This invention relates to improvements in repair house car construction.

At the present time there are many thousands of wood sheathed box or house cars owned by the railroads of the types commonly known as double sheathed steel underframe box cars and single sheathed box cars. All of these cars are provided with a substantial metal underframe including channel side sills and sheet metal ends and which are in sound condition and suitable for carrying present day loads. The side walls, however, in the majority of instances are in bad condition with the wood sheathing shrunk and otherwise impaired due to the driving of nails therethrough for the purpose of fastening lading or abuse resulting from the use of pinch bars in forcing the side doors into closed position. Practically all of said cars are also so designed as to afford only approximately 8', 6'' of inside width, which is less than that now recommended under the present A. R. A. rules.

Railroad officials are, therefore, confronted with a serious problem in determining whether or not to try to keep in repair said present wood sheathed cars by renewing the wood sheathing with the attendant expense and frequently recurring repair bills sure to follow or to provide an all metal car with steel sheathing possessing greater strength, rigidity and freedom from leakage in line with the constantly increasing demand for all metal cars on account of their greater durability, strength and lesser maintenance costs. Further, it is to the obvious advantage of the railroads owning these cars having only 8', 6'' inside width, to place in service cars having the greater inside width of about 8', 9' to conform with the present recommended practice.

One object of this invention, therefore, is to provide a metal side wall structure for house cars such that the same is especially adapted for incorporation in the reconstruction or repair of wood sheathed house cars while reutilizing the original steel underframes and sheet metal ends so as to provide a more durable and efficient car better adapted to present day conditions.

Another object of the invention is to provide, in a repair construction for wood sheathed house car, a metal side wall construction that may be combined with the original steel underframe in replacement of the original wood sheathed walls, in such manner as to obtain a greater inside width without necessitating any change or relocation of the side sills of the underframe.

More specifically, objects of the invention are to provide all metal side wall repair constructions of the type indicated in the two preceding objects of invention which may be assembled as a unit at the manufacturing plant and applied to the original car underframes there or at shops of the railroad car owners and to so arrange and construct the unit repair side walls that, in the attachment thereof to the original underframes, a minimum number of new rivet holes will be required in the side sills to effect the attachment.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawings forming a part of this specification, Figure 1 is a side elevational view of approximately one half of a box or house car showing one embodiment of the improvements incorporated therein and as specifically applied to a house car of original wood, double sheathed type. In this view, certain portions are broken out in order to better accommodate the figure on the sheet. Figure 2 is an enlarged, vertical, sectional view, parts being broken away, corresponding to the section line 2—2 of Figure 1. Figure 3 is a horizontal, enlarged, detail sectional view, corresponding to the section line 3—3 of Figure 1. Figures 4, 5 and 6 are vertical sectional views similar to the lower portion of Figure 2 and illustrating three different modifications in the repair side wall constructions and attachments to the side sills. Figure 7 is a front, elevational view of the arrangement shown in Figure 6, the latter sectional view corresponding to the section line 6—6 of Figure 7. Figure 8 is a view similar to Figures 4, 5 and 6, illustrating a still further embodiment of the invention.

Figure 9 is a vertical sectional view illustrative of the present construction of many thousands of single sheath wood box cars now owned by the railroads. Figure 10 is a similar, vertical, sectional view taken through the side wall of the same type of car as converted to include one form of the present improvements. And Figure 11 is a side elevational view of the construction at the lower end of the side wall arrangement shown in Figure 10.

In said drawings, only approximately one half of a side of a car has been illustrated in Figure 1, but as will be understood by those skilled in the art, the remaining portion of the same side of the car will be complementary of that illustrated and the opposite side of the car will be a duplicate thereof.

Referring first to the construction illustrated in Figures 1, 2 and 3, one of the channel side
sills of the steel underframe of the original car is indicated at 10 and one of the original metal end walls is indicated at 11. The wood double sheathed cars, in their original condition (not illustrated) are provided with wood side posts, outer wood sheathing, inner wood lining and wood side plates. In case the post 12 is present, all of these parts are dispensed with except that the inner wood lining is either replaced or a new one substituted therefor.

