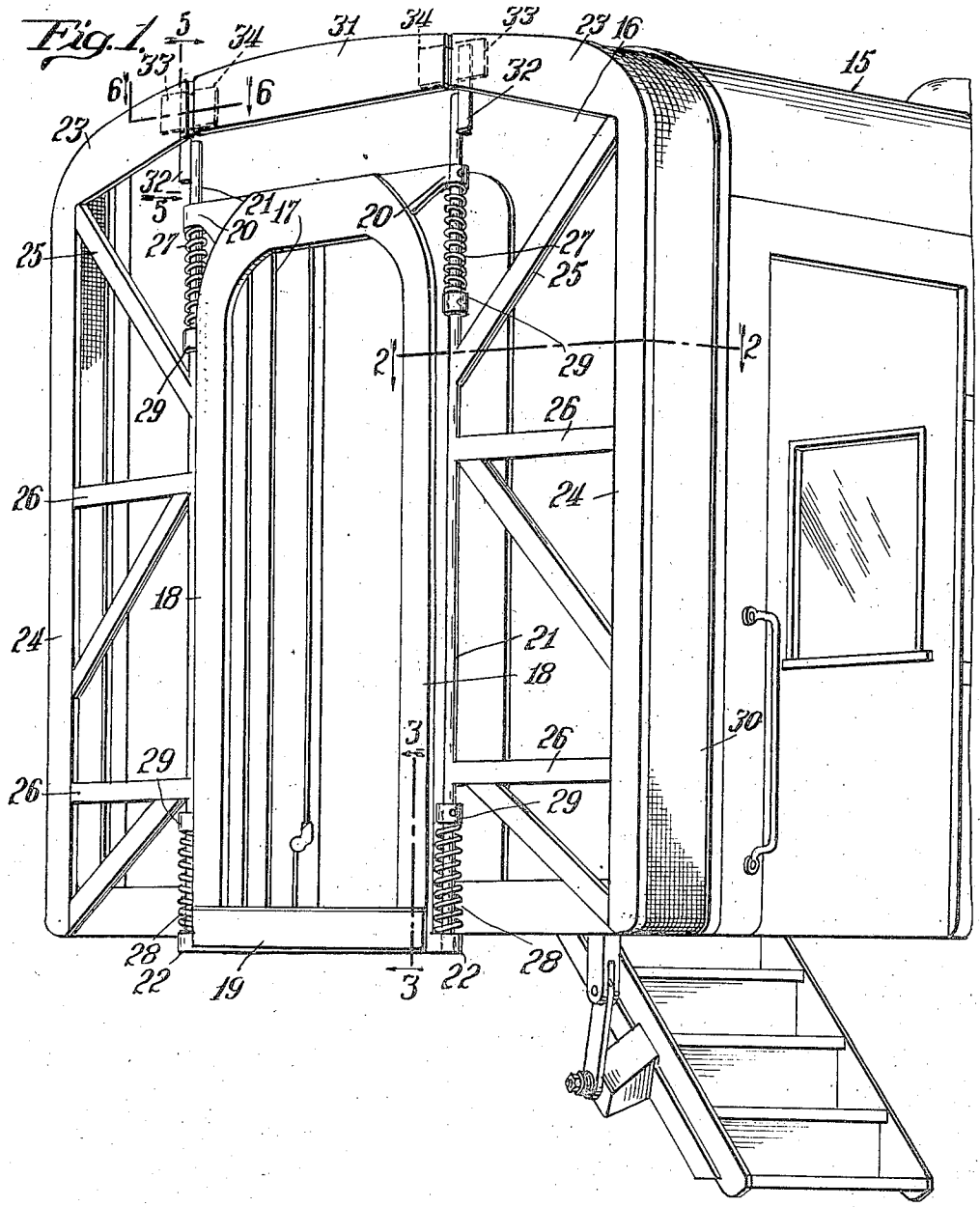
March 4, 1941. K. F. NYSTROM 2,234,059

DIAPHRAGM FOR RAILROAD PASSENGER CARS AND METHOD OF MOUNTING SAME

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Fig. 1.



