No. 875,642. PATENTED DEC. 31, 1907.

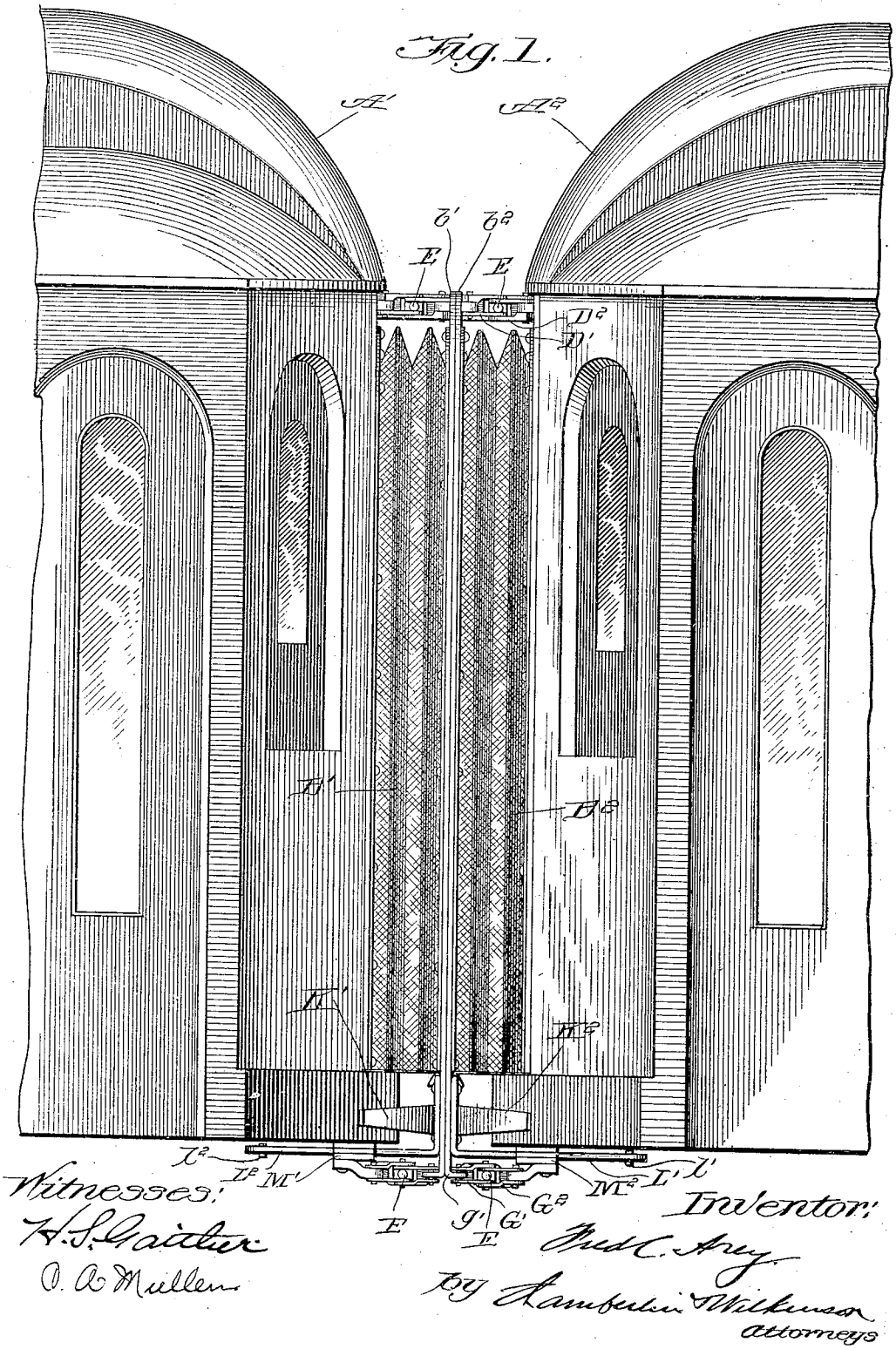
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CAR VESTIBULE DIAPHRAGM.

