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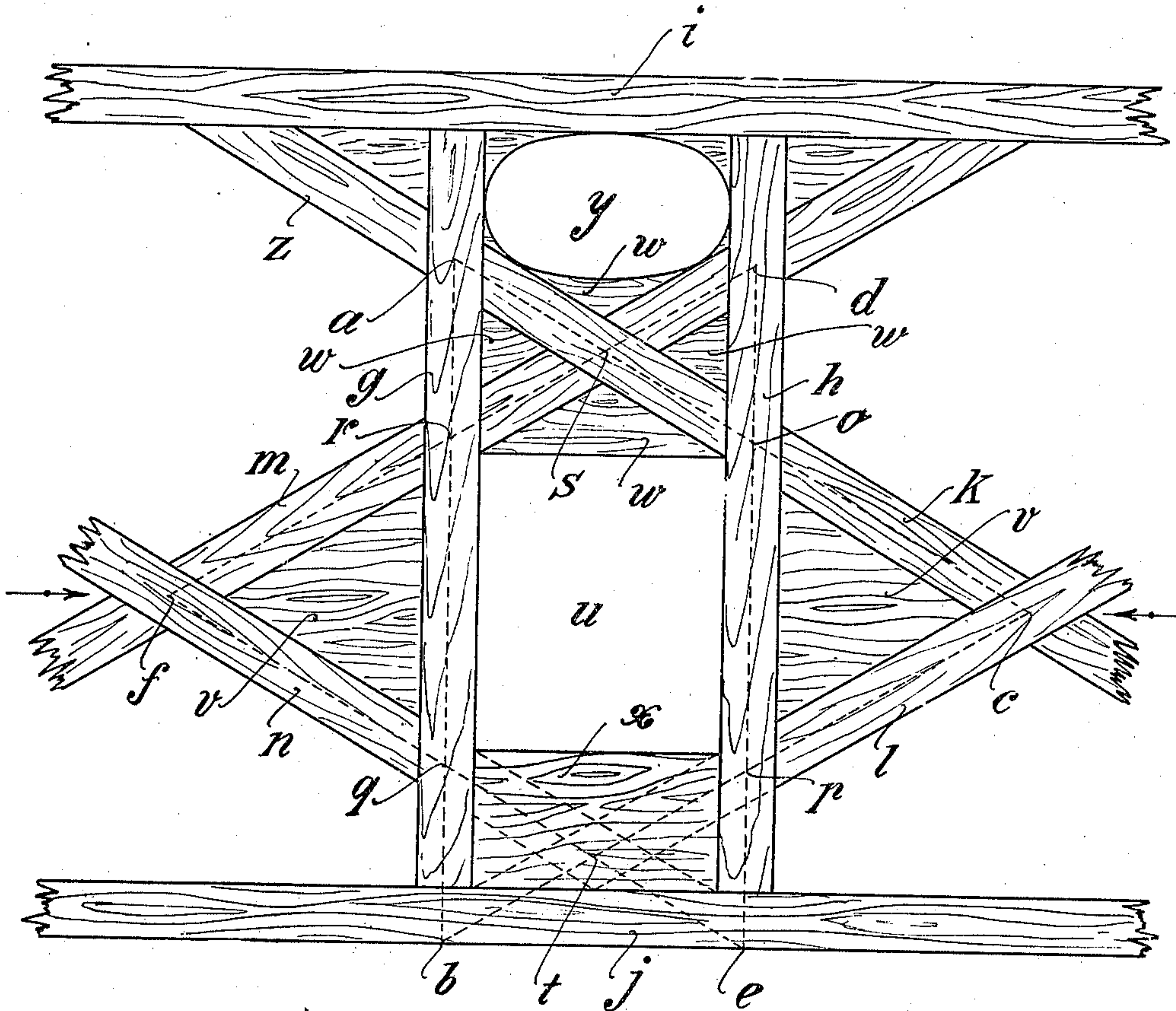
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D. ERDELBROCK.

SAFETY OUTLET IN THE LONGITUDINAL WALLS OF RAILWAY CARRIAGES.

(Application filed May 20, 1902.)

(No Model.)



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UNITED STATES PATENT OFFICE.

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SAFETY-OUTLET IN LONGITUDINAL WALLS OF RAILWAY-CARRIAGES.

SPECIFICATION forming part of Letters Patent No. 709,573, dated September 23, 1902.

Application filed May 20, 1902. Serial No. 108,183. (No model.)

