May 5, 1942. K. W. MEALING ET AL 2,282,146

DRAFT GEAR MECHANISM FOR RAILWAY VEHICLES

Filed Oct. 4, 1939 2 Sheets-Sheet 1

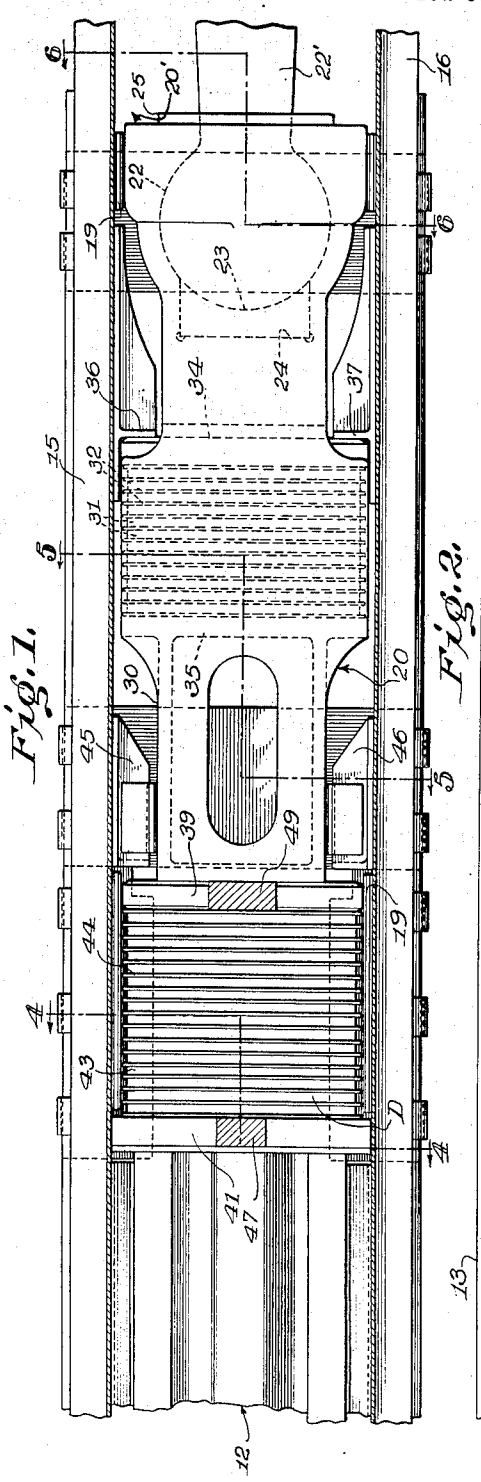


Fig. 1.

