Nov. 12, 1929. O. C. DURYEA 1,735,424

CAR CONSTRUCTION

Filed June 17, 1926 7 Sheets-Sheet 1

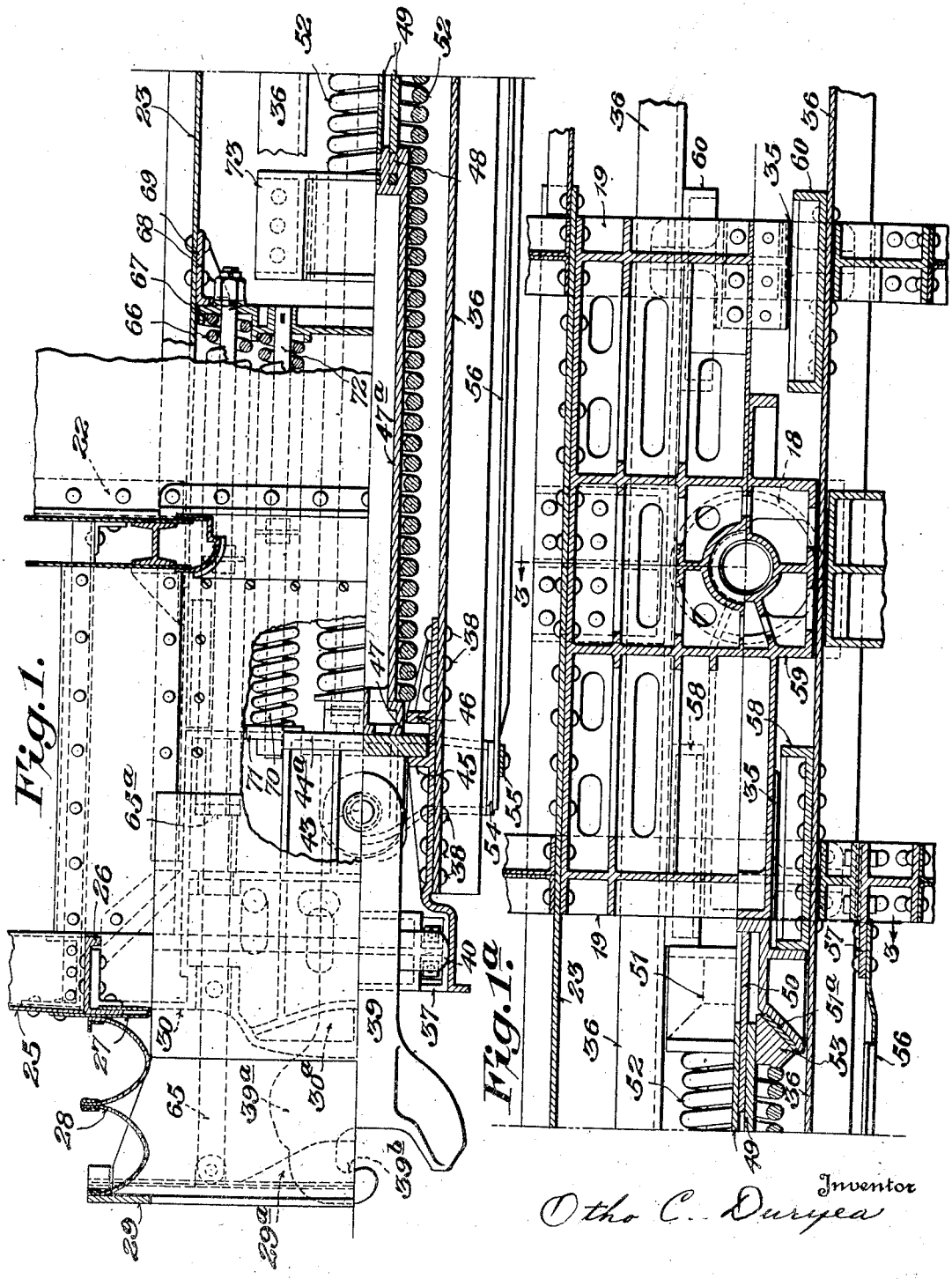

Fig. 1.

Fig. 1a.

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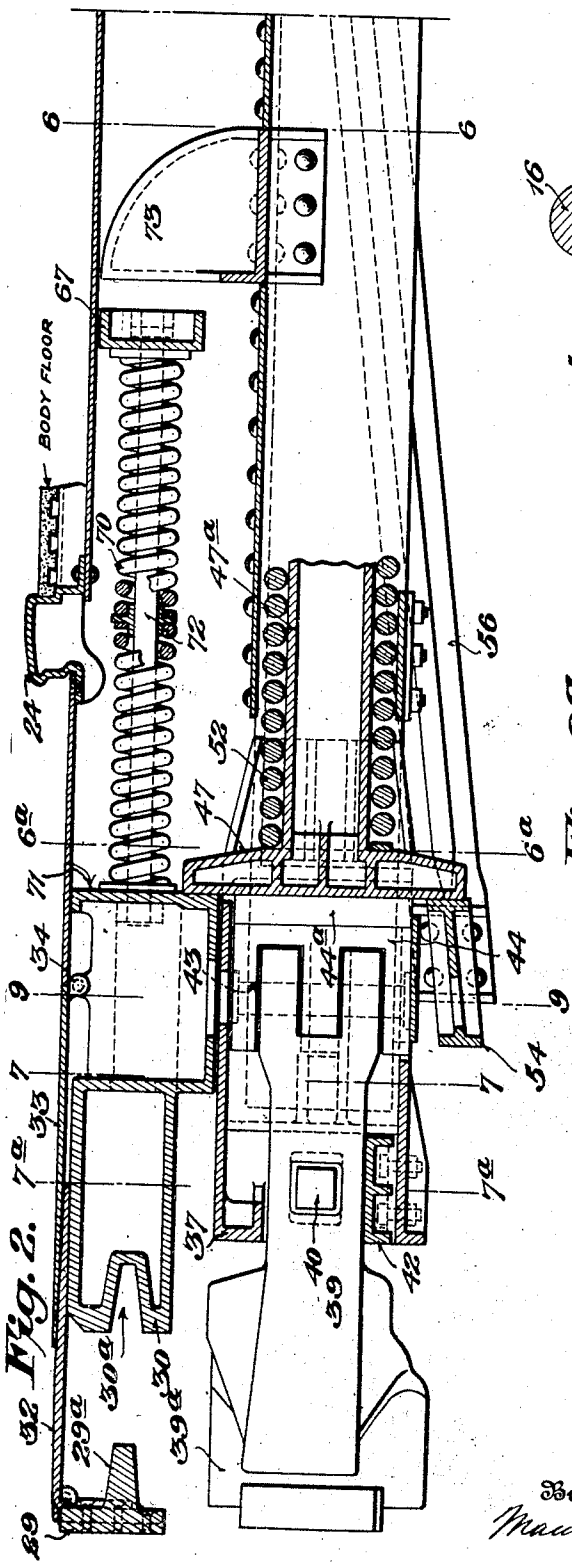

Fig. 2.