To all whom it may concern:

Be it known that I, DIETRICH ERDELBROCK, teacher, a subject of the King of Prussia, Emperor of Germany, residing at Ottweiler, in the Province of Rhineland and Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Arrangement of Safety-Outlets in the Longitudinal Walls of Railway-Carriages without Side Doors, of which the following is a specification.

Among railway-carriages constructed up to the present those which have the doors at their ends are indisputably preferable to those having side doors to the individual compartments. The only disadvantage they possess is, as the vestibule-train fire near Offenbach, Germany, proved, that in a collision the ends are easily knocked in and the doors blocked up, the occupants of the carriage being thus hopelessly lost. This evil is not remedied by providing these so-called "vestibule-trains" with side doors as well, as in a slight collision the doors jam and in a more violent collision, in consequence of the great weakening of the longitudinal walls caused by the arrangement of the side doors, a wrecking of the carriage, resulting in the passengers being killed or seriously injured, is unavoidable. The present windows are too small, and, above all, are situated too high to serve as a means of escape from danger. The present invention is intended to remedy this evil; and it consists, essentially, therein that parts of the longitudinal walls of the carriage are protected by a strong framework formed, essentially, of two beam-triangles, which are immovably connected with each other and with the longitudinal beams or girders of the carriage, an opening *u* being arranged in each of the said parts at a suitable height—*i. e.*, near the floor—which can be used as a safety outlet or exit and which is therefore furnished with a catch or fastening that can easily be opened and will not jam.

The accompanying drawing illustrates the invention by a special example of construction, showing one section of the carriage-wall. The protecting-framework and the strengthened wall part are represented as made of wood; but naturally any other suitable material could be used just as well—such as iron or steel in particular, or, where the greatest

possible reduction of weight is aimed at, aluminium.

The two immovable beam-triangles are *abc* and *def*. They are imagined as laid one upon the other, so that their vertices point outward in opposite directions—*i. e.*, to the right and left—and their bases run parallelly. The space between the two bases represents the width of the safety-exit. The said exit is of course variable and depends upon how far the two triangles are pushed over each other. However, it is best to take it at about seventy to eighty centimeters. The best height for the exits is probably about one hundred to one hundred and twenty centimeters. The triangles in the drawing are taken as being equilateral; but in practice they can advantageously be lengthened somewhat—say until their vertical angles measure fifty to seventy degrees—to correspond with the direction of the forces which principally act upon them. (Shown in the drawing by arrows.)

The beams *g* and *h*, which contain or form the parallel bases *ab* and *de* of the triangles, form two parallel perpendicular connecting-supports between the longitudinal girders *i* and *j* of the carriage, inasmuch as they are produced upward beyond the corners *a* and *d* of the triangles. It is also of advantage, in order to strengthen the entire carriage-wall, to produce the beams *k*, *l*, *m*, and *n*, which form or contain, respectively, the sides *ac*, *bc*, *df*, and *ef* of the triangles, upward beyond the points of section *a* and *d* to the longitudinal girder *i* and upward and downward beyond their points of section *c* and *f* to the longitudinal girders *i* and *j* or to the next perpendicular connecting-support between the same. The sides of the triangles also intersect at the points *o*, *p*, *q*, *r*, *s*, and *t*, of which *o* and *p* lie in the support *h*, *q* and *r* in the support *g*, and *s* and *t* midway between the said two supports above and below the safety-exit *u*. The consequence of this is that the two supports *g* and *h* are connected up, as it were, into a rigid lattice girder, which along its greatest free length, where the intermediate stays or cross-pieces are wanting and the exit *u* is situated, is trussed outwardly by the beam lengths *fr* and *fq* on one side and *co* and *cp* on the other and protected

against compression in the direction of the arrows—that is, in the direction in which the force of a collision would principally act upon the carriage. These parts can, furthermore, be formed into one compact whole by completely filling up the outer and inner triangles left free between the beams $g h k l m n$ with plates $v w x$ of steel or the like.

The individual beams or girders can either actually cross one another or they can, as shown in the drawing, abut on one another. Those portions of the other beams which lie between the two beams g and h , forming the bases of the triangles, can also be replaced, as shown at the bottom in the drawing, by a solid block x .

In a collision the pressure at c is divided and branches off to o and p and onto a and b , and the pressure at f diverges to q and r and onto d and e . The outlet or exit and the sides of the same are thus preserved from the pressure, the opening remaining unaltered. In consequence of the protection afforded by the two triangles between which it lies the window u cannot be crushed and cannot jam, and it is thus always ready for the passengers' use. The triangles, inasmuch as they are each completely closed, are sufficiently firm in themselves and need not, therefore, be connected with the longitudinal beams i and j for support, as they completely protect the window by themselves. However, in order to make the whole wall firmer it is better for the beams of each triangle to go right through to the longitudinal beams and to be fastened to the latter. Above the point of intersection of the beams at s a round or oval window y may also be arranged, which is flanked by the beams $g h$ and the continuations z of the beams k and m and also, if desired, by solid triangular pieces of material to fill up the gaps.

