

Nov. 21, 1939.

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2,180,494

END CONSTRUCTION FOR RAILWAY CARS

Filed June 15, 1937

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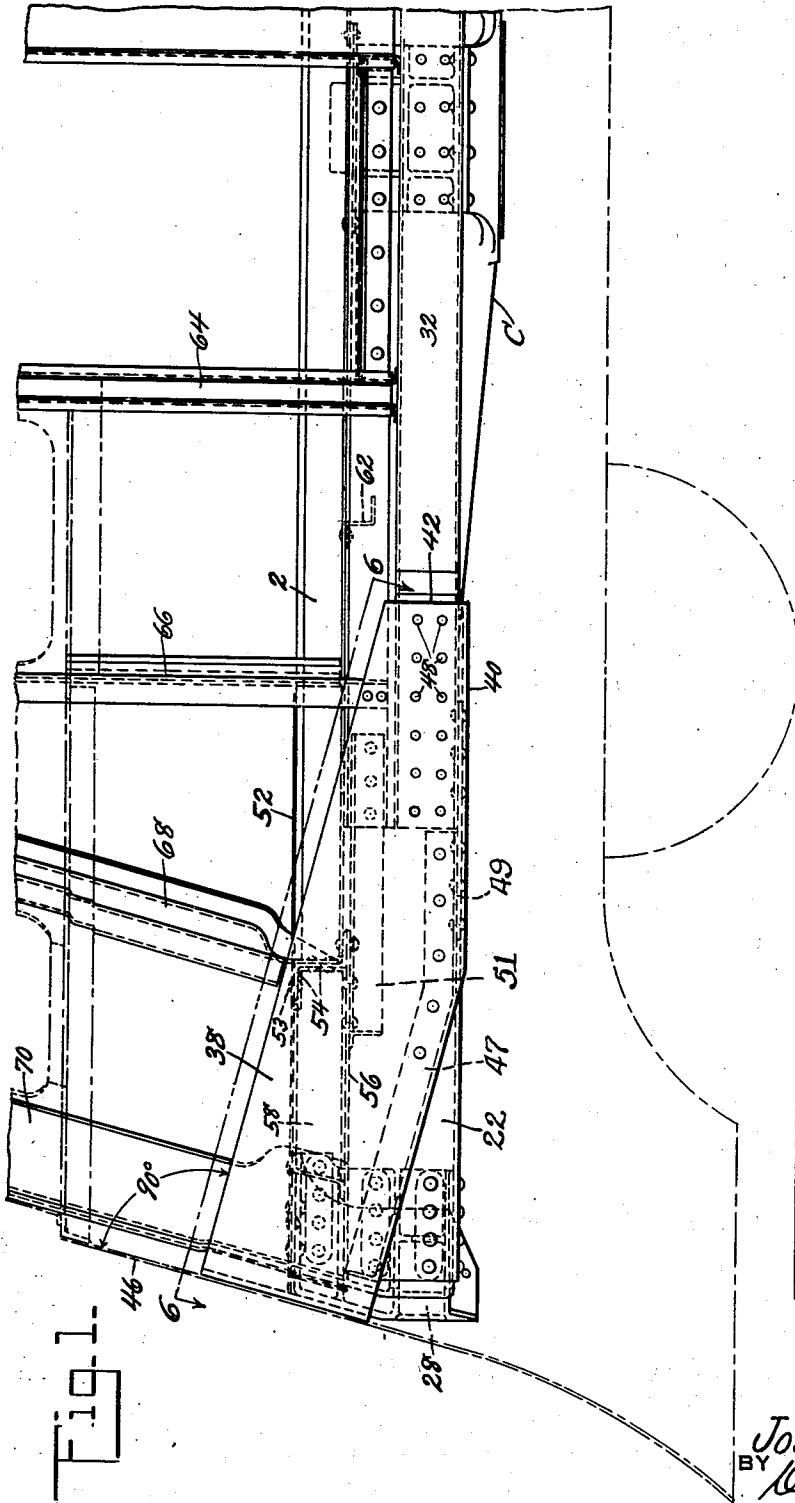