Inventor

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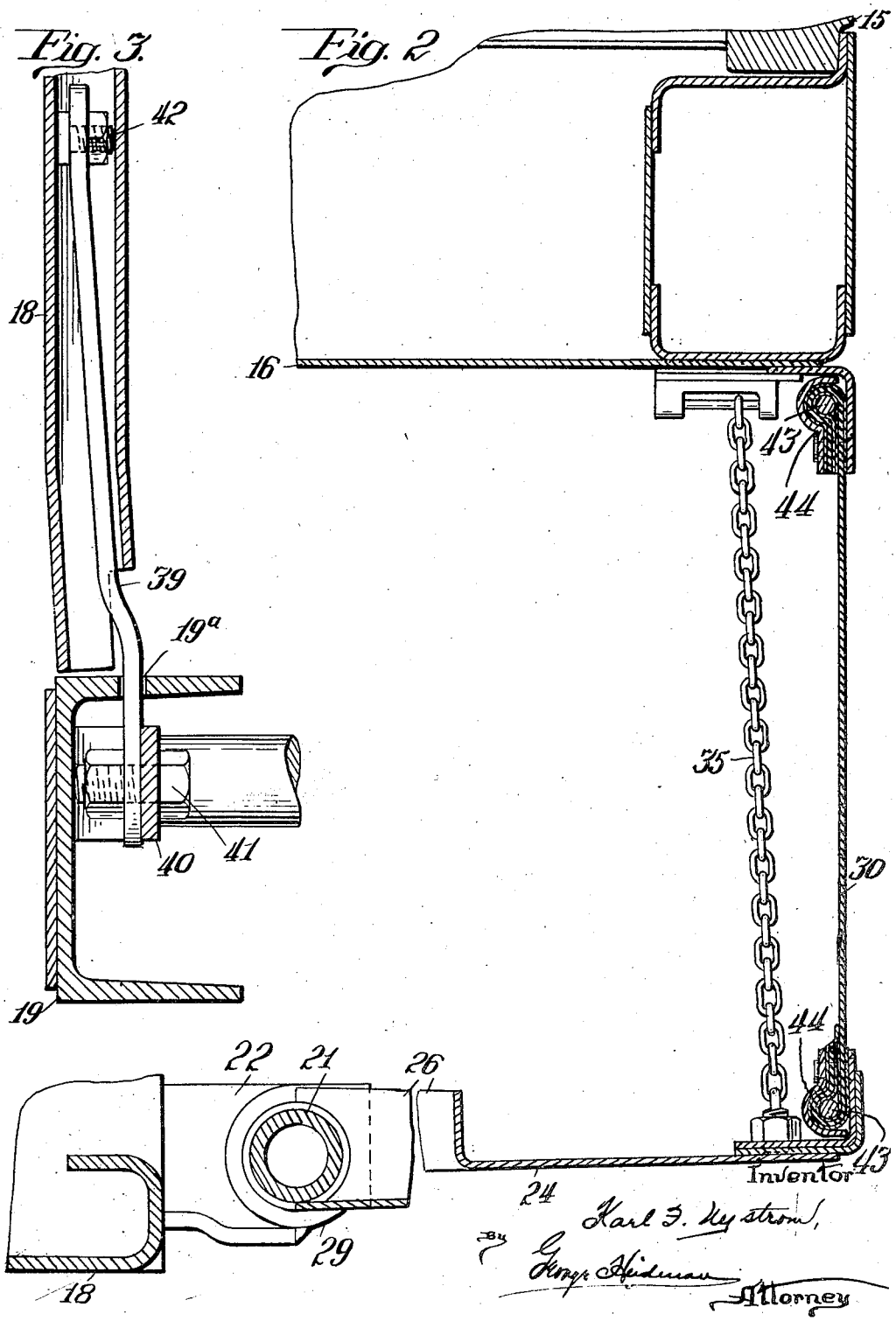
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DIAPHRAGM FOR RAILROAD PASSENGER CARS AND METHOD OF MOUNTING SAME

