O. M. EDWARDS.

TRAP DOOR FOR RAILWAY CARS AND SIMILAR STRUCTURES.

APPLICATION FILED FEB. 5, 1908.

942,719. Patented Dec. 7, 1909.

2 SHEETS—SHEET 1.

Fig. 1

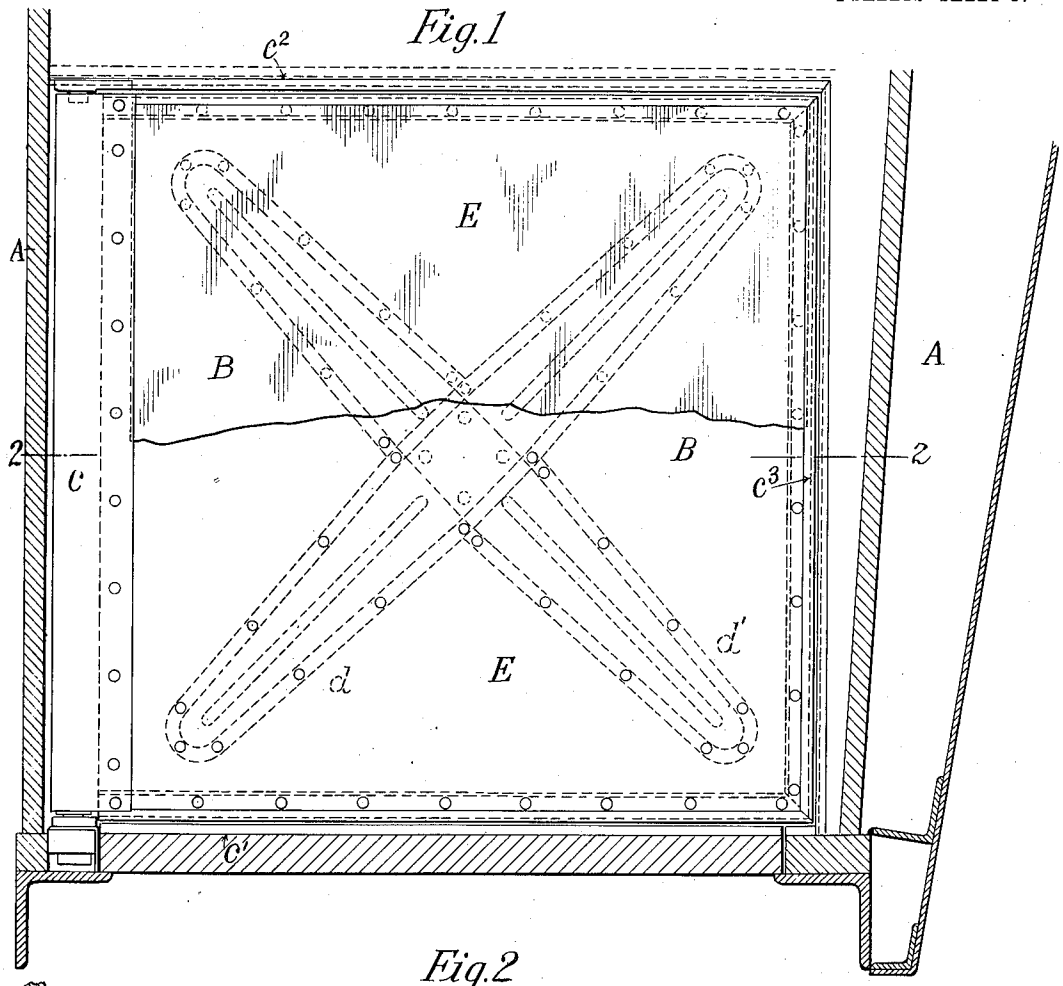


Fig. 2

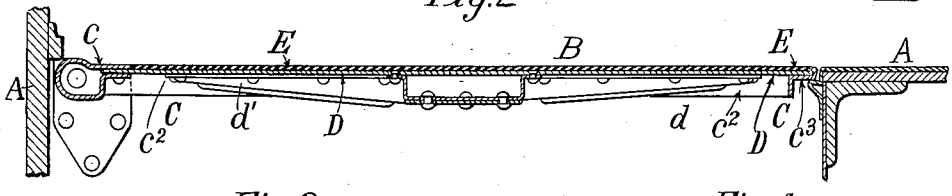


Fig. 3

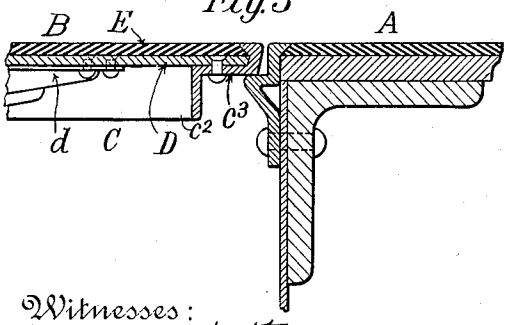
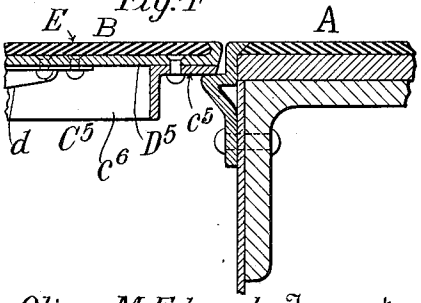