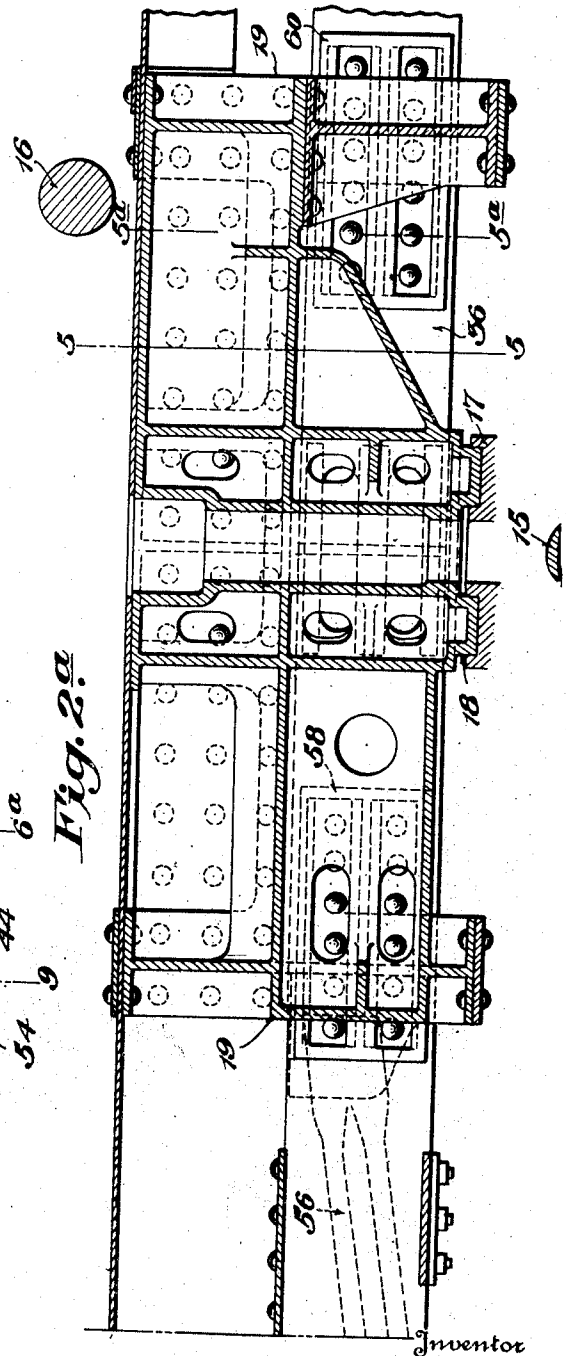

Fig. 2a.

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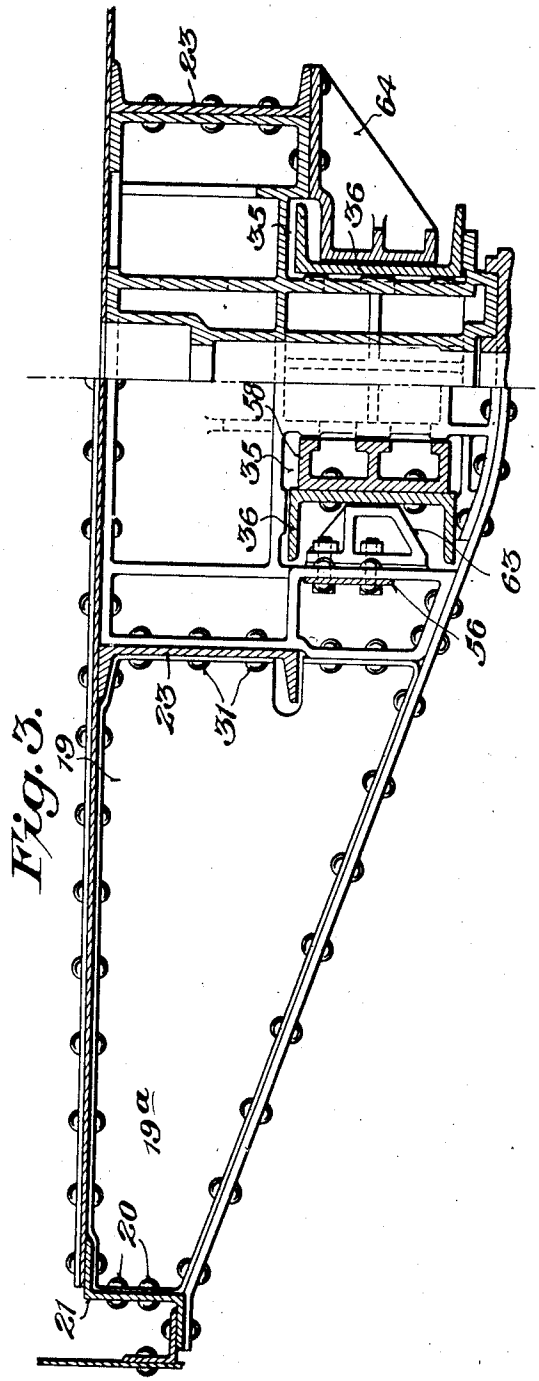

Fig. 3.

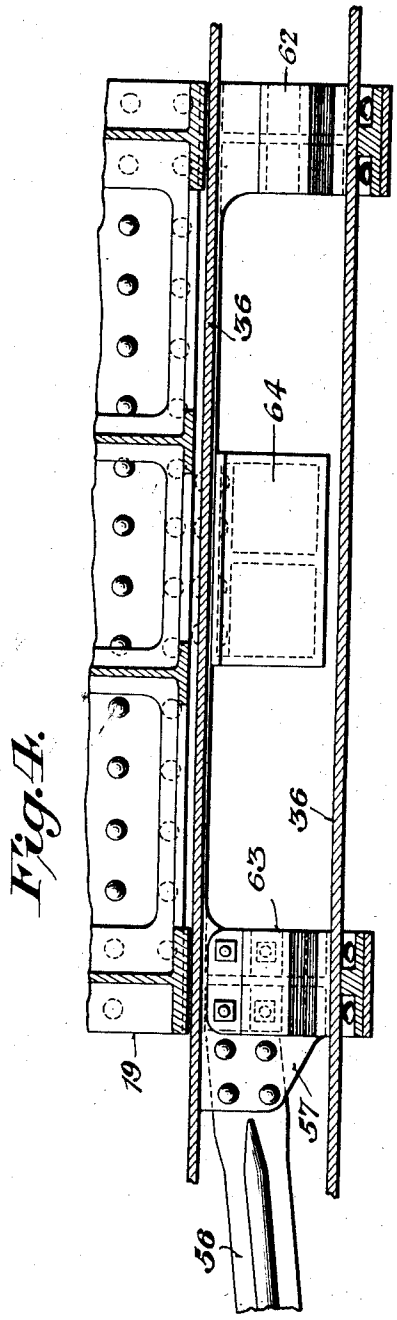

Fig. 4.

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Fig. 5.