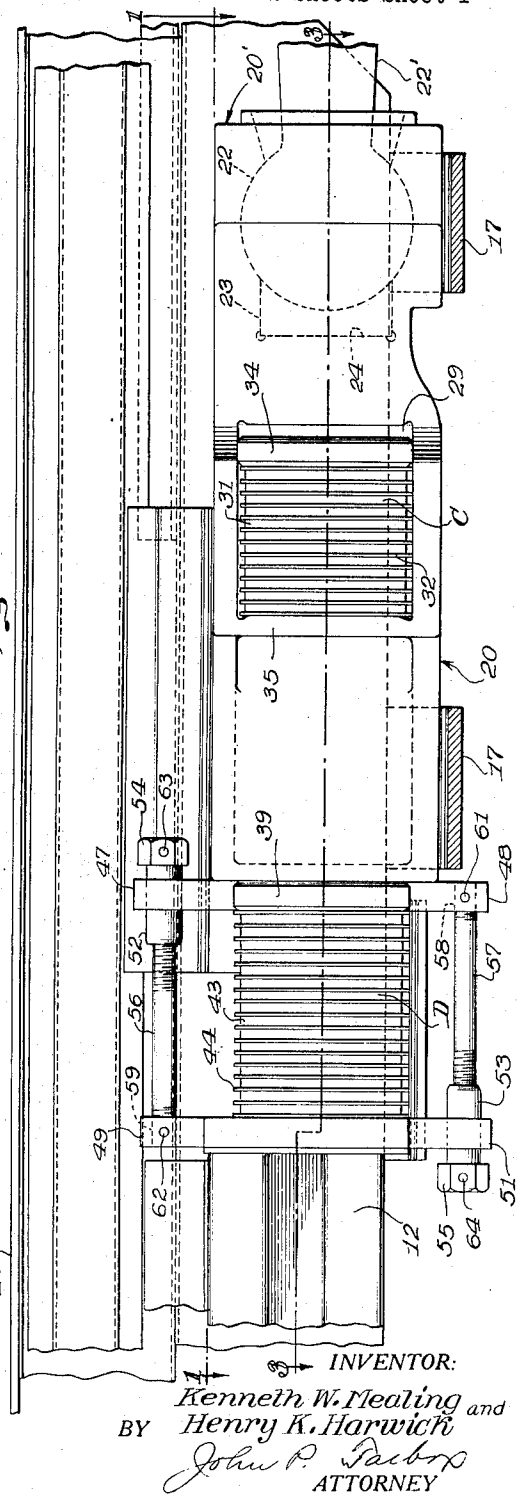


Fig. 2.

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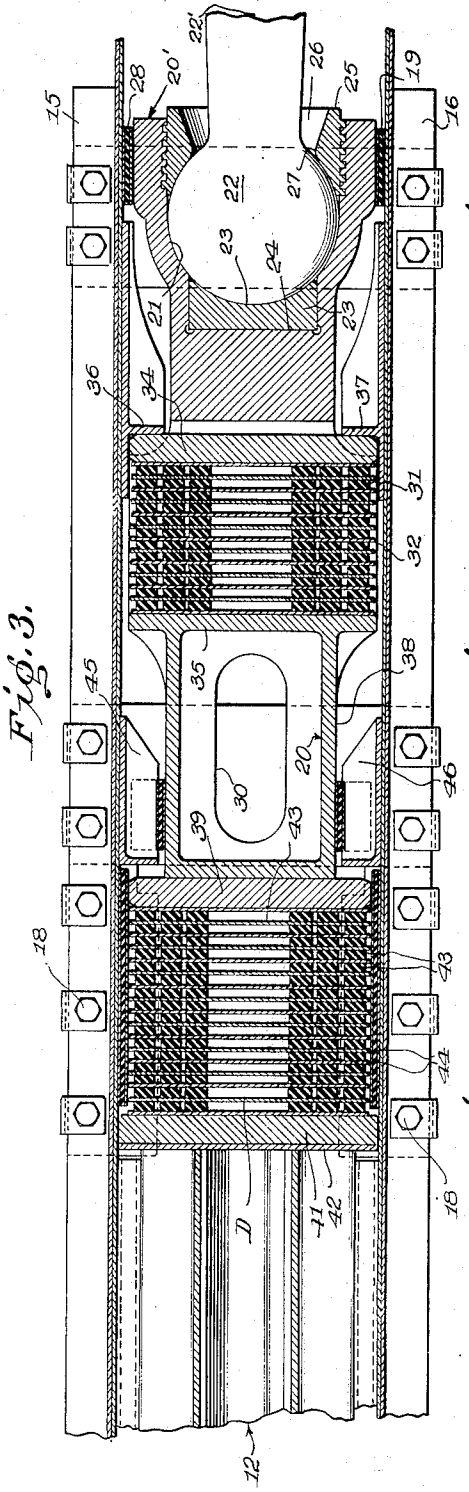


Fig. 3.

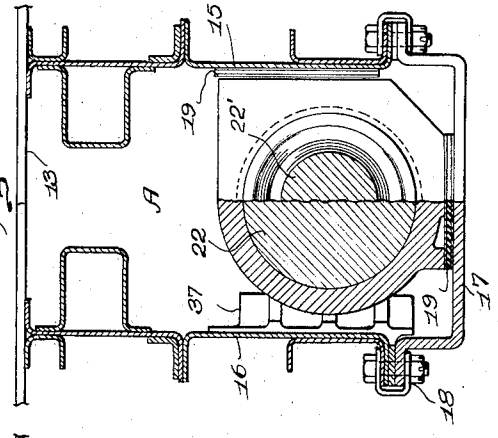


Fig. 6.