Fig. 4



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2 SHEETS—SHEET 2.

Fig. 5

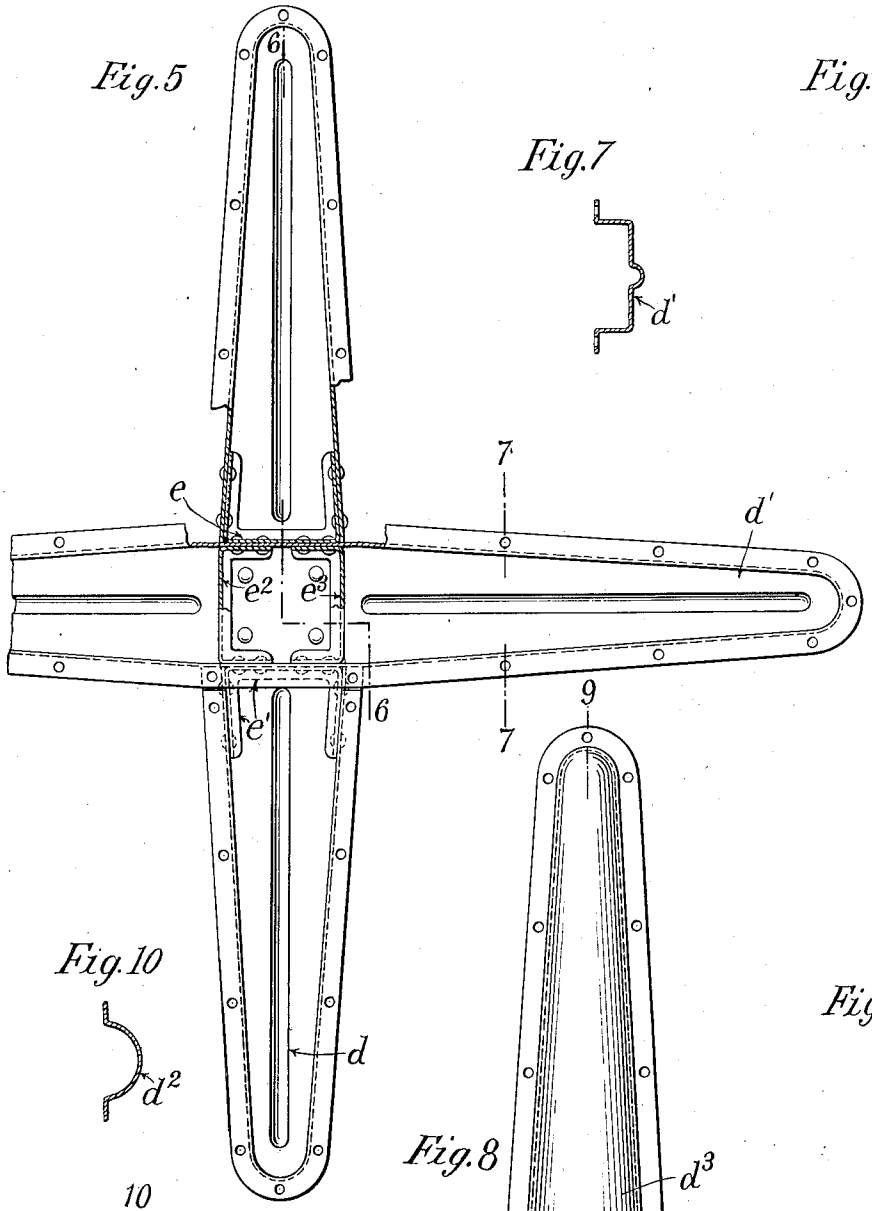


Fig. 6

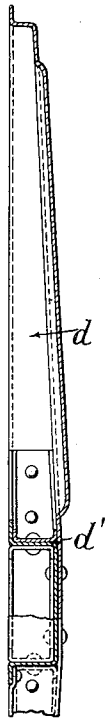
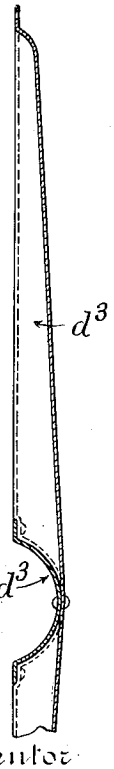


Fig. 7

Fig. 10

Fig. 8

Fig. 9



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UNITED STATES PATENT OFFICE.