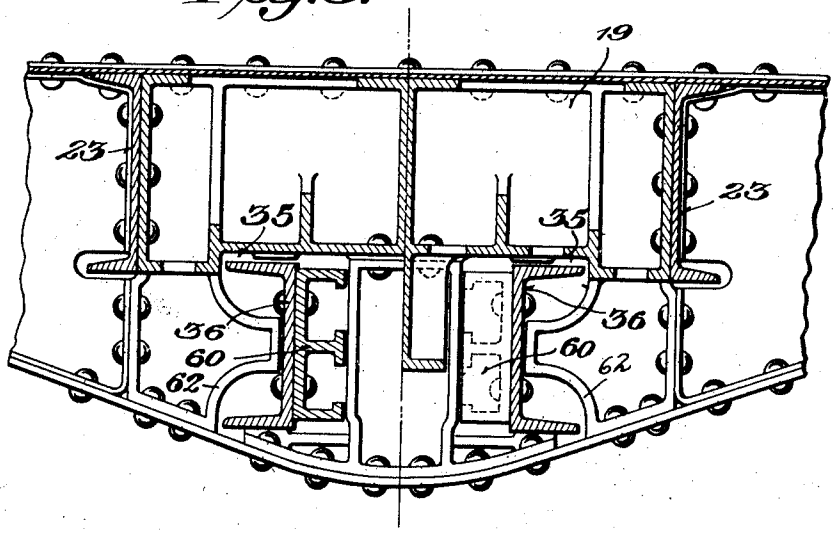


Fig. 6.

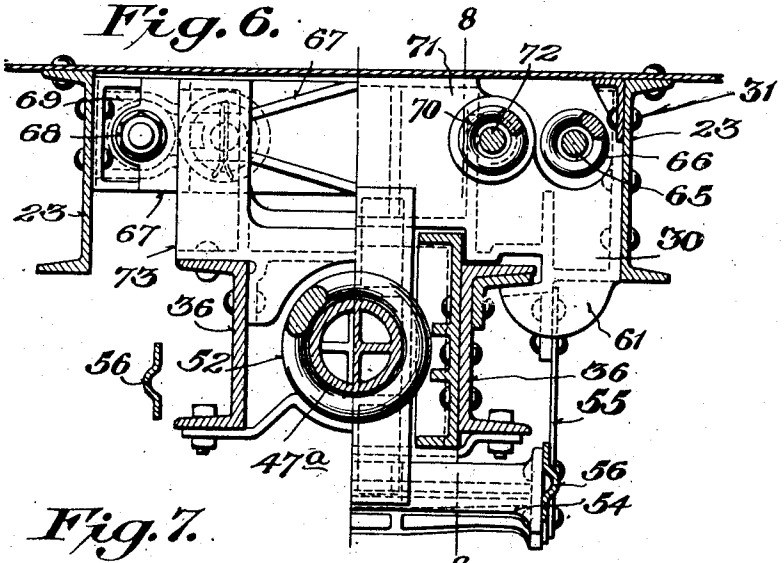
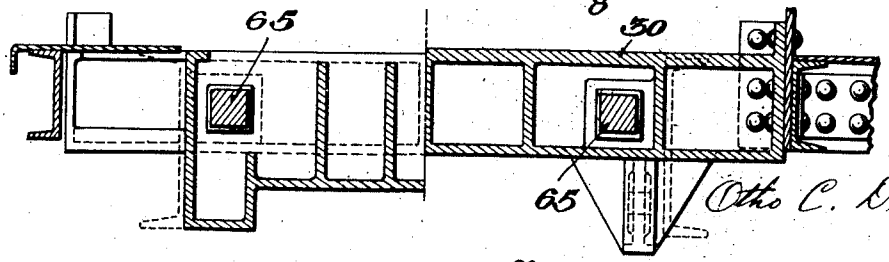


Fig. 7.



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CAR CONSTRUCTION

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Fig. 8.

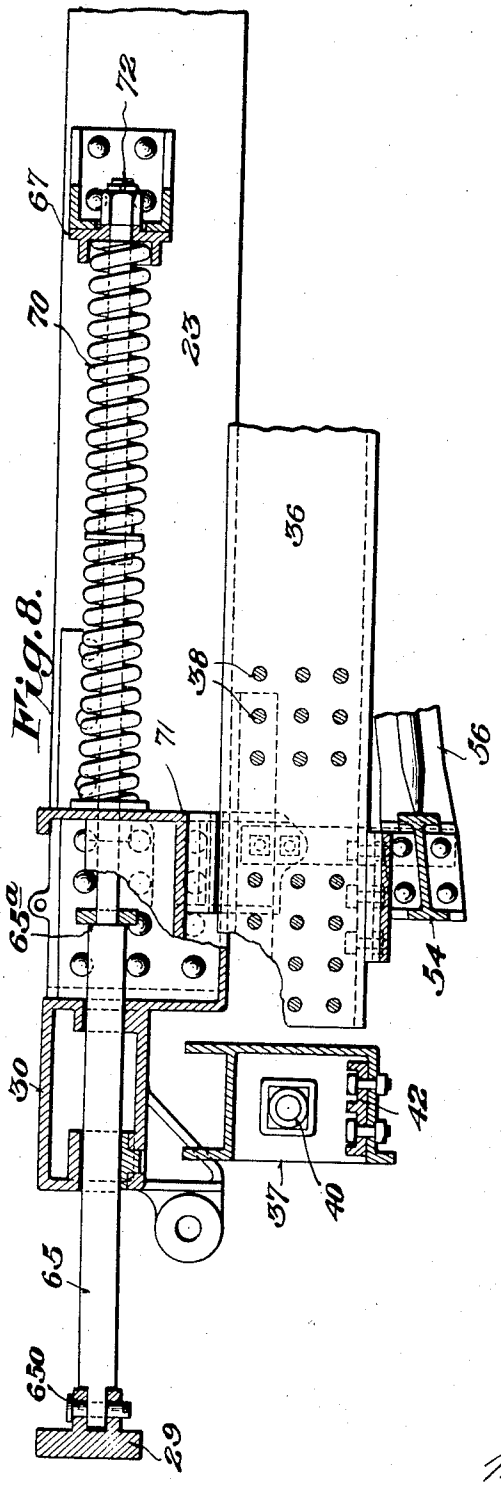


Fig. 10.

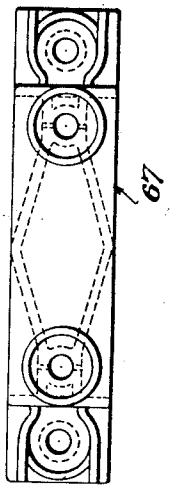
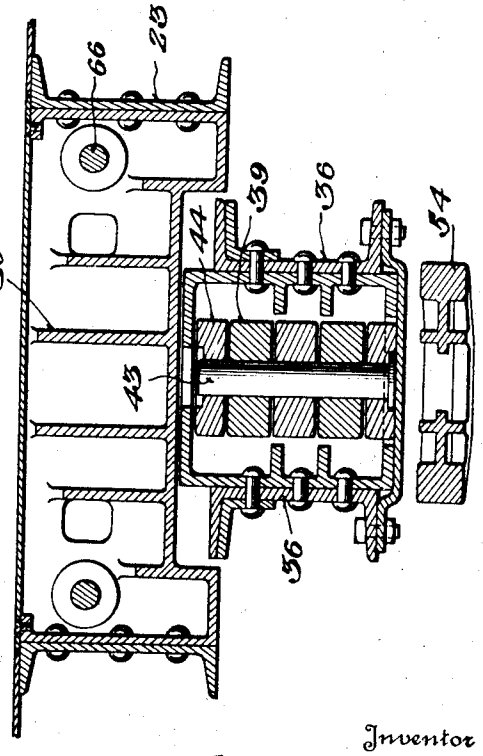


Fig. 9.