APPLICATION FILED SEPT. 15, 1904.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

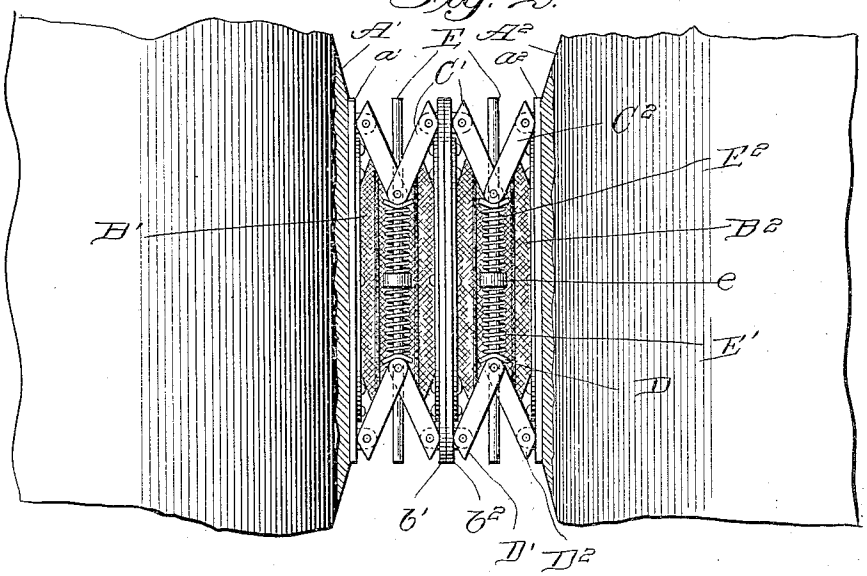
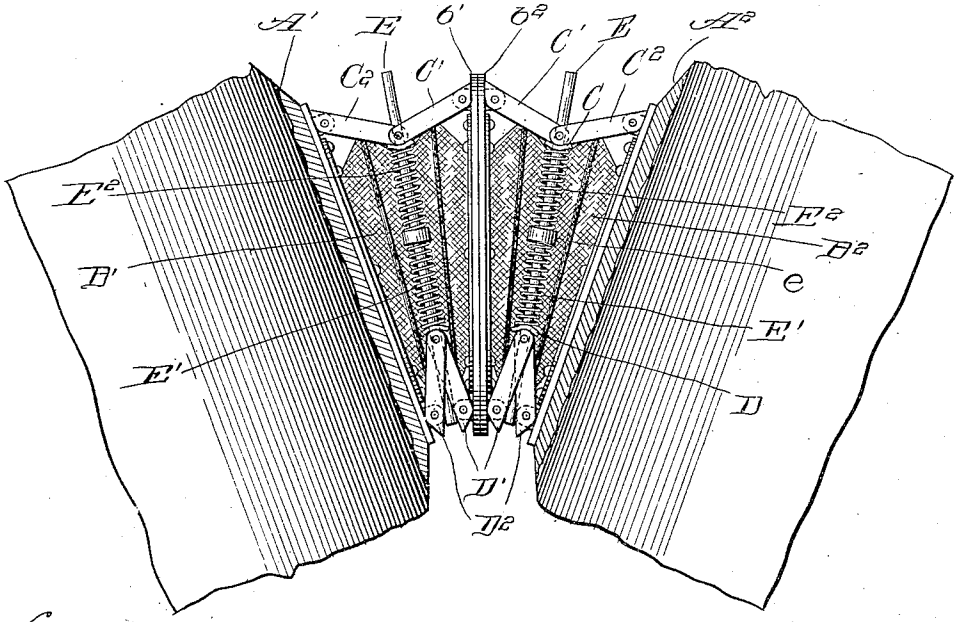


Fig. 3.



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3 SHEETS—SHEET 3.

Fig. 4.

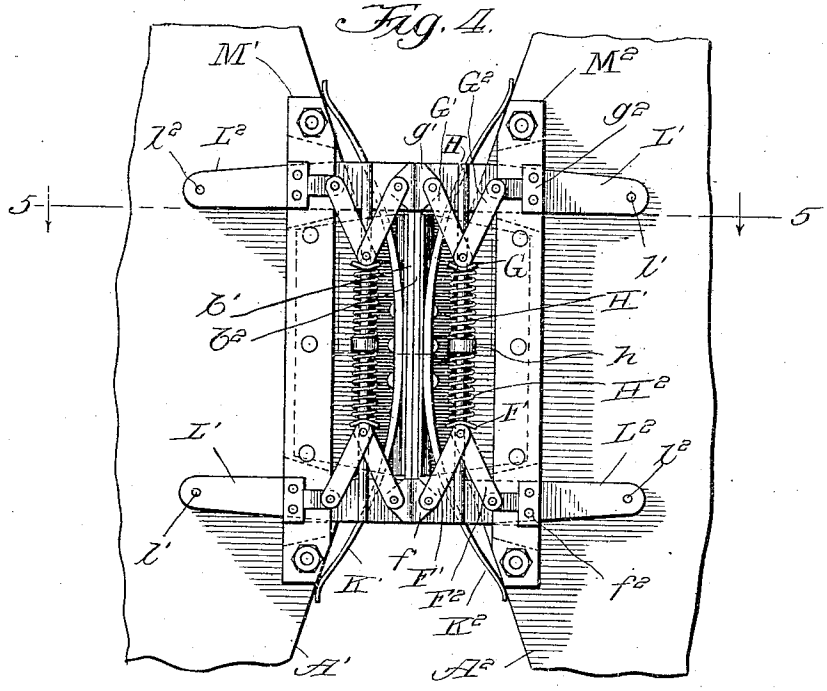


Fig. 5.