OLIVER M. EDWARDS, OF SYRACUSE, NEW YORK.

TRAP-DOOR FOR RAILWAY-CARS AND SIMILAR STRUCTURES.

942,719. Specification of Letters Patent. Patented Dec. 7, 1909.

Application filed February 5, 1908. Serial No. 414,326.

To all whom it may concern:

Be it known that I, OLIVER M. EDWARDS, a citizen of the United States, residing at Syracuse, county of Onondaga, State of New York, have invented certain new and useful Improvements in Trap-Doors for Railway-Cars and Similar Structures, of which the following is a full, clear, and exact description, reference being had to the drawings accompanying the same.

This invention relates generally to the construction of metal trap-doors for cars and similar structures, such for instance as are used to cover and uncover the steps leading to and from the end platforms of passenger cars.

One of its objects is to provide a light, easily constructed and efficient metal door of this general class; another object is to so construct such a door out of metal that it will be sufficiently strong and rigid to do the work required of it and at the same time be of comparatively light weight and readily handled.

With these objects in view the invention consists in the construction, combination and arrangement of parts to be hereinafter more fully described and particularly pointed out in the claims hereunto annexed forming a part of this specification.

It has been found in use that trap-doors made of wood, as has heretofore commonly been done, in order to prove sufficiently strong and rigid, required some little thickness of material to be used and this necessarily makes such doors occupy more space than is usually desirable. Such doors in use are subjected to severe strains and are more or less wrenched which tends to weaken and destroy them and this many times seriously interferes with the quick and easy handling of the same for the ingress and egress of passengers. These trap-doors, like the platform or vestibule floors, where they are used, have to receive a covering having a surface adapted to prevent passengers and others using the cars from slipping thereon and this material, whether what is known as rubber tiling or other material be used, occupies some space and necessarily has to be secured in place against displacement in the quick and more or less violent use to which such doors are subjected by the persons having charge of the opening and closing of the same.

Figure 1 shows in plan view a door and a section of a car or vestibule platform illustrating generally the door when in the closed position, a portion of the upper covering of the door being broken away. Fig. 2 shows in cross section that which is seen on line 2—2 in Fig. 1, but with the covering in place. Fig. 3 shows on an enlarged scale that which is seen at the right of Fig. 2. Fig. 4 shows a modified form of construction of the plate of the door. Fig. 5 illustrates in plan view the reinforcing parts seen in dotted lines in Fig. 1, which are attached to the under side of the door, when such parts are secured together and ready to be secured to the door by rivets or otherwise. Fig. 6 is a sectional view on line 6—6 of Fig. 5 showing the upper portion of the reinforcing part of the door seen in Fig. 5. Fig. 7 is cross sectional view on line 7—7 of Fig. 5 showing the formation of such reinforcing portion. Fig. 8 shows in plan view a modified form of reinforcing parts. Fig. 9 shows in cross section that which is seen on line 9—9 of Fig. 8; and Fig. 10 shows in cross section that which is seen on line 10—10 of Fig. 8.

Like letters of reference, wherever they occur, indicate corresponding parts in the several figures of the drawings.

In Figs. 1 to 7, inclusive, A represents the car or vestibule platform in which the door B is hung so as to be opened and closed by any suitable form of means desired. As shown a well known form of hinge mechanism connects the door to the platform so that it may be readily moved in opening and closing the same. The door B as shown, is made up of a frame C preferably adapted to form the outer edge of such door, a plate D, reinforcing ribs *d d'*, which are secured to such plate and the tiling E, secured to the plate D within the frame C. The plate D is preferably a thin, flat plate of metal of a size to be received by and be secured to the frame C. The frame C may be made from any desired form of material, such as "angle-iron" or other shapes, properly secured together at the corners and adapted to receive and have secured thereto the plate D. As here shown special forms or shapes of frame material are employed having certain features adapting the frame to serve purposes ordinary angle-iron would not serve. Such special forms of frame ma-

terial receive and hold the plate D to the desired extent and also aid in holding the tiling in place. These frames are made of the desired shape to fill to the desired extent the opening in the platform.