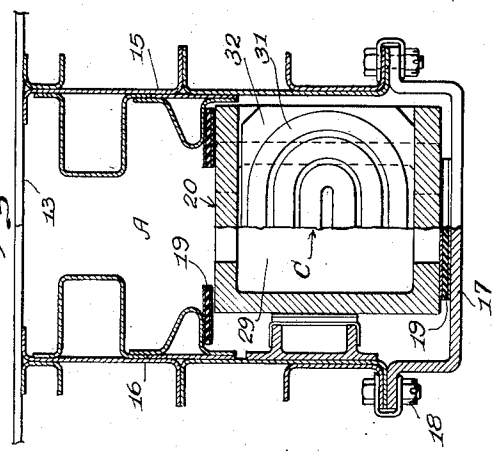


Fig. 5.

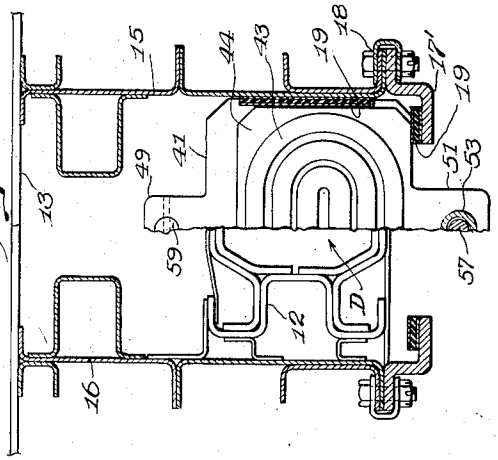


Fig. 4.

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UNITED STATES PATENT OFFICE

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DRAFT GEAR MECHANISM FOR RAILWAY VEHICLES

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Application October 4, 1939, Serial No. 297,784

5 Claims. (Cl. 213—47)

This invention relates in general to cushioning or shock absorbing mechanism for railway cars, having for its principal object the provision of an improved draft and buff gear for railroad cars, particularly designed and adapted to simplify the construction and improve the operation of mechanism of this type.

Another object is to provide an improved, simplified, draft gear arrangement of a type assuring efficient cushioning of the coacting parts, elimination of lost motion in the component parts of the draft gear assembly, automatic compensation of misalignments and/or irregularities frequently occurring in this type of mechanism, and a construction particularly adapted to prevent bulging and distortion of the walls of the draft gear pocket.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that various changes may be made in the scope of what is claimed, without departing from the spirit of the invention.

Figure 1 is a sectional plan view taken on the line and as viewed in the direction of the arrows 1—1 of Fig. 2;

Figure 2 is a fragmentary side elevational view partly in section of a draft gear pocket or housing operatively applied to the understructure of a railway car, one of the side walls of the housing having been removed to show the draft gear assembly therein;

Figure 3 is a sectional plan view similar to Figure 1, as taken on the line, and as viewed in the direction of the arrows 3—3 of Figure 2;

Figure 4 is a transverse, sectional view, taken on the line and as viewed in the direction of the arrows 4—4 of Figure 1; and

Figures 5 and 6 are views similar to Figure 4, taken respectively on the lines and as viewed in the direction of the arrows 5—5 and 6—6 of Figure 1.

Referring now to the drawings wherein similar characters of reference indicate corresponding parts in the several views of the preferred form of the invention, the numeral 12 designates the longitudinal center sill proper terminating short of the end of the car and 13 a portion of the flooring of a railway car. To the flooring 13 and to the center sill proper 12, a housing or draft gear pocket designated generally at A is fastened. The housing or pocket A comprises side walls 15, 16 which are preferably welded to adjacent side portions of the center sill 12 and form end extensions thereof and to the flooring 13. It has a detachable bottom comprising spaced members 17 removably secured or bolted to the side walls 15, 16 as at 18.

