J. E. MUHLFELD.

VESTIBULE DIAPHRAGM AND SUPPORT THEREFOR.

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1,074,731.

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Fig. 1

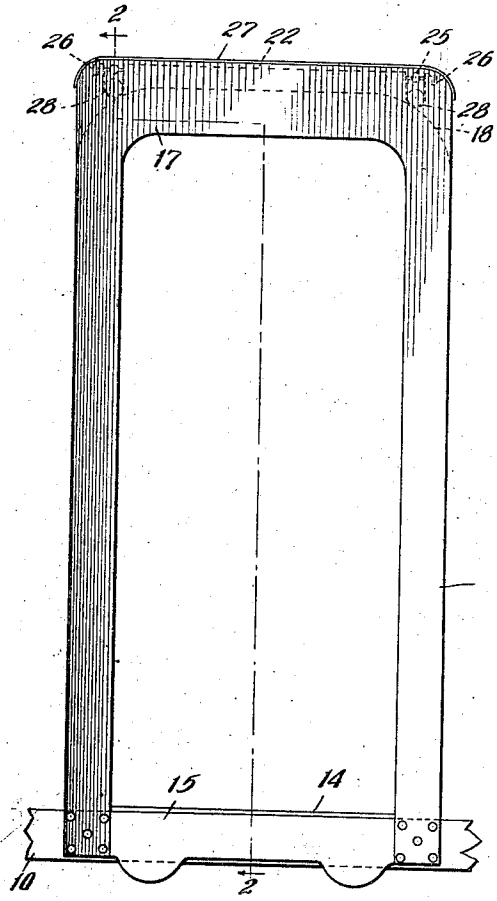


Fig. 2

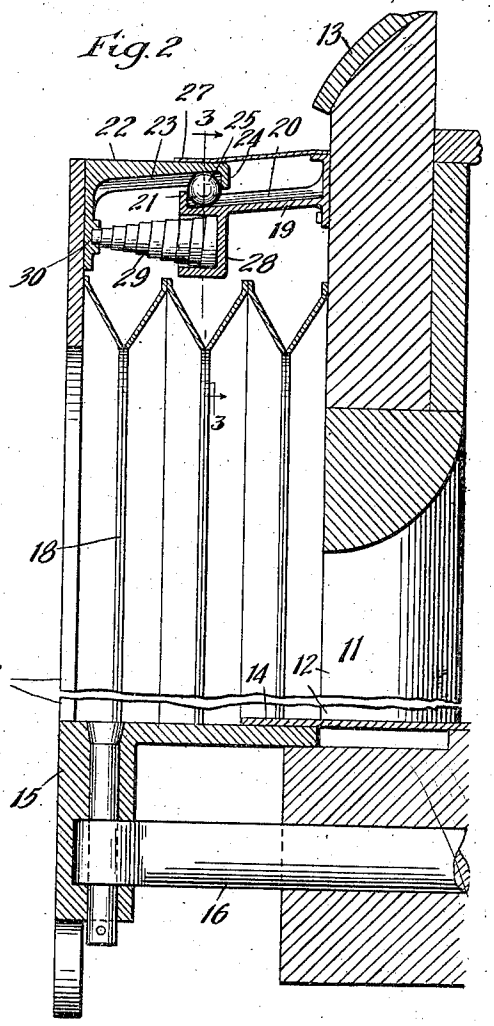
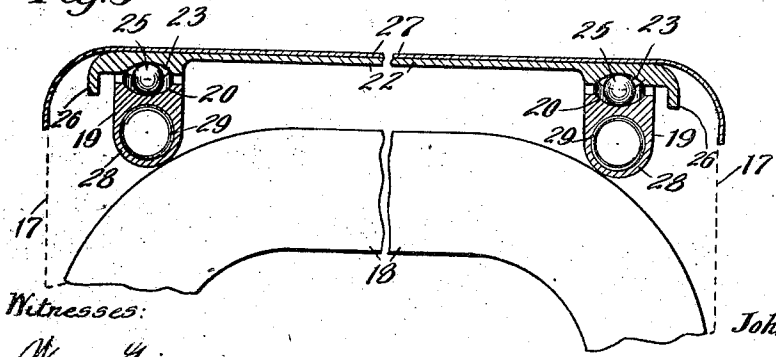


Fig. 3



Witnesses:

Wm. Geiger

Pearl Abrams.