As shown the frame C is made up of side and front angle pieces and a rear piece adapted to receive the hinge by which the trap door is hung in the vestibule platform to open and close the opening therein. This hinge portion c of the frame C is preferably struck up out of comparatively thin sheet steel in the shape shown, so that the plate D may be received thereby and secured thereto. When in the shape thus seen the parallel portions of the rear or hinge portion of the frame C are brought near enough together to receive the plate D between them and permit of such portions being secured thereto by rivets or otherwise, as desired. This manner of securing the hinge portion of the frame C to the plate D strengthens the connection between both. This construction of the hinge portion of the frame C also permits of securing the rear end portions of the side pieces c' and c^2, to such hinge portion, as indicated in Fig. 1, thus tying such side pieces to the hinge portion in addition to securing all of such pieces or portions to the plate D. The front piece or portion c^3 of the frame C is preferably secured to the end pieces c' and c^2 by means of the plate D and rivets, as shown in Fig. 1. These side and front pieces c', c^2 and c^3 are preferably provided with upstanding extensions, as shown, to serve the purposes heretofore referred to. The exterior or outermost surfaces of these upstanding extensions of the side and front portions of the frame C are preferably not made perpendicular to the plate D, but are out of such perpendicular so as to widen the door as the top surface thereof is approached, as shown in Figs. 2 and 3. With this construction of these extensions the trap-door, if it binds at all in the opening of the platform, the side and front edges will bind only at or near the top surface thereof and as the door begins to open the binding of the door is lessened and continues to lessen as the opening continues until the door has passed beyond the edges of the opening in the platform, the same as is the case with the construction of trap-door bindings shown and described in my Patent No. 847,559 dated March 19, 1907. As here shown the plate D is secured to the frame C by rivets, this being thought to be the preferable means for securely holding the parts together, but other means may be employed if desired.

The plate D, as shown, is suitably reinforced and stiffened by ribs d and d', preferably struck up out of thin sheet metal so as to make the door as light as thought desirable in each case. As shown in Fig. 2 these ribs d and d' are fixedly secured to the plate D by rivets and the ribs are preferably arranged at substantially right angles to one another and also preferably secured together so as to form a comparatively rigid joint between such ribs, one rib stiffening the other rib where the two cross one another. This joint can be made as shown in the drawings or otherwise. As shown in Figs. 1 to 7, one rib d has its bent up portions cut away to receive the other one and the two ribs cross one another at substantially right angles and are secured together by riveting at their deepest or bottom portions and the use of angle pieces arranged within the bent up or recessed portions of such ribs where such pieces are entirely hid from view when the ribs are secured to the plate D, as shown. There are preferably four angle pieces, e, e', e^2 and e^3, as shown, which are preferably made from comparatively thin sheet metal having the edges thereof turned up as shown in Fig. 5 to strengthen the same.

The rib d' as shown, is continuous and its upstanding side edges are uncut at its central portion, but the rib d has its upstanding side edges cut away so as to permit the bottom portion of such rib to rest directly against the bottom portion of rib d', the two ribs being arranged as shown. The bottom portion of the rib d' is preferably bent or depressed to an extent of about the thickness of the metal out of which the ribs are made, so as to bring all of the flanges on the upstanding side edges of such ribs of substantially the same height or in line with one another. The angle pieces e and e' are preferably arranged outside of the upstanding side edges of the rib d' so that the central portions of such pieces may engage with and be riveted to the continuous side edges of that rib and the end portions of such angle pieces may engage with and be riveted to the remaining or uncut away side edge portions of the rib d. These angle pieces e and e' when secured to the upstanding side edges of the ribs d and d' in the manner just mentioned secure the respective side edges of such ribs together and form substantially rigid connections between the ribs to hold them from being moved relatively to one another. The connections between these ribs d and d' can be further stiffened or made more rigid if desired by the employment of the angle pieces e^2 and e^3, similar in construction to pieces e and e', which are preferably arranged as shown in Fig. 5 to connect the upstanding side edges of the rib d' by engaging the interior surfaces thereof and being fixedly secured to such edges. As shown in this Fig. 5 these angle pieces e^2 and e^3 are secured to the side edges of rib d' by means of the rivets which secure the angle pieces e and e' to the exterior sur-

