July 16, 1940. W. S. DIETRICH 2,208,450

BOX CAR CONTRUCTION AND METHOD OF MAKING THE SAME

Filed Aug. 14, 1937

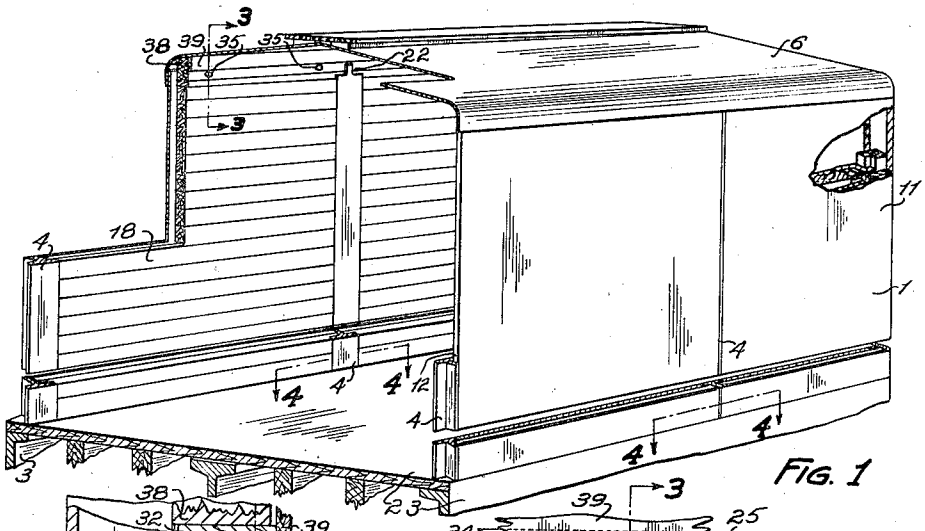


FIG. 1

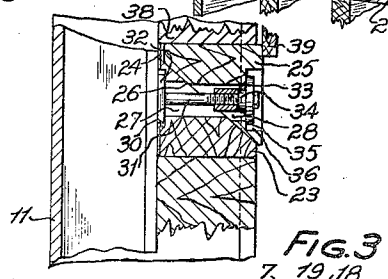


FIG. 3

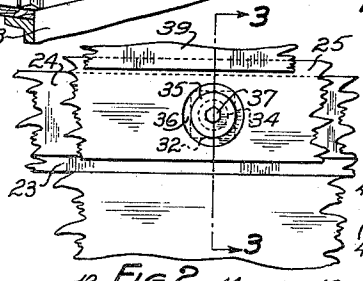


FIG. 2

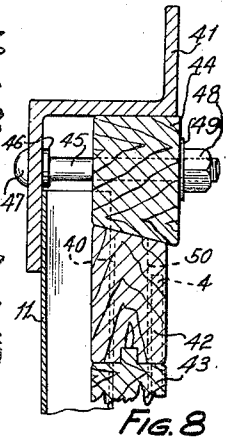


FIG. 8

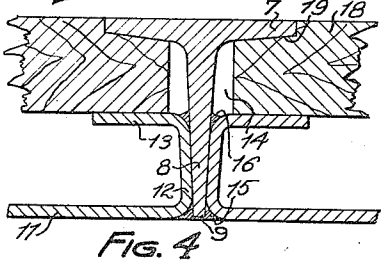


FIG. 4

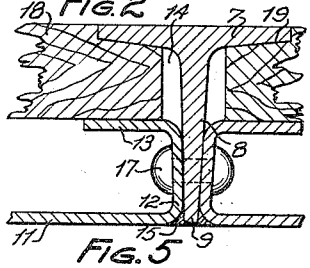


FIG. 5

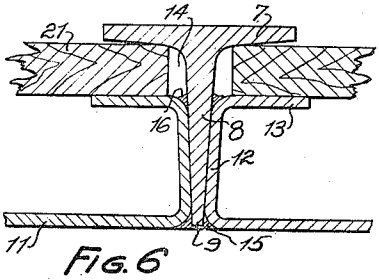


FIG. 6

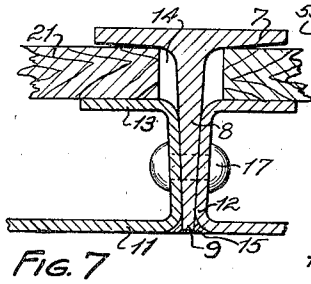


FIG. 7

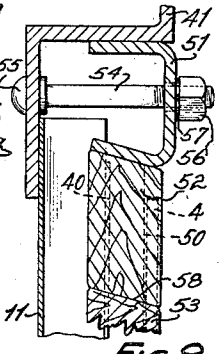


FIG. 9

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2,208,450

BOX CAR CONSTRUCTION AND METHOD OF MAKING THE SAME

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Application August 14, 1937, Serial No. 159,133

12 Claims. (Cl. 105—409)

This invention, as indicated, relates to a box car construction and method of making the same. More particularly, it comprises a box car with the structural elements so related that economies of construction are brought about through the elimination of elements usually present in such structures.

Heretofore it has been the practice in building box cars to provide horizontal members and upright side posts to form a rigid frame and to secure to such elements plates to form the outer walls of the car, such plates being attached by riveting, welding, or the like, and on the interior of such framing to secure side boards usually formed of lumber approximately twenty-two feet in length. Such side boards ordinarily are secured to the side posts by nailing them to wooden strips bolted to such posts, with reinforcing wooden frame members at intermediate points. The inner walls of a car made in this manner are permanently secured in position, and if a portion of the wall is injured, the repairing of the same is usually a matter of considerable expense for materials and labor, as the wall practically has to be torn down and rebuilt. In such conventional structures, the interior dimensions of the car are somewhat reduced by reason of the side boards being positioned inwardly of the inner faces of the side posts. Different forms of side posts are utilized in such cars, some of the side posts being in cross section of the Z type and others being in the form of various types of channels.

In welding the side plates to the box cars of conventional type of construction, the welding heat is concentrated chiefly on the margins of the side plates and does not extend to the adjacent supporting members at least to a degree sufficient to produce conditions of equal expansion. This results in the conventional type of cars in a very objectionable buckling of the side plates.