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DIAPHRAGM FOR RAILROAD PASSENGER CARS AND METHOD OF MOUNTING SAME

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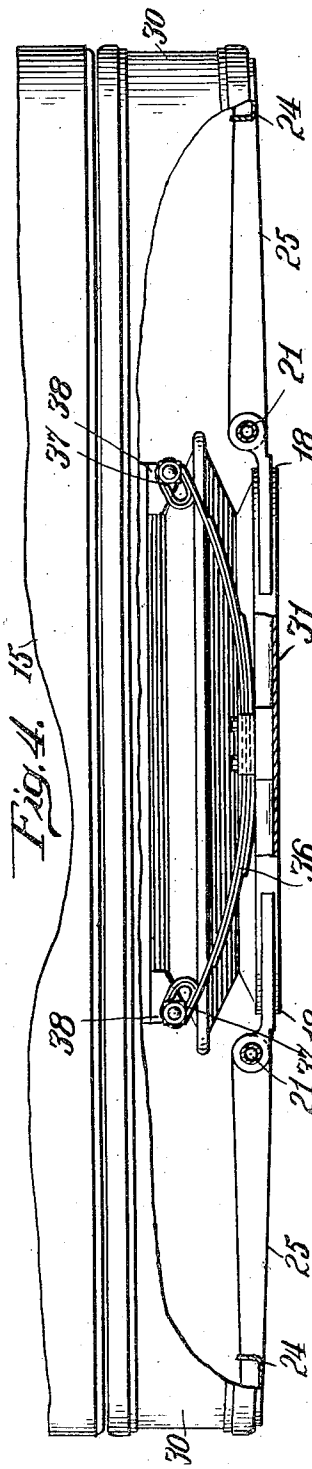


Fig. 4.