faces of such rib passing through the end portions of such angle pieces e^2 and e^3, as well as through the central portions of the angle pieces e and e'. From this, it will be seen that the central portions of the angle pieces e and e' are secured to the end portions of the pieces e^2 and e^3 and also to the upstanding edges of the rib d. This forms a very strong and stiff connection between the crossing portions of the ribs d and d' and makes one rib substantially as strong and stiff as the other notwithstanding that the upstanding side edges of one, where the two cross, are cut away. This arrangement not only strengthens the ribs against lateral movement but also strengthens them against movement in the direction of the upstanding side edges, thus strengthening the ribs in two different directions, one of which is at an angle to the other. If desired these ribs may be constructed as shown in Figs. 8, 9 and 10, instead of as shown in preceding figures and the same be secured together, if desired, as there shown. As thus shown the rib d^2 has its bent up portions continuous throughout the central or crossing portion thereof and the rib d^3 in its corresponding portion is bent so as to more or less closely fit over the exterior surface of the rib d^2. This permits the securing of the flanges of the two ribs together by rivets, as shown, or otherwise, if one desires to directly secure such ribs to one another. The manner of securing the outer portions of the upstanding edges of the ribs together as shown strengthens such ribs in substantially the manner that the use of the angle pieces e and e' does in the construction seen in preceding figures.

The ribs d^2 and d^3 are to be secured to the plate D after the manner the ribs d and d' are secured thereto, if desired, and when this is done such plate and the trap door of which it forms a part is stiffened and made sufficiently rigid in handling without the door occupying undue space, when in the open position, to interfere with the full opening of the vestibule door for the ingress or egress of passengers to or from the car. These ribs whatever their construction may be are to be secured to the plate D in any desired manner which will enable them to coöperate with the plate as hereinbefore set forth. As shown rivets are employed for this purpose and this is thought to be the best and most expeditious manner of securing the two together, but any desired means may be employed, because such manner is not a material part of this invention. These ribs necessarily strengthen and stiffen the plate, as D, and keep it from unduly yielding or twisting in use which is important in doors of this general class. The plate, as D, is left flat on its uppermost surface without depressions or projections and consequently the rubber tiling, as E, may be secured thereto without the use of filling material as would have to be done if depressions or projections were present. These ribs can be made and attached to the plate, as D, without twisting or otherwise distorting it, and this tends to lessen the cost of constructing these doors.

In each of the embodiments herein shown the reinforcing means is so formed and arranged relatively to the plate to which it is secured that such means bear upon the plate and are secured thereto at different points some of which are adjacent to the edges of the plate and others centrally thereof and each of the different portions of such reinforcing means extends from the central portion of the plate toward the edges thereof with the farthermost portions of such means at different distances therefrom as the edges of the plate are approached with the result that the major portions of such reinforcing means are held away from and out of contact with the plate to which such means is attached by the minor portions thereof which are formed and arranged to bear against the plate, to reinforce and strengthen the same, whereby a minimum weight of material is required to give the maximum reinforcing action of such means upon the plate.

Instead of the plate, as D, being constructed and attached to the frame, as C, as shown in Figs. 1, 2 and 3 it may, if desired, be made as indicated in Fig. 4 where the front and side edges are turned up relatively to the body thereof so as to receive the rubber tiling, as E, and the extensions of the front and side portions of the frame, as C, are omitted, as seen in this Fig. 4. When this is done the frame C^5 may be of ordinary angle-iron construction as seen in Fig. 4, or of any form desired which will serve the purpose. As shown in Fig. 4 the plate, as D^5, is turned up at the front and side edges so as to form upstanding portions, preferably of the shape in cross section there seen. When this is done these upstanding portions of such plate serve the purposes served by the upstanding extensions of the front and side portions of the frame C seen in preceeding figures of the drawings.

As shown in Figs. 1, 2 and 3, the plate D is received between the parallel portions of the rear or hinge portion, as c, of the frame C, the upper one of the two parallel portions being preferably formed to receive the tiling, as E, as is the case with the front and side portions of such frame. The form of hinge shown is of the general construction set forth in Letters Patent No. 781,643, but any form or construction desired may be used because the special form or construction shown is not a material part of this invention. This special form of hinge has been in common use for some years and is so well known that it is not deemed necessary to describe the construction in detail.

As is well known the special feature, generally stated, of this construction is the use of a torsional spring or springs, the stress of which can be readily adjusted, for assisting in opening the door. The rear or hinge portion as *c*, of the frame, as C, provides a space for these springs, (not shown) one end of which engages with the door and the other end engages with the platform to which the door is hinged, as is well known and as set forth in said Patent No. 781,643 to which reference is made for a more detailed description.