Fig. 1

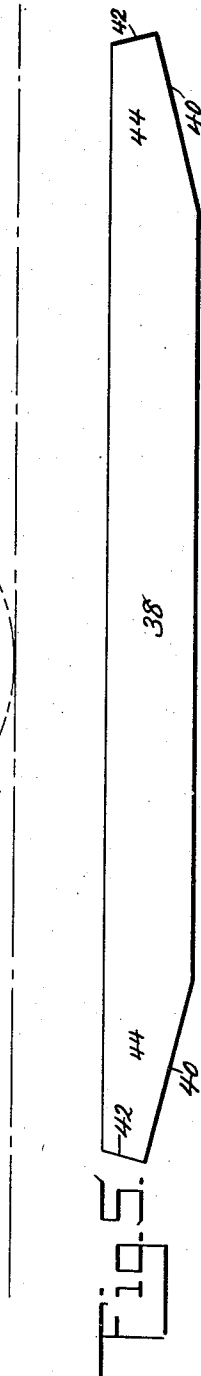


Fig. 5

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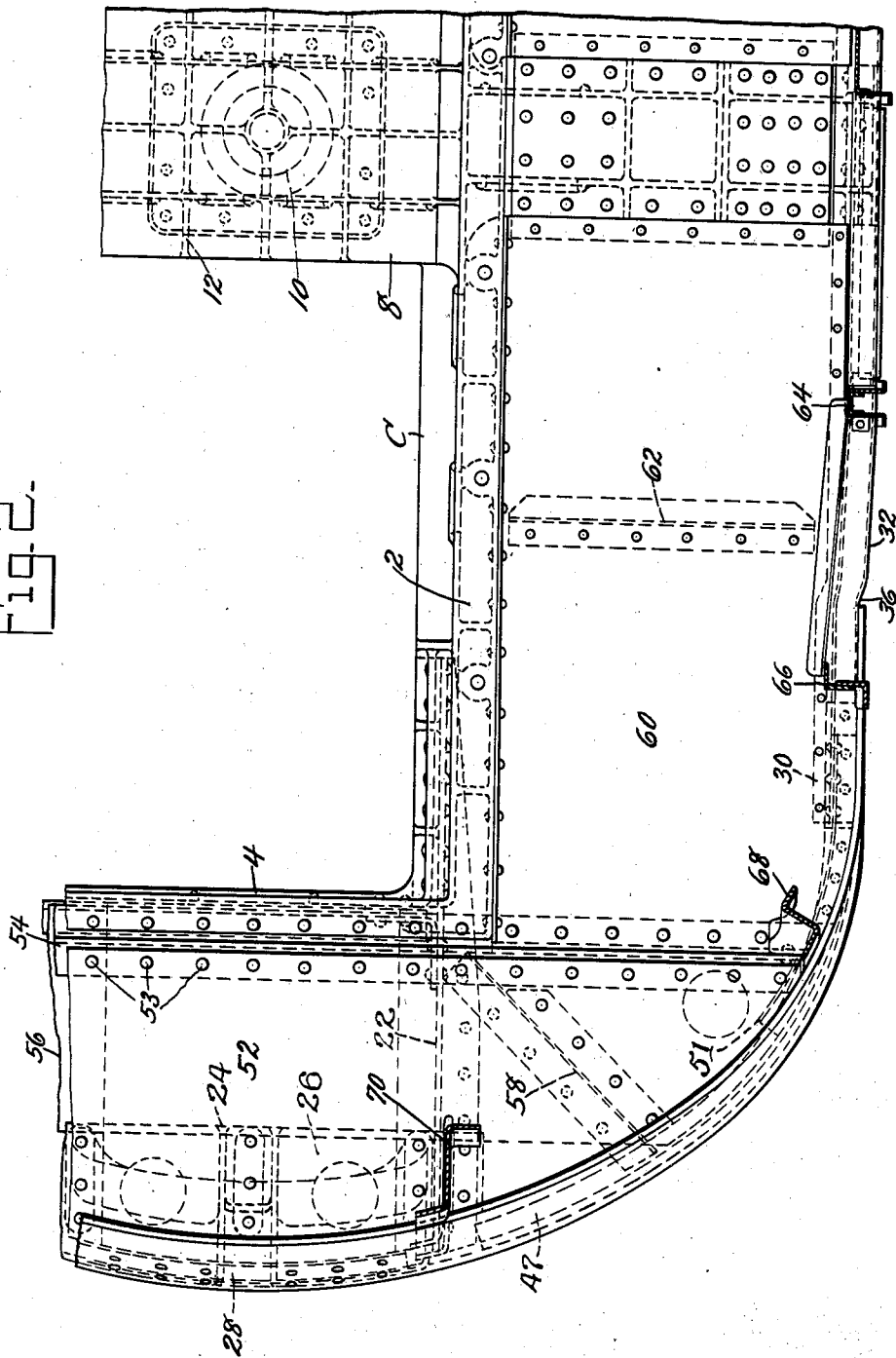
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Fig. 2.