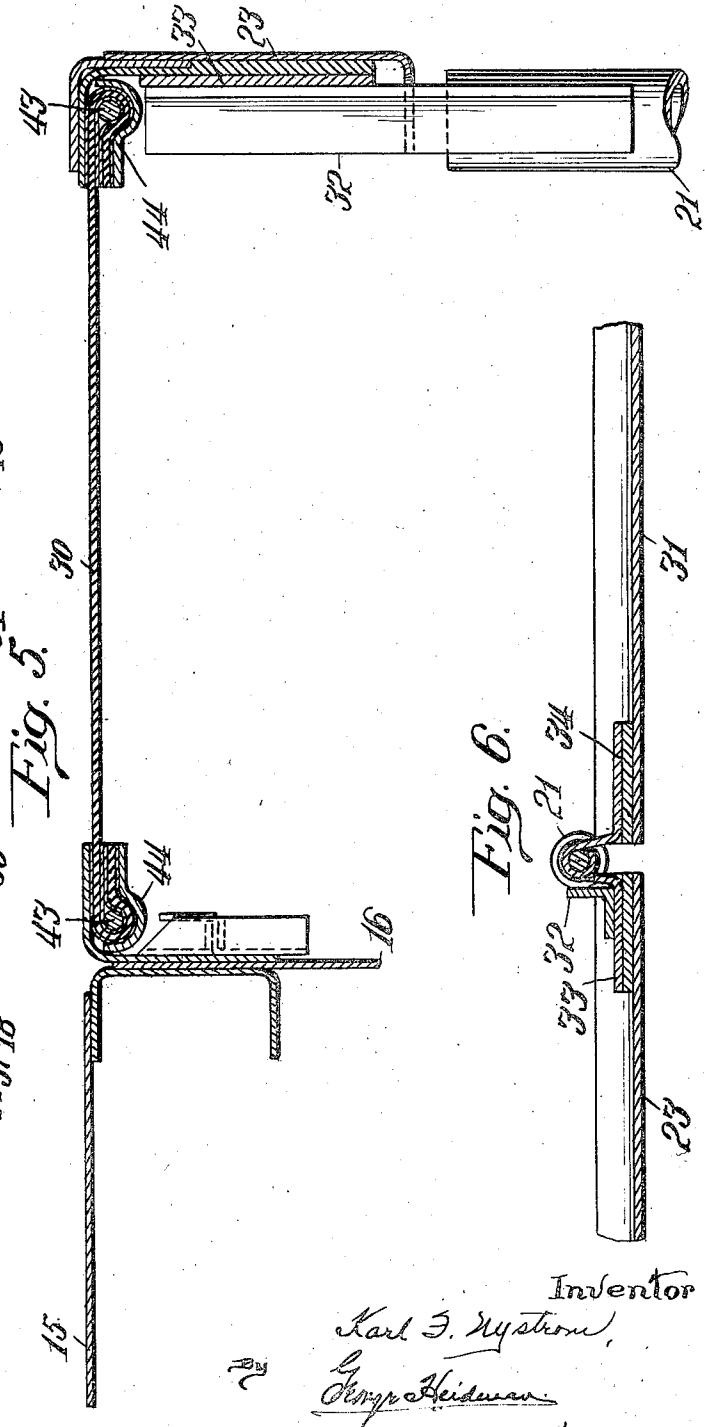


Fig. 5.

Fig. 6.

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UNITED STATES PATENT OFFICE

2,234,059

DIAPHRAGM FOR RAILROAD PASSENGER CARS AND METHOD OF MOUNTING SAME

Karl F. Nystrom, Milwaukee, Wis.

Application August 9, 1937, Serial No. 158,148

14 Claims. (Cl. 105—10)

My invention relates to diaphragms especially intended for use on high speed railroad passenger trains; and has for its object the provision of an outer diaphragm substantially in line with the side walls of the car, in conjunction with the inner diaphragm which connects the vestibule face plate with the vestibule.

The invention also has for its object the provision of means for suitably mounting both inner and outer diaphragms whereby proper exclusion of cinders, dust and other foreign matter not only is obtained, but the presentation of air resisting surfaces is also eliminated.

The invention also involves means whereby a proper coaction between the inner and outer diaphragms is provided and wear and noise are eliminated; said means also preventing undesirable strains on the diaphragms; while at the same time keeping the diaphragms taut under normal conditions.

The above enumerated objects and the advantages, as well as other advantages inherent in the invention, will all be more readily comprehended from the detailed description of the accompanying drawings, wherein:

Figure 1 is a perspective view of the vestibule end of a railroad passenger car, illustrating my invention applied thereto.

Figure 2 is a horizontal sectional view taken on the line 2—2 of Figure 1, looking downwardly.

Figure 3 is a vertical sectional view taken substantially on the line 3—3 of Figure 1; looking in the direction of the arrows.

Figure 4 is a top plan of a part of the roof of a car vestibule and the diaphragm portion, with portions broken away to disclose mechanism therebeneath.

Figure 5 is an enlarged sectional view taken on the line 5—5 of Figure 1, looking in the direction of the arrows.

Figure 6 is a sectional view of one of the hinges and taken substantially on the line 6—6 of Figure 1.

My invention contemplates the use of inner and outer diaphragms at the vestibule ends of railroad passenger cars and involves means for mounting the same whereby wear will be greatly reduced and noise will be eliminated; while at the same time a proper flexible or yielding operative connection between the inner and outer diaphragms is provided adapted to compensate for curves in the track without subjecting the outer diaphragm to undue strains or tension.

An exemplification of the invention is disclosed in the accompanying drawings wherein the vestibule end of a railroad passenger car is disclosed at 15 in Figure 1 and the outer end wall of the vestibule is shown at 16, which is formed to provide the usual passage-way disposed substantially in line with the longitudinal center of the car.

This central passage-way is enclosed by the inner diaphragm 17 consisting of U-shape folds of suitable fabric, one side whereof is suitably secured to the vestibule end wall 16, while the other side is secured to the vestibule face plate 18 which is of inverted U-shape construction as shown in Figure 1 and terminates at the buffer member 19.

The upper end of the face plate 18 is provided with the laterally disposed lobes or extensions 20, 20 disposed toward opposite sides and each provided at the outer end with a hole for passage of the rod or tube 21 therethrough. The lower ends of the rods or tubes 21 are journalled in ears or extensions 22, 22 at opposite ends of the buffer member; while the upper ends of these tubes or rods extend through the lobes 20, 20 and are non-rotatably secured to the upper portions 23, 23 of the frame members 24, 24 in the manner later described.

