilient means for resisting relative movement of the car body, the friction between the flooring and the center sill and between the cross-bearers and side sills cooperating with said resilient means to resist relative movement of said body.

16. A device of the class described comprising running gear including bolsters, a car body having side sills mounted for relative longitudinal movement on said running gear, and resilient means secured to said bolsters and side sills for resisting relative movement of the body in either direction.

17. A device of the class described comprising running gear including bolsters, a center sill and draft sills, a car body having side sills and end sills mounted for relative longitudinal movement on said running gear, members operatively secured to said end sills and draft sills permitting relative longitudinal movement between the same and resisting movement in any other direction, and resilient means for resisting relative movement of the car body.

18. A device of the class described comprising running gear including bolsters, a center sill, and draft gears secured to the opposite ends of the latter, a car body having side sills and end sills mounted for relative longitudinal movement on said running gear, means secured to said end sills and center sill permitting relative longitudinal movement of the latter, and resilient means operatively secured to said bolsters and side sills for resisting longitudinal movement of the car body.

19. In a railway car structure, a body portion including an end sill, a longitudinally extending center member adapted for movement relative to the body, the said member including vertically disposed flanged members extending substantially the length of the body portion, means secured to the end sill and having engagement with the flanges of said flanged members for guiding said center member in its relative movement, couplers disposed in the plane of the center member and means for movably connecting the couplers to the opposite ends of the center member.

20. In a railway car structure, a body including an end sill, a center member constituted by channels mounted for movement relative to said body, and means secured to the lower portion of said end sill for guiding said channels in their relative movement.

21. In a railway car structure, a body portion having a flooring, means including vertically disposed and longitudinally extending channels which constitute a center sill adapted for longitudinal movement relative to the body portion, friction elements secured to the flooring and having engagement with said means for resisting said relative movement, and resilient means positioned in the horizontal plane of the center sill for coacting with said friction elements.

22. In a railway car structure, a body portion having an end sill, a center member mounted for longitudinal movement relative to said end sill, and means including a pair of jaws secured to the end sill and having sliding engagement with the center member for guiding the latter in its relative movement.

23. In a railway car structure, a body portion including an end sill, a longitudinal center member extending substantially the length of said structure, said body portion and center member being adapted for relative longitudinal movement, a coupler, a draft gear of standard travel for operatively connecting said coupler to said center member, said coupler being located in the horizontal plane of the center member, yielding means for resisting relative movement between the center member and the body portion, and means secured to the lower portion of said end sill for guiding said center member in its longitudinal movement relative to the body portion.

In testimony whereof I have signed this specification.

OTHO C. DURYEA.