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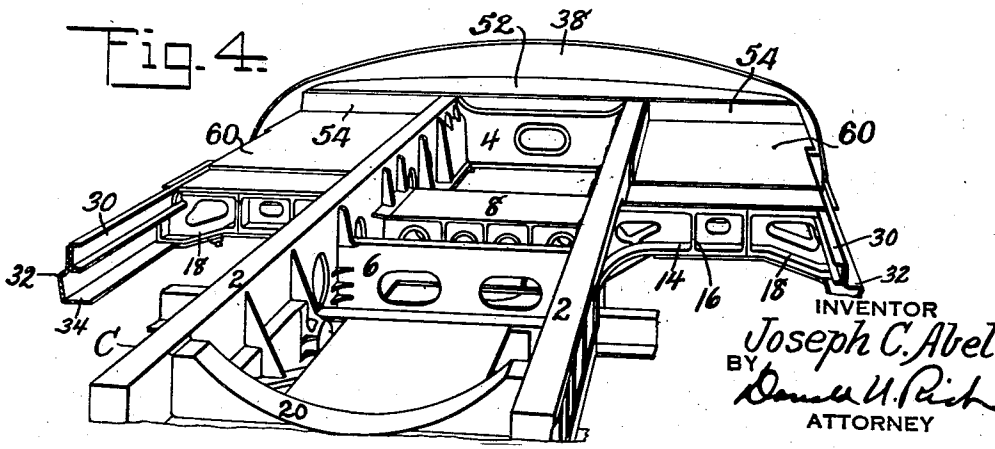
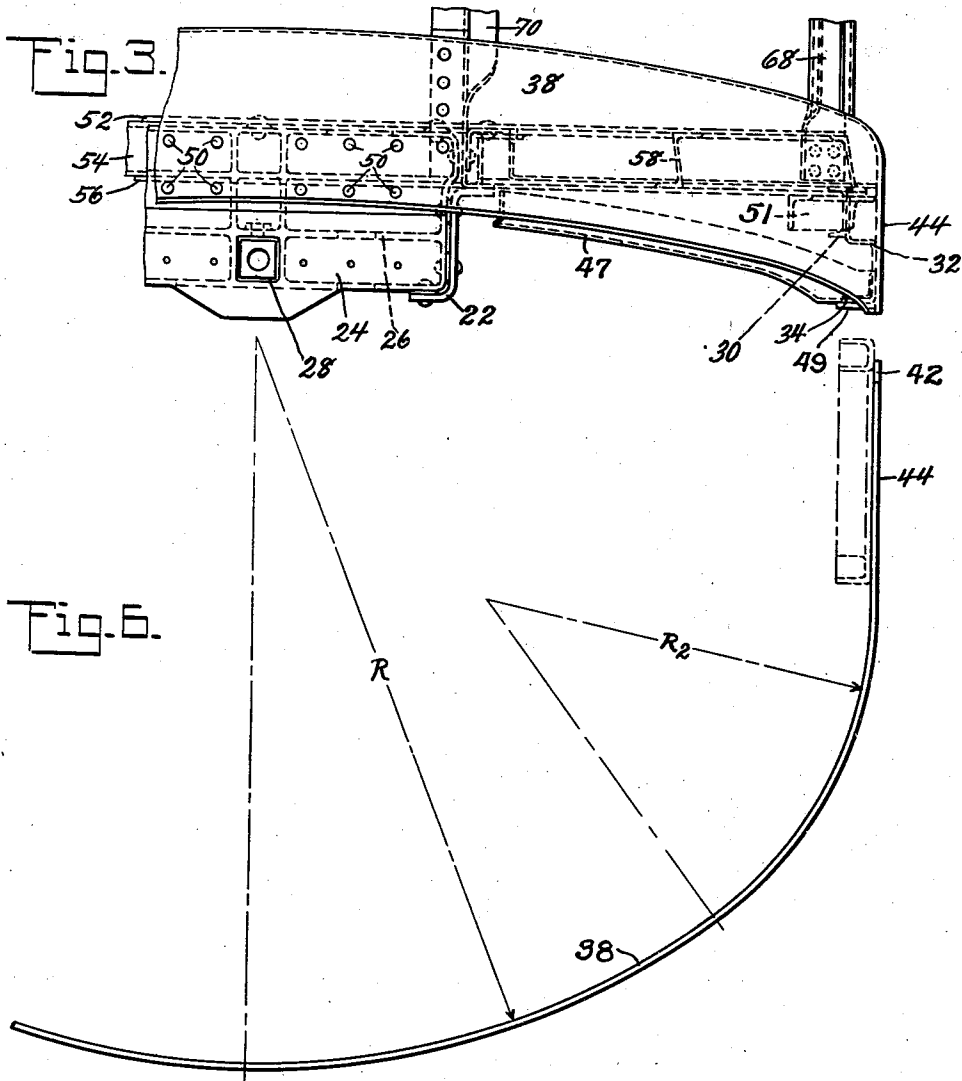
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# UNITED STATES PATENT OFFICE