The frame members 24, 24 are normally arranged in the planes of the car sides, while the upper portions 23 thereof extend substantially into the same horizontal plane as the car roof.

The frame members 24 involve the diagonal and horizontal brace members 25, 26, whose inner ends are suitably secured to the respective rods 21 so as to oscillate therewith.

Each rod 21 is shown provided with a pair of coil springs 27, 28; one of the ends of springs 27 being fixedly secured to the extensions 20, 20 while the other ends are operatively secured to the rods 21 as by means of the collars 29 which are immovably secured to the rods thus inducing the springs 27 to exert a torsional or twisting action to the rods. The lower ends of springs 28 are secured to or held by the ears 22 of the buffer member 19, and the upper ends of springs 28 are operatively secured to the rods 21 by the collars 29 (immovably secured to the rods), thus causing springs 28 to also exert a twisting force on the rods 21; the torsion of the springs 27 and 28 tends to force the outer sides of frames 24 away from the vestibule outer wall 16.

The outer frame members 24, like the face plate 18 of the inner diaphragm, are normally arranged in spaced relation with the vestibule

wall 16, with the space between the face plate 18 and the vestibule wall 16 enclosed by the inner diaphragm 17; while the space between the frame members 24, 24 and the vestibule wall 16 is enclosed by an outer diaphragm 30. The outer diaphragm 30 preferably extends from the lower ends of the frame members 24, 24 and hence from the horizontal plane of the car bottom or platform upwardly and across the tops of the upper frame portions 23 and the intermediate top face plate 31, to provide a complete enclosure as shown in Figures 1 and 4.

The upper end of each rod 21 is shown provided with an off-set extension or angle bar, as at 32, which is integrally secured to the rod, while the upper end of the bar is intimately (by welding or otherwise) secured to the top portion 23 of each frame side member 24.

Arranged intermediate of each angle bar 32 and the frame portion 23 is one leaf or member 33 of a suitable hinge and a similar or mating leaf or member 34 is intimately secured to the top section 31 of the face plate or frame. The hinge-pin receiving portions of these leaf members 33 and 34 are preferably offset rearwardly toward the vestibule wall in order to permit the side sections 24 to swing in proper arcs and these members 33 and 34 are provided with a suitable hinge pin as shown in Figure 6. It will be understood that both the side frames 24, 24 are similarly hinged to the top section 31 of the sectional frame and that the hinges permit the two side frames 24, 24 to have independent swinging movement toward and away from the vestibule end wall; movement toward the vestibule wall being induced by contact between two opposing frame members 24 at the adjacent ends of two cars, namely the frames located on the inside of a curve in the track. The frames are immediately forced outwardly or away from the vestibule end wall by the action of the springs 27, 28. The maximum outward movement of the frames 24, 24 may be controlled by any suitable flexible means, as for example by chains 35 shown in Figure 2; one end of each chain being suitably secured to the vestibule or car platform under-structure while the other end of each chain 35 is secured to the outer swinging frame member 24; the maximum outward position of the frames 24 being such that the outer diaphragms 30 normally will be taut without, however, subjecting the diaphragm to severe stretching strains.

The top face plate 31 is yieldingly supported and maintained outwardly in normal position by the action of the semi-elliptic spring 36, see Figure 4, whose intermediate portion bears against the top section 31 while the ends of the spring have slotted or shackle-like connection at 37, 37 with a suitable frame portion or bracket 38 adjacent the roof structure of the car or vestibule end wall. In the event of forcible contact between the frame members of the opposing ends of two cars, the top section with the attached upper ends of the side sections may move slightly inwardly or toward the vestibule end wall as is apparent from the spring structure 36; and such slight inward movement is also permitted because the face plate 18 of the inner diaphragm will likewise be moved inwardly and carry the torsion producing rods 21 (which are trunnioned in the ears of the inner diaphragm face plate and of the yieldingly held buffer member) with it.