Arranged within the pocket A and slidably mounted on and guided by friction pads or means, indicated generally at 19, fastened or connected to the side walls and detachable bottom of the said pocket, is a draft gear assembly. This assembly comprises an oblong yoke designated generally at 20 and provided at its front end with an integrally-formed coupling device 20'.

The coupling device 20' has a socket 21 adapted to rotatably receive a ball 22 formed integrally on the draft bar 22'. The ball 22 abuts the concave hardened face of a thrust or wear plate 23 fastened within a pocket 24 communicating with the socket 21, and is movably retained in the socket by an annular retainer member or collar 25 threadedly engaged in the wall of the socket. The collar 25, as best shown in Figure 3, has a passageway 26 flared or diverging on either side of an inwardly projecting annular bulge 27 formed on its inner periphery. The left hand side of the passageway 26 (as viewed in Figure 3) is of a configuration adapted to register with the adjacent portion of the ball, the right hand side permitting freedom of movement of the shank of the draw bar 22'.

The movable yoke member 20 further includes a pocket or recess 29 located between the coupling device 20' and an integral narrowed extension 30 which directly abuts the rear follower plate hereinafter mentioned. The pocket 29 removably accommodates a cushioning device or spring nest designated generally at C and including a plurality of oblong, concentric rubber strips 31 vulcanized to and interposed between metal plates 32.

The shock-absorbing cushion or spring nest C is confined between a front or draft follower block 34 and a bulkhead or partition 35 provided on the said yoke adjacent the extension 30 and forming one of the walls of the pocket 29. The follower block 34, as described more fully hereinafter, is normally maintained by the urge of the preloaded spring cushion C in continuous contact with the abutments or draft lugs 36, 37, arranged on either side of the forward portion of the side walls 15, 16 of the casing A. The integral yoke extension 30, which is narrowed to provide clearance for abutments or buff lugs fastened to the side walls 15 and 16 and hereinafter

described, is also continuously urged against a buff or rear follower block 39 by the reaction of the draft spring cushion C.

Between the rear follower block 39 and an abutment block 41 directly contacting the center sill 12, a buff cushioning assembly or spring nest D of a similar design, but materially larger than cushion C described above, is arranged. The cushioning assembly D is similarly composed of oblong rubber concentric strips 43 vulcanized to and spaced by metal plates 44. Lugs or abutments 45, 46 referred to above and fastened to the side walls 15, 16 of the pocket A, serve as stops to limit the movement of the rear follower 39 in a direction from left to right as viewed in Figures 1 and 2, or when the yoke 20 is operating in draft. The lugs 45, 46 however, do not receive or transfer any load either in buff or draft.

As best shown in Figures 2 and 4, extensions or lugs 47, 48 are attached to or integrally formed with the top and bottom edges of the follower block 39, and coacting opposed lugs 49, 51 are similarly provided on the top and bottom edges of the abutment block 41. The top lug 47 of the follower 39 and the bottom lug 51 of the abutment block 41 are similarly apertured to receive rotatably adjustable sleeves 52, 53, each formed integrally with a nut 54, 55 and having an interiorly threaded bore receiving the adjacent threaded ends of screws 56, 57. The other ends of the screws 56, 57 are threadedly engaged in holes 58, 59 formed in the lugs 48, 49. Cotter pins 61, 62 passed through registering apertures in the lugs 48, 49 and the adjacent ends of the screws 56, 57 serve to lock the said screws against rotation. Similarly the nuts 54, 55 are provided with apertures which may be brought into registration with holes (not shown) in the adjacent ends of the screws 56, 57 to accommodate cotter pins 63, 64 and thereby lock the said nuts and their integrally-formed sleeves against movement relatively to the fixed screws 56, 57 during normal usage.

As illustrated in Figure 2, it will be understood that the sleeves 52, 53 have been backed off their respective screws 56, 57 and consequently the nuts 54, 55 away from the lugs 47, 51, thereby permitting the cushion D to expand and maintain the follower block 39 in biased contact with the adjacent end of the yoke 20. The cushion D, it is to be noted, is still under compression; i. e., preloaded by the reaction of the parts between which it is operatively confined. The function of the sleeves 52, 53 and the integral nuts 54, 55 thereon in connection with the coacting lugs and screws is to provide a convenient means for compressing the spring cushion D sufficiently to permit its ready insertion into the pocket A and between the abutment block 41 and the follower 39. The compressed state of the cushion D preliminary to insertion in the pocket A and which is accomplished by turning the sleeves 52, 53 relatively to the fixed screws 56, 57 and the lugs 47, 51, is not shown.