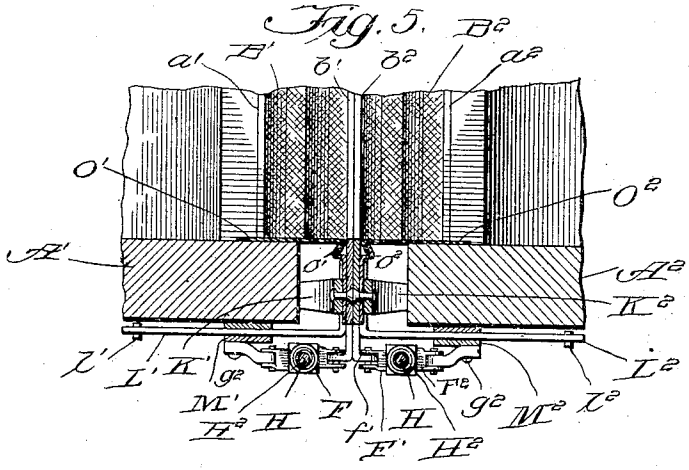
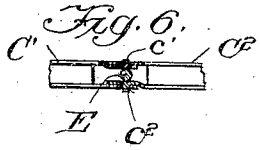


Fig. 6.



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UNITED STATES PATENT OFFICE.

FRED C. AREY, OF CHICAGO, ILLINOIS.

CAR-VESTIBULE DIAPHRAGM.

No. 875,642. Specification of Letters Patent. Patented Dec. 31, 1907.

Application filed September 15, 1904. Serial No. 224,551.

To all whom it may concern:

Be it known that I, FRED C. AREY, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Car-Vestibule Diaphragms, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates in general to car vestibules and more particularly to the extensible diaphragms for forming a closed passage-way between the vestibules of adjoining cars.

The use of vestibule cars on elevated and other railroads having short curves has heretofore been unsatisfactory owing to the fact that the face plates between the diaphragms separate on the outer side of the curve thereby forming an opening between the adjoining cars and destroying the advantage of using vestibules.

The primary object of my invention is to provide an extensible diaphragm for vestibule cars which will at all times, even on the shortest curves upon which it is practicable to run trains, maintain a closed passage-way between adjoining cars.

A further object of my invention is to provide vestibule cars with extensible diaphragms which, when the cars are on a curve, will be extended on the outer side of the curve and the face plates forced together by a pressure derived from the compression of the diaphragms on the inner side of the curve.

A still further object of my invention is to provide a vestibule diaphragm which will be simple in construction, comparatively inexpensive in manufacture, and efficient in use.

The embodiment of my invention herein disclosed, generally described, consists in horizontally breaking toggle links located at each side of the face plates, between the top and bottom thereof and the ends of the vestibules, floating springs interposed between the pairs of toggle links at the top and bottom of the diaphragms, and horizontally movable rods above and below the diaphragms around which the springs are located extending between and movable relatively to the pairs of toggle links.

My invention will be more fully described hereinafter with reference to the accompanying drawings in which the same is illustrated as embodied in a convenient and practical form, and in which,—

Figure 1 is a side elevational view showing the ends of two adjoining cars provided with my improved diaphragm; Fig. 2 a top plan view, the adjoining cars being in alinement; Fig. 3 a view similar to Fig. 2 showing the diaphragm when the adjoining cars are on a curve; Fig. 4 a bottom plan view; Fig. 5 a sectional plan view on line 5—5 Fig. 4; and Fig. 6 a detail view.

The same reference characters are used to designate the same parts in the several figures of the drawings.

Reference characters A′ and A² indicate the ends of adjoining cars provided with end plates a' and a^2 from which diaphragms B′ and B² project.

b' and b^2 designate the face plates surrounding the outer ends of the diaphragms and which closely engage each other on adjoining cars thereby forming a closed passage-way between the cars.