The inner diaphragm holding frame or face plate 18 as heretofore constructed was rigidly connected at its bottom with the buffer sill or member 19, with the result that the face plate 18 was subjected to considerable frictional action and wear in excess of the wear of the buffer plate and necessitated renewal of the inner face plate 18, either by welding additional metal thereto or by entire replacement. The wear on the face plate of the inner diaphgram is more pronounced at the lower ends thereof, namely at its junction with the buffer member, which causes the lower ends of the face plate to become so worn as to result in breakage.

In my improved structure, the inner diaphragm frame or face plate 18 is made independent of the buffer member 19 as more clearly shown in Figure 3 and the lower ends of the frame 18 are yieldingly supported in proper position and alignment with the bumper element 19 by means of the leaf springs 39, whose lower ends are disposed through slots 19a in the buffer member 19 and preferably removably secured to the buffer member by means of suitable brackets 40 which are attached to the rear or inner side of the buffer member. 19; the lower end of each leaf spring being held in place in the bracket by a bolt 41 disposed through registering apertures in the spring and the bracket; while the upper end of each leaf spring is secured to the face plate by means of a pin or bolt 42 which is secured to the inner side of each of the vertically disposed portions of the inner face plate 18, all as shown in Figure 3. The buffer member 19 is yieldingly supported at the end of the car in the usual conventional manner, namely by slidably mounted rods surrounded by coil springs (not shown) which yieldingly hold the buffer member in outward or normal position; the buffer being movable horizontally toward the car body. In the event the buffer member by reason of forcible contact with the buffer of an adjacent car is forced inwardly toward its car-body, inward movement of the face plate 18 will also be caused by the leaf springs 39, while on the other hand the face plate 18 may have slight movement toward the car-body independently of the buffer due to the resiliency of the long leaf-springs 39.

The top central portion of the inner face plate 18, like the top section 31 of the outer sectional frame is yieldingly supported from the car platform upper structure or vestibule end wall by means of a semi-elliptical spring similar to that shown in Figure 4. With the structure just described, the inner face plate 18 is permitted a certain amount of horizontal movement independent of the buffer member 19, thereby eliminating the wear that has heretofore been encountered and also obviating the constant or excessive noise encountered with structures as heretofore made. Then too, with the flexible connection between the inner and outer frames compensation is provided for the respective angles assumed by the frames during curvatures in the track to prevent the outer diaphragm becoming excessively compressed on the inner side of the curve, while at the same time this flexible or yielding relation between the outer frame and the end wall of the car vestibule will prevent the diaphragm at the outer side of the curve from being subjected to severe stretching or pulling strains.

The leaf springs 39 at the lower ends of the inner face plate 18 are intended substantially to equal the strength of the semi-elliptic spring

employed at the top of the inner face plate and exert a pressure somewhat less than the pressure on the buffer plate 19, with the result that the attendant noise during frictional contact of the face plates at the opposing ends of two cars is materially reduced because in my improved structure the face plate may have slight movement independent of that of the buffer plate.

The diaphragm 30 may be of any suitable fabric and secured in place in any suitable manner, as for example the fabric may be folded about a rod 43 and clamped thereto by means of the clamp plates 44.

The structure illustrated and described is a practical embodiment of my invention, but modifications are possible and may be made without, however, departing from the spirit of my invention as defined in the appended claims.

What I claim is:

1. In a vestibuled passenger car provided with a diaphragm enclosing the central passageway of said vestibule; a face plate at the outer end of the diaphragm yieldingly supported by the buffer plate of the car; an outer flexible diaphragm arranged substantially flush with the car side walls and with the car-roof and secured to the vestibule end wall; a sectional face plate or frame secured to the outer end of said last mentioned diaphragm and disposed about the top and sides of the first mentioned face plate, means rotatably associated with the first mentioned face plate and operatively connected with the two side sections of the said sectional face plate whereby the said side sections are hingedly supported in place; means whereby said side sections are yieldingly held in normal position; and means whereby the top central section of said sectional face plate is yieldingly supported by the vestibule end wall.