2,180,494

## END CONSTRUCTION FOR RAILWAY CARS

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Application June 15, 1937, Serial No. 148,257

16 Claims. (Cl. 105—414)

This invention relates in general to end constructions for railway cars and in particular to end constructions for power cars of the streamlined type.

5 Past constructions for streamlined cars have been either of the cast or fabricated type with commercial forms bent to form a frame to which the end sheathing might be attached. It is almost impossible to bend a commercial shape to a  
10 streamlined contour and even if so bent it will have very little strength since the metal will be improperly placed after bending to resist the heavy thrusts to which an end member of a car may be subjected. In cases where cast framing  
15 members were used it was, of course, easy to obtain the streamlined contour, but in these cases a large amount of grinding and machining was necessary in order to make the end member smooth enough for attachment of thin sheathing.  
20 With the cast construction it was impossible to vary the streamlined contour without an excessive amount of machining or grinding or the use of a new pattern. It is an object, therefore, of the present invention to provide an end construction which may be readily modified to conform  
25 to changes in streamlined contour.

A further object of the invention is the provision of an improved end construction of great strength and simplicity which may be manufactured from plate and standard rolled section.

A still further object of the invention is the provision of an end construction which may be readily secured to a standard underframe and be readily modified in accordance with changes in  
35 the streamlined contour of the car.

A yet further object of the invention is the provision of an end construction for streamlined cars which is of extremely strong box section and connects the side and center structures together.

40 These and other objects of the invention will be apparent to persons skilled in the art from a study of the following description and accompanying drawings, in which:

45 Figure 1 is a side view of the improved end construction;

Fig. 2 is a plan view of the end construction showing substantially one-half the car;

Fig. 3 is a front end view of the portion of the construction shown in Fig. 2;

50 Fig. 4 is a perspective view of the end construction;

Fig. 5 is an elevational view of the end plate sheared and ready for bending, and