The principal object of the present invention is to produce a box car construction free of the defects referred to, in the matter of providing side plates substantially free of buckling, and in eliminating the auxiliary framing members used to hold the side boards to the side posts and as intermediate reinforcements, and also in eliminating the long lengths of side boards and utilizing in lieu thereof short lengths which may be of thirty to thirty-six inches in many instances.

Another object of the invention is to so relate the side plates to the side posts that they will provide areas of mutual support without introducing any objectionable projections on the outer walls of the car or any buckling of the plates.

Another object of the invention is to provide side posts of T cross section and side plates having inturned marginal vertical edges cooperating with the T heads of the side posts to form channels to receive the wooden side boards forming the interior wall of the car structure.

Another object of the invention is to permit a welding operation to connect the marginal portions of the side plates to the web portion of the T side posts, which will distribute the welding heat throughout the metal of the structures being united, so that upon the cooling of the welded areas there will be equal shrinkage and no excessive buckling of the side plates as in the box car constructions currently in use.

Another object of the invention is to provide adjacent the top of the side posts means for interlockingly engaging the inner wall members with the channelways intermediate the T heads of the side posts and the inturned flanges on the metal side plates forming the outer walls of the car, so that said side wall boards may be assembled with the car frame structures without the use of nails or wooden frame members bolted to the side posts or the outer car plates.

A further object of the invention is to provide means for firmly holding the side wall boards in position after they have been assembled in the channels provided by the frame members, such means being readily removable in the event replacement is required.

Another object of the invention is to provide a box car construction wherein the interior dimensions of the car are maintained at a maximum without in any way weakening the strength of the car structure.

Another object of the invention is to provide a method of constructing a box car with a minimum of structural elements and with inner walls adapted to be easily installed and readily removed and repaired.

Other and further objects of the invention will appear in the course of the following description.