2. In a vestibuled passenger car provided with a diaphragm enclosing the central passageway of said vestibule; a face plate at the outer end of the diaphragm yieldingly supported at the top by the vestibule end wall; means whereby the lower ends of said face plate are yieldingly supported by the buffer plate of the car; an outer diaphragm arranged substantially flush with the car side walls and car-roof and secured at one end to the vestibule end wall; a sectional frame secured to the outer end of the last mentioned diaphragm and disposed about the first mentioned face plate, said frame comprising a central top section and two side sections hingedly associated with the top central section; means carried by the first mentioned face plate for pivotally supporting said sectional frame in place and for maintaining the outer diaphragm in taut condition; and means whereby the top section of said sectional frame is yieldingly supported from the vestibule end wall.

3. In a vestibuled passenger car provided with a diaphragm enclosing the central passageway of said vestibule and a face plate at the outer end of the diaphragm; an outer diaphragm arranged substantially flush with the car side walls and car roof and secured at one end to the vestibule end wall; a sectional frame secured to the outer end of the second mentioned diaphragm and disposed about the first mentioned face plate; vertically disposed means pivotally associated with the first mentioned face plate and having operative relation with the respective sections of said sectional frame; torsion means operatively associated with the first mentioned face plate and with said vertically disposed means whereby the two side sections of said sectional frame are yieldingly forced way from the vestibule end wall; and yielding means arranged between the vestibule end wall and the central top section of said sectional frame.

4. In a vestibuled passengar car having a buffer plate and provided with a diaphragm enclosing the central passageway of said vestibule; a face plate at the outer end of said diaphragm carried by the car buffer plate and yieldingly supported at the top by the vestibule end wall; vertically disposed rods rotatably supported by said buffer plate and by said face plate; springs operatively associated with said rods for yieldingly controlling rotation of said rods; an outer diaphragm arranged substantially flush with the car side walls and the car roof and secured at one end to the vestibule end wall; and a sectional frame secured to the outer end of said last mentioned diaphragm and disposed about the first mentioned face plate and in spaced relation therewith, said frame comprising a central top section and two side sections hingedly secured to the ends of the top section so as to swing in horizontal planes, said central top section being yieldingly secured to the vestibule end wall while the two side sections are secured to said vertically disposed rods so as to oscillate therewith.

5. In a vestibuled passenger car provided with a diaphragm enclosing the central passageway of said vestibule and a face plate secured at the outer end of said diaphragm; a pair of vertically disposed rods at each side of said face plate and rotatably secured thereto; torsion means for controlling rotation of said rods; a sectional frame disposed about said face plate and extending substantially into the planes of the car sides and car roof, said sectional frame comprising a central top section and two side sections hingedly secured at the tops to the ends of the central top section, the two side sections being operatively connected with said vertically disposed rods so as to oscillate therewith; and an outer diaphragm arranged in the planes of the car side walls and car roof and secured to the vestibule end wall and to the respective sections of said sectional frame.

6. In a vestibuled passenger car provided with a diaphragm enclosing the central passageway of said vestibule, a face plate secured at the outer end of said diaphragm, and a yieldingly held buffer plate to which the face plate is yieldingly connected; a pair of vertically disposed rods pivotally supported by the buffer plate and by said face plate so as to move therewith; torsion springs disposed about said rods with their ends secured, respectively, to the buffer plate and to said rods and to the face plate and to said rods; a sectional frame disposed substantially in the planes of the car side walls and car roof and about said face plate in spaced relation therewith, said frame comprising a central top section and two side sections hingedly secured at the top to the ends of the central section so as to permit the side sections to swing through horizontally disposed arcs, the side sections being also operatively connected with said rods; means intermediate of the central top section and the vestibule end wall for yieldingly supporting and forcing said top section outwardly; and an outer diaphragm secured at one end to the vestibule end wall and at the outer end to said sectional frame.

7. In a vestibuled passenger car provided with a diaphragm enclosing the central passageway

of said vestibule, and a buffer plate at the end of the car; an inverted U-shape frame or face plate to which the outer end of the diaphragm is secured; and a yielding connection between the lower ends of said frame or face plate and the buffer plate whereby said frame or face plate may have movement independently of the buffer plate.