55 Fig. 6 is a plan view of the end plate as bent to the proper form.

Referring now to the drawings in detail, it will be seen that the end construction has been applied to the front end of a power car but it is to be understood that this construction is equally applicable to cars other than power cars. The car as shown is constructed with a center structure formed in part by an engine or machinery bed casting C. This casting, as will be clearly seen from Fig. 4, consists of longitudinally extending side rails 2 joined together by front and intermediate cross members 4 and 6 respectively and by bolster member 8. The bolster member is of conventional box section design and is provided with customary center bearings 10 and bracing web or gussets 12. The bolster is extended outwardly beyond the side rails by means of short stub castings 14 which are also of box section and suitably braced by gussets 16. The ends of these stub castings have a short adapter casting 18 rigidly secured thereto and which in effect after attachment forms an integral part of the bolster. This adapter casting permits varying the distance between the side sills as well as their cross section without affecting the main casting. In this manner changes may be made in the underframe without necessitating any change in the engine bed casting, the only change necessary being the change in pattern of the bolster adapter casting. The rear portions of the bed casting side rails are joined together by rear cross member 20, which in the instance shown is curved downwardly in order to accommodate a generator (not shown). The lower front portions of the side rails are recessed at their forward ends in order to receive short Z-shaped center sill members 22 having their webs and upper and lower flanges securely riveted or otherwise secured to the bed casting. These center sills extend forwardly to receive therebetween a draft or buffer casting 24 which is securely riveted to the web and lower flange of the center sills and is formed with suitable bracing ribs 26 and emergency coupler openings 28 (Figs. 2 and 3). This engine or machinery bed casting together with the stub center sills and buffing casting constitute what may be termed a center construction or center structure and extends substantially to the forward boundary of the car body.

The bolster adapter castings are formed on their outer faces to receive any desired shape of side sill and these sills in the present instance are formed by an upper channel shaped member 30 having the flanges directed inwardly and to the web of which is attached a substantially Z-shaped

pressed member 32 having a lower inturned flange 34. These side sills extend forwardly beyond the bolster to a point to the rear of but substantially in alignment with the front edge of the machinery bed casting and have their forward ends deflected inward slightly as at 36 in order to receive the improved end plate which is a part of the front end construction.

The improved end plate 38 is formed merely by a strip of suitable plate metal having the edges sheared as at 40 and 42. In shearing these edges the edge 40 will be sheared at an angle to the adjacent edge of the plate equal to the angle which the car sheathing will make with the vertical substantially at the center line of the car, while the edge 42 will be sheared at 90° to the edge 40 as is clearly shown by Figure 1. With the plate so sheared it may now be bent to the desired contour which as shown in Fig. 6 is formed by a central portion bent on a radius R and side portions bent on a radius R<sub>2</sub>, the latter of which merge into straight portions 44 adapted to be secured to the side sills. It is obvious that by raising or lowering the central portion of this curved or U-shaped end plate the angle between the plate face and the vertical will be changed and in this manner the angle of the front sheathing 46 also changed. The ends of this curved or U-shaped plate are attached to the side sills by suitable means such as rivets 48 and to the draft or buffer casting by suitable means such as rivets 50. The plate is reinforced by a lower angle 47 attached thereto and to the side sill lower flange 34 by a splice plate 49 and also by an upper angle 51 secured to the plate and to the web of the channel sill element 39 as is clearly shown in Figures 1 and 2. These upper and lower reinforcing angles are, of course, curved in accordance with the end plate curvature and the lower angle terminates adjacent the buffer casting, while the upper angle terminates a short distance ahead of the end of the engine-bed casting. It will thus be seen that these angles not only suitably reinforce the curved plate but also assist in tying the side sills into the box like end structure later to be described. It is obvious that if changes in the streamlined contour are desired, it will be only necessary to either shift the position of the curved plate or apply a new plate and buffer casting without in any way affecting the remainder of the structure. The U-shaped plate is of itself, of course, not sufficiently strong to resist the shocks to which it may be subjected, therefore, a flat plate 52 will be provided having its front edge cut to the desired contour and this plate will be positioned substantially horizontal with its front edge abutting the curved plate to which it will be welded, thus giving in effect a T-section end member forwardly of the engine bed casting. The rear edge of this plate rests upon and is secured as by rivets 53 to the upper flange of a transverse Z-bar 54 extending from side to side of the car immediately adjacent the front cross tie of the bed casting. The lower rearwardly directed flange of this Z-member is securely riveted to a bottom plate 56 which also has its edges curved in conformity to the end plate and welded thereto. These flat plates, together with the Z-bar and curved plate, form substantially a box section end member located outwardly of the bed casting and securely tying the bed casting and side sills together. In order to prevent any buckling of the plates of this box section as well as to transmit corner thrusts to the bed casting, a pair of Z-bar stiffeners 58 are

securely riveted to the plates 52 and 56 and abut the curved plate at their forward edge and to which they are welded. The lower flange of the Z-bar member 54 will also be attached to the heavy floor plates 60 which are also attached to the side rails of the bed casting as well as to the side sills and bolsters and these floor plates are suitably braced to prevent buckling by Z or other shaped stiffeners 62 (Fig. 2).