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CAR CONSTRUCTION

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Fig. 11.

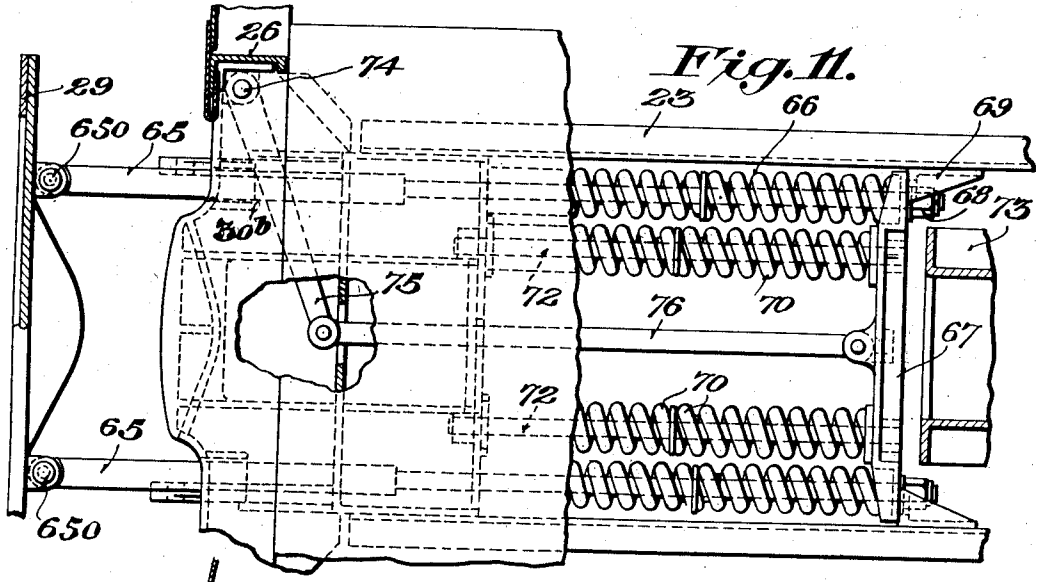
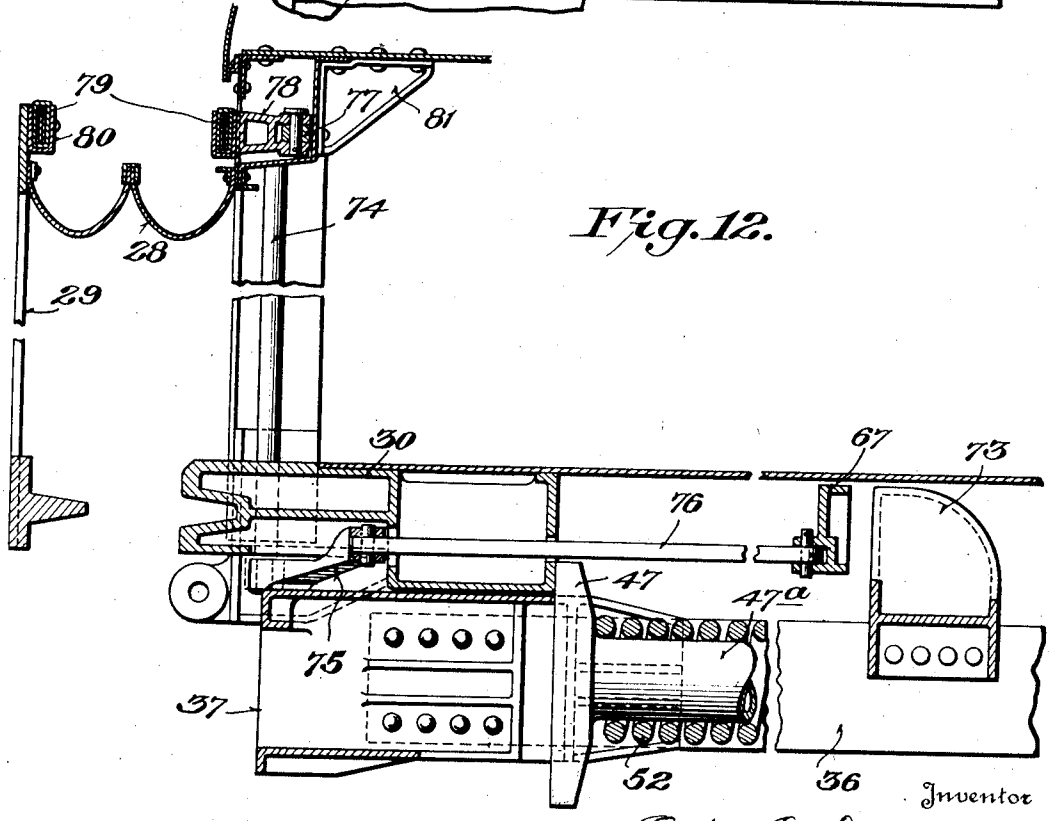


Fig. 12.