Interposed between the face plate of each diaphragm and the plate on the end of the vestibule of the corresponding car are pairs of toggle links, one pair of such links C′ and C² being interposed between the top of the face plate b^2 and plate a^2 on the vestibule at the top of the diaphragm and at one side thereof, while similar toggle links D′ and D² are interposed between the plates b^2 and a^2 above the diaphragm at the opposite side thereof. Each of the toggle links C′ and C² as well as the links D′ and D² are made in parallel pairs the outer ends of which are located on either side of lugs projecting from the corresponding plates b^2 and a^2 to which they are pivoted. The upper link of the pair C′ is offset downwardly and provided at its free end with an upwardly projecting pin c' which is received in a hole in the end of the corresponding link of the pair C², as clearly shown in Fig. 6, while the free end of the lower link of the pair C² is offset upwardly and provided at its free end with a downwardly projecting pin c^2 which is received in a hole in the end of the lower link of the pair C′. The links D′ and D² are pivoted to ears projecting from the plates a^2 b^2 in the same manner as are the links C′ and C². The free ends of the links D′ and D² are provided with upwardly and downwardly projecting pins which are received within co-

operating holes thereby forming a pivoted joint between such links in the same manner as the pivoted joint is formed between the links C′ and C².

A transverse rod E extends loosely between the pairs of links C′ C² as well as between the corresponding pairs of links D′ D² at the opposite side of the diaphragm thereby retaining the pins c' and c^2 in engagement with the respective holes in the links C′ and C² and also retaining the corresponding pins on links D′ D² in engagement with the coöperating holes. Similar pairs of toggle links are located between the plates a' and b' of the diaphragm B′ above the top thereof and at each side as clearly shown in Figs. 2 and 3.

The rod E is provided with a collar e fixed thereto between which and the inner joints of the pairs of toggle links C′ and C², and D′ and D² are coil springs E′ and E². The outer ends of such springs bear against washers or saddles C and D which surround the rod E and bear against the inner joints of the respective pairs of toggle links.

Located beneath the diaphragm on each car and at each side thereof are pairs of toggle links G′ and G², and F′ and F² respectively. The ends of the pairs of links G² and F² are pivotally connected to ears g^2 and f^2 respectively projecting from a plate M² rigidly secured beneath the end of the vestibule while the ends of the pairs of links G′ and F′ are pivotally connected to ears g' and f' respectively depending from the bottom edges of the face plates. Each of the links G′ and G², and F′ and F² are formed of two parallel parts spaced apart between which a floating rod H passes. The inner ends of the links in each toggle are united to form joints in the manner illustrated in Fig. 6 and above described in connection with the links C′ and C². Saddles G and F surround the rod H and bear against the inner ends of the pairs of toggle links. Springs H′ and H² which surround the rod H are interposed between the saddles F and G and a collar h rigidly secured to the rod H. Similar toggle links located beneath the diaphragm B′ are interposed between the plates b' and a' and pivotally united at their outer ends to ears projecting respectively from the plate M′ and from the bottom edge of the plate b'.

Interposed between the horizontal bottom portion of the face plates b' and b^2 and the ends of the corresponding vestibules are leaf springs K′ and K² respectively which are rigidly secured by any suitable means, such for instance as rivets, to the plates b' and b^2. The tension of such springs tends to normally maintain the diaphragms extended and in alinement with the cars. O′ and O² indicate the usual floor plates extending from the top edge of the bottom horizontal portions of the face plates b' and b^2 and overlying the inner edges of the floors of the vestibules to at all times completely close the floor space between the cars. Such plates are shown as connected to the respective face plates b' and b^2 by means of securing plates o' and o^2 rigidly fastened to the face plates and provided with off-set flanges at their upper edge with which are engaged downwardly extending flanges on the plates O′ and O².

L′ and L² designate supporting bars for the respective diaphragms which are secured at their ends to the horizontal bottom portion of the diaphragm face plates and are guided in slots formed in the plates M′ and M² respectively. The ends of the bars L′ and L² which extend beneath the vestibules are provided with studs l^1 & l^2 which prevent the bars being disengaged from the plates M′ and M² and limit the movement of the face plates away from the cars owing to the studs being too large to pass through the slots in the plates M′ and M².