In carrying out the repair construction, a plurality of intermediate Z-bar side posts 12 are employed arranged as best illustrated in Figure 3, and the Z-bar posts extending perpendicular to the plane of the side wall. At their upper ends, the posts 12 are attached to a new Z-bar side plate 13, the web of which is disposed horizontally as indicated at 113, the outer flange depending, as indicated at 121, and 20}

One of the original metal end walls is indicated at 1313. The attachment between each post 12 and side plate is preferably effected by two angle clips 14—14 each of which has one flange thereof riveted to the post and its other flange riveted to the web of the side plate, one clip being disposed on each side of the side post web.

At their bottom ends, each post 12 is rigidly supported and connected to the side sill 10, by the following arrangement. In line with each post is provided a bracket 15, preferably in the form of a casting. Said bracket is formed with two oppositely extending inner flanges 15a—15a which are directly riveted to the web of the side sill 10. The bracket 15 is additionally formed with an outwardly extended, centrally disposed vertical flange 15b aligned with the web of the post 12. Connection between the post and bracket is effected through the medium of two vertically extending plates 16—16, each of which is connected to the web of the post and the bracket flange 15b by a plurality of rivets 17, as shown. As clear from Figures 1 and 3, said rivets 17 are in double shear. With the construction so far described, it will be seen that the number of new rivets required in each side sill is kept to a minimum, the same corresponding to only those rivets required for attaching the brackets 15.

The door posts, one of which is indicated at 18, will also preferably be of Z-bar type but with the web thereof arranged parallel to the plane of the side wall. At its lower end with the side sill is effected preferably through a plurality of angle plates 19—19 and 20, the former being riveted to the inner flange of the Z and side plate and the plate 20 to the side sill and out-turned flange of the Z post. At its upper end the brace anger post 18 will be attached to the side plate, which extends continuously from end to end of the car, in the same manner as the intermediate posts 12, that is, by angle plates or clips 14—14.

The new metal sheathing which replaces the original wood sheathing, preferably consists of a plurality of rectangular panels 21 and 21a and, together, completing the closure from each door post to the corresponding corner of the car. The end panel 21a will be lapped under the usual vertical side flange 111 of the end wall and the connection reinforced by an interior plate 22, all the parts being suitably gas welded thereon. The vertical series of rivets 23—23. The panel 21 adjacent the door opening has its adjacent vertical edge lapped over the web of the door post 14 and riveted thereto by the vertical series of rivets 24.

The panels are preferably lapped in line with the outer flange of each intermediate post 12, as best shown in Figure 3, and the lapped flanges riveted to the post flange as by the vertical series of rivets 25. Along their upper edges, the sheet metal panels 21—21a are lapped under the depending side plate and connected thereto by the horizontal series of rivets 26.

The lower edges of the sheathing panels are connected to the side sill of the underframe by a longitudinally extending, preferably formed angle plate 27 best shown in Figure 2, said plate 27 extending from door post 18 to the opposite side of the end of the car. Said angle plate 27 has an outer upstanding flange lapped under the lower margins of the sheet metal panels and connected thereto by a horizontally extending series of rivets 28. The other horizontal and wider flange of the angle plate 27 is extended inwardly beneath the lower edge of the posts 12 and supported on the upper flange 29 of the side sill and riveted thereto as by the horizontally extending series of rivets 30. Where the angle plate 27 passes beneath each post 12, the angle plate 27 will be suitably notched, as indicated at 31, to accommodate the side plate connected thereto 16. Further, each post 12 will be notched out or coped, as indicated at 32 in Figure 2, so as to clear the upstanding flange of the bottom angle plate 27 and thus avoid the necessity of offsetting the outer flange of the post 12, which would otherwise be necessary in order to maintain the sheathing in the one vertical plane.

The inner wood lining 40 is applied to the inner sides of the posts and the means of attaching the same in place is afforded by vertical nailing strips 33 which are supported from the panel sheets by angle plates 34—34 riveted thereto, the nailing strips in turn being bolted to the plates 34 as by the bolts 35. Preferably, the lining will terminate somewhat above the floor 36 and shedding cleats 37 interposed near the floor line between the several pairs of posts.

In carrying out the invention, the repair side wall may be shipped knocked down and the parts applied in any desired manner but, preferably, the improved repair side wall will be fabricated and shipped as a unit, that is, with the side plate 13, posts 12, door posts 18, sheathing panels, the two lower angle plates 27 at opposite sides of the door opening, and brackets 15 all riveted and connected together so that the unit may be applied directly to the underframe of the original car after the latter has had all of its superstructure, with the exception of the end walls, removed. As will be understood, the necessary additional rivet holes will have been provided in the side flanges of the end walls for the end panels and in the side sills for connection of plates 27, door posts and post attaching brackets 15.