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CAR CONSTRUCTION

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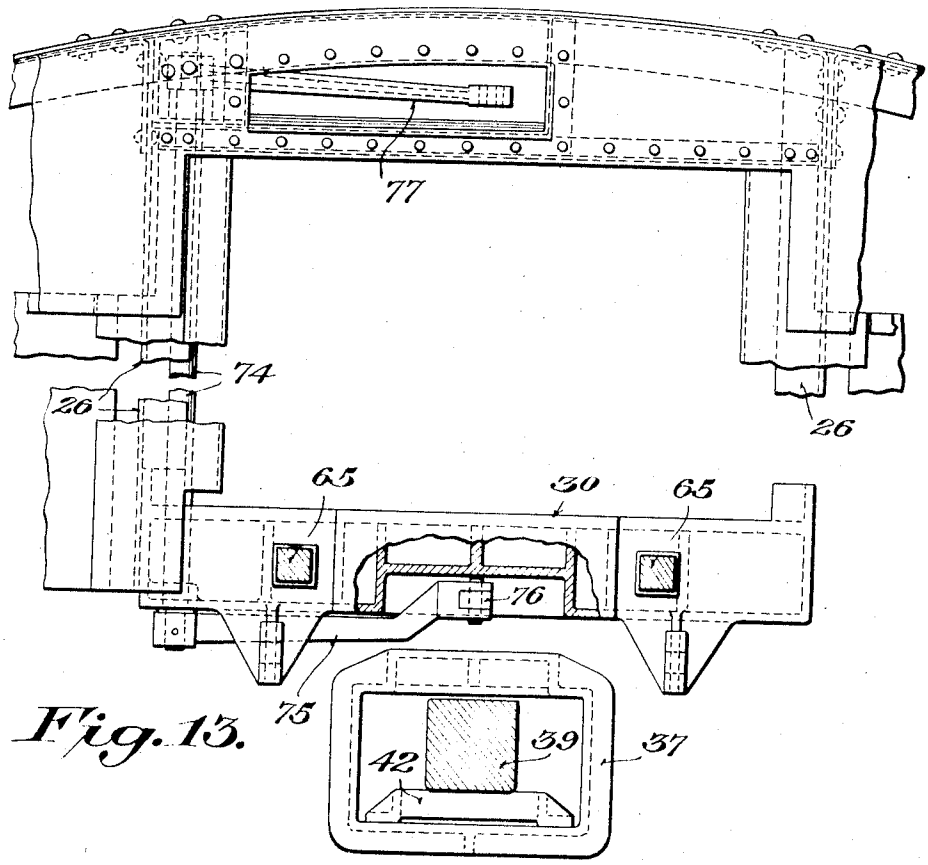
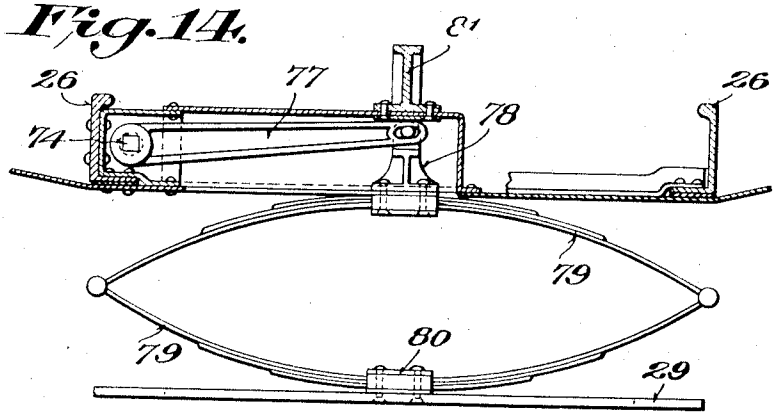


Fig. 13.

Fig. 14.



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1,735,424

UNITED STATES PATENT OFFICE

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CAR CONSTRUCTION

Application filed June 17, 1926. Serial No. 116,695.

This invention relates to railway cars and more particularly to passenger coaches of the vestibule type.

Freight and passenger cars now in use embody short travel draft and buffing mechanism interposed between the draw bars and the car structure. Much annoyance, discomfiture, and frequently, injury are experienced by railway passengers due to the use in passenger coaches of such short travel draft and buffing mechanism. The standard travel of mechanism of this type now in use is only two and one-half inches and the enormous forces involved on draft and buffing cannot be smoothly absorbed by mechanism of such limited travel. It has been considered impossible, from a practical standpoint, to increase the travel of the draft and buffing mechanism for passenger coaches because of the necessity for limiting the train slack, and the necessity for maintaining the face plates of the vestibule diaphragms in engagement at all times in order that passengers may safely pass from one coach to another.

In my copending application Serial No. 105,291, filed April 28, 1926, there is disclosed a novel passenger coach of the vestibule type embodying long travel means for absorbing draft shocks, but said mechanism, when subjected to buffing shocks, has the limited travel which is at present considered as standard.

An object of the present invention is to provide a passenger coach comprising novel means for smoothly resisting draft and buffing shocks imparted thereto under usual operating conditions.

Another object is to provide a passenger coach, embodying a long travel center member, which is so constructed that both draft and buffing shocks will be smoothly resisted, thereby enabling the coach to be placed in motion or stopped without being subjected to the usual jolts or jars.

Another object is to provide an improved passenger coach embodying a long travel center member which extends substantially the length of the car and is located in the same horizontal plane as the couplers or draw bars.

A further object is to provide an improved passenger coach embodying long travel draft and buffing mechanism and yet one which is so constructed that the train slack is maintained within predetermined limits, and may be decreased or increased as desired. Another object is to provide a novel passenger coach of the above type embodying means for preventing the draft and buffing means from going solid.

A still further object is to provide a coach of the "long travel" center member type which embodies novel means for insuring that the vertibule face plates between adjacent coaches will be maintained in engagement at all times in order that passengers may safely pass from one coach to another.

Another object is to provide a vestibule diaphragm construction which is so constituted that the face plate thereof is maintained in a desired position, relative to the coupler head, such, for example, as is now considered standard, and yet one which is so arranged that said face plate is adapted for movement of long travel relative to the car body.

One embodiment of the present invention is illustrated in the accompanying drawings, wherein like reference characters refer to like parts throughout the several views, and wherein—

Figs. 1 and 1ª constitute a partial top plan sectional view through one end of the novel structure constituting the subject-matter of the present invention, the view extending from the vestibule face plate to and including the adjacent double body bolster. A portion of the structure is broken away and certain of the duplicate parts are omitted in order to permit the use of large scale drawings;

Figs. 2 and 2ª constitute a sectional side view of the structure shown in Figs. 1 and 1ª;

Fig. 3 is a sectional end view taken on the broken line 3—3 of Fig. 1ª;

Fig. 4 is a vertical sectional view, with parts broken away, taken through the flanges of one of the channels of the center member in the plane of the body bolster;

Fig. 5 is a composite detail sectional view, the left-hand portion of the figure being

taken on line 5—5 of Fig. 2ª and the right-hand half of the figure being taken on the line 5ª—5ª of Fig. 2ª;

Fig. 6 is a composite sectional detail view, the left-hand half of the figure being taken on line 6—6 of Fig. 2 and the right-hand half of the figure being taken on the line 6ª—6ª of Fig. 2;

Fig. 7 is a composite detail sectional view, the left-hand half of the figure being taken on line 7—7 of Fig. 2 and the right-hand half on line 7ª—7ª of Fig. 2;

Fig. 8 is a longitudinal detail sectional view taken on the line 8—8 of Fig. 6;

Fig. 9 is a transverse sectional view taken on the line 9—9 of Fig. 2;

Fig. 10 is a front elevation illustrating one type of buffer springs follower that may be employed in accordance with the present invention;

Fig. 11 is a top plan detail view, partly in section, illustrating one manner in which the upper end of the vestibule face plate may be operatively connected to the longitudinally movable center member;

Fig. 12 is a center line detail sectional view taken through the end of the vestibule and illustrating one type of mechanism which may be employed for moving the upper end of the vestibule face plate;

Fig. 13 is an end view of the portion of the mechanism illustrated in Fig. 12; and

Fig. 14 is a detail sectional view illustrating one type of resilient means which may be associated with the upper end of the vestibule face plate.