Inventor:

John E. Muhlfeld

By Munday, Evarts, Adcock & Clarke,

his Attys.

UNITED STATES PATENT OFFICE.

JOHN E. MUHLFELD, OF KANSAS CITY, MISSOURI

VESTIBULE-DIAPHRAGM AND SUPPORT THEREFOR.

1,074,731. Specification of Letters Patent. Patented Oct. 7, 1913.

Application filed March 17, 1913. Serial No. 754,686.

To all whom it may concern:

Be it known that I, JOHN E. MUHLFELD, a citizen of the United States, residing in Kansas City, in the county of Jackson and State of Missouri, have invented a new and useful Improvement in Vestibule-Diaphragms and Supports Therefor, of which the following is a specification.

This invention relates to improvements in vestibule diaphragms and supports for the face plates thereof, and more particularly to vestibule diaphragms and face plates such as are used on railway cars.

In order to provide a continuous passageway from the vestibule of one railway car to that of another coupled to it, the arched doorways at the outer ends of the vestibules are fitted with a combination of vestibule diaphragms and face plates for the purpose of excluding the weather, dust, dirt, cinders, noise and the like, and as a protection against fire and accident. As is well known, these diaphragms and face plates must necessarily have a free movement both up and down and sidewise in order to adjust themselves to the movement of the cars, and the face plate of one car must be kept in contact with that of the adjacent car in order to maintain the continuous and protected passageway.

In the arrangement of diaphragms and face plates now generally used, the upper portion of the face plate near the car roof is kept thrust outwardly against the opposing face plate by means of a combination of rods and springs which are frequently housed in the vestibule end of the car, or placed in an unprotected location outside of the diaphragm. These arrangements do not tend to automatically maintain the face plate in its central position relative to the vertical central line of the vestibule, nor do they tend to carry any portion of the weight of the face plate and diaphragm, this weight being substantially entirely carried on the buffer plate which is located at the end sill of the underframe of the car, with the result that, in moving trains, there is a great deal of vertical, lateral and oscillating movement and working of the face plates and diaphragms, due to the movements of the cars, which causes otherwise avoidable noise, wear, tear, loss and damage. Furthermore, as the outer transverse or top portion of the diaphragm, which is usually made of readily destructible, flexible material, such as rubber, leather, ducking, canvas or the like, in order to give it the proper bellows-like action, is directly exposed to the weather, steam, cinders, smoke, fire and like elements on account of the open space between the top of the face plate and the end of the car body, it wears out so quickly that the use of supplemental hoods and double thicknesses and sections of fire and waterproof material are now placed over the tops of the diaphragms to provide for proper protection and to increase their life. Another defect inherent in the constructions now generally used, arises from the fact that practically the entire weight of the diaphragms and the face plate is borne by the buffer plates at the floor of the car, so that there is no means to modify or counteract the vertical, lateral and oscillating movements of adjacent cars to cause the cars and the train to ride and run more steadily.

One object of my invention is to provide a construction which is free from all the defects and disadvantages, above indicated, of those constructions now generally in use, and to provide means whereby the diaphragm face plate will automatically center itself relatively to the vertical center line of the vestibule under the influence of gravity, and to further have the arrangement such that the weight of the face plate will be utilized to thrust the same outwardly toward the face plate of an adjacent car.

Another object of the invention is to provide a cover plate attached to the car body, which coöperates with the carrier bracket of the face plate to provide protection for the top of the diaphragm from injury.

My invention furthermose consists in the improvements in the parts and devices and in the novel combinations of parts and devices herein shown, described or claimed.

In the drawing forming a part of this specification, Figure 1 is an end elevation of a diaphgram and diaphragm face plate embodying my improvements. Fig. 2 is a longitudinal, sectional view, taken substantially on the line 2—2 of Fig. 1, parts being broken away in order to prevent crowding of the drawing, Fig. 2 being upon a larger scale than Fig. 1, and Fig. 3 is a detail, transverse, sectional view, taken substantially on the line 3—3 of Fig. 2.

In said drawing, 10 denotes the end sill of a car or other vehicle, provided with a vestibule 11, door frame 12 and roof 13.