When the car is converted in the manner described, it is evident that the side walls become true load-carrying girders with tension exerted between the posts and the side sills. By providing the direct type of connection described between the bottoms of the posts and the side sills through the brackets 15 and plates 16, these tension stresses are very effectively resisted in direct vertical pulls, without imposing any appreciable stress on the vertical series of rivets 25. Attention is also directed to the fact that corrosion will be effectively resisted along the lower edge of the side wall by the relatively thick or heavy bottom plates 27. Any moisture that may
collect along the outer edges of the flooring is prevented from coming in contact with the relatively thin side wall flange by the upstanding integral flanges 216 extending parallel to the plane of the side wall and adapted to be riveted to the inner flange of the post 121 by the series of rivets 117. The bottom attaching member 127 is similar to the plate 27 of the first described form and is secured to the top flange of the sill in the same manner as by the rivets 130. In the Figure 4 construction, the post 112 is not coped at its bottom but, on the contrary, the outer flange of the Z is laterally inwardly offset as indicated at 112" and is connected to the upstanding flange of the bottom plate 127 and lower edge of the mating by the rivet 128. The remainder of the side wall construction with respect to the attachment of the posts and sheathing to the side plate may be of the same character as that previously described.

In the Figure 4 construction, it will be noted that the inner wood lining 140 is located farther out from the center line of the car than the lining 40 of the first described construction, thus providing for a greater inside width of the car when this is desired. As will be understood, the posts and lining of the first described form might well be set outwardly, if desired, to accomplish the same result.

In the Figure 5 arrangement, the post attaching bracket or casting 215 is also secured to the side sill 10 but in this instance the attaching bracket is provided with a pair of upstanding flanges 215 arranged perpendicular to the plane of the side wall and adapted to straddle and embrace the web of the post 212 to which it is riveted as by the rivets 217. In the Figure 5 arrangement, the plate or bottom attaching member 227 is generally similar to the bottom plates 217 and 127 previously described, but is provided with an additional upwardly offset section 41. In some instances, it is desirable to use thinner floor boards than those originally used on the car and as shown in Figures 2 and 4, for instance, without materially changing the height of the floor from the rails. With the Figure 5 construction of plate 227, the floor boards 236 may be of lesser thickness to accomplish the result indicated, the same being supported above the side sills by utilizing the integrally formed offset 41 referred to. In both of the Figures 4 and 5 constructions, it will be understood that the plates 227 and 227 are suitably apertured for passage therethrough of the bracket flanges 116 and 216 respectively, and further, each of the brackets 115 and 215 is formed with horizontal supporting flanges riveted to the horizontal legs of the plates 217 and 227 as by the rivets 42-42.

Referring next to the construction illustrated in Figures 6 and 7, the attachment for the lower end of each of the posts 312 is effected through a specially formed attaching bracket or casting 316 riveted as before to the side sill 10, as indicated. In this arrangement, the attaching bracket is formed with a narrow shoulder or ledge 315 flush with the upper flange of the side sill and an upwardly extending section 315" outwardly thereof. The side wall bottom attaching member 327 is formed to correspond with the contour of the bracket 315 and may be said to be of approximately W-shape. The bracket 315 is provided with a pair of upstanding integral flanges 316 similar to those of the bracket shown in Figure 5 and which are secured to the web of the Z bar post 312 in the same manner. In the Figures 6 and 7 construction, the outer flange of the post 312 is cope which, as indicated at 322 to clear the upstanding outer flange of the bottom connecting plate 327. With the W type of plate 327, it will be seen that the lapped joint between the sheathing and upstanding flange of the plate 327 is located above the level of the flooring 336 so that there is even less danger of corrodung the sheathing than in the previously described forms since it is practically impossible for any moisture to reach the sheathing from the inside of the car.