To the accomplishment of the foregoing and related ends, said invention, then, consists of the means and method hereinafter fully described and particularly pointed out in the claims, the annexed drawing and the following description setting forth in detail certain means and methods embodying the invention, such disclosed means and methods constituting, however, but

several of various forms in which the principle of the invention may be used.

In said annexed drawing:

Figure 1 is a fragmentary perspective view, partly in section, showing a box car construction embodying the principles of the invention;

Figure 2 is a fragmentary side elevation in enlarged detail showing the wedge members for locking the side wall boards in position;

Figure 3 is an enlarged sectional detail view taken along the lines 3—3 shown in Figures 1 and 2, looking in the direction of the arrows;

Figure 4 is a horizontal sectional view, taken along the line 4—4 shown in Figure 1, looking in the direction of the arrows, and illustrating a welded side post and side plate construction with the side wall boards recessed to engage within the channels of the frame structure;

Figure 5 is a view similar to Figure 4 showing the use of rivets to hold the side plates and side posts in rigid relation to each other;

Figure 6 is a view similar to Figure 4 showing a welded side post and side plate construction wherein the ends of the side boards are not recessed and the T heads of the side posts project inwardly of the ends thereof;

Figure 7 is a view similar to Figure 4 showing a construction like that illustrated in Figure 6, but having the T side posts connected to the inwardly turned portions of the side plates by means of rivets to hold the same firmly in relation to each other;

Figure 8 is an enlarged sectional detail view, showing a modified form of wedging device for locking the side wall boards in position; and

Figure 9 is a view similar to Figure 8, showing a still further modified form of wedging device and side wall board structure.

As is clearly shown in the drawing, the box car 1 is provided with a floor 2 supported on the sills and longitudinal frame members 3 in the conventional manner, and having at spaced intervals side posts 4 firmly secured to the members of the understructure 2, 3, and to the roof structure 6. The side posts may be spaced from each other any distance found desirable, but it has been found that a spacing of from thirty to thirty-six inches satisfactorily provides for a very rigid box car construction as well as one permitting large economies in the way of construction and maintenance.

The side posts 4, it will be noted, are structural shapes of T cross section, the head portion 7 as well as the web portion 8 being tapered to narrow width adjacent their free outer edges. The head portions of the side posts are faced inwardly with the extreme outer end 9 of the web portion of each post in alinement with the outer side walls of the car.

The outer side walls are formed of sheet metal plates 11, which, as shown more particularly in Figures 4 to 7, are bent inwardly at each vertical edge so as to provide areas 12 to conform to the surface of the outer portion of the web of the T section side posts, and at a point approximately at the mid distance of said web are turned into a position substantially parallel with the main body of the side plates to form flanges 13 spaced from the head portions 7 of the side posts to provide channels 14.

The side plates may be secured in various ways to the outer portions of the webs of the side posts, the constructions shown in Figures 4 and 6 being welded constructions with the outer welds 15 flush with the outer sides of the plates and with the inner welds 16 forming fillets in the corners of the channels formed, as stated, by the respective head portions 7 of the side posts and inturned flanges 13 of the side plates.

In the form of construction shown in Figures 5 and 7 the intermediate areas 12 of the side plates may be secured to the outer web portions of the T side posts by means of rivets 17. It is usually desirable in such construction to utilize the outer welds 15 to unite the outer ends of the webs of the side posts to the adjacent portion of the side plates to provide an entirely smooth outer surface of the entire car side.

The welding operation, as has been indicated, can be carried out in every instance without introducing an unequal distribution of the welding heat with the resultant buckling of the side plates upon the cooling of the welded portions.

It will be noted that in the form of construction shown in Figures 4 and 5, the ends of the side boards 18 are formed with recesses 19 so as to provide a smooth inner wall surface throughout the interior of the car.

In the construction illustrated in Figures 6 and 7, the side boards 21 are of a width to fit within the channels 14, and the head portions 7 of the T side posts project inwardly of said side boards.