The window u can be closed with a pane of glass, which in case of need can easily be broken with the hand or foot. Instead of a pane of glass, however, a thin wooden panel or the like may be used. A plate of stronger material, such as sheet metal, may also be employed, in which case, however, the said plate must be so arranged and fastened that when a violent shock, such as that caused by a collision, occurs it falls down or out of its own accord.

It is of advantage to arrange firm iron bars outside the carriage by the side of the window, parallel to the sides of the latter and corresponding with them in length, and a little below the lower edge of the window an iron step is fastened, so that any one getting through the window has something to hold on to and can then jump off the step or else slide down the bar, when he will in most cases immediately touch the ground.

As many of these safety-exits as required may be introduced into the wall of a carriage. It is probably best to arrange them alternately on opposite sides, so that in a carriage

having the corridor on one side every alternate compartment has its exit in its own outer wall, while the compartment in between has its exit in the outer wall of the corridor. As carriages are frequently overturned in a collision, so that the safety-exits in the walls cannot be used, it is of advantage to arrange such exits in roof and floor. In the latter they must of course not open through the weight of people treading on them.

In the event of a carriage turning over safety-exits in the roof only might not always suffice, as this part of the carriage might be hanging over a river or a precipice, so that the passengers getting out there would be exposed to danger anew, and possibly perish.

The exits may of course be marked with a suitable superscription and rendered easily recognizable, especially when they are not closed with glass, but with an opaque material.

Where the actual safety-exit is too low, or when it is closed with opaque material, so that the passengers cannot see through it at all or only uncomfortably, the above-mentioned round or oval window y , which can easily be arranged above it, supplies the deficiency.

In vestibule-trains furnished with such safety-exits catastrophes like that of the D-train fire near Offenbach cannot occur. These exits will greatly reduce the number of accidents that can happen to travelers on railways.

Having fully described my invention, what I desire to claim and secure by Letters Patent is—

1. In railway-carriages, especially in such of vestibule or corridor trains, the arrangement of strengthened parts in the longitudinal walls, each containing a safety-exit, the strengthened wall parts each consisting of two congruent equicrural beam-triangles abc and def , being laid upon each other in such a manner, that their vertices point outward in opposite directions along the carriage and their bases run parallelly, and being immovably connected with each other and with the longitudinal beams or frame-irons i, j of the carriage, the base-beams g, h of the two triangles forming traverses between the latter, and the safety-exits consisting of suitable closed openings u lying between the parallel base-beams g, h and the lower adjoined parties of the triangle side beams k, l and m, n crossing each other.

2. In railway-carriages, especially in such of vestibule or corridor trains, provided with strengthened parts in the longitudinal walls, each containing a safety-exit, the strengthened wall parts each consisting of two congruent equicrural beam-triangles abc and def , being laid upon each other in such a manner, that their vertices point outward in opposite directions along the carriage and their bases run parallelly, and being immovably connected with each other and with the

longitudinal beams or frame-irons *i, j* of the carriage, the base-beams *g, h* of the two triangles forming traverses between the latter, and the safety-exits consisting of suitable closed openings *u* lying between the parallel base-beams *g, h* and the lower adjoined parties of the triangle side beams *k, l* and *m, n* crossing each other a special arrangement of the strengthened parts with safety-exits in the opposite walls, these parts and exits being arranged alternately in the one and in the opposite wall of the carriage.

3. In railway-carriages, especially in such of vestibule or corridor trains, provided with strengthened parts in the longitudinal walls, each containing a safety-exit, the strengthened wall parts each consisting of two congruent equicrural beam-triangles *a b c* and *d e f*, being laid upon each other in such a manner, that their vertices point outward in opposite directions along the carriage and

their bases run parallelly, and being immovably connected with each other and with the longitudinal beams or frame-irons *i, j* of the carriage, the base-beams *g, h* of the two triangles forming traverses between the latter, and the safety-exits consisting of suitable closed openings *u* lying between the parallel base-beams *g, h* and the lower adjoined parts of the triangle side beams *k, l* and *m, n* crossing each other, the arrangement of the strengthened parts with safety-exits not only in the two side walls, but also in the floor and in the roof of the carriage.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

DIETRICH ERDELBROCK.

Witnesses:

CHARLES L. SEMPLE,
CARL SCHMITT.