What I have herein shown and described will naturally suggest to those skilled in this art other specific embodiments of this invention and also modifications in the construction and arrangements of parts wherein substantially the same results may be accomplished by combinations of elements or devices having essentially the same mode of operation as the combinations have that are particularly pointed out in the claims hereunto annexed, hence I do not wish to limit my invention to the specific forms and arrangements herein shown and described, but desire to include all forms and arrangements which embody the spirit of my invention and which have substantially the same mode of operation as do the specific parts and arrangements herein set forth.

What I claim as new is:—

1. In a trap door for the vestibule of a railway car the combination, substantially as set forth, of a flat plate adapted to form the main portion of such door and to receive hinge portions for mounting the same in place, reinforcing means formed separate from the plate and adapted to be secured thereto with portions thereof at varying distances therefrom, which distances vary from the central portion of the plate outwardly toward the hinge and front side portions of the door, and securing means adapted to attach such reinforcing means to the plate and thereby strengthen and stiffen the same.

2. In a trap door for the vestibule of a railway car the combination, substantially as set forth, of a flat plate adapted to form the main portion of such door and to receive hinge portions for mounting the same in place, reinforcing means formed separate from the plate, different portions of which, when secured to the plate, are adapted to reinforce and strengthen the same in two directions, one at an angle to the other, with the major portions thereof held away from and out of contact with the plate by the minor portions which contact with and bear against such plate, and means adapted to secure the minor portions of the reinforcing means to the plate to reinforce and strengthen the same.

3. In a trap door for the vestibule of a railway car the combination, substantially as set forth, of a flat plate forming the main portion of the door and adapted to receive hinge portions for mounting the same in place, reinforcing ribs formed separate from such plate out of sheet metal and adapted to be secured thereto at the edges of such ribs, and securing means adapted to secure such ribs to the plate, thereby strengthening and stiffening the same.

4. In a trap door the combination, substantially as set forth, of a plate forming the main portion of the door and adapted to receive hinge portions for hinging the same in place, reinforcing ribs formed out of thin metal and adapted to cross one another with the edge portions thereof in a common plane and adapted to bear against the plate when secured thereto, and securing means adapted to secure such ribs to the plate for stiffening the same.

5. In a trap door for the vestibule of a railway car the combination, substantially as set forth, of a plate forming the main portion of a door and adapted to receive a hinge portion which extends along one edge of such plate and is adapted to be secured thereto and extend above the upper surface thereof to stiffen that portion of such plate, a hinge portion adapted to extend substantially across the door, a stiffening piece adapted to be attached to the opposite edge portion of the plate and stiffen the same, reinforcing ribs formed separate from such plate by bending and adapted to be secured thereto at different points adjacent to the opposite edges of such ribs and at an angle to the hinge portion of the door, and securing means adapted to secure the reinforcing means, hinge portion and strengthening piece to the plate, thereby strengthening and stiffening the same against loads placed thereon.

6. In a trap door for the vestibule of a railway car the combination, substantially as set forth, of a plate forming the main portion of the door and adapted to receive a hinge portion, a hinge portion adapted to extend clear across such plate upon opposite sides thereof and extend above and below the upper and lower surfaces of such plate and be secured thereto and stiffen the same, an angle stiffening piece adapted to be attached to the opposite edge portion of the plate and stiffen the same, reinforcing means separate from the plate and adapted to be secured thereto between the hinge and angle stiffening piece attached to such plate, and securing means adapted to attach the reinforcing means to the plate and thereby strengthen and stiffen the central portion of the same.

7. In a trap door for the vestibule of a railway car the combination, substantially as set forth, of a flat plate adapted to form the main portion of the door and receive

hinge portions for mounting the same in place, reinforcing means formed separate from the plate and having edge portions adapted to contact with and be secured to the plate at points in a common plane, and securing means adapted to secure such means to the plate at different points where such means contact therewith to strengthen and stiffen the same against loads placed thereupon.

8. In a trap door for the vestibule of a railway car the combination, substantially as set forth, of a flat plate forming the main portion of the door and adapted to receive hinge portions for mounting the same in place, reinforcing means formed separate from the plate by bending, the minor portions of such means being adapted to contact with the plate and to be secured thereto at points of contact therewith and hold the major portions of such means a distance away from the plate in position to strengthen and stiffen the same, and securing means adapted to secure the minor portions of the reinforcing means to the plate at points where such means contact therewith, whereby the plate is reinforced and strengthened against loads placed thereupon.