The side sills and end construction have side posts 64, 66, 68 and 70 rigidly secured thereto for the support of the side and front end sheathing 46 previously referred to. The posts 68 are of Z-bar formation having one leg firmly attached to the curved end plate, while the web is securely attached to the web of the Z-cross member 54. The posts 70 are of exceptionally heavy Z-cross section having one flange securely attached to the curved end plate, while the other flange is bent into the plane of the web at the lower end of the post for attachment to the vertical web of the stub center sills prior to the positioning of plate 52.

It is thus seen that an extremely rigid end structure has been provided which is formed of standard rolled sections and plates which may be readily modified to conform to various streamlined contours as may be necessary. If the change in the contour is merely a change in the angle of the sheathing, then this may be accomplished merely by raising or lowering the curved or U-shaped plate prior to the attachment of the horizontal bracing plates; while if the change is in curvature, then the flat end plate will need to be changed accordingly and the horizontal bracing plates cut to conform. It will be obvious that with this construction a standard engine bed casting may be used for various cars having different streamlined contours and different side sill sheets and spacings.

While the invention has been described more or less in detail, it is obvious that certain modifications and rearrangements of parts will be apparent to persons skilled in the art and all such modifications and rearrangements of parts are contemplated as fall within the scope of the following claims.

What is claimed is:

1. In a railway power car having propelling machinery mounted therein, the combination of an integral machinery bed casting terminating inwardly of the car end, side sills spaced outwardly of the bed casting, a draft pocket casting located adjacent the end of the car and spaced longitudinally from said bed casting, and means rigidly connecting said sills and castings and forming with said sills and castings a substantially closed box-section end forwardly of the bed casting.
2. In a streamlined railway power car having propelling machinery mounted therein, the combination of an integral machinery bed casting terminating inwardly of the car end, side sills spaced outwardly of the bed and terminating inwardly of the forward end of the bed casting, a draft pocket casting located adjacent the end of the car and spaced longitudinally from said bed casting, and means rigidly connecting said sills and castings and forming a box-section end forwardly of the bed casting and side sills.
3. In a streamlined railway power car having propelling machinery mounted therein, the combination of an integral machinery bed casting terminating inwardly of the car end, side sills spaced outwardly of the bed and terminating in-

wardly of the forward end of the bed casting, a draft pocket casting located adjacent the end of the car and spaced longitudinally from said bed casting, and means rigidly connecting said sills and castings and forming a box-section end forwardly of the end casting and side sills, the forward end of the box-section being formed by a curved plate so arranged as to conform to the streamline contour of the car end.

4. In a streamlined railway power car having propelling machinery mounted therein, the combination of an integral machinery bed casting terminating inwardly of the car end, side sills spaced outwardly of the bed and terminating inwardly of the forward end of the bed casting, a draft pocket casting located adjacent the end of the car and spaced longitudinally from said bed casting, and means rigidly connecting said sills and castings and forming a box-section end forwardly of the bed casting and side sills, the forward end of the box-section being formed by a curved plate so arranged as to conform to the streamline contour of the car end and overlapping the draft casting and side sills.

5. In a streamlined railway power car having propelling machinery mounted therein, the combination of an integral machinery bed casting terminating inwardly of the car end, side sills spaced outwardly of the bed and terminating inwardly of the forward end of the bed casting, a draft pocket casting located adjacent the end of the car and spaced longitudinally from said bed casting, and means rigidly connecting said sills and castings and forming a box-section end forwardly of the bed casting and side sills, the forward end of the box-section being formed by a flat plate curved and bodily tilted at an angle to the vertical whereby to conform to the streamline contour of the car end.

6. In a metal sheathed front end construction for a streamlined railway car, the combination of a longitudinally extending center structure, side sills spaced outwardly of the center structure and having their ends terminating inwardly of the forward end of the center structure, a flat plate connected at its ends to the side sills and curved forwardly to overlap the center structure, and a second flat plate overlapping and joined to the center structure and secured to the inner face of the first mentioned plate between the edges thereof thereby forming an end element of substantially T cross section joining the sills and center structure together and providing a surface for the attachment of the front end metal sheathing.