It will be noted that under either form of construction the side boards lie wholly outwardly of the inner surface of the T heads of the side posts, and that in this manner the maximum inside car width is greatly increased over the car width permissible when the side boards of the inner walls are secured to the inside faces of the head portions 7 of the T cross section side posts. In this manner the cubic capacity of the box car is considerably increased over the full extent of the side wall from the floor to the roof.

The side wall boards are preferably formed with tonge and grooved longitudinal edges, respectively, as shown in Figures 1 and 8, but may have beveled upper and lower faces, as shown in Figure 9, as will be hereinafter described.

It will be noted that the side boards are engaged with the side posts through the mere operation of sliding the end portions of said side boards into the channels 14. In order that this operation may be carried out, the upper portions of the side posts are provided with notches 22, as shown more particularly in Figure 1, the lowermost of the side boards resting against the floor of the car and the boards thereafter successively resting upon each other progressively toward the roof.

In order to hold the boards firmly in position, a locking means is provided. Such locking means may take various forms, but the form illustrated has the advantages of simplicity and strength without in any way detracting from the appearance of the interior wall surface of the car. This particular construction is illustrated in Figures 1, 2 and 3, and comprises a wedging device formed of a lower side board section 23 having a beveled upper face 24 and an upper side board section 25 having a beveled under face 26. The beveled faces of the respective side boards 23 and 25 are placed in contact with each other and are provided with alined apertures 27, 28, respectively, said apertures being enlarged in a vertical direction so as to permit a range of sliding movement of the side boards 23 and 25 upon each other. The means for causing the sliding movement of the respective side board members comprises a bolt 31 having a square head 32 engaged in a

square recess 30 formed in the outer face of the side board member 23 and having its free end 33 provided with screw threads and engaged within a screw-threaded sleeve 34. The sleeve is formed with a cylindrical head portion 35 adapted to be received in a countersunk cylindrical recess 36 in the side board member 25. In order to rotate the sleeve to draw the blocks toward each other in wedging relation or to release the same, the cylindrical head 35 is provided centrally with a hexagonal lug 37 which may be engaged by a socket wrench, preferably of the ratchet type (not shown), permitting rotation of the sleeve in either direction upon reversal of the ratchet and also permitting the positioning of the bolts closely adjacent the roof of the car.

The wedging device, it will be noted, is interposed between the uppermost side wall board 11 and a fixed abutment 38 which may be a timber secured to the roof of the car and which may have a metal face plate 39 secured to the inner face thereof and projecting downwardly slightly beyond the lower surface of the member 38, thus providing a retaining flange to prevent accidental displacement of the wedging device, but not interfering with the installing or removal of said wedging device when the two elements thereof are separated.

The construction described with reference to the sides of the car may be also utilized in the ends thereof, although, under present practice, the end members of the car are usually specially formed structures and the end walls in such instances may be formed of continuous end boards extending completely across the car. In the event the shorter lengths of end wall boards are to be used, it will be desirable to form the corner posts of the car of such shape as to provide parallel flanges on each of its sides, and the inturned flanges on the side plates and corner plates are necessarily somewhat longer and bent angularly at their central portions where they abut the web of the corner post. In such case, the corner post in cross section will be in the nature of an H plate deformed to provide parallel flanges on each side uniting with the web at an angle of 45°. If, however, the ends of the car are made of conventional transversely ribbed integral end plates, the side plates of the car may be united thereto in the same manner as the same are united to the web portions of the T section side posts, and an additional angle strip may be secured to the end portion of the car inwardly of the flanges of the side plates and spaced therefrom a distance equal to the spacing of the T head from the flanges to receive the extreme end portions of the short side boards at each respective corner portion of the car.

The box car construction above described involves a novel method of assembly in that it comprises the steps of providing a base, mounting frame members on said base to form a supporting structure, mounting plate members on said frame members to cooperate with said frame members to position horizontal side wall boards, and engaging such horizontal side boards with said frame members intermediate the cooperating frame members and plate members and locking the same in position.