9. In a trap-door the combination, substantially as set forth of a frame adapted to receive a plate and extend upwardly beyond the upper surface of the same, a plate secured to such frame reinforcing means separate from the plate and adapted to be secured thereto, and securing means adapted to attach the reinforcing means to the plate for stiffening the same.

10. In a trap-door, the combination, substantially as set forth, of a frame the hinge portion of which is adapted to engage with opposite surfaces of a plate which is to be secured to such frame, a plate secured to the frame, the upstanding portions of the frame extending above the upper surface of the plate, reinforcing means separate from the plate and adapted to be secured thereto, and securing means adapted to attach the reinforcing means to the plate for stiffening the same.

11. In a trap-door the combination, substantially as set forth, of a plate adapted to receive hinge portions for hinging the same in place, reinforcing ribs formed out of sheet metal and adapted to cross one another, securing means adapted to secure the two ribs together where they cross, and means adapted to attach such ribs to the plate to stiffen the same.

12. In a trap-door the combination, substantially as set forth, of a plate adapted to receive hinge portions for hinging the same in place, reinforcing ribs formed out of sheet metal and adapted to cross one another, angle pieces adapted to be inserted in the space between the ribs and plate and to be secured in place to strengthen the ribs where they cross, and means adapted to attach the ribs to the plate to stiffen the same.

13. In a trap-door the combination, substantially as set forth, of a plate adapted to receive hinge portions for hinging the same in place, reinforcing ribs formed out of sheet metal and adapted to cross one another, means adapted to secure the two ribs together at different points where they cross one another to strengthen them against lateral movement, and securing means adapted to attach the reinforcing ribs to the plate to stiffen the same.

14. In a trap-door the combination, substantially as set forth, of a plate adapted to receive hinge portions for hinging the same in place, reinforcing ribs having upstanding portions provided with flanges, and adapted to cross one another, means arranged between the upstanding portions of the ribs and adapted to connect portions of one rib with portions of the other, and securing means adapted to attach the ribs to the plate to stiffen the same.

15. In a trap-door the combination, substantially as set forth, of a plate adapted to receive hinge portions for hinging the same in place, reinforcing ribs having upstanding portions and adapted to cross one another, angle pieces arranged adjacent to the upstanding portions of both ribs and adapted to be secured thereto, and securing means adapted to attach the ribs to the plate to stiffen the same.

16. In a trap-door the combination, substantially as set forth, of a plate adapted to receive hinge portions for hinging the same in place, reinforcing ribs having upstanding portions and adapted to cross one another, angle pieces formed out of sheet metal with bent up edges to strengthen the same arranged between the upstanding portions of the ribs and adapted to connect one portion of one rib with portions of the other, and securing means adapted to attach the ribs to the plate to stiffen the same.

17. In a trap-door platform, the combination, substantially as set forth, of an opening in the platform adapted to receive the door, a door frame adapted to receive a plate and be hinged in such opening, portions of which frame opposite adjacent portions of the opening in the platform are tapered or beveled so that such portions of the frame first engage with the adjacent portions of the opening near the top of the platform surface, a plate secured to the frame, reinforcing means separate from the plate adapted to be secured thereto, and securing means adapted to attach the reinforcing means to the plate for stiffening the same.

18. In a trap-door platform the combination, substantially as set forth, of an open-

ing in the platform adapted to receive a door and have the same hinged therein, which door at its edges is provided with portions extending above the main portion thereof to receive the tiling or similar material to be secured thereto, reinforcing means adapted to be attached to such door, and securing means adapted to secure the reinforcing means to the main portion of such door for stiffening the same.

19. In a trap-door platform the combination, substantially as set forth, of a frame adapted to receive a plate, a plate having upstanding edge portions and adapted to be secured to the frame, reinforcing means adapted to be secured to the plate, and securing means adapted to attach the reinforcing means to the plate for stiffening the same.

20. In a trap-door platform the combination, substantially as set forth, of a flat plate adapted to receive hinge portions for mounting the same in place, reinforcing means formed in two pieces one crossing the other and which are secured together where they cross and both are adapted to contact with and be secured to the plate adjacent to the edges of such pieces, and securing means adapted to secure such reinforcing means to the plate for stiffening the same against loads placed thereupon.

21. In a trap-door platform the combination, substantially as set forth, of a plate adapted to receive hinge portions for hinging the same in an opening in the platform, reinforcing means formed in two pieces out of sheet metal, one piece crossing the other and the two are secured together by means which attaches one to the other to strengthen the same, and securing means adapted to secure the two pieces of the reinforcing means together and to the plate for strengthening the same.