Referring next to the modifications shown in Figure 8, the attaching bracket or casting 415 is similar to that of Figure 5 and attached to the Z-bar post 412 in the same manner. The post in this instance is shown coped as indicated at 432. In this construction, the bottom member 427 of the side wall structure is of angular cross section and each, will extend from door post to corner post as in the case of the previously described forms. The plate 427, however, is not extended over or connected to the side sill but has the inner edge of its bottom horizontal flange located somewhat outside of the plane of the side sill web. The plate 427 is connected to the brackets 415 by rivets 442, as clearly shown. To provide suitable attachment for the floor boards 436, a separate longitudinally extending plate 441 is employed, the same being riveted to the upper flange of the side sill and extended inwardly thereof and to which the boards may be attached as by the bolts 443. The outer edges of the floor boards are supported on the bottom flange of the plate 427 and, as will be apparent, the floor boards close the gap otherwise existing between the plate 427 and the side sill.

Referring next to the construction shown in Figures 9, 10 and 11, wherein is illustrated the manner of carrying out the improvements with respect to a single wood sheathed box car. As indicated in Figure 9, the standard steel underframe single sheathed wood box car is usually provided with channel side sills 110; specially formed angle side plates 50, outside pressed side posts 51; flooring 52; and heavy wood sheathing 53. As customary, the upper ends of the posts 51 are flattened out and riveted to the side plate, as indicated at 54, and the lower ends are similarly flattened out and riveted to the side sill as 55. The posts 51 are usually of U or bathtub section, having a maximum depth throughout their intermediate portions and tapering inwardly and upwardly and inwardly and downwardly at the tops and bottoms respectively, as shown. Said standard single sheathed cars are generally constructed with an inside width of 8'-6" and with 8', 9" over the side sills. The side sill spacing is somewhat greater than that of the usual standard double sheathed car where-in the distance over side sills is generally about 8', 6%".

In carrying out the conversion of the single wood sheathed car to an all metal car, the posts 51, sheathing 53 and side plates 50 are removed, as well as the usual roof structure, leaving only the steel underframe and the usual metal car ends. In Figures 10 and 11, the means for converting to the all steel construction are illustrated...
wherein are employed Z-bar posts 512 located outwardly of the plane of the side sills and rigidly secured to the latter by attaching brackets or castings 515, similar in all substantial respects to that type of attaching bracket illustrated in Figure 11, although, as will be understood, the attaching brackets may be modified to conform with those shown in any of the other figures previously described. The posts 512 are so located that, when the inner wood lining 540 is applied thereto, an inside width of 8', 9'/16" will be obtained as indicated in Figure 10, thus materially increasing the inside width over the original 8', 6'/16", to conform to present recommended practice.

New Z-bar side plates 513 will preferably be employed and, further, the same will be located somewhat higher than that of the original side plates 50 as indicated in Figure 10 so as to obtain an increase in the inside height of the car. Connection between each side plate and the respective side posts 512 is obtained in the same manner as heretofore described, that is, by angle clips or plates 514. The metal sheathing 521 is riveted to the outer flanges of the posts and to the outer flange of the side plate in the same manner as first described.

The bottom member or plate 527 of the side wall structure is preferably in the form of an angle, as shown, and with its upstanding flange riveted to the lower edge of the sheathing and its horizontal flange supported on and riveted to the bracket castings 515. In the construction shown, the posts 512 have their outer flanges inwardly offset, as indicated at 512b, to accommodate the upstanding flange of the connecting plate 527. In such a construction, it is riveted although as will be understood, the posts may be coped in a manner similar to that illustrated in Figures 2, 6 and 8. The two upstanding flanges 516 of the attaching casting are riveted to the web of the respective post, as by the rivets 511 which, as appears from Figure 11, are thereby placed in double shear. The horizontal flanges of the bracket casting are riveted to the angle plate 527 as by the rivets 542. In the construction described, no direct connection is effected between the bottom plate 527 and the side sill but in order to provide means for attaching the flooring 539, a separate longitudinally extending plate 541 is employed, riveted to the side sill and connected by bolts to the flooring in the same manner as previously described for the Figure 8 construction.

From the construction just described, it is evident that the single sheathed type of cars may not only be converted to an all steel car but the inside width and the inside height, when desired, may be increased without in any way disturbing the underframe construction.

In all forms of the invention illustrated, it will be seen that the connections between the posts and the attaching brackets are effected directly in line with the posts so as to effectually resist the vertical stresses arising in the posts due to the girder action of the all metal walls. In all instances also, a weather tight closure is provided for the sheathing along both the bottom and top edges thereof. In all forms, the repair wall may, as previously described, be shipped either knocked down or preferably shipped as a complete side unit of the car for attachment to the original underframe and car ends. It will also be noted that, in all car constructions, only a minimum number of new rivet holes is required to be made in the original side sills for the attachment of the post brackets only, there being no direct connection between any of the bottom plates and the webs of the side sills.