The wedging device shown in Figures 1, 2 and 3, may not be readily adaptable for installation in some types of cars, and a simplified structure is shown in Figures 8 and 9, wherein the wedging member coacts with a flanged angle bar 41 at the upper edge of the side walls of the car. The outer wall plates 11 are engaged within the downwardly turned flange of the bar 41, and the side wall boards 42, 43 are engaged at their side edges in the channels intermediate the flanges on the side plates 11 and the head portions of the T shaped side posts, in the manner heretofore described. However, as is shown in Figures 8 and 9, the channels may be made somewhat narrower, and the ends of the side boards may be formed with recesses 40, 50, corresponding to the recesses 19 shown in Figures 4 and 5, on their outer faces as well as their inner faces. This construction will permit the use of T side posts of somewhat less extent of web and will reduce the air space intermediate the outer and inner side walls and will provide for slightly greater cubic capacity in the interior of the car structure.

The upper side wall board 42, in the form shown in Figure 8, is provided with an inclined or beveled upper edge against which the beveled under surface of the wedge member 44 engages. The wedge member 44 is provided with a plurality of apertures through which a stud bolt 45 is engaged, such bolt preferably having a shoulder spaced from its outer end and having its extreme outer end riveted against the outer face of the flange of the angle bar 41. The inner free end of the stud bolt 45 is screw-threaded and is engaged through an aperture in the wedge member and is drawn into locking position by means of a nut 48 bearing against a lock washer 49. This construction provides for ready accessibility to the means for tightening the wedge members, should the occasion require, to take up any looseness which may be brought about through shrinkage of the side boards. It also permits ready release of the wedge members for the replacement of any injured side boards. It will be obvious that upon the release of the wedge block, any single injured side board may be broken at an intermediate point and removed without removing the entire series of side wall boards, and a substitute side wall board of standard construction may then be placed immediately beneath the special side wall board 42 preliminary to the tightening of the wedge block 44.

In the form of construction shown in Figure 9, the angle bar 41 is provided with an aperture in its depending flange to receive the outer end of the stud bolt 54 having the riveted head 55 to hold it securely against the angle bar. The entire series of side boards in the instance shown may be formed of elements 52, 53, each having upwardly and outwardly inclined beveled faces 58 on both their upper and lower longitudinal edges. In place of utilizing a wedge member in the form of a wooden board 44, such as is shown in Figure 8, a metal channel member 51 is provided, the channel being turned inwardly and having an upwardly and outwardly inclined under face adapted to bear against the upwardly inclined upper face of the uppermost side wall board 52. In this construction the side wall boards are not provided with tongues and grooves, but are locked through the coaction of their inclined faces. The ends of the side boards are held in the manner heretofore described in the channels intermediate the flanges on the outer plates 11 and the head portions of the T side posts. The channel members 51 are perforated at suitable points to receive the stud bolts 54, and nuts 56 are engaged on the screw-threaded ends of the stud bolts and bear against the lock washers 57, so that upon the tightening of the channel members 51,

satisfactory wedging action may be had against the entire series of side wall boards intermediate each of the T side posts heretofore described.

The invention, as has been indicated, provides for a very rigid box car construction wherein the number of parts has been reduced to a minimm and wherein the rigidity of the structure is not in any way reduced. It also results in the elimination of frame members to support the side wall boards and provides for the positioning of the side wall boards inside of the inner wall surface of the side posts. This increases the interior space available for useful loads, and at the same time permits of the replacement of broken side wall boards with a minimum of expense in the way of time and labor. These features all greatly assist in reducing the time required for fabrication of box cars of standard outside dimensions but with increased carrying capacity, and thus effects economies not only in the fabrication of such structures but in the use of the same during their entire period of service.

Other modes of applying the principle of my invention may be employed instead of those explained, change being made as regards the means and steps herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. A box car construction having in combination base and end members, T-shaped side posts with their webs turned outwardly mounted in spaced relation along the lateral edges of said base, the outer edges of said webs in alinement with the marginal portions of said base, a plurality of outer plates having their ends bent to form inwardly turned channel marginal portions secured to said webs with the inner flanges of said channels in spaced relation to the head portions of said T-shaped supports providing parallel vertical channelways at the sides of said plates intermediate said T-heads and inner plate flanges, a plurality of side wall boards having their ends engaged in said spaced channelways, and means adjacent the upper ends of said channelways for permitting the insertion of said side wall boards in position.