22. In a trap-door or platform the combination, substantially as set forth, of a plate adapted to receive hinge portions for hinging the same in an opening in the platform, reinforcing means formed in two pieces out of sheet metal, one piece crossing the other and the two are secured together by angle pieces secured to each piece, and securing means adapted to secure the reinforcing means to the plate for strengthening the same.

23. In a trap-door platform the combination, substantially as set forth, of a plate adapted to receive hinge portions for hinging the same in an opening in the platform, reinforcing means consisting of two ribs formed out of sheet metal, one crossing the other, angle pieces inserted within one rib and secured to both ribs for connecting and strengthening the two where they cross one another, and securing means adapted to secure the reinforcing means to the plate for stiffening the same.

24. In a trap-door platform the combination, substantially as set forth, of a plate adapted to receive hinge portions for hinging the same in an opening in the platform, reinforcing means consisting of two ribs formed out of sheet metal one crossing the other, angle pieces inserted in one of the ribs and secured to the side walls thereof for strengthening such rib, and securing means adapted to secure the reinforcing means to the plate for stiffening the same.

25. In a trap-door platform the combination, substantially as set forth, of a plate adapted to receive hinge portions for hinging the same in an opening in the platform, reinforcing means consisting of two ribs formed out of sheet metal one crossing the other, angle pieces inserted within each of the two ribs and secured to each rib and to one another for strengthening the same where the two cross, and securing means adapted to secure the reinforcing means to the plate.

26. In a platform trap door the combination, substantially as set forth, of a flat metal plate, reinforcing means formed separate from the plate and adapted to be secured thereto with the major portions thereof arranged at varying distances therefrom, which distances vary in different directions relatively to the surface of the plate to which the reinforcing means is secured, hinging means adapted to hinge the plate in the platform, and means adapted to secure the reinforcing means to the plate and thereby reinforce and strengthen the same against loads placed thereupon.

27. In a platform trap door the combination, substantially as set forth, of a flat metal plate, means adapted to hinge the plate in the platform, reinforcing means formed separate from the plate by bending and provided with portions adapted to contact therewith and be secured thereto with the major portions of such means held away from and out of contact with the plate by the contacting portions which, when secured in place, contact with and bear against such plate, and means adapted to secure the reinforcing means to the plate in position to reinforce and strengthen the same against loads placed thereupon.

28. In a platform trap door the combination, substantially as set forth, of a flat metal plate, means adapted to hinge the plate in the platform, reinforcing means formed separate from the plate by bending and provided with portions adapted to contact therewith and be secured thereto with the major portions of such means held away from and out of contact with the plate at varying distances therefrom by such con-

tacting portions which are adapted to bear against the plate, and means adapted to secure the reinforcing means to the plate in position to reinforce and strengthen the same against loads placed thereupon.

29. In a platform trap door the combination, substantially as set forth, of a flat metal plate, means adapted to hinge the plate in the platform, reinforcing means formed separate from the plate by bending, different portions of which, when secured to the plate, are adapted to reinforce and strengthen the plate in a plurality of directions, each at an angle to another and to the plate, the minor portions of such means being arranged to contact with the plate and hold the major portions of such means away therefrom, and means adapted to secure the reinforcing means to the plate to reinforce and strengthen the same against loads placed thereupon.

30. A reinforced platform trap door comprising a metal plate having a flat surface for one side thereof, hinging means for hinging the door in the platform and reinforcing means formed separate from the plate corresponding portions of which are of substantially the same dimensions and are secured to such plate at different points with the furthermost portions of such means held away therefrom at varying distances by other portions formed at angles to such furthermost portions.

31. A reinforced platform trap door comprising a metal plate having a flat surface for one side thereof and adapted to receive hinging means for mounting the door in the platform and reinforcing means having a plurality of portions formed separate from the plate by bending and which are secured thereto at different points at varying distances therefrom which distances lessen as the edges of such plate are approached to reinforce and strengthen the door.

32. A reinforced platform trap door comprising a metal plate having a flat surface for one side thereof, hinging means for hinging the door in the platform and reinforcing means formed separate from the plate by bending and having portions secured to the plate at different points and other portions arranged at angles to and between such portions to hold the major portions of such means away from the plate at different points to reinforce and strengthen the door.

33. A reinforced platform trap door comprising a flat metal plate adapted to receive means for hinging it in the platform and reinforcing means, portions of which are formed by bending sheet metal to the desired shape and securing the same to the plate at different points to hold the major portions of such means away from the plate with free spaces between such portions and plate to which such means are secured, thereby strengthening and stiffening the door.

OLIVER M. EDWARDS.

Witnesses:
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