Mounted at the floor of the vestibule is a floor plate 14, between which and the end sill 11 is slidable the buffer floor plate 15, the latter being normally pressed outward by means of buffer mechanism (not shown), by the buffer rods 16. Secured to the buffer floor plate 15 is the vestibule diaphragm face plate 17, which is of substantially inverted U-shape, said face plate having secured thereto by any suitable means, one end of the diaphragm 18, the latter having its other end suitably secured to the end of the car, and said diaphragm being of the usual bellows-like construction. Secured to the end of the car are a pair of supporting brackets 19, each of said brackets 19 having an outwardly and downwardly inclined wide, arcuate ball race 20, each ball race being provided at its lower, outer end with a stop 21. Secured to the inner side of the face plate 17 is a wide carrier bracket 22 which extends substantially the full width of the vestibule diaphragm, said carrier bracket 22 being provided on its under side at its outer edges with inwardly and upwardly inclined wide, arcuate ball races 23, and having also limiting stops 24 corresponding to the limiting stops 21 of the supporting brackets. Mounted in each coöperating pair of ball races 20 and 23 is a bearing ball 25, the latter being formed on a radius shorter than the radius of the ball race surfaces so that, as will be understood, the carrier bracket may move sidewise or laterally relatively to the supporting bracket 19, the bearing balls during these movements riding up on the curved ball races and automatically tending to resume a central position under the influence of gravity. The carrier bracket 22 is also provided with a pair of limiting stops 26 to limit the amount of sidewise or lateral movement of the face plate relatively to the supporting brackets 19.

Secured to the end of the car and above the supporting brackets 19 is a preferably metallic cover plate 27 which fits over the carrier bracket 22, the latter and the cover plate, as will be obvious, forming a complete protection for the top of the diaphragm and supporting members. Each bracket 19 is provided with a spring seat or socket 28, in which is seated one end of a coiled spring 29, the coiled springs 29 having their other ends seated in suitable sockets 30 formed on the inner side of the carrier bracket 22.

From the foregoing description, it will be seen that the parts are so arranged that a portion of the weight of the face plate and diaphragm is carried at the top thereof; that on account of the inclined positions of the ball races and the wide formation thereof, the weight of the face plate and diaphragm will automatically tend to thrust the former outwardly toward the face plate on an adjoining car, and will also automatically center itself relative to the vertical center line of the vestibule; that all the parts are placed outside of the vestibule or car body ends and therefore readily accessible for repairs, renewals or adjustments; that the entire supporting, carrying, thrusting and centering arrangement gives a substantial metal protection to the top of the diaphragm and eliminates the use of supplemental hoods and like accessories; that the noise due to the face plates contacting and sliding over each other, caused by the car movements, will be minimized; that the means for supporting and securing the face plate at the top thereof without depending on the buffer arrangement at the floor to carry the weight, will give a more uniform contact throughout the entire face plate; and that the strong means for securing the face plate at the top thereof will afford greater protection in case of collision or accident.

I claim:—

1. In combination with a vehicle having a vestibule, a flexible vestibule diaphragm, a diaphragm face plate, and means located outside of said diaphragm for supporting the face plate and permitting the same to automatically center itself laterally solely under the influence of gravity, substantially as specified.

2. In combination with a vehicle having a vestibule, a vestibule diaphragm, a diaphragm face plate, and means for supporting the face plate and permitting the same to automatically center itself laterally under the influence of gravity, said means including a supporting bracket, a carrier bracket, relatively wide ball races formed in said brackets, and bearing balls interposed between the ball races and bodily and laterally movable therein, substantially as specified.

3. In combination with a vehicle having a vestibule, a vestibule diaphragm, a diaphragm face plate, said diaphragm being secured to the vestibule and to the face plate, a supporting bracket secured to the end of the vehicle, a carrier bracket rigidly secured to the face plate, each of said brackets being provided with ball races and having bearing balls interposed therebetween, substantially as specified.

4. In combination with a vehicle having a vestible, a vestibule diaphragm, a diaphragm face plate, said diaphragm being secured to the vestibule and to the face plate, a supporting bracket secured to the end of the vehicle, a carrier bracket secured to the face plate, each of said brackets being provided with ball races and having bearing balls interposed therebetween, and springs located near the top of the face plate for normally forcing the latter outwardly, substantially as specified.

5. In combination with a vehicle having

a vestibule, a vestibule diaphragm, a diaphragm face plate, means for supporting the face plate and permitting the same to automatically center itself laterally solely under the influence of gravity, and stops for limiting the amount of lateral movement of the face plate relatively to the vestibule, substantially as specified.

