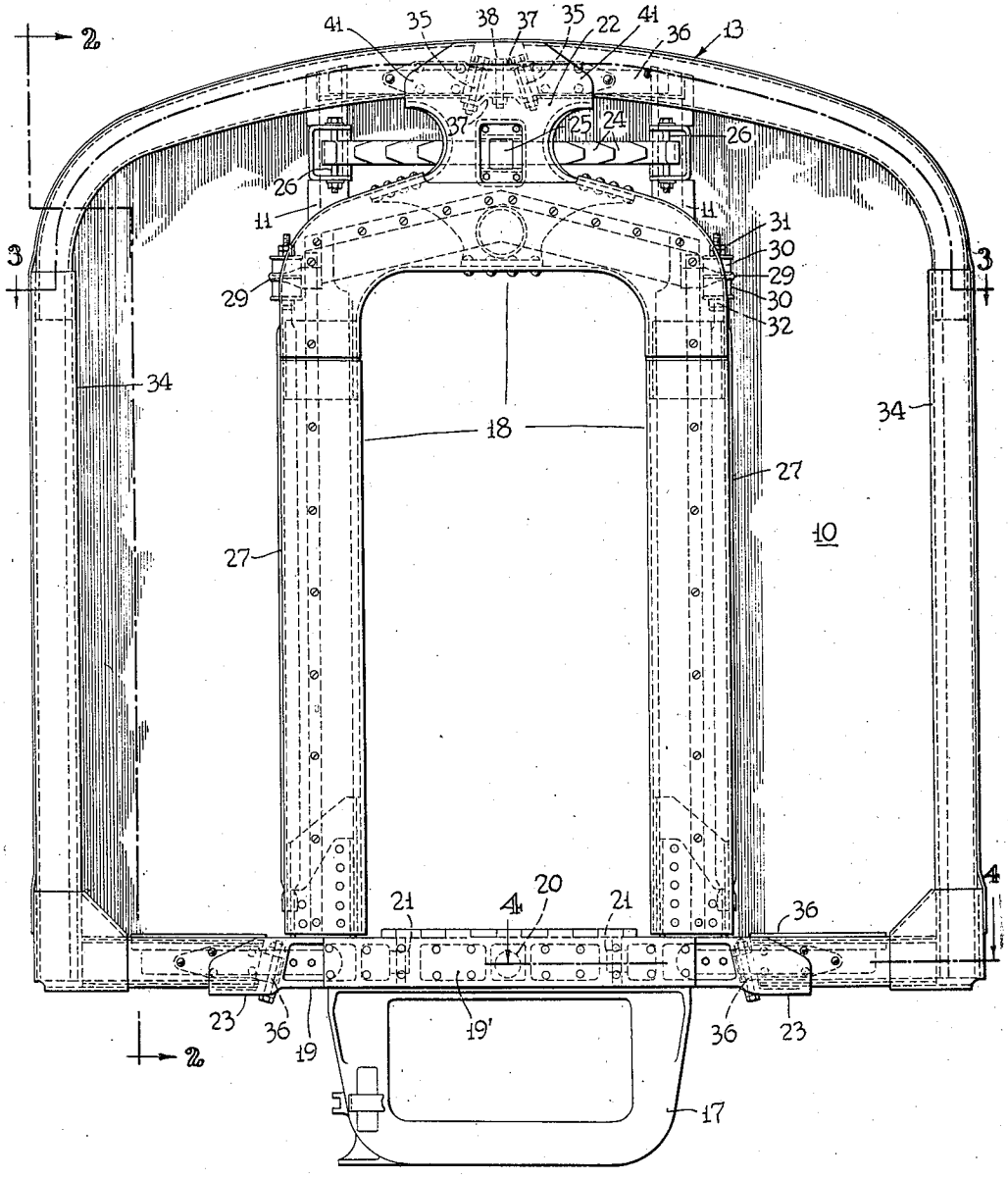
Feb. 4, 1947. W. B. DEAN ET AL 2,415,385

DIAPHRAGM SUPPORT FOR RAILWAY CARS

Filed Oct. 2, 1945 3 Sheets-Sheet 1

FIG. 1.