The passenger coach structure constituting the subject matter of the present invention is mounted on six-wheel trucks of suitable type. The center truck axle at one end of the car is illustrated at 15 in Figure 2ª and the adjacent outer truck axle is illustrated at 16 in Fig. 2. The center plate 17 of the six-wheel truck is partially illustrated in Fig. 2ª, and mounted thereon is the usual center plate 18 of a double body bolster 19. The structural details of the double body bolster may be varied and the same may be constituted by a casting, as illustrated, or may be of the built up type. The outer ends 19ª (Fig. 3) of the double body bolster 19 are secured, as by means of rivets 20, to side sills 21 that extend substantially the length of the car body. End sills 22 (Fig. 1) extend inwardly from the side sills 21 to longitudinally extending sub-sills 23 which are preferably constituted by vertically disposed channels (Figs. 3 and 5), that are fixedly secured to the double body bolster 19. The inner ends of sub-sills 23 are located approximately in the vertical plane of the inner face of the double body bolster while the outer ends of the same extend outwardly beyond the end sills 22 and an end door threshold 24 (Fig. 2) to within a short distance of the vertical plane of a vestibule end sheet 25 (Fig. 1). The sub-sills 23 thus constitute supporting means for the vestibule which extends from the end sills 22 to said end sheet 25. The vestibule structure includes a diaphragm post 26, a diaphragm post cover 27, a diaphragm 28, and a diaphragm face plate 29, these last named elements being of any suitable type. Preferably the lower end of face plate 29 is provided on its inner face with a transverse strengthening rib 29ª which is adapted to move into a recess 30ª provided in a buffer member 30, when a buffing force is imparted to said face plate. Preferably the buffer member 30 is formed as a casting and is rigidly attached, as by means of rivets 31 (Fig. 6) to the ends of the sub-sills 23 and said member includes a transversely extending portion or beam 30ᵇ that terminates on the opposite sides of the longitudinal center line of the structure at the diaphragm posts 26. The face plate 29 is provided with a horizontally disposed buffer cover plate 32 which may be pivoted at its outer end to said face plate and which preferably extends beneath a foot plate 33 that is hingedly attached at a suitable point 34 to the buffer member 30. The passenger coach of the present invention is provided with means of long travel for yieldingly absorbing draft and buffing shocks and said means is so constructed that an invariable and predetermined amount of train slack, which may be as limited as desired, is provided.

In the form shown, the double body bolsters 19 are provided with openings 35 (Figs. 1ª and 3) in the lower portion thereof and slidably extending through said openings are two laterally spaced and vertically disposed channels 36, 36 which extend sustantially the length of the car on the opposite sides of the longitudinal center line thereof. The channel members 36 are preferably of such length that their outer ends terminate substantially in the vertical planes of the outer ends of the sub-sills 23. As shown more clearly in Figs. 1 and 2, a member 37 is rigidly attached to the outer ends of the vertical channels 36 as by means of rivets 38. The member 37 which may be formed as a casting, constitutes a housing for a draw bar or coupler 39 having a coupler head 39ª and a pulling face 39ᵇ. The draw bar, in the form shown, embodies a knuckle joint whereby the outer end of the draw bar may move in a horizontal plane relative to the housing 37. Preferably centering means that are diagrammatically illustrated at 40 are carried by the casting 37 for normally maintaining the coupler in the longitudinal center line of the structure and if desired wear plate 42 may be interposed between the lower face of the draw bar and the lower portion of housing 37. A vertically disposed pin 43 constitutes the pivot of the draw bar knuckle joint and the inner link of

said joint is formed by a member 44 that is provided on its inner end with a vertically disposed flange 44^a which coacts with suitable stops 45 and 46 rigidly secured to the inner faces of the channels 36, whereby movement of the coupler relative to the channels constituting the long travel center member 36, 36 is positively limited. The movement of the coupler relative to the center member determines the amount of train slack and as will be apparent this may be varied as desired without varying the extent of movement of the center member relative to the body structure.

Long travel means are provided for resisting movement of the center member in either direction relative to the body structure. A variety of shock absorbing means may be employed for this purpose but preferably energy dissipating means are provided and said means are effective on both draft and buffing for yieldingly resisting relative movement of the center member. In the form shown the energy dissipating means includes a follower 47 having a longitudinally disposed cylindrical portion 47^a. Rigidly secured to the inner end of the cylindrical portion 47^a, as at 48, are a plurality of spaced friction plates 49 which have interleaving engagement with a second set of friction plates 50 that extend into a housing 51 which normally has abutting engagement with the outer face of the double body bolster 19. A resilient member 52, such as a coil spring that may be formed in one or more sections if desired, surrounds the cylindrical portion 47^a and has engagement at its outer end with the head of the follower member 47. The inner end of resilient member 52 has abutting engagement with two or more friction shoes 53 that bear against the inclined surface 51^a of the housing 51. The details of the energy dissipating means illustrated herein are fully set forth in my co-pending application Serial No. 79,449, filed January 5, 1926.

Movement of follower 47 to the left, as viewed in Figs. 1 and 2, is prevented by the buffer member 30 which is normally in engagement with the upper portion of the outer face of said follower. Preferably a transverse beam 54 is mounted for engagement with the lower face of said follower and coacts with buffer member 30 to prevent relative movement of the follower toward the adjacent end of the car structure. As shown, the beam 54 is rigidly connected by hanger irons 55 to buffer member 30, and movement of said beam in a horizontal plane is prevented by means of braces 56 which extend inwardly to the outer face of the bolster and are suitably secured thereto as at 57 (Fig. 4) by means of rivets.

If a buffing force be applied to the draw bar 39, movement of the latter relative to the center member 36, 36 is yieldingly resisted by the elements 49, 50, 52 of the energy dissipating means, since the inner end of spring 52 and the friction plates 50 are prevented from moving by engagement of housing 51 with the lateral face of the double body bolster. The extent of movement of the draw bar relative to the center member determines the train slack and is positively limited by the stops 46. The remainder of the buffing force is absorbed, and partially dissipated, in producing relative movement between the long travel center member 36, 36 and the body structure. In order to prevent the energy dissipating means from going solid when the buffing force is excessive, the center member 36, 36 is provided at suitable points with follower stops 58 (Figs. 1^a and 3) which are adapted to engage the double body bolster, as at 59.

If a draft force be applied to the draw bar 39, the center member 36, 36 will be moved to the left, as viewed in Figs. 1 and 1^a, relative to the body structure. Stops 45 limit the movement of the draw bar relative to the center member and the follower stops 58 engage and move the housing 51 to actuate the elements of the energy dissipating means. The follower 47 is held against movement by its engagement with buffer member 30 and beam 54. Stops 60 prevent the energy dissipating means from going solid.

Suitable means are provided for guiding the center member in its relative longitudinal movement. In the form shown, the buffer casting 30 is provided with supporting and guiding jaws 61 (Fig. 6) which engage the upper flanges of channels 36. Follower stops 58 and stops 60 slidably coact with the body bolster to prevent deflection of the center member in a horizontal plane. Preferably the bolster is also provided with guiding members 62 (Fig. 5) adjacent the inner end of said bolster, with guide members 63 (Fig. 3) adjacent the outer end thereof, and with members 64 in the vertical plane of the bolster center plate. These guiding members engage the outer faces of the webs of the channels 36 and prevent deflection of the center member in a horizontal plane. The center member is guided in a vertical plane by the jaws 61 and by the upper and lower walls of the openings 35 through the bolsters.

As pointed out above, the relative movement of the draw bars at the opposite ends of the coach is quite limited and hence the train slack is limited. On the other hand, the movement of either draw bar relative to the vestibule and car body is of great extent due to long travel of the center member. Accordingly, the coach structure constituting the subject-matter of the present invention embodies novel means for governing the movement of the vestibule face plate to insure that the face plates of two adjacent coaches in a train will be maintained in engagement at all

times regardless of the relative movement of the center member.