6. In combination with a vehicle having a vestibule, a vestibule diaphragm, a diaphragm face plate, means for supporting the face plate and permitting the same to automatically center itself laterally under the influence of gravity, said means including a supporting bracket fixed with respect to said diaphragm face plate, a carrier bracket, ball races formed in said brackets, bearing balls interposed between the ball races, and stops for limiting the amount of lateral movement of the face plate relatively to the supporting bracket, substantially as specified.

7. A device of the character described including, in combination: a vestibule diaphragm; a diaphragm face plate; and means for supporting the face plate including a relatively fixed supporting bracket having a ball race therein, a carrier bracket rigidly secured to the face plate and having a ball race therein, and a bearing ball interposed between said brackets, substantially as specified.

8. In combination with a vehicle having a vestibule, a flexible vestibule diaphragm, having top and side portions, a diaphragm face plate, a carrier bracket secured to the face plate and extending substantially the width of the diaphragm over the top portion thereof, supporting brackets on which said carrier bracket is movably mounted, and a cover plate overlapping said carrier bracket, said cover plate and the carrier bracket forming a protection for the top portion of the diaphragm, substantially as specified.

9. In combination with a vehicle having a vestibule, a vestibule diaphragm, a diaphragm face plate, supporting brackets secured to the end of the vehicle above the diaphragm and provided with a downwardly and outwardly inclined supporting surface, a carrier bracket secured to the inner face of the face plate and slidable relatively to the supporting brackets, springs normally pressing said face plate away from the end of the vehicle, and stops limiting the outward movement of the face plate, substantially as specified.

10. In combination with a vehicle having a vestibule, a vestibule diaphragm, a diaphragm face plate, and means for supporting said face plate at the top thereof, said means including supporting brackets provided with wide ball races and secured to the end of the vehicle, a carrier bracket secured to the inner side of the face plate and having also wide ball races corresponding to those of the supporting brackets, and bearing balls in the ball races, said ball races being wider than the diameter of the bearing balls to permit lateral or sidewise movement of the face plate relatively to the supporting brackets, substantially as specified.

11. In combination with a vehicle having a vestibule, a vestibule diaphragm, a diaphragm face plate, means for supporting said face plate at the top thereof, said means including supporting brackets provided with wide ball races and secured to the end of the vehicle, a carrier bracket secured to the inner side of the face plate and having also wide ball races corresponding to those of the supporting brackets, bearing balls in the ball races, said ball races being wider than the diameter of the bearing balls to permit lateral or sidewise movement of the face plate relatively to the supporting brackets, and means for limiting the amount of said lateral movement of the face plate, substantially as specified.

12. In combination with a vehicle having a vestibule, a vestibule diaphragm, a diaphragm face plate, supporting brackets secured to the end of the vehicle and to the face plate and having bearing balls interposed therebetween, said supporting brackets being located at the top of the face plate, and a cover plate, substantially as specified.

13. A device of the character described including, in combination: a diaphragm; a diaphragm face plate; a pair of relatively fixed supporting brackets having ball races therein; a carrier bracket secured to the face plate and slidable with respect to the supporting brackets, said carrier bracket having ball races therein; bearing balls in said races; springs normally forcing said face plate away from the supporting brackets; and means for limiting the movement of said face plate away from the supporting brackets, substantially as specified.

14. In combination with a vehicle having a vestibule, a vestibule diaphragm having top and side portions, a diaphragm face plate, the diaphragm being secured to the vehicle and to the face plate, and means supporting the face plate located at the top thereof above the top portion of the diaphragm and adapted to permit the face plate to automatically move itself outwardly under the influence of gravity and center itself laterally solely under the influence of gravity, substantially as specified.

15. In combination with a vehicle having a vestibule, a vestibule diaphragm, a diaphragm face plate, a carrier bracket secured to the face plate and extending substantially the width of the diaphragm over

the top thereof, supporting brackets on which said carrier bracket is removably mounted, centering and thrusting devices for maintaining said diaphragm and diaphragm face plate in proper position, and a cover plate overlapping said carrier bracket, the cover plate and the carrier bracket forming a protection for the top of the diaphragm the supporting, centering and thrusting devices, substantially as specified.

JOHN E. MUHLFELD.

Witnesses:
T. M. APPLEGARTH,
ARMAND RIAT.