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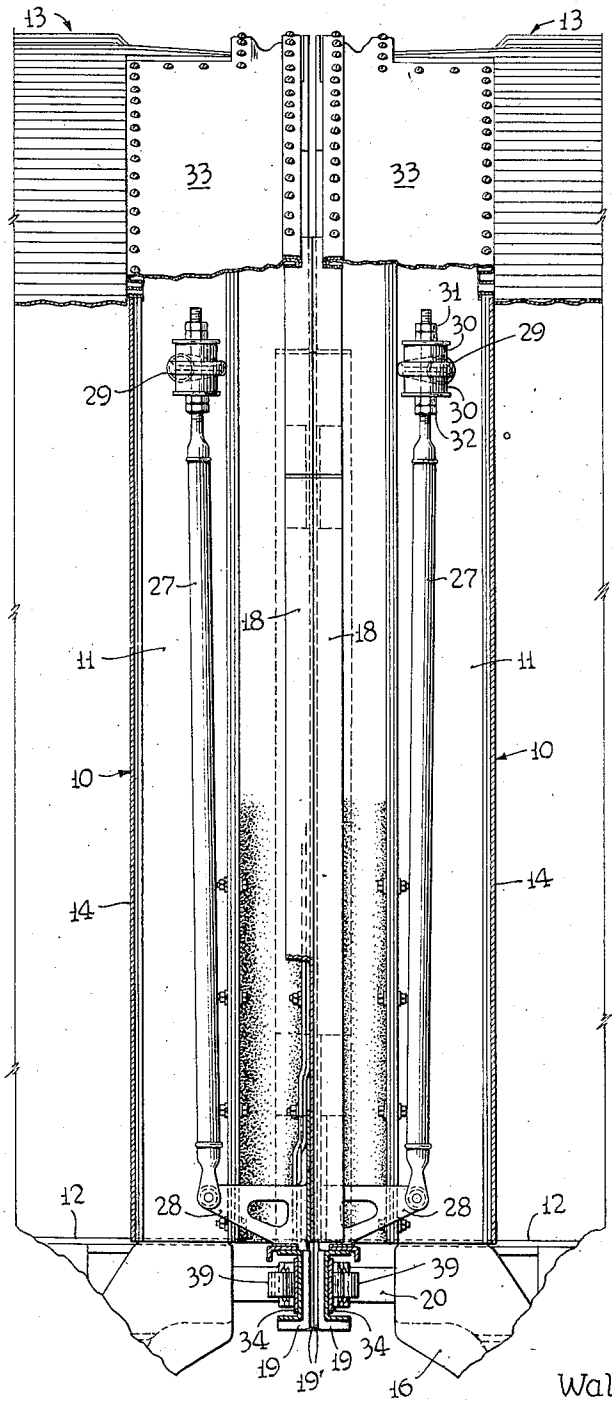
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FIG. 2.




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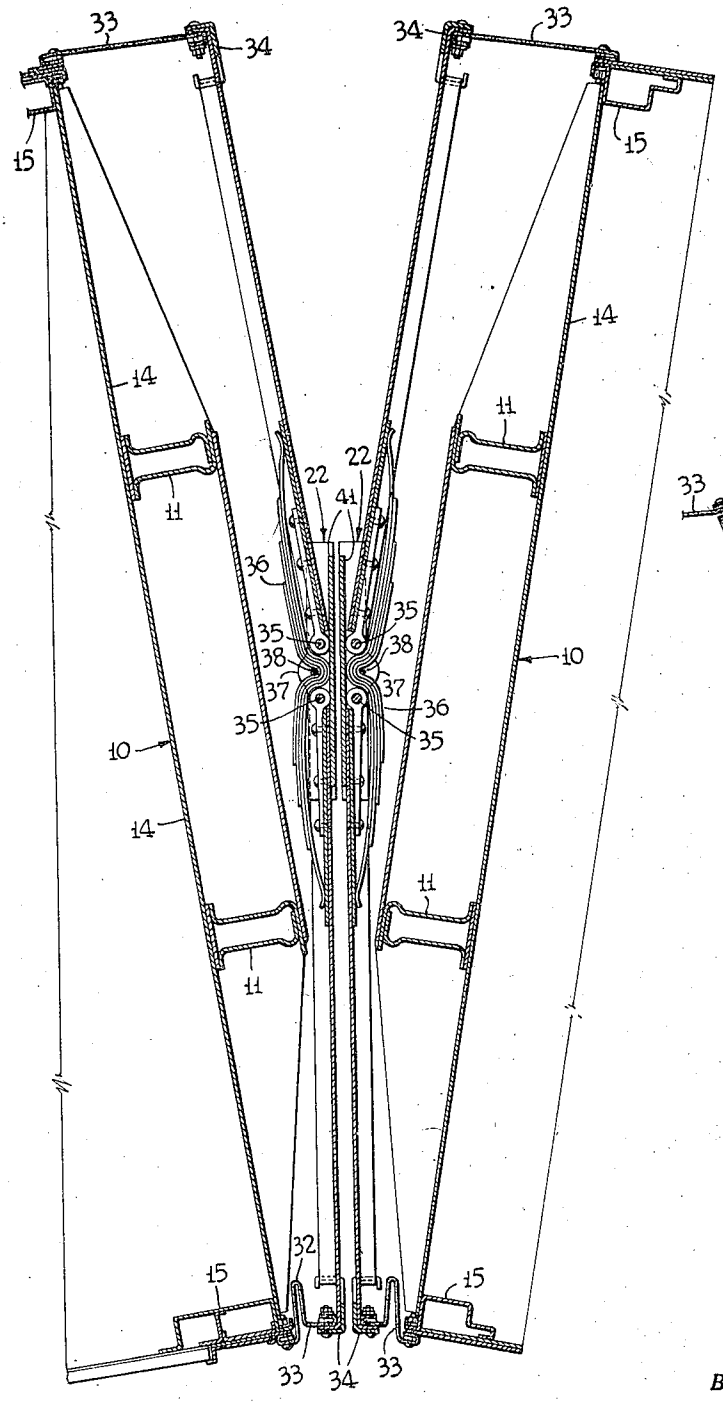
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DIAPHRAGM SUPPORT FOR RAILWAY CARS