The operation of my invention is as follows: The tension of the springs E′ and E² exerts an outward pressure on the inner joints of the pairs of toggle links C′ and C², and D′ and D² thereby tending to project the face plate away from the vestibule at its top. The springs H′ and H² perform a similar function in connection with the pairs of toggle links G′ and G², and F′ and F², namely, they tend to project the bottom of the face plate away from the vestibule. When the cars pass around a curve and the diaphragms assume the position shown in Fig. 3, the pairs of toggle links between the diaphragm face plates and the ends of the vestibules at the inside of the curve are folded together thereby moving the respective rods E outwardly owing to the outward movement of the saddles D being communicated to the rods through the springs E′. Such outward movement of the rods E exerts an outward pressure upon the joints of the toggle links C′ and C² through the medium of the springs E². The vertical portions of the face plates b' and b^2 at the outside of the curve are consequently projected toward each other and kept in close contact owing not only to the normal tension of the springs E² but also owing to the fact that the floating rods E are moved towards the outside of the curve by reason of the folding together of the toggle links between the face plates and vestibules at the inside of the curve.

The operation above described with respect to the toggle links above the diaphragms also occurs with respect to the toggle links beneath the diaphragms. The links between the diaphragm face plates and vestibules at the inside of the curve are folded together thereby through the floating rods H and coil springs H′ and H² straightening out the toggle links at the outside of the curve and forcing tightly together the diaphragm plates at their bottoms. The face plates at

the outer side of the curve are consequently kept tightly together throughout their height owing to the tops and bottoms thereof being forcibly projected towards each other simultaneously.

From the foregoing description it will be observed that I have invented an improved car vestibule diaphragm by means of which a closed passage-way between adjoining cars is effected under all conditions and even when the cars are passing around the sharpest possible curves, such result being due to the compression of the diaphragms at inner side of the curve serving to project the face plates and extend the diaphragms at the outer side of the curve. It will be also observed that by reason of the horizontal arrangement of the toggle links a great expansion of the diaphragm at one side is effected by a comparatively slight compression of the springs owing to the shifting of the springs when one side of the diaphragm is compressed.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form, the proportion of parts, and the substitution of equivalents, as circumstances may suggest or render expedient, without departing from the spirit of my invention.

Having now fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. The combination with a car vestibule, of an extensible diaphragm the inner end of which is secured to the vestibule around the passage therethrough, a face plate to which the outer edge of the diaphragm is secured, horizontal toggle links operatively connecting the face plate and vestibule at each side of the diaphragm, and means interposed between the toggle links for extending one side of the diaphragm when the other side is compressed.

2. The combination with a car vestibule, of an extensible diaphragm the inner end of which is secured to the vestibule around the passage therethrough, a face plate to which the outer edge of the diaphragm is secured, horizontal toggle links operatively connecting the face plate and vestibule at each side of the diaphragm, and a transverse spring extending between the toggle links for extending one side of the diaphragm when the other side is compressed.

3. The combination with a car vestibule, of an extensible diaphragm the inner end of which is secured to the vestibule around the passage therethrough, a face plate to which the outer edge of the diaphragm is secured, horizontal toggle links operatively connecting the face plate and vestibule at each side of the diaphragm, a floating rod extending transversely across the diaphragm and movable relatively to said toggle links, and a spring surrounding said rod engaging the inwardly projecting joints of the toggle links.

4. The combination with a car vestibule, of an extensible diaphragm the inner end of which is secured to the vestibule around the passage therethrough, a face plate to which the outer end of the diaphragm is secured, toggle links interposed between the face plate and the vestibule at each side of the diaphragm, a rod extending transversely across the diaphragm and movable relatively to the toggle links, a collar fixed to said rod, and springs surrounding said rod at each side of said collar and bearing against the inwardly projecting joints of the respective toggle links.

5. The combination with a car vestibule, of an extensible diaphragm the inner end of which is secured to the vestibule around the passage therethrough, a face plate to which the outer end of the diaphragm is secured, horizontal toggle links above and below the diaphragm at each side thereof, means interposed between the toggle links above the diaphragm and means interposed between the toggle links below the diaphragm whereby the compression of one side of the diaphragm extends the other side.

6. The combination with a car vestibule, of an extensible diaphragm the inner end of which is secured to the vestibule around the passage therethrough, a face plate to which the outer end of the diaphragm is secured, horizontal toggle links above and below the diaphragm at each side thereof, and springs interposed between the toggle links above, and between the toggle links below the diaphragm for extending one side of the diaphragm when the other side is compressed.

7. The combination with a car vestibule, of an extensible diaphragm the inner end of which is secured to the vestibule around the passage therethrough, a face plate to which the outer end of the diaphragm is secured, horizontal toggle links above and below the diaphragm at each side thereof, rods extending transversely across the top and bottom of the diaphragm, springs surrounding said rods and engaging the inwardly projecting joints of the respective toggle links whereby the compression of one side of the diaphragm extends the other side.

In testimony whereof, I sign this specification in the presence of two witnesses.

FRED C. AREY.

Witnesses:
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C. A. MULLEN.