The method of installing the draft gear assembly within the draft gear pocket A is as follows:

The bottom 17 is unbolted and detached from the side walls 15, 16. The rear cushion assembly which includes the spring nest D the adjustable sleeve nuts and coacting parts may be next inserted into the pocket A from beneath. After insertion, it is retained by the removable bottom closure comprising in this region the strips 17' secured similarly to members 17. The yoke 20 and the cushion C carried thereby may be then inserted from beneath, after which the removable bottom members 17 are secured in place. Then the cotter pins 63, 64 are withdrawn from the nuts 54, 55 and the latter with their integral sleeves turned to permit the free expansion of the spring nest. The cotter pins 63, 64 are then replaced to lock the sleeves against rotation. This procedure brings the abutment plate 41 and the follower 39 into biased operative engagement with the center sill 12 and the extremity of the yoke 20, as depicted in Figures 2 and 3. The forward or draft spring nest C will now be under compression, or in other words, preloaded by the pressure of the rear or inner nest D, so that the parts are normally rigidly held between the follower 34 and abutment 41 against movement.

The rear or inner or buff spring nest D, it is to be observed, is also under compression and preloaded by the mutual reactions of both spring nests. Lost motion between the component parts of the draft gear assembly including the coacting spring nests C and D, the center sill 12, yoke 20 and the pocket A, it will be observed, is substantially eliminated by this construction.

But abutting the comparatively short yoke member immediately against the rear follower 39, a direct transfer of loads in buff from the draft gear assembly and through the preloaded large rear cushion to the center sill 12 is obtained. This affords a far stronger and more simplified construction than conventional types wherein the high buff load is applied to lugs or abutments carried by the walls of the draft gear pocket, frequently resulting in bulging of or serious damage to the walls of the said pocket. Loads in draft which are generally substantially less than those encountered in buff, are carried through compression in the smaller preloaded cushion C, by draft lugs or fixed abutments 36, 37 on the walls 15, 16 of the pocket.

Among other advantages accruing to the construction above described and illustrated, it may be pointed out that the entire draft gear assembly of this invention can be applied, with comparative slight change to conventional type draft gear pockets or casings. The size of the yoke 20 is materially reduced with a corresponding reduction in the space heretofore required for same. Possible misalignments or irregularities of construction in the draft gear pocket or assembly, it will be seen, are automatically compensated for by the flexibility of the preloaded spring nests C, D in maintaining themselves in juxtaposition with their abutments and follower blocks in all positions which might occur in normal operation.

The functioning and mode of operation of the device has been in large measure described above but may be summarized as follows:

A load applied in buff through the coupling device to the yoke 20 will first cause the initial further compression of the rear cushioning assembly or spring nest D against the center sill 12 as the yoke moves inwardly in the pocket A. This last referred to movement reduces the pressure of cushion C against the front or draft follower block 34 although the latter meanwhile remains motionless in contact with the lugs 36, 37 until the space between the front face of the said block 34 and the forward wall of the recess or pocket 29 in the yoke 20 is taken up by the inwardly advancing yoke and expanding cushion C. Further inward movement of the yoke 20 will then engage the yoke with the follower block

34 and move it in the direction of the former, the rear or buff cushion D being further compressed by this last movement. During this operation, it will be observed that all parts are continuously in preloaded engagement, thereby cushioning the impact of the load while eliminating lost motion.

When operating in draft, the compresison of the rear cushion D decreases as the yoke 20, continuously engaged by rear follower 39, moves to the right, as viewed in Figure 3. During this last movement the forward cushion C is put under increasing compression between the partition 35 and the front draft follower 34 which now abuts the fixed draft lugs 36, 37. Here again, it will be observed, the continuous juxtaposition of the draft and buff follower with their respective cushions and adjacent parts of the yoke and pocket, eliminate lost motion and provide a quiet efficient cushioning of the load.