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FIG. 3.



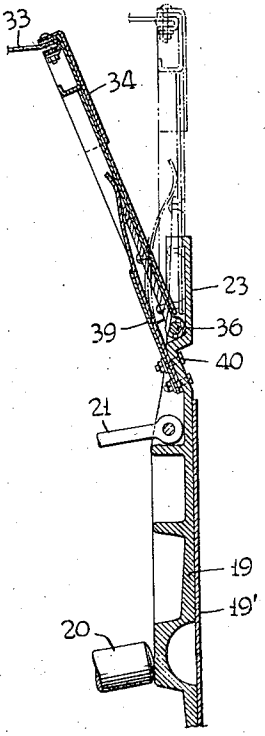




FIG. 4.

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Patented Feb. 4, 1947

2,415,385

# UNITED STATES PATENT OFFICE

2,415,385

## DIAPHRAGM SUPPORT FOR RAILWAY CARS

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Application October 2, 1945, Serial No. 619,825

4 Claims. (Cl. 105—15)

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The invention relates to railway cars and particularly the diaphragm support structure associated with the car end and adapted to form with inner and outer flexible diaphragms extending between said structure and the car end wall, respectively, an inner passageway for persons going from car to car and an outer streamline extension of the car end wall.

Such structure usually comprises a combined buffer and face plate extending around a doorway opening in the car end and supported from said end wall for in and out and pivotal movement substantially in the longitudinal central vertical plane of the car. Further, the combined buffer and face plate is constantly urged in outward direction to maintain flatwise engagement with a corresponding structure on an adjoining coupled car under all normal conditions of operation. To form the inner passageway this face plate is connected at sides and top to the sides and top of the doorway opening in the car end by a flexible diaphragm and the buffer has connected to it a walkway overlapping the car platform.

An outer frame conforming generally to the sides and top contour of the car end wall is usually supported either from the face plate or from the car end wall and is also urged outwardly to maintain an outer flexible diaphragm connecting it to the sides and top of the car in substantially taut condition to form a streamline extension of the car end, which cooperates with a similar extension on an adjoining coupled car to form an outer closure between such coupled cars.

It is among the objects of the invention to simplify such a diaphragm support structure, to facilitate its fabrication and to insure long life and minimize servicing, and to lighten the overall construction.

These and other objects and advantages and the manner in which they are attained will become apparent from the following detailed description when read in connection with the drawings forming a part of this specification.