2. A box car construction having in combination base and end members, T-shaped side posts with their webs turned outwardly mounted in spaced relation along the lateral edges of said base, the outer edges of said webs being in alinement with the marginal portions of said base, a plurality of outer plates having their ends bent to form inwardly turned channel marginal portions secured to said webs with the inner flanges of said channels in spaced relation to the head portions of said T-shaped supports providing parallel vertical channelways at the sides of said plates intermediate said T-heads and inner plate flanges, a plurality of side wall boards having their ends engaged in said last named channelways, means adjacent the upper ends of said channelways for permitting the insertion of said side wall boards in position, a roof supported above the upper ends of said supports, an abutment member secured beneath said roof, and means disposed intermediate said abutment member and the adjacent side wall boards to secure the side wall boards firmly within the channels.

3. A box car construction having in combination base and end members, T-shaped side posts with their webs turned outwardly mounted in spaced relation along the lateral edges of said base, the outer edges of said webs being in alinement with the marginal portions of said base, a plurality of outer plates having their ends bent to form inwardly turned channel marginal portions secured to said webs with the inner flanges of said channels in spaced relation to the head portions of said T-shaped supports providing parallel vertical channelways at the sides of said plates intermediate said T-heads and inner plate flanges, a plurality of side wall boards having their ends engaged in said last-named channelways, means adjacent the upper ends of said channelways for permitting the insertion of said side wall boards in position, a roof supported above the upper ends of said supports, an abutment member secured beneath said roof, and an expanding and locking device disposed intermediate said abutment member and the adjacent side wall boards to secure the side wall boards firmly within the channels.

4. A box car construction having in combination base and end members, T-shaped side posts with their webs turned outwardly mounted in spaced relation along the lateral edges of said base, the outer edges of said webs being in alinement with the marginal portions of said base, a plurality of outer plates having their ends bent to form inwardly turned channel marginal portions secured to said webs with the inner flanges of said channels in spaced relation to the head portions of said T-shaped supports providing parallel vertical channelways at the sides of said plates intermediate said T-heads and inner plate flanges, a plurality of side wall boards having their ends engaged in said last-named channelways, means adjacent the upper ends of said channelways for permitting the insertion of said side wall boards in position, a roof supported above the upper ends of said supports, an abutment member secured beneath said roof, and an expanding and locking device in the form of cooperating wedge blocks adapted to be drawn toward each other and exert vertical wedging pressure against the adjacent abutment member and side wall boards intermediate each pair of vertical side posts.

5. A box car construction having in combination floor, end and roof members of conventional structure, and side walls formed of spaced side posts, outer plate members, and inner side wall boards, said spaced side posts being provided with flanges adjacent the inner ends thereof, said outer plate members being bent at their lateral margins to provide inturned flanges in spaced parallel relation to the flanges of said side posts, providing channelways between said post flanges and said parallel flanges, and said inner side wall boards extending horizontally and being placed one above the other in vertical series with their ends engaged in and positioned by said channelways.

6. A box car construction having in combination floor, end and roof members of conventional structure, side walls formed of spaced side posts, outer plate members, and inner side wall boards, said spaced side posts being provided with flanges adjacent the inner ends thereof, said outer plate members being bent at their lateral margins to provide inturned flanges in spaced parallel relation to the flanges of said side posts, providing channelways between said post flanges and said parallel flanges, and said inner side wall boards extending horizontally and being placed one above the other in vertical series with their ends engaged in and positioned by said channelways,

and means for locking said side wall boards firmly within said channelways.