8. In a vestibuled passenger car provided with a diaphragm enclosing the central passageway of said vestibule, and a buffer plate; a frame or face plate secured at the outer end of the diaphragm and supported from the buffer plate; and a spring element secured to the rear face of each side of said frame or face plate and to the rear side of said buffer plate for yieldingly holding the lower ends of said frame or face plate substantially in vertical alignment with the buffer plate.

9. In a vestibuled passenger car provided with a diaphragm enclosing the central passageway of said vestibule and with a buffer plate; an inverted U-shape frame or face plate secured to the outer end of the diaphragm and yieldingly supported at top from the vestibule end wall; and a leaf spring secured to the rear face of each side of said frame or face plate and removably secured at the lower end to the rear face of the buffer plate.

10. In a vestibuled passenger car provided with a diaphragm and with a buffer plate, the buffer plate on its upper surface being provided with slotways; an inverted U-shape frame or face plate secured at the outer end of the diaphragm with the top portion thereof yieldingly supported from the vestibule end wall; and a leaf spring secured to the rear face of each leg or side of said frame or face plate and disposed through one of the slots in the buffer plate with the lower end of each leaf spring removably secured to the rear face of the buffer plate whereby the lower ends of the frame or face plate are yieldingly supported from the buffer plate.

11. In a vestibuled passenger car provided with a diaphragm enclosing the central passageway of said vestibule, and a yieldingly held buffer plate; an inverted U-shape frame or face plate to which the outer end of said diaphragm is secured, said frame or face plate being provided with laterally disposed apertured extensions, while the buffer plate is provided with laterally disposed socketed extensions; vertically disposed rods, seated in the sockets of the buffer plate extensions and disposed through the apertures of the extensions to said face plate, said rods being arranged to have rotative movement; coil springs disposed about the rods with one end of each spring fixedly secured to the rods while the other ends of said springs are secured to the extensions of the face plate and of the buffer plate to induce rotation of the rods; a sectional frame composed of a top intermediate section and two side sections arranged, respectively, substantially in the planes of the car roof and the car side walls, said sections being hingedly secured together at the top with the side sections supported by said rods so as to oscillate therewith; and an outer diaphragm secured to the sections of said frame and to the vestibule end wall.

12. In a vestibuled passenger car provided with a diaphragm enclosing the central passageway of said vestibule, and a yieldingly held buffer plate; an inverted U-shape frame or face plate to which the outer end of the diaphragm is secured; resilient means for yieldingly supporting said frame or face plate on the buffer plate; vertically disposed rods rotatably supported by the buffer plate and by said frame or face plate; resilient means whereby said rods are given rotative movement; a sectional frame arranged substantially in alignment with the car roof and car side walls and beyond the vestibule end wall, said frame being composed of a top section and two side sections, the upper ends of the two side sections and the ends of the top section being hingedly secured together; and means intermediate of said rods and said side sections whereby the latter are supported in place and caused to oscillate with said rods; an outer diaphragm secured to the vestibule end wall and to said sectional frame substantially in alignment with the car roof and car side walls; and flexible means for limiting the oscillation of said rods and side sections of said frame in one direction.

13. In a passenger car provided with a vestibule face plate, a sectional frame disposed at the end of the car platform in spaced relation therewith and substantially in the same plane as the car sides and the car roof, said frame being composed of two side sections and a top section hingedly secured together; means whereby said frame is pivotally supported by the vestibule face plate; a flexible diaphragm secured to the platform end wall and to said frame; and independent resilient means for said side sections and for said top section for urging the sectional frame away from the platform outer wall.

14. In a vestibuled passenger car provided with a buffer plate and with a diaphragm enclosing the central passageway of said vestibule; a face plate disposed above the buffer plate about said passageway and secured to the outer end of said diaphragm; means whereby the lower ends of said face plate are operatively secured to the buffer plate and yieldingly held in substantial alignment therewith; and means whereby the top of the face plate is yieldingly secured to the vestibule end wall and forced outwardly therefrom.

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