In the drawings,

Fig. 1 is an end elevational view of a railway car equipped with the invention;

Fig. 2 is a fragmentary enlarged side elevational view, parts being shown in section, of two adjoining coupled car ends embodying the invention, the line of section being indicated by the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary transverse sectional view corresponding to the coupled car end showing in Fig. 2, the section being taken through the

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upper portion of the structure, substantially along the line 3—3 of Fig. 1, and the parts being shown in the position they would assume when the cars were rounding a curve in the track; and

Fig. 4 is a similar sectional view, taken substantially along the line 4—4 of Fig. 1, through the lower portion of the structure, but showing only the portion corresponding to the left hand top portion of Fig. 3, the full line position corresponding to the position of said portion of Fig. 3, and the dotted line position indicating the position assumed by the parts when operating on a straight track.

According to the embodiment selected for illustration, the end wall of the car is designated generally by the reference numeral 10 and has a central doorway opening therein flanked by door posts 11 extending from platform 12 to the roof 13. The roof merges smoothly at its sides into the side wall contour and both said roof and said side walls are joined to the end wall panel 14 by corner reinforcements as indicated at 15, in Fig. 3.

The platform 12 is supported in usual fashion by an underframe including an end sill 16 which is shown in this instance carrying a downwardly projecting coupler bar carrier 17, Fig. 1.

The face plate 18 is supported in a usual manner outwardly of the car end wall 10 and surrounds a doorway corresponding and longitudinally aligned with the doorway opening in the car end wall. The bottom member 19 of the face plate may be a buffer casting covered on its outer face by a plate 19', and it is backed centrally by a usual buffer stem 20 and hinged to usual side stems 21, 21. The buffer stem and side stems are, as usual, urged outwardly by springs (not shown) to move the face plate to its outward position, where it is held flatwise in engagement with a corresponding face plate on an adjoining coupled car under all normal conditions of operation.

At the top, the face plate is provided with an upward extension 22 of reduced transverse width, this extension being widened at the extreme top for a purpose which will appear hereinafter. This top extension may conveniently be a separate casting, riveted to the channel section sheet metal body of the face plate. In the coupled cars, these top extensions 22 of adjoining cars are preferably slightly spaced apart as shown in Fig. 3.

Similarly, the bottom buffer member 19, 19' of the face plate is provided with end extensions 23, 23 projecting laterally beyond the main body of

the face plate for a purpose which will hereinafter appear.

The face plate is urged outwardly at the top by a usual means such as a multi-leaf spring 24 secured centrally, at 25, to the face plate extension 22 and having its ends engaging suitable connections on the posts 11, 11 of the car end wall at 26, 26.

To carry the weight of the face plate and associated parts, the usual vertically extending hanger rods 27, 27 are provided, one at each side thereof. These rods are pivoted at their lower ends to brackets, as 28, rigidly mounted on the face plate, and at their upper ends, they are mounted for limited universal movement in brackets, as 29, secured to the adjacent posts 11, such movement being cushioned by rubber washers 30, arranged above and below the bracket 29, and compressed by the nuts 31, 32 threaded on the end of the rod, which is received loosely within an opening in the bracket. This arrangement also permits of an adjustment of the length of the rods.

Since the particular manner of support of the face plate forms no part of the invention, no further description thereof is necessary. Suffice it to say that the face plate must at all times be held in flatwise engagement throughout its main body surrounding the doorway therein with the corresponding face plate of a coupled car, i. e. it must be yieldingly forced outwardly but be capable of in and out movement and angular movement, such as occurs in rounding curves.

According to the invention, the outer flexible diaphragm designated generally, by 33, which forms a streamline extension of the end of the car is preferably carried at its outer margin by a pair of hinged side members 34, 34. Each of these side members is hinged by an inclined hinged connection, 35, 36, respectively, to the widened extreme upper portion of the face plate extension 22 and to the adjacent lateral extension 23 of the buffer member 19 of the face plate 18. The hinged connections 35 and 36 are aligned with each other so that the member can freely swing thereon, and in each case they are located a substantial distance inwardly of the member to which they are connected, such as the widened extreme end of upward extension 22 and the end extension 23 of the buffer, and in such relation thereto that these parts form stops to limit the outward swinging movement of the associated member 34. With this arrangement the member can be made a relatively light sheet member of channel form, adding but little to the overall weight of the combined structure.

This arrangement also enables the use of a simple form of spring reacting between the face plate and the adjacent portion of the member to urge it to its outer position to maintain the diaphragm taut. At the top where the opposed hinges 35, 35 are located close together a single multiple-leaf spring 36 may be used, this spring being centrally secured, between vertically spaced brackets, as 37, and a vertical pin or bolt 38 passing through them, to the face plate extension 22 between the opposed hinges 35, 35, the free ends of the spring being reversely bent and engaging the respective members 34 to move them outwardly.