The vestibule face plates of passenger coaches now in use normally occupy a position such that their outer faces project beyond the ends of the coach a distance of three inches farther than the pulling face of adjacent coupler head. This arrangement is desirable since the coupler heads now in use have a movement relative to the car body of two and one-half inches and there is thus, at least, one half inch of compression, at all times, in the buffer side stem springs for insuring that the face plates of adjacent coaches of a train will be maintained in engagement.

The structure constituting the subject-matter of the present invention includes novel yielding means for normally maintaining the vestibule face plates in predetermined positions relative to the adjacent couplers. As shown more clearly in Figs. 1, 6, 7 and 8, the buffer member 30 is provided with openings through which slidably extend buffer side stems 65 that are pivoted, as by means of pins 650 (Fig. 8), to the lower portion of the inner face of plate 29. The outer portions of stems 65 are preferably rectangular in cross-sections, while the inner portions are cylindrical, a suitable shoulder 65^a being provided intermediate these portions. Surrounding the cylindrical portion of each of the side stems 65 is a resilient member 66 which engages the shoulder 65^a at its forward end, and a follower 67 (Fig. 10) at the inner end thereof, the latter being provided with openings adjacent its opposite ends through which the side stems loosely extend. Stop means, such as a nut 68, is secured to inner end of each of the side stems 65 to maintain the latter in normal position relative to the buffer springs follower 67. The opposite ends of this follower normally engage stops 69 secured at suitable points to the sub-sills 23, and said follower is yieldingly held in engagement with the said stops by means of springs 70 that have engagement at the inner ends with the outer face of the buffer springs follower and at their outer ends with abutments 71 (Fig. 1) which, in the illustrated embodiment, are formed integral with the buffer casting 30. Due to the length of the resilient members 70 it may be desirable to provide pilot rods 72 which, as shown, are attached to follower 67 and slidably extend through the abutments 71.

When a passenger coach is coupled with the structure illustrated (see Fig. 1), the face plate 29 is moved inwardly, or to the right, by the face plate of said coach, a distance of approximately three inches, compressing springs 66 which are held against movement by follower 67 and stops 69. When the face plate 29 is so moved the pulling face 39^b of the coupler is engaged and the coupling is completed. Any further movement of coupler 39 and face plate 29 to the right relative to the vestibule merely serves to increase the compression on springs 66 and to move the side stems through the openings in follower 67. No force is placed on springs 70.

When a draft force is applied to coupler 39, the latter, together with the center member 36, 36 is moved to the left relative to the vestibule. If this relative movement exceeds two inches a center member follower 73 carried by the center member and having a portion projecting above the upper flanges of channels 36 engages buffer springs follower 67 and carries the latter to the left against the tension of spring 70, said motion being transmitted through springs 66 to the side stems 65 and face plate 29. It will thus be apparent that the outward movement of the face plate 29 will vary according to the relative movement of the center member, and that the vestibule face plates of two adjacent coaches will be maintained in engagement at all times. Springs 70 insure that the vestibule face plates will normally be maintained in the position illustrated in Figs. 1 and 2.

It is desirable that means be provided for insuring that the upper ends of the vestibule face plates will move at all times in accordance with the lower ends of the same. For this purpose, the structure of the present invention embodies a vertically disposed rod or shaft 74 (Figs. 11 to 14) which is rotatably mounted in any suitable manner adjacent the diaphragm post 26, said rod preferably extending from the horizontal plane of buffer springs follower 67 upwardly to the horizontal plane of the upper end of the vestibule face plate 29. The lower end of shaft 74 is operatively connected, as by means of a rigidly attached lever 75 and a link 76, to the buffer springs follower 67, the link being pivoted to said lever and follower. A lever arm 77 is fixedly secured to the upper end of shaft 74 and the opposite end of said arm terminated in the vertical plane of the longitudinal centerline of the coach structure. In the illustrated embodiment, the lever arm is attached by a pin and slot connection to a clip 78 that is rigidly secured to the central portion of the inner half of a horizontally disposed elliptic plate spring 79. The outer half of spring 79 is secured as by means of a clip 80 to the upper end of the vestibule face plate 29. Suitable stop means 81 is provided for limiting the inward movement of lever arm 77. Movement of the draw bar and center member to the left, as viewed in Figs. 11 and 12, is yieldingly transmitted to the upper end of face plate 29 by follower 73, buffer springs follower 67, link 76, lever 75, rod 74, arm 77, and spring 79.

It will be seen that there is provided a novel passenger coach embodying long travel means for yieldingly resisting draft and buffing shocks, and yet one which is so constructed as to maintain the train slack with-

in desired limits and the vestibule face plates of adjacent coaches of a train in engagement at all times. In order to employ large scale drawings a portion only of the structure at one end of the coach has been illustrated. It will be understood, however, that a similar structure is employed at the opposite end of said coach. The means for controlling the movement of the upper end of the vestibule face plate have been omitted from certain of the figures in the interest of clearness. The channels 36 are shown as being rigidly connected at the outer ends by member 37 and it is to be understood that additional means may be employed along the length of said channels to provide a rigid center member. Various changes may be made in the details of construction without departing from the invention. For example, among others, the means for resisting relative movement of the center member may be constituted by suitable energy absorbing means, or by various types of energy dissipating means other than that illustrated and described. Reference will therefore be had to the appended claims for a definition of the limits of the invention.

What is claimed is:—

1. In a passenger coach, a body including a vestibule and body bolsters, a center member mounted for movement of great extent in either of two directions relative to said body and extending substantially the length of the body, long travel yielding means for resisting draft and buffing shocks imparted to the center member, coupler means movably connected to the center member, and means for positively limiting the movement of the coupler means relative to the center member.

2. In a passenger coach, a body having a vestibule, a vestibule diaphragm operatively connected to the vestibule, a face plate for said diaphragm, long travel yielding means for normally maintaining the face plate in a predetermined position relative to the vestibule, a long-travel center member mounted for movement relative to said body and adapted to coact with said yielding means, yielding means of long travel for resisting relative movement of the center member in either direction, and coupler means operatively connected to the center member.

3. In a passenger coach, a body including a vestibule, a vestibule face plate operatively connected to the vestibule, resilient means for normally maintaining said face plate in a predetermined position relative to the vestibule, a long-travel center member mounted for movement relative to said body and adapted to coact with said resilient means, said center member being located in a horizontal plane below said resilient means, long-travel yielding means for resisting movement of the center member in either direction, and coupler means operatively connected to said center member.

4. In a passenger coach, a body having a vestibule, a vestibule diaphragm operatively connected thereto, a face plate for said diaphragm, and means for moving said face plate outwardly relative to the vestibule, said means including a resilient member operatively connected to the upper end of the face plate, and means for moving said resilient member outwardly relative to said vestibule.

5. In a passenger coach of the vestibule type, a vestibule face plate, buffing means for said vestibule face plate, a long-travel center member mounted for movement relative to said buffing means, said center member being mounted in a plane below said buffing means and adapted to coact with said means, and long-travel resilient means for yieldingly resisting relative movement of the center member in either direction.