7. A box car construction having in combination floor, end and roof members of conventional structure, side walls formed of spaced side posts, outer plate members, and inner side wall boards, said spaced side posts being provided with flanges adjacent the inner ends thereof, said outer plate members being bent at their lateral margins to provide inturned flanges in spaced parallel relation to the flanges of said side posts, providing channelways between said post flanges and said parallel flanges, and said inner side wall boards extending horizontally and being placed one above the other in vertical series with their ends engaged in and positioned by said channelways, and side wall boards providing wedging means disposed adjacent the upper portion of said series of side wall boards for locking the same firmly within their channelways.

8. A box car construction having in combination floor, end and roof members of conventional structure, side walls formed of spaced side posts, outer plate members, and inner side wall boards, said spaced side posts being provided with flanges adjacent the inner ends thereof, said outer plate members being bent at their lateral margins to provide inturned flanges in spaced parallel relation to the flanges of said side posts, providing channelways between said post flanges and said parallel flanges, and said inner side wall boards extending horizontally and being placed one above the other in vertical series with their ends engaged in and positioned by said channelways, side wall boards providing means for locking said side wall boards firmly within said channelways, and means adjacent the upper portion of said side posts permitting the ready removal of any of said side wall boards upon release of said locking means.

9. A box car construction having in combination floor, end and roof members of conventional structure, side wall posts secured to said floor member with the outer portions of said posts in alinement with the marginal portions of said floor member, said side wall posts being formed of metal of T-shaped cross section with the head portions positioned inwardly, side sheets positioned intermediate the webs of said side posts and formed with vertical marginal portions overlying the webs of said side posts adjacent their outer portions and securely fastened thereto, and having flanges at their free edges bent parallel to the body of said side sheets, said flanges being in spaced relation to the said head portions and forming channels therewith, side wall members disposed one above the other intermediate said side posts with the end portions thereof engaged in and positioned by said channels, and means for holding said side wall members in firm relation to said channels.

10. A box car construction having in combination floor, end and roof members of conventional structure, side wall posts secured to said floor member with the outer portions of said posts in alinement with the marginal portions of said floor member, said side wall posts being formed of metal of T-shaped cross section with the head portions positioned inwardly, side sheets positioned intermediate the webs of said side posts and formed with vertical marginal portions overlying the webs of said side posts adjacent their outer portions and securely fastened thereto by means of vertically extending welded seams at their outer and inner points of contact with said webs, and having flanges at their free edges bent parallel to the body of said side sheets, said flanges being in spaced relation to the said head portions and forming channels therewith, side wall members disposed one above the other intermediate said side posts with the end portions thereof engaged in and positioned by said channels, and means for holding said side wall members in firm relation to said channels.

11. A box car construction having in combination floor, end and roof members of conventional structure, and a plurality of side posts disposed in spaced relation along the respective side edges of said floor, said side posts being of T-shaped cross section, side sheets intermediate said side posts, such side sheets having inwardly turned margins with flanges at the vertical edges thereof, said flanges being in spaced relation to the outer wall portions of said side sheets and also in spaced relation to the heads of said side posts, a plurality of vertical welded seams joining said side sheets to the webs of said side posts at their outer and inner lines of contact, respectively, a plurality of side wall boards positioned horizontally within the channels intermediate the heads of said side posts and the flanges of said side plates, the ends of said side boards being gained to bring the inner faces of said side boards in alinement with the inner faces of the T-heads of said side posts.

12. A box car construction having in combination floor, end and roof members of conventional structure, a plurality of side posts disposed in spaced relation along the respective side edges of said floor, said side posts being of T-shaped cross section, side sheets intermediate said side posts, such side sheets having inwardly turned margins with flanges at the vertical edges thereof, said flanges being in spaced relation to the outer wall portions of said side sheets and also in spaced relation to the heads of said side posts, a plurality of vertical welded seams joining said side sheets to the webs of said side posts at their outer and inner lines of contact, respectively, a plurality of side wall boards positioned horizontally within the channels intermediate the heads of said side posts and the flanges of said side sheets, the ends of said side boards being gained to bring the inner faces of said side boards in alinement with the inner faces of the T-heads of said side posts, a locking device disposed above said side boards adjacent an abutment member, and means for causing said locking member to exert pressure against said abutment and against said series of side wall boards.

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