At the bottom separate multi-leaf springs as 39, are rigidly connected at their inner ends to an inclined portion 40 of the buffer casting and have their outer reversely bent free ends pressing against the associated member 34 to urge it outwardly. This spring arrangement forms the lightest and most efficient spring arrangement for constantly urging the members outwardly, and is very easy to install and maintain, and capable of long life. As clearly appears in Figs. 3 and 4, the outward movement of the members 34 under the action of the springs 36 and 39 is limited by their engagement at a substantial distance from the hinge axis with the lateral extensions 41, at the top and 23 at the bottom.



The invention has herein been described in detail in connection with a specific embodiment selected for illustration but it will be understood that changes and modifications may be made by those skilled in the art, without departing from the main features of the invention, and such changes and modifications are intended to be covered by the appended claims.

What is claimed is:

1. In combination, a railway car end wall having a central doorway opening, a diaphragm face plate having an opening aligned with said doorway opening and extending from top to bottom of said end wall, said face plate being supported in spaced relation from said end wall for in and out and pivotal movement substantially in the central vertical plane of the car, lateral members hinged to the inward side of said face plate on hinge lines disposed some distance inwardly from the adjacent side margins of said face plate, whereby said members have substantial overlaps with said face plate and are limited in their outward swinging movement by said overlapping engagement with said face plate, a flexible diaphragm connecting the peripheral side and top portions of said members with the periphery of the sides and top of the car end wall, and leaf springs secured to the face plate and having their free ends engaging said lateral members to urge them outwardly toward the overlapping engagement with the face plate and maintain the diaphragm taut.

2. In combination, a railway car end wall, a diaphragm face plate not substantially greater in width than a doorway opening therein but extending from top to bottom of said end wall, said face plate being supported in spaced relation from said end wall for in and out and pivotal movement substantially in the central vertical plane of the car, lateral members hinged to the inward side of the face plate on inclined hinged lines disposed some distance inwardly from the adjacent side margins of the face plate with their top portions closely approaching each other, whereby said members have a substantial overlap with said face plate and are limited in their outward swinging movement by said overlapping engagement with said face plate, a flexible diaphragm connecting the peripheral side and top portions of said members with the periphery of the sides and top of the car end walls, and leaf springs secured to the face plate and having their free ends engaging the respective lateral members to urge them outwardly toward the overlapping engagement with the face plate and maintain the diaphragm taut, a single such leaf spring being centrally secured to the face plate and having its ends engaging the respective closely approaching top portions of the lateral hinged members.

3. In combination, a railway car end wall, a diaphragm face plate having a main body framing a doorway opening therein, the bottom member of the face plate having lateral extensions beyond the main body of the face plate and the

top member having an upward extension of less width than the main body and laterally widened at its extreme upper end adjacent the top of the car end wall, said face plate being supported in spaced relation from said end wall for in and out and pivotal movement substantially in the vertical central plane of the car, lateral members hinged to the inward side of said face plate on hinges disposed some distance inwardly of the widened extreme upper end of the upward extension of said face plate and the lateral extensions of the bottom member of the face plate, respectively, whereby said members have substantial overlap with said face plate and are limited in their outward swinging movement by said overlapping engagement with the face plate, a flexible diaphragm connecting the peripheral side and top portions of said hinged members with the periphery of the sides and top of the car end wall, and leaf springs at top and bottom rigidly secured to the face plate and having their free ends engaging said hinged members to urge them outwardly and maintain the diaphragm taut.

4. In combination, a railway car end wall, a



diaphragm face plate surrounding a doorway opening and extended upwardly to the top of the car end wall by a relatively narrow upward extension, widened laterally outwardly at its extreme top end and a laterally extended bottom member, said face plate being supported in spaced relation from said end wall for in and out and pivotal movement substantially in the central vertical plane of the car, lateral members hinged at top and bottom, respectively to the inward side of the laterally widened extreme top end and the laterally extended bottom member of the face plate on hinges disposed some distance inwardly of the lateral margins of said top end and laterally extended bottom member to form a substantial overlap between them limiting the outward swinging of said members, and means for urging said members outwardly to maintain the diaphragm taut, comprising a multi-leaf spring secured centrally of the top face plate extension and having its free ends engaging the respective hinged members.

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