6. In a passenger coach, a body having a vestibule, means including a vestibule face plate operatively secured to said vestibule, a long-travel center member mounted for movement relative to said body, long-travel yielding means for resisting movement of the center member in both directions relative to said body, and means operatively connected to said face plate and said center member for moving said face plate outwardly relative to said vestibule.

7. In a passenger coach, a body structure including bolsters and a vestibule having a face plate, a movable center member extending substantially the length of the body structure, long-travel yielding means for resisting movement of said member in both directions, said member being adapted for movement of great extent in both directions relative to said body structure, and means for maintaining said face plate in engagement with the face plate of the next adjacent coach in a train regardless of the relative movement of said center member.

8. In a passenger coach, a body structure including a vestibule having a face plate, a center member extending substantially the length of said body structure, said member being adapted for longitudinal movement in both directions relative to said body structure, means for resisting relative movement of the center member, and means operatively associated with said center member for moving said face plate outwardly relative to said vestibule.

9. In a passenger coach, a body structure including a vestibule, a diaphragm for said vestibule, a face plate for the diaphragm, buffing means for said face plate, a long-travel center member extending substantially the length of the body structure and operatively associated with said buffing means, said center member being mounted below the plane of said buffing means, coupler means secured

to the center member, and means for yieldingly resisting movement of the center member relative to the body structure in both directions.

10. In a passnger coach, a body structure including a vestibule, a diaphragm for said vestibule, a long-travel center member extending substantially the length of said structure, means for resisting relative movement of the center member in either direction, means for securing limited train slack associated with said center member, and means operatively connected to said center member and the upper portion of the diaphragm for actuating the latter.

11. In a passenger coach of the vestibule type provided with a diaphragm and vestibule face plate, a long-travel center member extending substantially the length of the coach, yielding means for resisting relative movement of said center member, side stems for the face plate, a follower carried by said side stems, resilient means having operative engagement with said stems and said follower, resilient means having engagement with said follower for normally maintaining said face plate in a predetermined position relative to the center member, a link pivoted to said follower, lever means connected to said link, resilient means interposed between said face plate and said lever means, and means on said center member for engaging and moving said follower.

12. In a passenger coach, a body structure including a vestibule, a vestibule diaphragm and a face plate, a long-travel center member extending substantially the length of the structure, yielding means for resisting relative movement of the center member, and means for moving said face plate relative to the body structure, said last-named means including a follower slidably connected to said face plate, means on the center member for engaging said follower, and resilient means engaging said follower and adapted to normally maintain the latter in a predetermined position relative to said face plate.

13. In a passenger coach, a body structure including a vestibule, a vestibule diaphragm and a face plate therefor, a long-travel center member extending substantially the length of the structure, yielding means for resisting relative movement of the center member in either direction, and means for moving the face plate outwardly with respect to the body structure, said last-named means including a follower, means carried by the center member for engagement with said follower, lever means operatively connected to said follower, and an elliptic spring secured to said face plate and lever means.

14. In a passenger coach, a body structure including a vestibule, a vestibule diaphragm and a face plate therefor, means for moving said face plate relative to the body structure including buffer side stems having engagement with the face plate and slidably mounted relative to the body structure, a follower carried by said stems, resilient means interposed between the follower and the body structure, resilient means carried by the side stems, lever means operatively connected to the follower and resilient means having operative engagement with the lever means and said face plate.

15. In a passenger coach, a body structure including a vestibule, a vestibule diaphragm and a face plate therefor, a center member extending substantially the length of the structure and mounted for movement relative thereto, means for yieldingly resisting relative movement of the center member, coupler means operatively connected to the center member and movable with respect thereto, means for positively limiting movement of the coupler means relative to the center member, and means operatively associated with said center member including lever mechanism and a plurality of resilient members for normally maintaining said face plate in a predetermined position relative to said coupler means.

16. In a passenger coach, a body structure including a vestibule, a vestibule diaphragm and a face plate, a long-travel center member extending substantially the length of the structure and adapted for movement relative thereto, means for yieldingly resisting relative movement of the center member in either direction, said last-named means including a follower, means including a buffing member associated with said face plate, said buffing member normally having engagement with said follower, and a transverse member operatively secured to the buffing member and normally having engagement with said follower.

17. In a passenger coach, a body structure including a vestibule, a long-travel center member extending substantially the length of the structure and mounted for movement relative thereto, energy dissipating means for resisting movement of the center member relative to the body structure, coupler means slidably connected to the center member, and means for positively limiting the movement of the coupler means relative to the center member, movement of the coupler means relative to the center member being yieldingly resisted by said energy dissipating means.

18. In a passanger coach, a body structure including a vestibule, a vestibule diaphragm and a face plate, sub-sills carried by said structure, buffing means secured to said sub-sills and adapted for engagement with said face plate, a center member extending substantially the length of said structure and

movably mounted in a plane located below said buffing means, yielding means for resisting relative movement of the center member in both directions, and means carried by the buffing means for guiding said center member in its longitudinal movement.

19. In a passenger coach, a body structure including a vestibule and a vestibule face plate, buffer means for the face plate, a center member extending substantially the length of the structure and mounted for substantially equal movement in two directions relative thereto, said center member being adapted to coact with said buffer means, energy dissipating means for yieldingly resisting movement of the center member relative to the structure, and means carried by the center member for preventing said energy dissipating means from going solid.

20. In a passenger coach, a body structure including a vestibule and a body bolster, a long-travel center member extending substantially the length of the structure and mounted for equal movement in two directions relative thereto, said center member having sliding engagement with said bolster, yielding means for resisting movement of the center member, and means carried by the center member and normally having engagement with said yielding means, said last-named means being adapted to engage said bolster to prevent said yielding means from going solid.

21. In a passenger coach, a body structure including a vestibule having a vestibule face plate, buffer means for said face plate, a continuous draft member mounted for substantially equal movement in both directions longitudinally of said body structure and adapted to coact with said buffer means, and yielding means for resisting relative movement of the draft member in either direction.

22. In a passenger coach, a body structure including a vestibule and a vestibule diaphragm, a face plate for said diaphragm, long-travel means mounted for movement relative to the body structure, coupler means operatively secured to said long-travel means, said face plate normally occupying a position outwardly of the pulling face of the coupler means, means for yieldingly resisting relative movement of the center member in either direction, and means operatively associated with said travel means for moving said face plate outwardly beyond said normal position.

23. In a passenger coach, a body structure, a long-travel center member mounted for movement relative to said structure, coupler means carried by said center member, means for resisting movement of the center member in either direction, a vestibule face plate for said body structure, and means operatively associated with said center member for moving said face plate from its normal position outwardly relative to said body structure.

24. In a passenger coach of the vestibule type, a long travel draft and buffing member extending substantially the length of said coach and mounted for substantially equal movement in both directions longitudinally of said coach, a vestibule element movable with said draft and buffing member, long travel yielding means for resisting relative movement of the draft and buffing member in either direction, and coupler means secured to the opposite ends of said draft and buffing member, the long travel of the draft and buffing member being secured without a corresponding increase in the train slack.

In testimony whereof I have signed this specification.

OTHO C. DURYEA.