7. In a front end construction for a streamlined railway car, the combination of a longitudinally extending center structure, side sills spaced outwardly of the center structure and having their ends terminating inwardly of the forward end of the center structure, a flat plate connected at its ends to the side sills and curved forwardly to overlap the center structure, said plate being tilted to thereby conform to the streamline contour of the car end, and a second flat plate secured to the inner face of the first mentioned plate between the edges thereof and at such an angle thereto as to form an end element of substantially T cross-section, and said T cross-section element being connected to the side sills and center structure.

8. In a front end construction for a streamlined railway car, the combination of a longitudinally extending center structure, side sills spaced outwardly of the center structure and having their

ends terminating inwardly of the forward end of the center structure, a flat plate connected at its ends to the side sills and curved outwardly to overlap and be connected to the center structure, said plate being tilted at a predetermined angle to the horizontal whereby its outer surface will conform to the streamline contour of the front end of the car.

9. In a front end construction for a streamlined railway car, the combination of a longitudinally extending center structure, side sills spaced outwardly of the center structure and having their ends terminating inwardly of the forward end of the center structure, a flat plate curved to a U-shape and connecting the sills and center structure, said plate being tilted at an angle to the horizontal whereby its outer surface will conform to the streamline contour of the front end of the car.

10. In a front end construction for a streamlined railway car, the combination of a longitudinally extending center structure, side sills spaced outwardly of the center structure and having their ends terminating inwardly of the forward end of the center structure, a U-shaped plate connecting the sills and center structure and adapted to receive the end sheathing, said plate being tilted at a predetermined angle to the horizontal whereby its outer surface will conform to the streamline contour of the front end of the car for reception of the end sheathing at a predetermined angle to the vertical.

11. In a railway power car having propelling machinery mounted therein, the combination of an integral machinery bed casting terminating inwardly of the car end, side sills spaced outwardly of the bed casting and extending beyond the sides thereof, and independently formed adapter castings connected to the bolster and adjacent side sills whereby a standard bed casting may be used with various side sill spacings.

12. In a railway power car having propelling machinery mounted therein, the combination of an integral machinery bed casting terminating inwardly of the car end, side sills spaced outwardly of the bed casting, a bolster integral with the bed casting and extending beyond the sides thereof, and independently formed adapter castings connected to the bolster and adjacent side sills whereby a standard bed casting may be used with varying side sill contours.

13. In a railway power car having propelling machinery mounted therein, the combination of an integral machinery bed casting terminating inwardly of the car end, side sills spaced outwardly of the bed casting, a short bolster integral with the bed casting, a stub casting extending laterally from each side of said bed casting and forming an extension of said bolster, and an independently formed adapter casting connected to each of said stub castings and side sills whereby a standard bed casting may be used with various side sill spacings.

14. In a streamlined railway power car having propelling machinery mounted therein, the combination of an integral machinery bed casting terminating inwardly of the car end, side sills spaced outwardly of the bed casting and terminating inwardly of the forward end thereof, means including vertically spaced, laterally extending plates rigidly connecting said sills and casting, and a substantially vertically extending plate secured to and overlapping said sills and

spaced plates to form a box-section end forwardly of the bed casting.

15 In a streamlined railway power car having propelling machinery mounted therein, the combination of an integral machinery bed casting terminating inwardly of the car end, side sills spaced outwardly of the bed casting and terminating inwardly of the forward end thereof, a draft pocket casting located adjacent the car end and spaced longitudinally from said bed casting, and means rigidly connecting said sills and castings, said means including a plate being so formed and arranged as to conform to the streamline contour of the car end.

15 16. In a front end construction for a streamlined railway car, the combination of a longi-

tudinally extending center structure, side sills spaced outwardly of the center structure and having their ends terminating inwardly of the forward end of the center structure, a flat plate connected at its ends to the side sills and curved forwardly to overlap the center structure, said plate being tilted to thereby conform to the streamline contour of the car end, and a second substantially horizontally extending flat plate secured to the inner face of the first mentioned plate between the edges thereof and to the center structure thereby forming an end element of constantly changing but substantially T-shaped cross section joining the said sills and center structure.

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