Although there has herein been shown and described what is now considered the preferred manner of carrying out the invention, the same is merely illustrative and all changes and modifications are contemplated that come within the scope of the claims appended hereto.

What is claimed is:

1. A repair construction for originally wood sheathed house car, having a metal side sill of continuously uniform cross section throughout its length, including, in combination: a metal side plate; metal side posts; means connecting the upper ends of the posts and side plate; attaching brackets at and connected to the bottom ends of the posts, said brackets being directly secured to the outer side of the existing side sill; metal sheathing separately formed from and secured to the outer sides of the posts and along its upper edge to the metal bottom member having an upstanding flange located outwardly of the plane of the sill and secured to the lower edge of the metal sheathing, said posts being coped at their bottom ends to accommodate said upstanding flange.

2. A repair construction for originally wood sheathed house car having a metal side sill, including in combination: a metal side plate; metal side posts, the lower ends of which terminate above the side sill; means connecting the upper ends of the posts and side plate; attaching brackets at and connected to the bottom ends of the posts, said brackets being directly secured to the existing side sill; metal sheathing formed separately from and secured to the outer sides of the posts and along its upper edge to the side plate; and a metal bottom side wall member of angle cross section having its outer flange located outwardly of the sill and extending vertically and secured to the lower edge of the sheathing and its other flange extending horizontally inward over and secured to the top of the side sill.

3. A repair construction for originally wood sheathed house car having a metal side sill, including, in combination: a metal side plate; metal side posts; means connecting the upper ends of the posts and side plate; attaching brackets at and connected to the bottom ends of the posts, said brackets being adapted to be secured to the existing side sill; metal sheathing secured to the posts and along its upper edge to the side plate; and a metal side wall bottom member of angle cross section having its outer flange extending vertically and secured to the lower edge of the sheathing, said brackets being secured to the bottoms of the posts by means extending through the other flange of said member and the posts being adapted to be attached to the existing sill, independent of said bottom member.

4. A repair construction for house cars having a metal side sill, including, in combination: a side plate; side posts; metal sheathing secured to the posts; flooring; and unitary means providing connection between the lower edges of the sheathing and side sill and for supporting the flooring in a spaced relation above the side sill, said means including a plate secured to the top of the side sill and having one portion extending outwardly from the sill and united to the sheathing and another portion extended inwardly and upward-
5. A house car construction, comprising in combination: a metal side sill; metal side posts; metal sheathing secured to the outer faces of the side posts; metallic means extending between the lower edge of the sheathing and the side sill; and means for attaching the lower ends of the posts to the side sill, each of said means including a bracket secured to the side sill below said metallic means and connecting plates secured to said bracket and extended upwardly through said metallic means and secured to the bottom of the post thereof.

6. A converted house car including: a metal underframe having channel side sills with the flanges thereof turned inwardly and with an over-all spacing from web to web of substantially 8', 9'', and corresponding to a standard steel underframe, single wood sheathed box car having an original inside width of substantially 8', 6''; metal side posts located outwardly of the side sills; metal side plates to which the upper ends of the posts are attached; metal sheathing secured to the side plates and outer faces of the posts; means, including longitudinally extending side wall bottom members secured to the lower edges of the sheathing, providing a weatherproof connection between the sheathing and side sills and for anchoring the lower ends of the posts to the webs of the channel sills; and inner lining secured to the posts, the latter and the lining being so located as to provide an inside width of the converted car not less than the over-all spacing of the side sill webs.

7. A car side wall repair construction adapted to be assembled and applied as a unit to the metal underframe of an originally wood sheathed house car, including: a metal side plate having a depending outer flange; a plurality of vertically disposed metal posts, secured at their upper ends to the side plate; metallic sheathing secured to said posts and said depending flange of the side plate; a metallic bottom member of angle section having a vertically disposed outer flange located outwardly of the existing car side sill and secured to the lower edge of the sheathing, the other flange of said member extending horizontally inwardly and beneath the bottoms of the posts; and attaching brackets at the bottoms of the posts beneath the horizontal flange of said bottom member, each bracket being connected by means extending through the bottom member to its respective post and having portions adapted to be riveted to the outer face of the existing car side sill to effect connection of the post to the sill independent of said bottom member.

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