Certain features of the underframe shown in this application are more fully described and claimed in co-pending application Serial No. 296,026, of Albert G. Dean, filed September 22, 1939, for Rail car underframe.

It is to be understood that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention; and it will be further understood that each and every novel feature and combination present in or possessed by the mechanism herewith disclosed, forms a part of the invention included in this application.

What we claim is:

1. In a draft gear rigging for a railway car, a center sill proper and end extensions thereof forming therewith a draft gear pocket, a draft gear yoke slidably supported in the pocket, an inner cushioning device arranged in the pocket and normally directly interposed under normally preloaded condition between the end of the center sill proper and the inner end of the yoke, abutment means on said end extensions of the center sill, the yoke having a transverse recess, and a second cushioning device arranged in said recess and normally held in preloaded condition between the inner wall of the recess and said abutment means, and means associated with the inner cushioning device for preloading it beyond the normal to facilitate the insertion thereof and of the yoke and the second cushioning device into the pocket, said means being operable to release said abnormal preloading to permit expansion of said inner cushioning device after such insertion into the pocket to normally maintain a bias on the yoke to compress the second cushioning device to its normal preloaded condition between the yoke and the abutment means on the sill extensions, the center sill proper, the yoke and the cushioning devices being in substantially axial alignment.

2. In a draft rigging for railway cars, a draft gear pocket having longitudinally spaced abutments adapted to receive the cushioning units of a draft gear therebetween, said draft gear comprising a draft gear yoke slidably supported in said pocket and inner and outer cushioning units, the inner being normally disposed under preloaded compression between a yoke portion extending between said units and the inner of said abutments, the outer being encircled by the yoke and normally disposed likewise under preloaded compression between said yoke portion and the outer of said abutments, means associated with one of said units for placing it under, and holding it at, an abnormal preloaded compression to foreshorten it so that the overall length of the two units and the yoke portion between them is less than the distance between said abutments, permitting the ready removal from, or insertion into, the pocket of the draft gear, said means being operable to permit the associated unit to expand from its abnormal preloaded compression and act through the yoke portion between the units to place the other unit under normal preloaded compression, the while itself returning to normal preloaded compression.

3. In a draft gear rigging as specified in claim 2, in which the means for placing one of said units under, and holding it at, an abnormal preloaded compression includes adjustable threaded members extending between followers disposed at the opposite faces of said unit.

4. In a draft gear rigging for a railway car, a center sill proper and end extensions thereof forming therewith a draft gear pocket, a draft gear assembly including a yoke arranged within the pocket and an inner cushioning device, an outer cushioning device encircled by the yoke and disposed between abutments carried by said extensions and the yoke, said inner cushioning device being disposed directly between the end of the center sill and the inner end of the yoke; and adjustable means for variably compressing the inner cushioning device preparatory to inserting the assembly within the pocket and to permit its insertion as a unit into said pocket and thereafter permit its expansion in the pocket, the expansion of said inner cushioning device acting to maintain a bias on the yoke to cause the outer cushioning device encircled by the yoke to be normally precompressed between an abutment on the yoke and the abutments carried by the sill extensions, respectively.

5. In a draft gear for a railway car having a center sill proper, the end of which forms the inner end of a draft gear housing, end extensions of the center sill proper forming the sides of said housing, a yoke adapted to have its outer end connected to a coupler shank and slidably mounted in said housing in line with the center sill proper, a pair of inwardly and outwardly disposed shock absorbing cushions, the yoke encircling the outer of said cushions, abutments on the end sill extensions and a follower engaging said abutments, between which and the yoke the outer cushion is normally held in a preloaded condition, the inner cushion being disposed directly between the inner end of the yoke and the end of the center sill proper, this inner cushion being also normally in preloaded condition and acting in said condition to maintain a bias on the inner end of the yoke to preload the outer cushion, a follower on the outer face of said inner cushion and abutments on the end sill extensions to be engaged by said follower upon outward movement of the yoke to maintain the inner cushion under a certain minimum preloading at all times.

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